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Cerebral Palsy & Brain Injury Cases - Ensuring you do the best for your client

8 March 2018

Doubletree by Hilton, Bristol City Centre

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8 March 2018
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Dear Delegate

We are delighted to welcome you to the Cerebral Palsy & Brain Injury Cases conference. AvMA hope you find the day informative and interesting. AvMA staff will be on hand to help make it so and we hope that the following information will help make the day more pleasant and productive.

Contact Details at the Conference

The AvMA Registration Desk will be staffed from 09.00 to 16:55. If you have any queries or emergencies at any point during the conference, please go to the registration desk, or ask any member of the AvMA staff for assistance.

General Points

To ensure that you receive excellent service whilst attending this event, we would appreciate your co-operation with the following:

BADGES:

Please ensure that you wear your badge at all times to help with prompt delivery of messages and as a means of identifying you to other delegates.

QUESTIONS:

Speakers are happy to answer your questions at the end of their presentation. We would be grateful if you could identify yourself and your company before asking your questions.

DOCUMENTATION:

All documentation received at the time before the event is enclosed within the online documentation pack. Any missing papers will either be distributed during the event or be available for download soon after the event. Please be assured that AvMA always endeavours to offer a complete set of speaker papers included within the documentation pack. However, due to other commitments by our speakers this is not always possible.

MOBILE TELEPHONES:

We would appreciate your co-operation in ensuring that all mobile telephones are switched off in the conference room.

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EVALUATION FORMS:

Please be so kind as to complete and hand in the evaluation form before leaving the conference. All delegate packs should have an evaluation form in them, but if you cannot locate one then please collect one from the registration desk. We are constantly striving to improve our service to you and therefore value your feedback.

CPD CONFIRMATION:

APIL:	5 hour 50 minutes
Bar Council:	5 hour 50 minutes

SRA competencies: B
Provider ID Number: 1051
The conference code is AC/AvMA 356

Finally, if there are any problems, please do not hesitate to contact me.

Yours sincerely

Ed Maycock
Events Manager, AvMA

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Speaker Biographies

SONIA BARNFIELD is a Consultant Obstetrician at Southmead Hospital in Bristol with a special interest in Maternal Medicine and Labour Ward Practice. She is the Clinical Governance lead for Maternity and chairs the Trust Clinical Risk committee and has recently started working for the Healthcare Safety Investigation Branch. She is a faculty member of PROMPT, PRactical Obstetric Multi-Professional Training which is now in its 3rd edition. She has been doing medicolegal work for the past 6 years.

Her key interests are in improving patient safety via risk analysis, training and quality improvement projects.

SIMON ELLIMAN heads up the well-reputed clinical negligence team at Royds Withy King, and has extensive experience of conducting high value obstetric claims (cerebral palsy, Erb's palsy and wrongful birth) and catastrophic spinal injury claims. He is a member of the Law Society's Clinical Negligence Panel and AvMA's Referral Panel, as well as an APIL Senior Litigator. He is recognised by Chambers and Legal 500 legal directories as a leader in his field, and described as 'a very experienced lawyer with excellent judgment' who has 'an assured touch on difficult cases'.

DR JANE HAWDON is Responsible Officer and consultant neonatologist at Royal Free London NHS Foundation Trust. She has previously held consultant and clinical leadership posts at University College London Hospitals NHS Foundation Trust and Barts Health NHS Trust. She is the neonatal clinical lead for the National Maternity and Perinatal Audit (HQIP programme).

DR HAWDON has been member of the board of trustees of the charity Bliss, Independent Reconfiguration Panel and NICE guideline development groups, and has chaired the neonatal hypoglycaemia working group of the NHS Improvement Patient Safety programme. She is a qualified coach and facilitator.

DR PHILIP JARDINE worked as a consultant paediatric neurologist in Bristol and the South West of England from 1996. He resigned from this post in 2015 but maintain honorary posts with UHB and the University of Bristol. Dr Jardine registered with the GMC as a specialist with a license to practise. The majority of his work at present is an expert witness in UK clinical negligence cases. Birth injury makes up more than half of these cases. The volume of work is such that he does not get involved in traumatic brain injury or road traffic accidents. He is often involved with cases from the very beginning through to quantum. Dr Jardine examines around 50 children a year usually at their homes. He gives evidence in Court very rarely. In his spare time he likes to escape up remote mountains that don't have email.

ANNIE KINGSTON has worked within the field of cerebral palsy and brain injury for over a 15 years. This has included brain injury diagnostic teams in Australia as well as a specialist settings within the NHS and the educational setting. Working within this field has created a need for a dynamic therapeutic approach, best enhanced by a talented multidisciplinary team. The advancement of technology is proving to be one of the most rewarding aspects of speech and language therapy, by giving a voice to people who previously struggled to be heard.

VANESSA MCKINLAY is Head of the Clinical Negligence Practice Group at St. John's Chambers. She has an extensive practice in Claimant and Defendant work. She deals with all aspects of clinical negligence arising in NHS Trusts and Health Boards, GP surgeries and other primary care centres, private clinics and Ambulance Trusts. She regularly provides representation at Inquests.

"Her kind and very thoughtful approach to claims makes an often frustrating process more bearable for the client. I would not hesitate to recommend her." "Particular strengths are her pragmatic approach, being able to filter out the wheat from the chaff and boil it down so she can give practical advice in understandable terms." "Her medical background is really helpful in cases with technical medical issues." Chambers UK, Clinical Negligence (2018)

MATTHEW PHILLIPS QC has worked almost exclusively in the fields of clinical negligence and personal injury for over 20 years. His clinical negligence practice as a junior covered a wide range of medical fields but with a particular emphasis on birth injury claims. Since taking silk in 2017 Matthew has focused on cerebral palsy and spinal injury cases.

SUSIE QUINLAN joined ILS as a case manager in January 2007 and is now the Learning and Development Manager for the company. She also continues to have a small case management case load and mentors other ILS case managers.

Since qualifying as an Occupational Therapist in 1994, she has worked predominantly with children, young people and their families in a variety of both statutory and independent settings.

As well as having extensive case management experience Susie has significant experience in the planning and delivery of a wide range of training sessions to case managers, team leaders, carers, solicitors, OT students and healthcare professionals.

DR. NEIL STOODLEY qualified from the University of Oxford in 1985. He initially trained in general and paediatric surgery in Gloucester, Southampton and Bristol before changing to radiology. He trained in general radiology in Southampton and Oxford and in neuroradiology at the Radcliffe Infirmary, Oxford where one of his trainers and mentors was Dr. Philip Anslow. His interest in paediatric neuroimaging was inspired and encouraged by Phil.

In August 1998 he was appointed Consultant Neuroradiologist to the University Hospital of Wales in Cardiff where he was the lead consultant in paediatric neuroradiology. He moved to Bristol in 2002 to develop this special interest further. He has a busy medicolegal practice and has been instructed as an expert in over 1200 cases related to birth injury. The other main part of his medicolegal practice is in cases of alleged non-accidental head injury and he has reported in over 800 such cases. He also accepts instructions in more general paediatric cases and some adult cases involving neuroradiology.

His main research interests involve the use of neuroimaging in

i) non-accidental head injury in infants;

ii) birth injuries and

iii) the identification and classification of neuronal migration defects and related brain malformations.

DOMINIC WOODHOUSE has specialised in costs law since 2002, with a particular focus on high value complex clinical negligence actions, industrial disease and all forms of employer's liability.

Having represented a number of Claimant and Defendant practices over the years, Dominic is a well-regarded educator in the ever evolving costs industry and is often engaged for training by law and costs firms alike.

In his spare time, Dominic occasionally 'treads the boards', enjoys reading, watching films, and slowly achieving a basic level of competence on various musical instruments.

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Forthcoming Conferences and Events

Medico-Legal Issues in Oncology

22 March 2018, Slater & Gordon Solicitors, Manchester

This vital course will provide in-depth knowledge and understanding of Oncology in a medico-legal context relevant to your case load. The day will feature presentations from leading experts on breast surgery; medical treatment of breast tumours; abdominal tumours focusing on cancer of the colon; surgical treatment of urological tumours focusing on prostate cancer; and an orthopaedic perspective on oncology. Counsel will also examine causation issues arising in cancer claims.

Representing Families at Inquests: A Practical Guide

15 May 2018, Hardwicke Chambers, London

The important work conducted by AvMA's inquest service is the basis for this conference, which is designed to be a comprehensive guide to the practice and procedures when representing a family at an inquest.

Leading legal experts will take you through the preparation process, helping you to understand the complex issue of disclosure, management of expert evidence and Article 2. An update on case law, funding issues and post-inquest remedies will also be discussed. The event is aimed at intermediate to advanced level solicitors, junior barristers and healthcare professionals.

The conference will be immediately followed by a networking drinks reception, kindly hosted by Hardwicke Chambers.

AvMA Annual Golf Day

28 June 2018, Singing Hills Golf Course, West Sussex

The fourteenth AvMA Golf Day will take place on Thursday 28 June 2018 at a new course – the beautiful Singing Hills Golf Course in Albourne, West Sussex. The Welcome Event for the Annual Clinical Negligence Conference will take place later that evening at the Hilton Brighton Metropole (25 minutes' drive away), so the Golf Day offers the perfect start to the essential event for clinical negligence specialists.

The cost is only £98 + VAT per golfer, which includes breakfast rolls on arrival, 18 holes of golf and a buffet and prize-giving at the end of the day. All profits go directly to AvMA's charitable work.

30th Annual Clinical Negligence Conference

29-30 June 2018, Hilton Brighton Metropole

Join us in Brighton for the 30th ACNC! This is the annual event that brings the clinical negligence community together to learn and discuss the latest developments, policies and strategies in clinical negligence and medical law. Early bird booking closes on 26 March 2016.

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AvMA Medico-legal webinars

Instant access to leading medico-legal webinars from just £49 + VAT per webinar!

Medico-legal information at your fingers tips

Working on a client file and looking for more information to assist you with your case? AvMA's medico-legal webinars give you immediate access to leading specialists speaking on subjects ranging from interpreting blood test results to medico-legal issues in surgery and many more besides!

Over 40 key subjects from UK's leading authorities on medico-legal issues

Featuring some of the UK's leading authorities on medico-legal issues, AvMA's webinars bring you all the benefits of a specialist targeted seminar.

New titles are added at the beginned of each month.

Dentistry: dental legal issues MR DAVID KRAMER, Dentist and expert witness - 5 March 2018
Cardiac Arrythmias: the medico-legal issues PROF. JAS GILL, Guy's and St Thomas' NHS Foundation Trust - 4 April 2018
Nerve Injury MR TOM QUICK, Consultant Orthopedic Surgeon, Royal National Orthopaedic Hospital - 7 May 2018

When and where you need

The webinars can be watched at a time convenient to you, all without having to leave your office. You can watch the video as many times as you want, download the slides and extras materials to aid your learning.

Best value:

Sign up for an Annual Webinar Subscription with access to over medico-legal 40 titles to all your clinical negligence team from just £1200 + VAT

Get access now – www.avma.org.uk/learning

Please email pauals@avma.org.uk or call 020 3096 1140 for further details.

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Hold an event for AvMA

Help support AvMA while raising goodwill and awareness for your organisation

From golf days and bike rides to curry nights and quiz nights, holding an event on behalf of AvMA can bring great benefits to both you and us. And we are on hand to offer advice and support to help your event run smoothly. So whether your focus is on business objectives (networking with clients and colleagues, reaching a new audience, building customer loyalty) or purely philanthropic, we can help you to make your event a real success.

How AvMA can help

Online ticketing

Lighten the load of managing bookings for your event by letting AvMA manage ticket sales for you. We can provide secure online booking on a dedicated webpage, handle payments and provide a complete guest list for you.

Publicising your event

We can promote your event to our clients and lawyer service members through dedicated mailings, social media posts and word of mouth recommendations, helping you to reach a wide audience of potential guests.

Use of the AvMA brand

We can provide logos, banners, presentations and other marketing materials to promote the charitable aims of your event and encourage more people to attend and support AvMA

Expert speakers

Members of AvMA staff can attend your event to give a speech, lend their support or simply network with your guests.

Get in touch

To find out more about how AvMA can work with you to create a really exciting event for your firm, please contact our fundraising department.

Email: fundraising@avma.org.uk **Tel:** 020 8688 9555

Action against Medical Accidents, Freedman House, Christopher Wren Yard, 117 High Street, Croydon CR0 1QG
DX: **144267 Croydon 24** Tel: **020 8688 9555** Fax: **020 8667 9065** Email: **fundraising@avma.org.uk** **www.avma.org.uk**

Calculus Legal Costs Holdings Ltd

We are a specialist, professional provider of bill drafting, costs negotiation and advocacy, delivered with a market leading service to law firms across the UK. Working exclusively with claimant solicitor firms, we undertake all aspects of civil litigation recovery and are recognised as specialists in the serious injury and medical negligence arena.

Our primary focus is achieving optimum results for our clients on time, every time. We are confident in our approach and ensure that we are at the forefront of understanding the ever-changing regulatory environment. We maintain the highest professional standards at all times, maximising costs recovery, speeding up cash flow and ensuring that our clients legitimate entitlement to costs is preserved.

Valued by our clients for our collaborative working style, we provide you with a true partnership and will help move your business to a winning position.

We recognise and promote opportunities for growth through innovative partnerships and have built effective working relationships with solicitors, funders and business consultants in order to secure new sources of work and develop the network of our business partners.

Tailoring our approach to meet your individual needs is always at the forefront of our minds and we take the time at the outset of our relationship and throughout to ensure our approach is aligned to your specific and / or strategic objectives. Our focus is to achieve the optimum level of costs recovery within the shortest possible timeframe.

We will help you to strengthen and develop your team's performance by providing sensitive and constructive feedback and reinforce best practice techniques to aid in delivering improved results.

Our service offering includes;

- Retainer Advice
- Cost Budgeting
- Effective Cost Capture
- File Audits
- Drawing The Bill
- Consultancy
- Training

If you would like to discuss our services and how they can be tailored to meet your needs, or have any questions about what we do, please get in touch.

Telephone; 01704 508 240

Email; mark.farrell@calculusholdings.co.uk or krissi.fletcher@calculusholdings.co.uk

Case Management and Rehabilitation Solutions

Operating for our head off in Wiltshire, UK, we provide case management and rehabilitation services on a nationwide scale. After 26 years' in the industry, we're incredibly proud to be one of the UK's leading case management and rehabilitation companies.

When a person's life has been changed by injury, we address the practicalities. We work with children and adults who have had moderate or catastrophic, complex injuries. We assess individual needs and are able to provide a comprehensive case management and rehabilitation service designed to maximise independence.

Our team of case managers specialise in the care of clients who have: acquired brain injury, spinal cord injury, trauma injury, cerebral palsy, mental health issues, and multiple orthopaedic injuries. This means that no injury, disability, or mental health issue is too challenging for our team. All of our case managers are registered with BABICM and CMSUK and all have experience within the field of litigation.

The client's needs are our priority throughout our assessment and intervention process; this is demonstrated through the holistic and innovative way in which we work with our clients, and the people who are employed to support them.

To find out more about ILS Case Management and what you can expect from an ILS case manager, please call our Operations Managers Sarah Ransome or Phil Perry on 01722 742442.

Proud to be sponsoring the AvMA Cerebral Palsy and Brain Injury Cases Conference, 2018.

Visit Susie and Lindsay at the ILS exhibition stand for your chance to win a trip to New York.

Clinical Negligence

St John's CHAMBERS

"St John's Chambers acts for both claimants and an increasing number of defendants in complex and high-profile claims. The set has an impressive reach in the South West and is praised by solicitors for its established team and 'undoubtedly good reputation' on the Western Circuit."
Chambers UK, Clinical Negligence (2017)

St John's Chambers' Clinical Negligence team provides expert advice and representation in cases at all levels of complexity and seriousness in the South West and nationally.

With 17 specialist barristers, including 3 Silks, renowned for their logical and detailed approach to cases, we have the expertise to undertake all aspects of clinical negligence work including:

- Obstetric and neonatal injuries
- Misdiagnosis and delayed diagnosis, particularly in oncology
- Surgical negligence
- Cardiothoracic cases
- Cases involving drug administration
- GP and dental negligence
- Fatal injuries, including inquests
- Cerebral palsy
- Cases in which complex issues of causation arise
- Neonatal claims
- Perinatal and acquired brain injury

Our barristers can offer you comprehensive knowledge of medical fields including gynaecology, neurology and oncology. The team also has experience in dental negligence, ophthalmic negligence and in medical product liability.

Our team also provide representation at coroners' inquests in which death has followed medical treatment.

Our barristers are happy to consider cases on a conditional fee basis.

Our team regularly delivers lectures to solicitors and other professionals on recent developments in the law and practice. If you are interested in arranging a lecture then please contact our clerks.

"The clerks are excellent. They are extremely approachable, practical and will accommodate your needs."
Chambers UK, Clinical Negligence (2017)

For assistance please contact the clerks:

Annette Bushell, Practice Manager
e: annette.bushell@stjohnschambers.co.uk
t: 0117 923 4707

Adam Marston, Clerk
e: adam.marston@stjohnschambers.co.uk
t: 0117 923 4703

Hugh Maguire, Clerk
e: hugh.maguire@stjohnschambers.co.uk
t: 0117 923 4797

Marney White, Junior Clerk
e: marney.white@stjohnschambers.co.uk
t: 0117 923 4713

Meet the Team

The team consists of 3 silks and 17 juniors, and offers expertise at all levels of call with experience in every area.

St John's CHAMBERS

Christopher Sharp QC
Year of call: 1975

Christopher Wilson-Smith QC
Year of call: 1965

Matthew Phillips QC
Year of call: 1993

Ian Bullock
Year of call: 1975

Timothy Grice
Year of call: 1975

Richard Stead
Year of call: 1979

Tom Leeper
Year of call: 1991

Andrew McLaughlin
Year of call: 1993

David Regan
Year of call: 1994

Emma Zeb
Year of call: 1998

Justin Valentine
Year of call: 1999

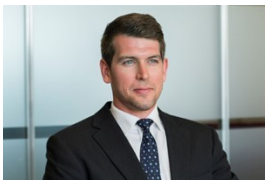
Vanessa McKinlay
Head of Department
Year of call: 2000

Patrick West
Year of call: 2007

James Marwick
Year of call: 2008

Jimmy Barber
Year of call: 2008

Ben Handy
Year of call: 2008



James Hughes
Year of call: 2011

Marcus Coates-Walker
Year of call: 2013

Robert Mills
Year of call: 2014

Rachel Segal
Year of call: 2013

101 Victoria Street, Bristol, BS1 6PU, DX 743350 Bristol 36
0117 923 4700 TELEPHONE
0117 929 4821 FAX

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W: www.stevendocker.co.uk

Steven Docker Associates (SDA) specialise as Accommodation Experts in Personal Injury and Clinical Negligence Litigation. The practice has long established and very successful departments dealing with: -

Accommodation reports

SDA is one of the country's leading disability adaptation firms.

Our experience in designing homes for severely disabled individuals throughout the United Kingdom and overseas provides us with the "hands-on" practical experience necessary to provide the Court with accurate and impartial reports in cases of Clinical Negligence and Personal Injury claims. Solicitors and barristers instructing or recommending our firm consider our reports to be unparalleled in providing reliable, expert evidence.

All members of the Expert Witness Department have secured the Certificate of Expert Witness Accreditation from Cardiff University Law School and RICS Accreditation. They are also RICS Registered Valuers.

Property Finding

Buying the wrong property for a disabled individual can be costly and, even when adapted, my not be entirely suitable. With our years of experience, we are ideally placed to provide guidance on identifying a suitable property. SDA are able to carry out property searches, viewings, feasibility assessments, valuations, prepare floor layout plans (illustrating how the property can be adapted), price negotiations and overall management of the buying (or renting) process.

Architectural Services

The design team at SDA prepares bespoke design solutions specifically to suit the needs of each individual client. We receive instructions from solicitors, deputy's and direct from the client.

We are very aware of how a person's injuries and disabilities can be life changing and everyday tasks can be challenging and, therefore, **the practice focuses on a person's abilities rather than the negative aspects of the disabilities.** By concentrating on the positive issues of what a disabled individual can do our expertise in adapting an existing property, or constructing a new purpose designed building, culminates in providing a safe and accessible home environment which encourages the maximum possible degree of independence and the associated benefits in an enhanced quality of life.

Our design team can assist with securing Planning Permission and Building Regulations Approval, preparation of Specifications of Works, obtaining competitive Tenders and producing Tender Evaluations, sourcing and appointing a Contractor, inspection of building works, preparation of interim Valuation Certificates, and payments to the contractor, assessing the final account and VAT assessment to calculate zero-rated disability related items.

royds withy king

"Excellent, sympathetic and supportive."

Court of Protection services

A more rewarding experience for you and your clients

As a busy professional you already have a hundred and one things to deal with and to worry about. Clients are increasingly expecting more for less. On top of that there are seemingly continuous changes to benefits rules and regulations. No solicitor wants to increase professional risk by offering advice in an area unfamiliar to them, so why take the chance? You don't have to; there is another option.

Ultimately, we all want to provide our clients with the best possible advice combined with first-class service delivery. But, as the law becomes more complex, it can be difficult to provide all of the services you'd like to offer your clients. We work together with other solicitors to mutually benefit and complement their existing services where they may not have their own capabilities.

Our approach

Your client's needs dictate our services. Every client is unique and so is our advice; we take the time to listen, understand and then advise each client, helping them to resolve issues and making sure that the clients and their families feel supported and enabled at every step.

Court of Protection expertise

As Royds Withy King is a full service firm, we have an integrated range of services, including Court of Protection, deputyship, and Power of Attorney expertise. We have an experienced and dedicated Court of Protection team, so you can be confident that your clients are receiving the best advice. We establish and run deputyships and trusts for clients, ranging from state-funded pensioners to multi-million pound damages claimants, including children. With our own trust company, Withy King Trustees Limited, we can also offer the option of a professional trustee or deputy, providing you and your clients with the confidence that their interests will be protected now and into the future.

Specific areas of support and expertise

We can offer you and your clients expertise and support across a range of services, including:

- deputyship applications for both property and affairs, and health and welfare
- deputyship administration
- tax planning and annual tax returns
- property adaptation following personal injury, including specialist construction advice
- Statutory Will and specific gift applications
- Lasting and Enduring Powers of Attorney and other elderly and incapacity issues
- benefits advice
- all aspects of trusts, including administration, management and trustee issues
- creation and administration of personal injury trusts
- preparation of Expert Witness statements.

Your key contacts

"I am very impressed with the level of support and assistance that I have received from Royds Withy King through a difficult time."
Royds Withy King client

Tracy Norris-Evans
Partner
T: 01865 268 632
tracy.norrisevans@roydswithyking.com

Stuart Brazington
Partner
T: 01225 730 211
stuart.brazington@roydswithyking.com

Becky Ricards Small
Partner
T: 01225 730 245
becky.ricardssmall@roydswithyking.com

Edward Vidnes
Partner
T: 01225 730 270
edward.vidnes@roydswithyking.com

Maria Meek
Senior Associate
T: 01225 730 244
maria.meek@roydswithyking.com

Louise Nettle
Chartered Legal Executive
T: 01865 268 379
louise.nettle@roydswithyking.com

Liz Lawrence
Paralegal
T: 01225 730 232
liz.lawrence@roydswithyking.com

Sarah Hathaway
Paralegal
T: 01865 268 366
sarah.hathaway@roydswithyking.com

royds withy king

WYVERN PARTNERSHIP

Wyvern Partnership is a long established partnership whose name is synonymous with the preparation of Expert Witness reports for the Court, in respect of the accommodation needs of people with disabilities. Our reputation is unparalleled with both the legal profession and with those affected by disability. We are appointed by solicitors to appear for Claimants and Defendants in medical negligence and personal injury claims. We often appear before High Court Judges and leading barristers and are instructed in approximately 500 cases a year. We provide a concise, punctual and impartial report. When an alternative property has been located we provide a suitability report which will include the alteration cost and the additional running costs. We undertake work throughout the United Kingdom and internationally.

WYVERN ARCHITECTS

Wyvern Architects - Devizes Ltd is involved in the project management of approximately 50 projects per year in respect of those with disabilities. We prepare feasibility studies, obtain planning permission and building control approval, prepare a fully detailed specification and working drawings, obtain competitive tenders from building contractors, carry out periodic inspections during the construction phase and produce all interim valuation certificates / variation orders up to project completion. We work directly with physiotherapists, occupational therapists and case managers in respect of design. We are appointed by deputies, solicitors and clients with disabilities.

We take pride in our professionalism and sensitivity in dealing with people at a challenging time in their lives.

PIC

PARTNERS IN COSTS

03458 72 76 78

info@pic.legal

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For 21 years, PIC has been the primary claimant-only costs specialist in the civil litigation market.

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Look out for #PIC21 on Twitter for our latest 21st Anniversary updates!

Cerebral Palsy and Brain Injury Cases - Ensuring you do the best for your client

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action against medical accidents

8 March 2018,

Doubletree by Hilton Bristol

DELEGATE LIST

Name	Surname	Organisation	Job Titles
Sam	Amin	University Hospital of Bristol	Consultant Paediatric Neurologist, Bristol
Tina	Ashley	New Law Solicitors	Senior Solicitor
Dr Sonia	Barnfield	Southmead Hospital	Consultant Obstetrician
Natalie	Bradshaw	Bell Lax Ltd	Associate Solicitor
Inez	Brown	Medical Accident Group (Part of Harrison Clark Rickerbys)	Partner Head of Clinical Negligence
Susan	Brown	Boyes Turner	Partner
Nadine	Claessen	BDE Law Ltd	Solicitor
Gillian	Clark	Metcalfes Solicitors LLP	Solicitor
Jonathan	Collins	Steven Docker & Associates	Accommodation Expert
Fiona	Dabell	Barcan + Kirby LLP	Solicitor
Tom	Docker	Steven Docker & Associates	Accommodation Expert
Simon	Elliman	Royds Withy King	Head of Clinical Negligence
Mark	Farrell	Calculus Legal Costs Holdings Limited	Client Services Director
Krissi	Fletcher	Calculus Legal Costs Holdings Limited	Business Development Manager
Caroline	Frean	Enable Law	Solicitor
Clare	Gooch	Stone Rowe Brewer LLP	Solicitor
Julia	Hamilton	Slater and Gordon (UK) LLP	Solicitor
Helen	Hammond	Penningtons Manches LLP	Solicitor
Richard	Harries	Barcan + Kirby LLP	Associate
Dr Jane	Hawdon	Consultant Neonatologist, Responsible Officer	Royal Free London NHS Trust
Adrian	Hawley	PIC	Head of Court of Protection
Paula	Hill	Metcalfes Solicitors LLP	Senior Chartered Legal Executive
Claire	Hurrell	Barcan + Kirby LLP	Sr. Associate
Dr Philip	Jardine	University of Bristol Medical School	Consultant Paediatric Neurologist
Derek	Jenkins	St John's Chambers	Chief Executive of Chambers
Sarah	Jones	Slater and Gordon (UK) LLP	Partner
Joanne	Kerr	Thompsons NI	Solicitor
Annie	Kingston	Association of Speech & Language Therapists in Independent Practice	Speech and Language Therapist
Rachel	Kirby	Geldards	Associate
Liz	Lawrence	Royds Withy King	Paralegal
Vanessa	Llewellyn	NWSSP Legal & Risk Services	Solicitor
Ed	Maycock	Action against Medical Accidents	Conference Manager
Vanessa	McKinlay	St John's Chambers	Barrister
Helen	Niebuhr	Knights	Partner
Cian	O'Carroll	Cian O'Carroll Solicitors	Solicitor

Cerebral Palsy and Brain Injury Cases - Ensuring you do the best for your client

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action against medical accidents

8 March 2018,

Doubletree by Hilton Bristol

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Name	Surname	Organisation	Job Titles
Lindsay	Oliver	Independent Living Solutions	External Training & Presentations Coordinator/ SALT
Jonathan	Phillips	Knights	Partner
Matthew	Phillips QC	St John's Chambers	Barrister
Susie	Quinlan	Independent Living Solutions Ltd	Case Manager/ILS Learning and Development Manager
Katie	Reid	Royds Withy King	Associate
Angelina	Rigby	New Law Solicitors	Head of Clinical Negligence Team (Solicitor)
Abigail	Ringer	Royds Withy King	Chartered Legal Executive
Tabitha	Rooks	Lyons Davidson	Senior Associate
Dr Mala	Sidebottom	Moore Blatch Resolve LLP	Associate
Elizabeth	Smith	Wolferstans	Legal Executive Partner
Claire	Stoneman	Enable Law	Partner
Dr Neil	Stoodley	Southmead Hospital Bristol	Neuroradiologist
Christopher	Taylor	Queen Square Chambers	Head of Chambers/Barrister
Ed	Vidnes	Royds Withy King	Partner
Fiona	Webber	NWSSP Legal & Risk Services	Solicitor
Jonathan	Wellington	Watkins & Gunn	Solicitor
Elizabeth	Wickson	Medical Accident Group (Part of Harrison Clark Rickerbys)	Solicitor
Tony	Wiseman	Wiseman Wingate Solicitors	Solicitor
Dominic	Woodhouse	PIC	National Training Manager
Steven	Woodley	Wyvern Partnership	Director
Anita	Young	St John's Chambers	Interim Events & Marketing Manager

Cerebral Palsy & Brain Injury Cases - Ensuring you do the best for your client

action *against* medical accidents

8 March 2018

Doubletree by Hilton,
Bristol City Centre

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CPD: **5 hours 50 minutes**
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CONFERENCE PROGRAMME

Chair: Vanessa McKinlay, Barrister, St John's Chambers

09.00 REGISTRATION AND REFRESHMENTS

09.45 CHAIR'S INTRODUCTION

09.50 CURRENT ISSUES IN CEREBRAL PALSY & BRAIN INJURY CLAIMS
MATTHEW PHILLIPS QC, **Barrister, St John's Chambers; &**
SIMON ELLIMAN, **Partner, Royds Withy King**

10.25 INTRAPARTUM FETAL DISTRESS AND SURVEILLANCE FOCUSSING ON CTGS
MS SONIA BARNFIELD **Consultant Obstetrician, Southmead Hospital, Bristol**
- Pre-eclampsia
- Pre and post-natal haemorrhaging
- Cord prolapse
- CTGs and recognition of features of various types of fetal hypoxia
- The role of additional tests of fetal well-being e.g. fetal scalp blood sampling and monitoring

11.15 REFRESHMENTS

11.30 DETERMINING CAUSATION IN CEREBRAL PALSY AND BRAIN INJURY CASES
DR NEIL STOODLEY, **Consultant Neuroradiologist, North Bristol NHS Trust; &**
DR PHILIP JARDINE, **Consultant Paediatric Neurologist, University Hospitals Bristol NHS Foundation Trust**
- Cerebral palsy, the incidence and the role of pre, peri and post-natal factors
- The various sub types of CP, how the symptoms present and which sub types of CP are more attributable to a perinatal hypoxic event
- The perinatal factors which are suggestive of a hypoxic event: deterioration in fetal heart rate, metabolic acidosis, early onset of HIE
- The timing and severity of the asphyxia, how it can affect the brain and how this will present on the ultrasound and MRI images
- The optimum time to image and the necessity for further imaging as the child develops
- The role of imaging in assessing damage to the hippocampus - presentation of learning difficulties at a later stage in a child's life

13.00 LUNCH

13.50 NEONATAL RISK FACTORS FOR CEREBRAL PALSY
DR JANE HAWDON, **Consultant Neonatologist, Responsible Officer, Royal Free London NHS Trust**
- Resuscitating the hypoxic infant
- Neonatal infection
- Neonatal hypoglycaemia
- Neonatal jaundice
- Stroke
- The role of brain cooling

14.40 CASE MANAGEMENT INPUT AND CARE – THE COSTS INVOLVED
SUSIE QUINLAN, **Case Manager/ Learning & Development Manager, Independent Living Solutions**

15.20 REFRESHMENTS

15.35 THE ROLE OF THE SPEECH AND LANGUAGE THERAPIST FOR CHILDREN WITH CEREBRAL PALSY & BRAIN INJURY
ANNIE KINGSTON, **Speech & Language Therapist, Association of Speech and Language Therapists in Independent Practice**
- Roles and responsibilities of SLT
- Eating and drinking difficulties
- Speech, language and communication: definitions and deficits
- Assistive communication technology
- Overview of (other) assistive technology
- Recommendations and costings
- Importance of developmental perspectives and use of evidence base

16.15 MAXIMISING HOURLY RATES AND TACTICAL BUDGETING IN CP AND BRAIN INJURY LITIGATION
DOMINIC WOODHOUSE, **National Training Manager & Senior Advocate, Partners in Costs Ltd**

16.55 CHAIR'S CLOSING REMARKS

MATERIAL CONTRIBUTION IN BIRTH INJURY CLAIMS

Key authorities on the principles of material contribution:

1. *Bonnington Castings Ltd. –v- Wardlaw [1956] AC 613 – HL.*

2. *Wilsher –v- Essex AHA [1988] AC 1074 – HL.*

3. *Holtby –v- Brigham Cowan (Hull) Ltd.[2000] 3 All ER 421 – CA.*

4. *Fairchild –v- Glenhaven Funeral Services Ltd. [2003] 1 AC 32 – HL.*

5. *Bailey –v- MOD [2009] 1 WLR 1052 - CA.*

6. *Williams –v- The Bermuda Hospitals Board [2016] UKPC 4 – PC.*

The following central propositions can be drawn from the said cases:

- In a case in which injury is caused by cumulative causes and medical science cannot establish the relative potency of each cause, i.e. can't answer the "but for" question or identify the extent of contribution, a Claimant merely has to establish that the negligent cause made a "material contribution: *Bonnington* and *Bailey*.

- It is immaterial whether the cumulative factors operate concurrently or successively: *Williams*.

- In a case where it is possible to identify the extent of the contribution of a "negligent" cause then the Defendant is liable to the extent of that cause: *Holtby*.

- Where the Defendant's breach of duty increases an <u>existing</u> risk factor the Court <u>may</u> infer material contribution to damage: *Fairchild.*

- Where the Defendant's breach of duty only adds a new/discrete risk factor to the existing risk factor(s) it is not legitimate to infer that it was causative of the damage: *Wilsher*.

Birth injury claims involving material contribution arguments:

1. *Canning-Kishver –v- Sandwell & West Birmingham NHS Trust [2008] EWHC 2384.*

Neonatal breaches of duty led to cardiac collapse in a premature baby. C developed cerebral atrophy. A number of potential contributory factors were identified by the experts (including immaturity at birth) but found on balance of probabilities the cardiac collapse constituted a more than negligible contribution to C's cerebral atrophy. C succeeded in full

2. *Ingram –v- Williams [2010] Med. LR 255.*

C delivered prematurely by father at home. Developed cerebral palsy. Alleged but for failures by GP C would have been delivered in hospital. Causative factors included prematurity, neo-natal infection and not being born in hospital. Expert evidence to the effect that all causal factors made an unquantifiable but material contribution to C's injury. GP found not to have been in breach of duty but J would have allowed awarded full damages had he found negligence.

3. *Popple –v- Birmingham Women's NHS Foundation Trust [2011] EWHC 2320.*

C suffered an acute profound hypoxic insult over 15-20 minutes leading up to birth causing cerebral palsy. Allowing for 10 mins of "fetal reserve" the damage was agreed to have been caused over the following 5-10 mins. The lack of CTG monitoring led the causation experts to conclude that it was impossible to identify when the damage occurred within the 5-10 min window. J. found that just as likely that C's injuries would have been avoidable if delivered 5 mins earlier as they would if 10 mins earlier. J held but for breach of duty by midwives C would have been delivered over 10 mins earlier (and avoided all damage) but that even if delivery was delayed by just 5 mins then there would have been a material contribution to C's injuries (and full recovery).

4. *Rich –v- Hull & East Yorkshire Hospitals NHS Trust [2016] Med. LR 33.*

Failure to prescribe maternal corticosteroids prior to an emergency CS at 32 weeks. C suffered respiratory distress syndrome resulting in PVL and cerebral palsy. J found there was no breach of duty but considered the issue of causation in some detail. Neo-natal experts agreed that steroids would have materially alleviated C's RDS and that the RDS caused the PVL. The extent of the diminution in severity of the RDS and PVL could not be quantified on any existing medical/scientific evidence. C would have recovered in full had breach of duty been established.

5. *DS –v- Northern Lincolnshire and Goole NHS Foundation Trust [2016] EWHC 1246.*

CP as a result of an acute profound hypoxic insult immediately prior to delivery. C case that midwifery failings caused a delay in delivery by 6-9 mins and but for that delay he would have sustained a less damaging injury. J. found that the negligent delay was only 3 mins and C did not contend that this would have materially affected the degree of injury. J did go on to find that a 6 min delay would have made no material difference but that a 9 min delay would have made a material difference to C's cognitive abilities, ability to manage himself and make daily decisions. Notable that the neonatologists and paediatric neurologists did attempt to identify exactly how C's injuries might have differed by reference to motor deficits, cognitive impairment, IQ, care/supervision patterns, continence, employability and capacity.

Application of the material contribution principle to "chronic partial" and "profound acute" hypoxia cases

Causation experts in CP claims generally take different approaches to chronic partial and profound acute cases:

(a) It is common to see neo-natal evidence to the effect that the progression of chronic partial hypoxic ischaemic injury is not linear over time. Once the fetal capacity to compensate is exhausted there will be irreversible damage but the rate of progression depends unpredictable factors. In those circumstances it is impossible to determine the point at which neurological injury commenced but it can be said that the longer the duration of the damaging hypoxia then the greater the neurological injury. In cases such as this a significant period of negligent delay in delivery might well be deemed to have materially contributed to the injury and result in full recovery.

(b) Neonatologists and paediatric neurologists are more willing to enter into an "apportionment of damage" exercise in cases of profound acute injury claims - see *DS –v- Northern Lincolnshire and Goole NHS Foundation Trust*. The period of damaging hypoxia (after the initial non-damaging 10 mins) is generally deemed to be more predictable. The *Popple* case might be seen as something of an "outlier" in this respect.

It follows from the above that a Court is more likely to carry out an apportionment exercise in acute profound hypoxia cases leading to less than 100% recovery for C. It should be borne in mind that Courts are expected to perform this exercise even if quantification is difficult – "broad brush" approaches are acceptable: *Allen –v- British Rail Engineering [2001] EWCA 242*.

What amounts to a "material" contribution?

There is little judicial guidance as to what constitutes "material" or "de minimis". Decisions in the field of asbestos related disease suggest that the threshold is low: *Mayne –v- Atlas Stone Co. Ltd. [2016] EWHC 1030* and *Carder –v- Secretary of State for Health [2015] EWHC 2399*.

With respect to CP cases involving delayed delivery, it is suggested that causation experts generally consider that it is difficult to attribute an appreciable difference in injury to a culpable delay of less than 5 minutes.

Application of *Montgomery* to CP Cases

Simon Elliman
Head of Clinical Negligence
Royds Withy King
Midland Bridge House
Midland Bridge Road
Bath BA2 3FP
Tel: 01225 730199
Email: simon.elliman@roydswithyking.com

Outline of talk

- Review of decided cases since 2015
- CP/*Montgomery* scenarios from ongoing cases

Montgomery

- Facts well known
- Facts could easily found a CP claim instead of an Erb's Palsy claim

Montgomery principles

- An adult person of sound mind entitled to decide which, if any, of the available forms of treatment to undergo
- The doctor has a duty to inform her of any material risks, and of any reasonable alternative treatments
- The test of materiality is whether a reasonable person in the patient's position would be likely to attach significance to the risk, or if the doctor is/should be aware that the particular patient would attach significance to it

The decided cases

***Webster v Burton* [2017]**

- First post-*Montgomery* case to reach CA
- Mother had 3 abnormalities identified on USS at 34 weeks:
- Baby small for gestational dates (SGA)
- Asymmetry – abdominal circumference significantly less than head circumference
- Polyhydramnios (excess liquor)

Webster (cont'd)

- Obstetrician failed to act upon these abnormalities
- Mother admitted to hospital day before term, expecting to be induced at term (27/12/03)
- In fact baby born on 07/01/03, following induction
- Cord compression on 4/5 Jan, causing significant brain injury

Webster (cont'd)

- At first instance, admitted negligence in failing to arrange repeat USS fortnightly after 34 weeks
- Negligence found in obstetrician failing to research the significance of the abnormalities
- Had he done so, would have found the abnormalities together did carry an increased risk of perinatal abnormality
- Albeit that the research leading to this conclusion had a small statistical base

Webster (cont'd)

- Prof Soothill, C's expert, argued that delivery by 38 weeks strongly indicated
- Mr Tufnell said reasonable to attach no importance to the abnormalities
- Claim failed on *Bolam* principles at first instance: a responsible body of opinion would support a conservative approach
- First instance decision made 4 months before *Montgomery* Supreme Court decision

Webster (Court of Appeal decision)

- On appeal, issue whether mother should have been advised of increased risk of perinatal mortality on 27/12
- AND whether she would have opted for immediate induction if so advised
- CA found that the answer was yes to both questions, even though failing to advise her of the risk might have accorded with the practice of a body of responsible obstetricians

Webster principles

- Reinforces that *Bolam* is not correct test for consent cases
- Reinforces that percentages do not determine what is a material risk
- Even when there is emerging but incomplete research material about a particular risk which a paternalistic doctor might choose not to tell a patient about, the *Montgomery* test may oblige him to do so

Webster principles (cont'd)

- Shows importance of evidence about characteristics of mother when considering whether she would have opted for a treatment
- Here she had a degree in nursing
- Had displayed independence of mind by a decision to leave hospital earlier in pregnancy

Webster principles (cont'd)

- May allow a way past the likes of Derek Tufnell stubbornly maintaining that there is a responsible body of medical opinion which would not warn of a risk, by virtue of the fact that this is not the relevant test in consent cases

Tasmin v Barts [2015]

- CP case – *Montgomery* argument run and failed
- C delivered by emergency LSCS
- Cord tightened around neck shortly before birth – acute profound hypoxic injury
- Alleged negligence in persevering with labour and not offering earlier LSCS

Tasmin (cont'd)

- Between 21.40 and 22.30 failure to interpret CTG as pathological
- Syntocinon infusions rather than taking FBS
- However evidence accepted that if FBS taken it would have been normal
- C alleged LSCS should have been offered either instead of FBS or after result of FBS available

Tasmin (cont'd)

- Judge preferred D's evidence – good medical practice required an FBS before a decision on LSCS
- Claimant argued that *Montgomery* trumped the expert evidence on good practice; mother entitled to be advised of material risk of injury and to elect for LSCS

Tasmin (cont'd)

- Judge found that the risk of serious injury was negligible – of the order of 1;1,000
- "Too low to be material"
- In *Montgomery* and *Webster* clear that percentages/ratios are not the measure of materiality
- In *Montgomery* the risk of CP arising from shoulder dystocia was also considered and was not said to be "too low to be material"

Tasmin (cont'd)

- Percentages only look at one of two components – probability but not severity of injury
- 0.1% may be a negligible risk in the context of a minor injury
- Would a mother regard it as material if it carried a risk of lifelong disability for a child?
- Percentages do not take account of risks specific to a patient (though none identified here)

Tasmin (cont'd)

- Was *Tasmin* wrongly decided then?
- Probably not; the judge found as a fact that the FBS would have been normal
- To offer a caesarean section in the face of a normal FBS flies in the face of national guidance
- To offer a caesarean section without carrying out an FBS would be equally illogical, given the speed, ease and reliability of the test

A v East Kent [2015]

- Another case in which a *Montgomery* argument failed
- Wrongful birth case
- Mr and Mrs A had IVF
- DNA tests on Mr A's sperm ruled out chromosomal abnormalities 13, 18 or 21
- Advised that other chromosomal abnormalities remained a possibility

A v East Kent (cont'd)

- During pregnancy, US scans revealed a low AFI (Amniotic Fluid index) and a low abdominal circumference
- No advice given as to increased risk of chromosomal abnormalities
- Later scans led to diagnosis of IUGR
- Born at 37+6 weeks
- Chromosomal abnormalities inherited from father, leading to disability

A v East Kent (cont'd)

- Claim brought on basis that, once abnormalities on USS evident, parents should have been advised of risk of chromosomal abnormality
- Would have terminated pregnancy
- Conflicting evidence of level of risk
- C's experts: 1-3%
- D's experts: 1:1,000

A v East Kent (cont'd)

- Judge preferred D's experts
- Risk found to be "theoretical, negligible or background"
- Ruled that *Montgomery* was not authority for the proposition that doctors need to warn of risks which are theoretical and not material
- Judgement at odds with the later CA decision in *Webster*, and paid too much attention to the percentage level of risk (in any event strongly disputed amongst the experts)
- Claim also failed because judge did not accept that the parents would have terminated

MC & JC v Birmingham [2016]

- Another case where *Montgomery* argument failed!
- C has CP, caused by hypoxia in last 20 minutes of labour
- Labour induced at one day overdue
- Swollen legs and concerns re pre-eclampsia
- Induction began at 1600 on 12/02/10
- Delivery at 0603 on 13/02/10

MC & JC (cont'd)

- Issue was whether mother properly advised as to the pros and cons of induction
- Would she have consented if risks and benefits properly explained?
- Claimed that not advised that induction was for risks of pre-eclampsia; thought simply because overdue
- Judge did not believe her on this point

MC & JC (cont'd)

- Further arguments:
- Should have been warned before induction that necessary support might not be available on the ward, or delivery suite potentially unavailable
- Consultant did not consent mother directly, deputing to a more junior colleague
- These arguments failed

MC & JC (cont'd)

- Case somewhat unsatisfactory
- Judge found:
- No sufficiently detailed evidence adduced as to precisely what mother should have been told about pros and cons of induction, as opposed to what she was told
- No evidence from mother in her witness statement or oral evidence as to what she would have decided if advised of relevant pros and cons

MC & JC

- Given the judge's comments, perhaps unsurprising that this case failed
- It may be that a similar case could succeed, if prepared in a different way

SXX v Liverpool [2015]

- Not strictly a *Montgomery* case
- *Montgomery* was drawn to the judge's attention, but he specifically stated that he did not rely upon it in arriving at his decision
- Concerns common scenario of a midwife "persuading" parents of the advantages of vaginal delivery over LSCS

SXX (cont'd)

- Twin delivery. Twin 1, delivered by forceps, suffered intracerebral haemorrhage and hydrocephalus – permanent neurological disability
- Parents had a particular reason for wanting elective caesarean – seven years earlier they had lost a twin during a vaginal delivery

SXX (cont'd)

- Parents saw a midwife rather than a consultant towards the end of pregnancy
- Midwife very forceful about benefits of vaginal delivery – felt "coerced" into having one
- Negligence found at trial in failing to refer the decision as to mode of delivery to the obstetrician, who would have agreed to caesarean

SXX (cont'd)

- *Montgomery* not strictly relevant since no withholding of material risk – parents knew material risk all too well
- But they were denied a "reasonable alternative treatment"
- In *Montgomery*, Lady Justice Hale at pains to make clear the right of a mother to choose caesarean over vaginal delivery, and for that to be a choice with equal validity

SXX (cont'd)

- *"A patient is entitled to take into account her own values, her own assessment of the comparative merits of giving birth in the "natural" and traditional way and of giving birth by caesarean section, whatever medical opinion may say, alongside the medical evaluation of the risk to herself and her baby. She may place great value on giving birth in the natural way and be prepared to take the risks to herself and the baby which this entails, the medical profession must respect her choice…There is no good reason why the same should not apply in reverse, if she is prepared to forgo the joys of natural childbirth in order to avoid some not insignificant risks to herself or her baby."*

SXX (cont'd)

- In a case where a mother can realistically claim that she was "coerced" into vaginal delivery by an over-zealous midwife, and the baby (or the mother!) suffers injury during vaginal delivery, might there be a viable cause of action, even in the absence of a medical indication for caesarean?

Scenario 1

- Mother suffering from documented bacterial vaginosis (BV) (a condition tending towards preterm birth and preterm rupture of the membranes) in a previous pregnancy, which led to delivery at 30 weeks
- Not tested for BV in a later pregnancy in which baby born at 24 weeks and has CP as a result of complications of prematurity

Scenario 1 (cont'd)

- We argue that mother should have been informed of risks of BV and given choice of screening and antibiotic treatment before 20 weeks
- Antibiotic treatment would, on b of p, have avoided very premature birth and resultant brain injury
- Failure to screen and give abx defensible via *Bolam*; failure to inform, warn and give the option of abx probably not defensible via *Montgomery*

Scenario 2

- Claimant has CP as a result of hypoxia during vaginal delivery
- Previous pregnancy complicated by shoulder dystocia
- We argue, on basis of *Montgomery,* that mother should have been seen at 16 weeks, advised that 2nd babies usually bigger than 1st babies, and that there was a significant risk of a repeat shoulder dystocia

Scenario 2 (cont'd)

- Should have been allowed to opt immediately (i.e. at 16 weeks) for elective CS at 39 weeks, or wait for 36 week growth scan and make a decision then
- Mother's evidence is that she would have opted for CS with this information
- Defendants accept the *Montgomery* argument but put the mother to proof that she would have had a caesarean

Scenario 3

- Claimant has CP due to hypoxic brain injury during vaginal delivery
- Again, previous pregnancy complicated by shoulder dystocia
- Mother not even informed that shoulder dystocia had occurred
- Additional risk because mother's BMI above 30
- Likely further additional risk of fetal macrosomia by 36 weeks

Scenario 3 (cont'd)

- Liability admitted on *Montgomery* basis
- In this case also admitted that mother would have opted for caesarean, and that all brain injury would have been thereby avoided

Scenario 4

- Mother in 2nd stage of labour, with pathological CTG
- Decision taken to proceed to trial of forceps at 14.00
- Baby eventually delivered by emergency CS at 15.32
- Cerebral palsy due to hypoxia

Scenario 4 (cont'd)

- Among several allegations made is one that caesarean section should have been offered on a *Montgomery* basis at 14.00, as well as offering a trial of instrumental delivery
- I am not confident that this is our best argument in this case, but time will tell!

Thank you.

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Application of *Montgomery* consent principles in cerebral palsy cases

My talk today considers the impact of the Supreme Court's decision in *Montgomery* in 2015 on cerebral palsy cases since that time.

I will review the decided cases, and if time allows, also consider a couple of cerebral palsy cases which my own firm is running on *Montgomery* principles.

I hope this may be helpful to others in running their own cerebral palsy caseloads.

The facts of *Montgomery* are well known, and I won't go over them, save to say that similar facts could obviously found a CP claim. It is self-evident that if a diabetic mother of small stature is not warned of the risks of shoulder dystocia and not offered a caesarean section, and the baby delivered vaginally suffers hypoxia and develops cerebral palsy rather than Erb's Palsy, there will clearly be a viable claim, (provided that she can show she would have elected for caesarean if properly informed)

The principle laid down in *Montgomery* can be summarised as follows:

- An adult person of sound mind is entitled to decide which, if any, of the available forms of treatment to undergo.
- The doctor has a duty to inform her of any material risks ,and of any reasonable alternative treatments.
- The test of materiality is whether a reasonable person in the patient's position would be likely to attach significance to the risk, or if the doctor is/should be aware that the particular patient would attach significance to it.

Two further points of significance should be noted.

It is evident from the judgements in *Montgomery* that:

1. *Bolam* does not apply to consent cases; and
2. The assessment of whether a risk is material cannot be reduced to percentages

The decided cases

Webster v Burton [2017] EWCA Civ 62

Webster was the first post-*Montgomery* case to reach the Court of Appeal.

The facts:

The mother had three abnormalities identified on USS at 34 weeks:

- The baby was small for gestational dates (SGA).
- There was asymmetry – the abdominal circumference was significantly less than the head circumference.
- There was polyhydramnios (excess liquor).

The treating obstetrician failed to observe or note these features or act upon them.

Just before term, the mother was admitted to hospital as she felt unwell. (26 December 2002) She expected to be induced at term (27 December). She was not. Her baby was in fact born on 7 January 2003, following induction, but a cord compression had by then occurred on about 4/5 January, causing a significant brain injury to the baby.

At first instance it was admitted that the treating obstetrician had been negligent in failing to organise fortnightly repeat ultrasound scans, following the one at 34 weeks, and also found that he should have researched the significance of these three abnormalities, which he did not do.

Had he done so he would have found that there was an increased risk of perinatal mortality with these three features, although with a small statistical base.

At trial, the Claimant's expert, Professor Soothill, argued that delivery by 38 weeks was strongly indicated, but Mr Tufnell maintained that it was reasonable to attach no importance to this combination of factors.

The claim failed therefore on traditional Bolam principles: there was a responsible body of opinion which would have taken a conservative approach.

The first instance decision was made in fact four months before the Supreme Court's decision in *Montgomery*; on appeal the issue was whether the mother should have been advised of the increased risk of perinatal mortality on 27 December, and if so, whether she would have elected for immediate induction of labour.

The Court of Appeal found that, even though failing to advise her of the risk might have accorded with the practice of a responsible body of obstetricians, nonetheless on *Montgomery* principles it was a material risk of which she should have been informed.

Important points from *Webster*

1. Reinforces that *Bolam* is not the correct test in consent cases
2. Reinforces that percentages do not determine what is a material risk
3. Shows that even where there is emerging but incomplete research material about a particular risk, which in *Bolam* terms, a paternalistic doctor might choose not to tell his patient about, he may be obliged to do so by the *Montgomery* test.
4. Shows the importance of evidence about the particular characteristics of the mother (in a birth injury context) when considering whether she would have opted for a particular treatment. Here the mother had a degree in nursing, and had already demonstrated independence of mind by a decision to leave hospital earlier in her pregnancy
5. May allow a way past the likes of Mr Tufnell stubbornly maintaining that there is a responsible body of opinion which would not warn of a risk, by virtue of the fact that this is not the relevant test.

Tasmin v Barts [2015] EWHC 3135

This was a CP case in which a *Montgomery* argument was run and failed.

The claimant, aged 14 at trial, was delivered by emergency Caesarean section. Minutes before birth the umbilical cord tightened around her neck resulting in a profound hypoxic/ischaemic insult and she suffered a severe brain injury which left her seriously disabled. She alleged negligence in the management of her delivery and a failure to obtain adequate consent from her mother to persevering with labour rather than undergoing a Caesarean section.

The key allegation related to a period between 21.40 and 22.30 when the registrar had failed to interpret CTG readings as pathological. The registrar proceeded with Syntocinon infusions when the correct course of action would have

been to take a foetal blood sample (FBS). The court accepted evidence that, had this been done, the results would have been reassuring and the mother would have been advised to persevere with labour.

The Claimant alleged that at this stage there should have been a discussion with the parents about the risks of the pathological trace and the alternative course of management by Caesarean section. In the absence of such a discussion the decision to proceed with vaginal delivery was made without their consent and was negligent.

Mr Justice Jay preferred the Defendant's expert evidence that good medical practice required an FBS before any consideration of Caesarean section, the pathological CTG not by itself being diagnostic of hypoxia which might lead to acidosis. However the claimant's case was that the issue could not be resolved solely on the basis of expert evidence because it was one of consent: her mother should have been advised of the material risk of injury and been able to elect for a Caesarean at this stage.

The court found that because CTG is not a diagnostic tool, there could not be a sensible discussion of the options before foetal blood sampling had been done. More significantly the risk of serious injury was negligible, of the order of 1:1,000. The judge held that this was not a material risk, citing *A v East Kent Hospitals NHS Foundation Trust* [2015] EWHC where Dingemans J described a risk of 1:1,000 as 'theoretical, negligible or background'. However he preferred to formulate the risk as being 'too low to be material'. The claim therefore failed.

The Supreme Court in *Montgomery* explicitly said that what amounted to a material risk was not a matter of percentages. In *Tasmin* Mr Justice Jay found that a risk of 1:1,000 was too low to be material. In *Montgomery* the risk of shoulder dystocia had been 9-10% and that in itself presented a risk of significant injury. However the risk of a prolonged hypoxia had been 0.1% or 1:1,000, the same as in *Tasmin*. The problem with looking at risk in percentage terms is that it looks only at one of two components: the probability as opposed to the severity of injury. 0.1% may be a negligible risk in the context of a minor injury but many mothers would regard it as material if it could give rise to lifelong disability. Further, percentages do not take into account factors which are specific to the particular patient. No such factors were identified in *Tasmin*.

Was *Tasmin* wrongly decided then? *Webster* has since reinforced again that the materiality of risk is not to be determined by percentages.

I think the reality is that *Tasmin* was probably rightly decided, because the judge found as a fact that the FBS would have been normal, and to offer an emergency caesarean in the face of a normal FBS would have been illogical and inconsistent with national guidelines, while to offer one without carrying out an FBS would be equally illogical, given the speed, ease and reliability of the test.

A v East Kent [2015] EWHC 1038

This is another case in which a *Montgomery* argument failed; it was a wrongful birth case.

Mr and Mrs A were unable to conceive naturally and had IVF. DNA tests on Mr A's sperm prior to undergoing IVF showed that he did not have chromosomal abnormalities 13, 18 or 21, but they were advised that there was still a risk of other chromosomal abnormalities

Mrs A then became pregnant, and at ultrasound scans performed between 21 and 27 weeks, a low AFI (Amniotic Fluid Index) and a low abdominal circumference measurement were noted.

No advice was given to the effect that the baby might be suffering from a chromosomal abnormality. Later scans led to a diagnosis of IUGR. But the baby was born at 37 weeks + 6 days. He was found to have chromosomal abnormalities inherited from his father.

The claim was brought on the basis that Mr and Mrs A should have been advised, once the abnormalities on USS became evident, of a risk of a chromosomal abnormality which would have led them to terminate the pregnancy.

At trial conflicting evidence was given by geneticists as to the level of risk of chromosomal abnormality which ought to have been evident. The Claimant's experts put it at 1-3%. The Defendant's experts put it at 1: 1,000, and described that risk as *"theoretical, negligible or background"*. The judge preferred The Defendant's experts.

He ruled against the Claimant on the basis that *Montgomery* is not authority for the proposition that doctors need to warn about risks which are theoretical and not material.

In my view this part of the judgment is at odds with the later Court of Appeal decision in *Webster,* and paid too much attention to the percentage level of risk (which in any event was strongly disputed between the experts) rather than applying the proper *Montgomery* test of materiality.

However the case also failed on the basis that the judge did not accept that the parents would have terminated, for reasons which I will not go into here.

MC and JC v Birmingham [2016] EWHC 1334

This is another case in which a *Montgomery* argument was run and failed. The claimant was born in 2010, and has CP due to hypoxia suffered during the last 20 minutes of labour.

Labour was induced when his mother was one day overdue; she had swollen legs and there were concerns about pre-eclampsia. Induction of labour began at 1600 on 12 February 2010; the claimant was born at 0603 on 13 February. A CTG trace had been abnormal since 0535, and there was a fetal bradycardia at the very end of labour, up until delivery.

The issue was whether the mother was properly advised as to the pros and cons of induction, and whether or not she would have consented to induction had she had the risks and benefits properly explained.

She claimed that she was not advised that she was being induced because of the risks of pre-eclampsia, but thought it was simply because she was overdue. The judge did not believe her on this point.

Other arguments made on behalf or the Claimant were:

- The mother should have been warned before she was induced that the necessary support might not be available on the ward, or that a delivery suite might not be readily available.
- The consultant did not consent the mother directly, deputing this to a more junior doctor.

The claim failed on both these points.

The case is somewhat unsatisfactory, in that the judge stated that:

- No sufficiently detailed evidence was adduced as to precisely what the mother should have been told about the pros and cons of induction, as against what she was actually told; and
- There was no evidence from the mother in her witness statement or in oral evidence as to what she would have decided if she had been given an account of the relevant pros and cons.

On this basis it seems very understandable that the claim failed.

From my reading of the judgement I would say that a similarly pleaded claim, with certain key differences, might well succeed.

SXX v Liverpool [2015] EWHC 4072

This was not strictly a decision made on *Montgomery* principles. *Montgomery,* which had been very recently decided, was drawn to the judge's attention by Liz-Ann Gumbel, but he specifically stated that he was not relying upon it in arriving at his decision.

The case is of interest, however, in that it concerns a fairly common scenario, in which parents were in effect "persuaded" by a midwife that vaginal delivery was the appropriate course that they should pursue rather than elective caesarean

It was a twin delivery, in which Twin 1, delivered in fact by forceps, suffered an intracerebral haemorrhage, and hydrocephalus and was left with a permanent neurological disability.

The parents had a particular reason for wishing to have a caesarean, namely that seven years earlier they had lost a twin during a vaginal delivery.

The factual scenario was that the parents saw a midwife rather than a consultant towards the end of the pregnancy, and the midwife was very forceful about the benefits of vaginal delivery so effectively they felt coerced into having one. The negligence found at trial was in failing to refer the decision as to mode of delivery to the obstetrician, who would have agreed to caesarean.

Montgomery is not strictly relevant to the facts in this case because there was no withholding of a material risk – the parents were in possession of all relevant information – nonetheless they were denied a *"reasonable alternative treatment"*.

In *Montgomery,* Lady Justice Hale in particular was at pains to make clear the rights of a mother to choose caesarean over vaginal delivery, and for that to be seen as a choice of equal validity.

She stated: [para 115]

"A patient is entitled to take into account her own values, her own assessment of the comparative merits of giving birth in the "natural" and traditional way and of giving birth by caesarean section, whatever medical opinion may say, alongside the medical evaluation of the risk to herself and her baby. She may place great value on giving birth in the

natural way and be prepared to take the risks to herself and her baby which this entails. The medical profession must respect her choice… There is no good reason why the same should not apply in reverse, if she is prepared to forgo the joys of natural childbirth in order to avoid some not insignificant risks to herself or her baby."

In any case where a mother may claim that she was "coerced" into vaginal delivery against her will by an over-zealous midwife, and the baby suffers injury during vaginal delivery, there may well be a viable cause of action even if there was no medical indication for caesarean.

Scenarios in which my firm is running *Montgomery* arguments in ongoing CP cases

- Mother suffering from documented bacterial vaginosis (a condition tending towards preterm birth and preterm rupture of the membranes) in a previous pregnancy, which led to delivery at 30 weeks. Not tested for the condition in a later pregnancy in which baby is delivered prematurely at 24 weeks and has CP. We argue that mother should have been informed of the risks of bacterial vaginosis and given the choice of having screening and antibiotic treatment before 20 weeks. Such antibiotic treatment would, on balance of probability, have avoided very preterm birth and the resultant brain injury. Failure to screen and give antibiotics in this situation probably would not satisfy the *Bolam* test, but failure to advise of the risks would satisfy the *Montgomery* test.
- Claimant suffers from CP as a result of hypoxia during vaginal delivery. Previous pregnancy complicated by shoulder dystocia. We argue, on the basis of *Montgomery*, that mother should have been seen by a consultant at 16 weeks of the second pregnancy, and advised that:
  - Second babies are usually bigger than first babies
  - There was a significant risk of repeat of shoulder dystocia
  - Could opt now (at 16 weeks) for elective caesarean at 39 weeks, or wait for 36 week growth scan and make a decision then.

  Mother's evidence is that she would have opted for caesarean section with this information. In this case the Defendants accept the *Montgomery* point but put the mother to proof that she would have opted for a caesarean section.
- Claimant suffers from CP due to hypoxic brain injury suffered during vaginal delivery. Again there had been a previous pregnancy complicated by shoulder dystocia, of which the mother had not been informed. In her case there was an additional risk factor of BMI above 30, and by 36 weeks the further risk factor of fetal macrosomia would have been present. Again in this case liability has been admitted on a *1* basis, and on this occasion it is also admitted that the mother would have opted for caesarean section, and all brain injury would have been avoided.
- Mother in second stage of labour with pathological CTG. Decision taken to proceed to trial of forceps at 14.00. Baby eventually delivered by caesarean section at 15.32. Among several allegations being made is one that caesarean section should have been offered on a *Montgomery* basis at 14.00 hours, as well as a trial of instrumental delivery. I am not confident that this is our best argument in this case, but it is part of our case at present at least.

About the author

Simon Elliman
Partner
T: 01225 730 199
simon.elliman@roydswithyking.com

Simon heads Royds Withy King's Medical Negligence team. He has particular expertise in birth injury and cerebral palsy cases, being described by the independent guide to the legal profession Chambers & Partners UK as *"well regarded for his handling of cerebral palsy cases"* and by The Legal 500 as a *"cerebral palsy expert."*

Simon *"draws considerable praise from market observers, who admire his 'sound judgement'"* (source: Chambers & Partners UK 2018). He is also recognised by Chambers & Partners UK as a "Leader in his field".

Independent legal directory Legal 500 UK describes Simon as *"a very experienced lawyer with excellent judgment"* who has *"an assured touch on difficult cases"* (source: Legal 500 UK 2017).

Simon completed a Master's degree in Medical Law and Ethics in 2010, graduating with Distinction. Simon is a member of two specialist panels, the Law Society's Clinical Negligence Panel, and Action against Medical Accidents (AvMA). He is also accredited as a Senior Litigator with APIL. He has had articles published in Clinical Risk, Medical Litigation, Healthcare Risk Report, the Solicitors Journal and the New Law Journal.

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Intrapartum fetal compromise and CTG interpretation

Cerebral Palsy & Clinical Negligence

AVMA- 8th March

Sonia Barnfield, Consultant Obstetrician

North Bristol NHS Trust

Scope of Lecture

- Lessons from 5 years of Cerebral palsy claims
- Antenatal events-Placental Abruption
- Intrapartum events-CTG interpretation, Cord Prolapse, Delays in delivery
- Example Case

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Problem ?

- **1 : 12 labours associated with adverse outcomes**

  Nielsen at al, Obstet Gynecol 2007 109(1)

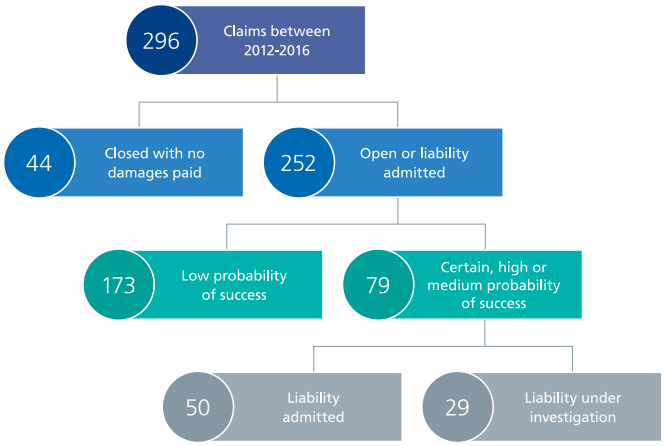
- **50% adverse outcomes preventable with better care**

  CESDI – 4th Annual Report. 1997
  CEMD – Why Mothers Die. 1998
  CEMACH – Saving Mothers Lives 2007

Cerebral palsy

- **Rate 2 per 1000 live births**
- **Potential causes**
  - Predisposing Intrauterine factors
  - Acute peripartum events
  - Events in the neonatal period

Figure 7: Breakdown of claims for cerebral palsy and neonatal brain injury between 2012 and 2016



Common Themes

- **64% involved errors with fetal heart rate monitoring**
  - CTG Misinterpreted
  - CTG not started when it should have been
  - False reassurance with uninterpretable trace
  - Too slow to act once pathological CTG identified
  - Monitoring maternal heart rate
- **12% of cases were breech births (national average 3-4%)**
- **58% of SI investigations identified Inadequate staff training/ monitoring of competency**
- **Shortcomings in informed consent evident in all cases**
  - Risk of VBAC/ Vaginal Breech birth

Contributory factors

Table 4: Contributing factors mentioned within SI report

Contributing factor	Number of SIs that mention each factor (not mutually exclusive)
Individual skill level	26
Poor communication	22
Guidelines or policy issues	18
Inadequate knowledge of individual	17
Equipment issues	10
Inadequate staffing level	7
Poor teamwork	5
Excess workload pressures	4

Table 5: The root cause(s) as written in the SI reports

Root Causes taken from SI reports
Hypoxic Ischaemic Encephalopathy following a breech delivery
Poor management of a pathological cardiotocograph (CTG)
Failure to make an obstetric emergency call
A premature baby with… a pathological CTG was born in poor condition
Delay in taking cord gasses
Undiagnosed breech with a subsequent vaginal birth
Delay in delivery following an attempted ventouse
The scan was incorrect and the care proceeded as if twin 1 was cephalic
Failure to follow trust guidelines and not start a CTG in a woman with high BP
Concealed placental abruption
Failing to request an obstetric review following transfer from the birth centre.
Deviation from pathway for fetal assessment
Shoulder dystocia due to fetal macrosomia
Deficiency in CTG interpretation

Recurring Themes

- Failure to recognise
- Failure to respond
- Failure to communicate

Cerebral Palsy

	Proportion CP
Spastic Diplegic	26%
Hemiplegic	35%
Ataxic	4%
Athetoid (Dyskinetic)	7-15%
Spastic Tetraplegic	18-20%

..and Clinical Negligence

	Proportion CP	Intrapartum
Spastic Diplegic	26%	<1%
Hemiplegic	35%	0%
Ataxic	4%	0%
Athetoid (Dyskinetic)	7-15%	80%
Spastic Tetraplegic	18-20%	45% +

Clinical Negligence

- Duty of care ?
- Breach in duty of care ?
  - Midwives
  - Obstetricians
  - Paediatricians
- Did that breach cause the injury ?

Guidelines

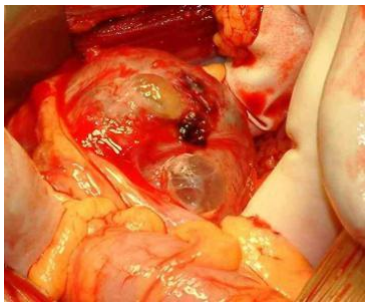
- RCOG
- NICE
- FIGO

Causation

- **Athetoid Dyskinetic Cerebral Palsy**
  - Acute profound hypoxia
- **Spastic Tetraplegic Cerebral Palsy**
  - Chronic partial ischaemia

Athetoid CP

- **Profound acute hypoxia - 'lack of oxygen'**
  - Uterine Rupture
    - VBAC
  - Cord Prolapse
  - Abruption



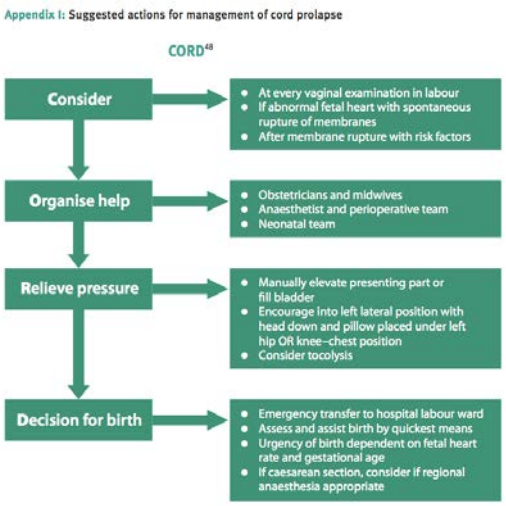
Cord Prolapse

- **0.1%-0.6% of births**
- **Perinatal mortality rate 91 per 1000**
- **Can cause acute hypoxia**

Cord Prolapse

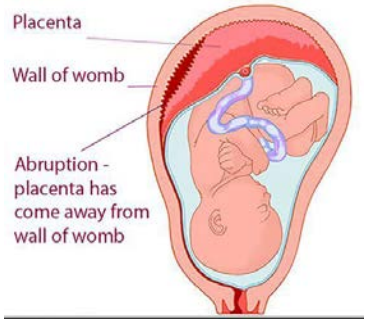
- **Antenatal Care-**
  - Could the cord prolapse have been predicted?
    - Adequate scans/Antenatal care etc.
  - Could it have been prevented?
  - Place of birth choice?
- **Management of cord prolapse**
- **Decision to delivery interval**
- **Resuscitation of newborn**

Cord Prolapse



Placental Abruption

- 1 in 150 pregnancies
- 70% occur in low risk pregnancies



Placental Abruption

- Did they have risk factors?
- Did they manage those risk factors?
- Decision to delivery interval
- Neonatal resuscitation

Example Case

- 36 year old, BMI 30
- Para 1 Previous Stillbirth secondary to abruption
- 32 weeks admitted with small APH, normal CTG.
- Bleeding ceased. Allowed home by registrar
- 2 days later massive abruption at home-no fetal heart on arrival

Decision-Delivery Intervals

RECOMMENDATIONS

The urgency of CS should be documented using the following standardised scheme in order to aid clear communication between healthcare professionals about the urgency of a CS:

C

1 immediate threat to the life of the woman or fetus
2 maternal or fetal compromise which is not immediately life-threatening
3 no maternal or fetal compromise but needs early delivery
4 delivery timed to suit woman or staff.

NICE CS Guideline. 2004

Figure 1. A classification relating the degree of urgency to the presence or absence of maternal or fetal compromise

Urgency	Definition	Category
Maternal or fetal compromise	Immediate threat to life of woman or fetus	1
	No immediate threat to life of woman or fetus	2
	Requires early delivery	3
No maternal or fetal compromise	At a time to suit the woman and maternity services	4

Mandated Intervals

- Category 1
  - 8-10% of total CS rate

    Kinsella et al. Anaesthesia. 2010
  - 30 mins
    - CNST recommended that for units to achieve level 3 they will need to audit their DDI for Cat 1 < 30 mins

      CNST Maternity Standards. 1999.
    - NICE Intrapartum Guideline

      NICE Intrapartum Guideline. 2015
  - Delivery within 30 minutes is achievable in:
    - 66% of women
    - 88% will be delivered in 40 minutes
    - Up to to 4% of women will remain undelivered at 50 minutes

      Tuffnell D et al. BMJ. 2001

NICE Intrapartum guidelines, 2015

Unplanned caesarean section

Perform category 1 caesarean section and category 2 caesarean section as quickly as possible after making the decision, particularly for category 1.

Perform category 2 caesarean section in most situations within 75 minutes of making the decision.

Take into account the condition of the woman and the unborn baby when making decisions about rapid delivery. Remember that rapid delivery may be harmful in certain circumstances.

Use the following decision-to-delivery intervals to measure the overall performance of an obstetric unit:

- 30 minutes for category 1 caesarean section
- both 30 and 75 minutes for category 2 caesarean section.

Use these as audit standards only and not to judge multidisciplinary team performance for any individual caesarean section.

Spastic Tetraplegic CP

- **Mechanism of injury less established**
- **Prolonged period of mild – moderate hypotension**
  - Cord Compression
  - Head Compression
- **Watershed areas of brain**

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Chronic Partial Ischaemia

- Low blood pressure in cerebral arteries
- Perfusion at peripheries reduced
- Lawn Sprinkler

Intrapartum

- Standard of care
  - NICE EFM May 2001
  - NICE Intrapartum Guideline Sept 2007
  - NICE Intrapartum Guideline 2014
  - NICE EFM 2017
  - FIGO 2015

NICE Intrapartum Care Guidelines – 2014

- NICE Intrapartum Care Guideline released in 2014 which included guidance on Intrapartum Fetal monitoring
- However significant numbers of concerns were raised by stakeholders in 2016 which led to an extra-ordinary decision to review the guidance
- FIGO Guideline released 2015
- Final amended guideline released in Feb 2017
- Return to Normal, Suspicious and Pathological!

Intrapartum

- Monitoring fetal heart rate in labour
- Cardiotocograph
  - Baseline rate
  - Baseline variability
  - Accelerations
  - Decelerations
- Introduction - not everything in 10 mins

Cardio-tocography

- Abdominal palpation
- Maternal pulse
- Name/number/time/paper speed
- Technically adequate
- Documentation (actions & opinion)
- Interpret in light of clinical setting

Factors influencing fetal oxygenation

Conditions and events that affect the mother and/or placental function may make fetus more vulnerable to hypoxia and less able to adapt:

Mother	Uterus/Placenta	Fetus
Analgesia/Anaesthesia	Abruption	Anaemia
Hypotension/dehydration/Anaemia	Impaired Placental function	Fetal bleeding
Hypertension	Cord Prolapse	Infection
Pyrexia	Uterine hyper-contractility	Growth restriction

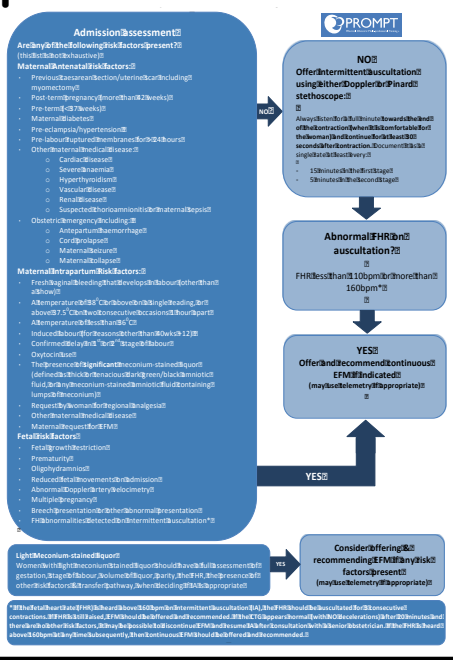
Schemata

Documentation pro forma for intrapartum CTG interpretation (based on FIGO 2015 and NICE 2017)

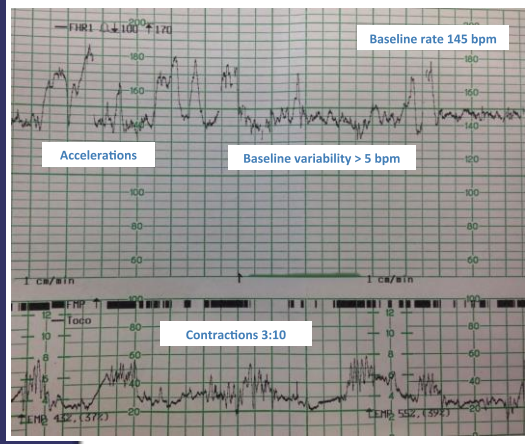
Feature	Reassuring (acceptable)	Non-reassuring	Abnormal
Baseline rate (bpm)	Baseline 110 – 160 bpm Rate:	Baseline rate 100 – 109 bpm for **more than 10** minutes Rate: Baseline rate **more than** 160 bpm for **more than 10** minutes Rate:	Baseline **less than** 100 bpm Rate: Baseline rate **more than** 180 bpm Rate:
N.B A rising baseline rate even within the normal range may be of concern if other non-reassuring/abnormal features are present.			
Variability (bpm)	Variability of 5 – 25 bpm Comments:	Variability **less than 5** bpm for **30 to 50** minutes Variability **more than 25** bpm for **15 to 25** minutes	Variability **less than 5** bpm for **more than 50** minutes Variability **more than 25** bpm for **more than 25** minutes Sinusoidal pattern **lasting for more than 30** minutes
Accelerations	Present	Comments:	
Decelerations	None **True** early decelerations	**V-shaped Variable decelerations (*NO concerning features*)** with **more than 50%** of contractions for **more than 90** minutes	**NON V-shaped (U-shaped) Variable decelerations – (*Concerning features present*) with more than 50%** of contractions and for **more than 30** minutes
	V-shaped Variable decelerations (*NO concerning features*) with **less than 50%** of contractions	**NON V-shaped (U-shaped) Variable decelerations – (*Concerning features present*) with more than 50%** of contractions for **less than 30** minutes	Repetitive **Late decelerations (U-shaped)** for **more than 30** minutes
	V-shaped Variable decelerations (*NO concerning features*) with **more than 50%** of contractions for **less than 90** minutes	Repetitive **Late decelerations (U-shaped)** for **less than 30** minutes	Repetitive **Late decelerations (U-shaped) and reduced variability** for **more than 20** minutes
	NON V-shaped (U-shaped) Variable decelerations with **less than 50%** of contractions ***(and all other features of CTG are Reassuring)***	Single prolonged deceleration **lasting more than 3** minutes, **but less than 5** minutes	Single prolonged deceleration for **more than 5** minutes ***(A prolonged deceleration of less than 80 bpm with reduced variability and lasting more than 5 minutes is often associated with hypoxia)***
Contractions :10 **(N.B If more than 5:10 - take action to reduce frequency)**	**Dilatation:**	**Liquor colour:** / **Gestation:**	**Maternal pulse:**
Reason for CTG:		**Other risk factors:**	
Opinion **(N.B If CTG has any non-reassuring or abnormal features present from the start, it may not be appropriate to wait for specified time limits before requesting review)**	**Normal CTG** (All ***four*** FHR features are reassuring) ***No intervention necessary***	**Suspicious CTG** (***One*** non-reassuring FHR feature) ***Low probability of hypoxia*** Correct reversible causes (refer to algorithm & EFM interpretation guidance)	**Pathological CTG** (***Two or more*** non-reassuring or ***one or more*** abnormal FHR features) **High probability of hypoxia – urgent action required** (refer to algorithm & EFM Interpretation guidance)
Action taken: **(Always consider the clinical circumstances when reviewing CTG and deciding action)**			
Date:	**Time:**	**Signature:** ..... **Status:**	
Fresh Eyes Opinion	*at least 2 hourly*	**I agree with opinion? YES / NO**	**If opinion different complete new pro forma**
Date:	**Time:**	**Signature:**	**Status:** .....

NHS North Bristol NHS Trust

Intrapartum admission assessment



Evaluation of Basic CTG features- Normal intrapartum CTG - (1cm/min)



5 features:

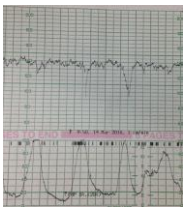
- Baseline rate 110-160
- Baseline variability - 5bpm or more
- Accelerations present
- Ideally no decelerations (some acceptable)
- Frequency of contractions

Always Interpret CTG in context with clinical circumstances

Variable decelerations (most common intrapartum decelerati

Variable decelerations constitute the majority of decelerations during labour. They are an autonomic nervous system response (triggered by the baroreceptors) to compression of the umbilical cord.

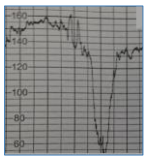
V-Shaped variable decelerations (*NO concerning features*)

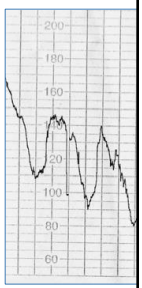


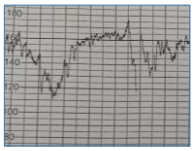
V-shaped variable decelerations (NICE describe these as with ***NO concerning features***) typically exhibit a symmetrical rapid drop and rapid recovery back to the baseline, and all other features of the CTG are reassuring.

If variable decelerations remain V-shaped (*and all other FHR features are reassuring*), then they are seldom associated with an important degree of hypoxia/acidosis.

Examples of NON V-Shaped (U-shaped) var decelerations (*with concerning features*)







Variable decelerations are likely to be associated hypoxia if they are present with more than 5 contractions and they exhibit the follo components/***concerning features***:

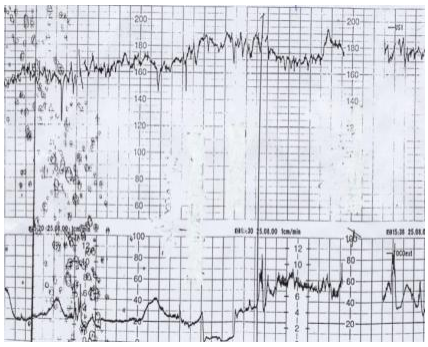
- A **NON V-shaped** component, i.e. **U-shap** anything other than V-shaped
- Reduced variability within deceleration
- Slower recovery back to the baseline
- And/or individual duration exceeding minut

Tachycardia

Baseline rate
161-180 bpm

If there is:-
- **Normal variability**
- **Accelerations**
- **No decelerations**

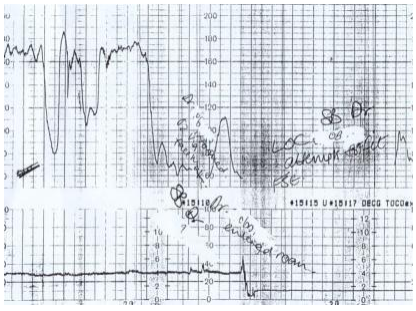
Hypoxia unlikely



Bradycardia

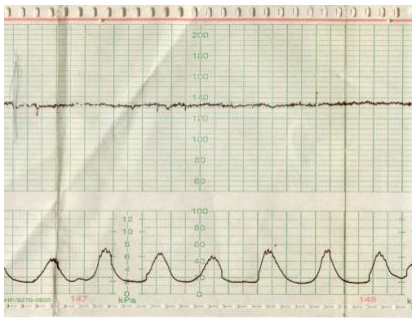
- **Abruption**
- **Scar dehiscence**
- **Cord Prolapse**
- **Maternal convulsion**
- **Cord Prolapse**

Reversible Causes
- **Maternal hypotension**
- **Epidural top-up**
- **Excessive contractions**



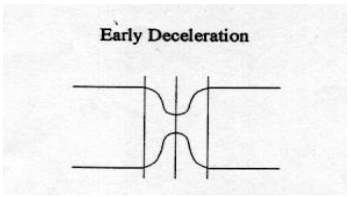
Reduced variability

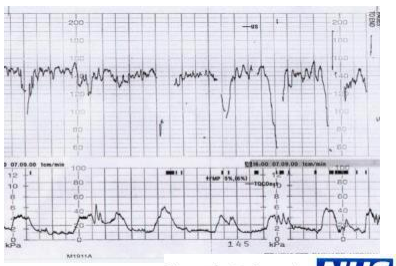
- Reassuring baseline variability (BLV): 5 bpm or more
- Non-reassuring BLV: <5 bpm for 30 mins or more but < 50 mins
- Abnormal BLV: < 5bpm for 50 mins or more



Early decelerations

- Repetitive and synchronous with contraction
- Mirror the shape of the contraction
- Often appear late in first stage of labour, and may be associated with descent of the head in the second stage





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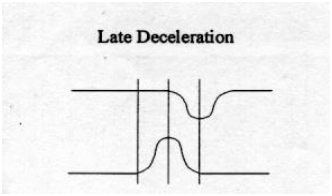
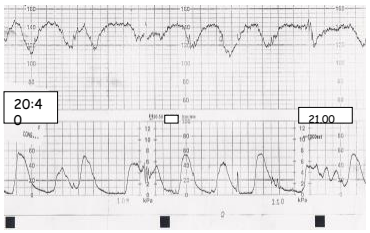
Late decelerations

- Repetitive and uniform in shape
- Begin at or after the peak of the contraction
- Lowest point is 20 secs or more after peak of contractions
- Similar shape to contraction
- Usually pathological





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Documentation pro forma for intrapartum CTG interpretation (based on FIGO 2015 and NICE 2017)

Feature	Reassuring (acceptable)	Non-reassuring	Abnormal
Baseline rate (bpm)	Baseline 110 – 160 bpm Rate:	Baseline rate 100 – 109 bpm for **more than 10** minutes Rate:	Baseline **less than** 100 bpm Rate:
		Baseline rate **more than** 160 bpm for **more than 10** minutes Rate:	Baseline rate **more than** 180 bpm Rate:
N.B A rising baseline rate even within the normal range may be of concern if other non-reassuring/abnormal features are present.			
Variability (bpm)	Variability of 5 – 25 bpm	Variability **less than 5** bpm for **30 to 50** minutes	Variability **less than 5** bpm for **more than 50** minutes
	Comments:	Variability **more than 25** bpm for **15 to 25** minutes	Variability **more than 25** bpm for **more than 25** minutes
			Sinusoidal pattern **lasting for more than 30** minutes
Accelerations	Present	Comments:	
Decelerations	None	**V-shaped Variable decelerations (*NO concerning features*)** with **more than 50%** of contractions for **more than 90** minutes	**NON V-shaped (U-shaped) Variable decelerations – (*Concerning features present*) with more than 50%** of contractions and for **more than 30** minutes
	True early decelerations		
	V-shaped Variable decelerations (*NO concerning features*) with **less than 50%** of contractions	**NON V-shaped (U-shaped) Variable decelerations – (*Concerning features present*)** with **more than 50%** of contractions for **less than 30** minutes	Repetitive **Late decelerations (U-shaped)** for **more than 30** minutes
	V-shaped Variable decelerations (*NO concerning features*) with **more than 50%** of contractions for **less than 90** minutes	Repetitive **Late decelerations (U-shaped)** for **less than 30** minutes	Repetitive **Late decelerations (U-shaped) and reduced variability** for **more than 20** minutes
	NON V-shaped (U-shaped) Variable decelerations with **less than 50%** of contractions ***(and all other features of CTG are Reassuring)***	Single prolonged deceleration **lasting more than 3** minutes, **but less than 5** minutes	Single prolonged deceleration for **more than 5** minutes ***(A prolonged deceleration of less than 80 bpm with reduced variability and lasting more than 5 minutes is often associated with hypoxia)***
Contractions :10 (N.B If more than 5:10 - take action to reduce frequency)	**Dilatation:**	**Liquor colour:** / **Gestation:**	**Maternal pulse:**
Reason for CTG:		**Other risk factors:**	
Opinion (N.B If CTG has any non-reassuring or abnormal features present from the start, it may not be appropriate to wait for specified time limits before requesting review)	**Normal CTG** (All ***four*** FHR features are reassuring) ***No intervention necessary***	**Suspicious CTG** (***One*** non-reassuring FHR feature) ***Low probability of hypoxia*** Correct reversible causes (refer to algorithm & EFM interpretation guidance)	**Pathological CTG** (***Two or more*** non-reassuring ***or one or more*** abnormal FHR features) **High probability of hypoxia – urgent action required** (refer to algorithm & EFM Interpretation guidance)
Action taken: (Always consider the clinical circumstances when reviewing CTG and deciding action)			
Date:	**Time:**	**Signature:**	**Status:** .....
Fresh Eyes Opinion	*at least 2 hourly*	**I agree with opinion? YES / NO**	**If opinion different complete new pro forma**
Date:	**Time:**	**Signature:**	**Status:** .....

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CTG Suspicious – Correction of reversible causes

Suspicious CTG
Low probability of hypoxia at this stage
(Inform Midwife/coordinator and an obstetrician)

Inadequate quality CTG (FHR and/or contraction pattern)?

Check maternal pulse

Poor contact from external transducer?
- If using telemetry, consider changing to static monitoring
- Check position of transducer
- Consider applying Fetal Scalp Electrode (FSE)

FSE not working?
- Check position of FSE
- Confirm FH with Pinard stethoscope and/or ultrasound

Uterine hypercontractility?
(Contractions more than 5-10)

Is the mother receiving oxytocin?
- Reduce/stop infusion and review by obstetrician before increasing rate/ recommencing

Has the mother recently received vaginal prostaglandins?
- Remove prostaglandin if possible
- Consider tocolysis with subcutaneous terbutaline 0.25mg

Other maternal factors

What is the mother's position?
- Encourage mother to mobilise if possible/ adopt left lateral position

Consider:
- Is mother hypotensive?
- Has a vaginal examination just been performed?
- Has mother been vomiting/ had a vasovagal episode?
- Has mother just had epidural sited?

Check blood pressure and offer 500ml crystalloid (IV) if appropriate

Maternal tachycardia/ pyrexia

Is there a maternal infection?
- Check maternal pulse & respiratory rate
- Check temperature. If ≥ 37.5°C on two occasions, two hours apart or ≥ 38.0°C or higher, consider screening & treatment for sepsis (including offering paracetamol)
- If temperature less than 36°C, screen for sepsis including maternal blood lactate

Is mother dehydrated?
- Check blood pressure & offer oral fluids and/or 500ml crystalloid (IV) if appropriate

Is mother receiving tocolytic infusion?
- If maternal pulse 9-140, reduce infusion

Do not use maternal facial oxygen therapy for intrauterine fetal resuscitation.
(Oxygen may still be used for maternal indications or as part of pre-oxygenation before maternal anaesthetic)

Continue to observe CTG closely for further non-reassuring or abnormal features. If CTG remains suspicious, consider additional methods to assess fetal oxygenation eg. Fetal Scalp Stimulation (if reduced variability) or Fetal Blood Sampling

Always consider CTG in context with clinical circumstances.

If CTG becomes pathological, see actions for pathological CTG

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Suggested actions if CTG Pathological (pH)

Pathological CTG
High probability of hypoxia - urgent action required
(Inform Midwife/coordinator and an obstetrician)

Is there a fetal bradycardia?
- Commence actions to correct reversible causes listed in Suspicious CTG algorithm
- STOP Oxytocin infusion
- Seek obstetric & midwifery coordinator support
- Perform vaginal examination to exclude cord prolapse
- Make preparations for urgent birth
- Expedite birth if bradycardia persists beyond 5 minutes, or sooner if fetal heart rate is less than 80bpm with reduced variability

Consider Fetal Scalp Stimulation (FSS) if appropriate?
The main purpose of FSS is to evaluate fetuses that are demonstrating **reduced variability in the CTG**, to distinguish between sleep/sleep and hypoxia/acidosis.
When FSS does not elicit the appearance of accelerations and subsequent normalisation of the CTG, continue monitoring and perform FBS if possible/appropriate.

Fetal Blood Sampling (FBS) possible and/or appropriate?
Encourage mother to adopt left lateral position for FBS. Check B/P and give 500mls crystalloid (IV) if appropriate.

Fetal Blood Sample result (pH)	Recommended action
Normal FBS Result 7.25 or above	• If the CTG remains pathological and there are no accelerations in response to fetal scalp stimulation, consider taking a second sample in 1 hour or sooner if there are other new abnormalities. • Discuss with a consultant obstetrician if a third fetal blood sample is thought to be needed
Borderline FBS Result 7.21 - 7.24	• If CTG remains pathological and there are no accelerations in response to fetal scalp stimulation, consider taking a second fetal blood sample in 30 minutes. • Consider expediting birth if there is a rapid fall since the last sample • Discuss with a consultant obstetrician if a third fetal blood sample is thought to be needed
Abnormal FBS Result 7.20 or below	• Inform obstetric consultant and neonatal team • Discuss what is happening with woman and partner • Expedite birth within 30 minutes (Category 1)

All FBS results should be interpreted taking into account the previous pH measurement, the rate of progress in labour and the clinical features of mother and fetus.

Fetal Blood Sampling not possible/ inappropriate?
- Encourage mother to adopt left lateral position. Check B/P and give 500mls crystalloid (IV) if appropriate.
- If an FBS is not able to be obtained but the associated Fetal Scalp Stimulation results in fetal heart rate accelerations and normalisation of the CTG, decide whether to continue with the labour or to expedite birth considering the clinical circumstances, and after discussion with the Consultant Obstetrician and the woman.

EXPEDITE BIRTH
- The urgency and mode of birth should take into account the severity of the FHR and the clinical circumstances.
- The accepted standard is that birth should be accomplished within 30 minutes
- All caesarean section or operative vaginal births may be advised, depending on results of FBS and stage of labour

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Efficacy of Fetal blood sampling (FBS)

- FBS as an adjunct to CTG is recommended by NICE and FIGO
- Continued uncertainty if it improves neonatal outcome and reduces intervention rates, as was originally intended
- A recent Cochrane review concluded that FBS in addition to CTG can provide additional information on fetal well-being, and can reduce the risk of operative birth

Breach of Duty

- **Appropriateness of CTG**
- **Adequate CTG**
- **Assessment of CTG (incl risk factors)**
- **Classification into NICE category**
- **Documentation, each hour**
- **Appropriate action for CTG category**

Causation – CP Template

- Fetal, umbilical arterial cord, or very early neonatal blood: pH <7.00 & base deficit >12 mmol/l
- Severe or moderate neonatal encephalopathy in infants >34 weeks
- Spastic quadriplegic or dyskinetic CP
- Exclusion of other identifiable causes

CP Template contd

- Sentinel hypoxic event
- Sustained fetal bradycardia or poor variability in the presence of late or variable decelerations
- Apgar scores of 0-3 beyond 5 minutes (previously <7).
- Onset of multi-system involvement within 72 hours of birth.

Pitfalls

- **Cord Gas better than expected**
  - Venous sample
  - Complete cord compression
- **MRI**
  - Other causes
- **Chronic Partial**
  - May not have sentinel event

Conclusion

- **Breach of duty of care**
  - Use NICE EFM & IP Template
  - Stickers
- **Causation**
  - ACOG & International consensus template

Thankyou

- Sonia.barnfield@nbt.nhs.uk

Neuroimaging in perinatal injury

Dr Neil Stoodley
Consultant Neuroradiologist
Southmead Hospital Bristol and Bristol Royal Hospital for Children
neilstoodley@doctors.org.uk

Modalities

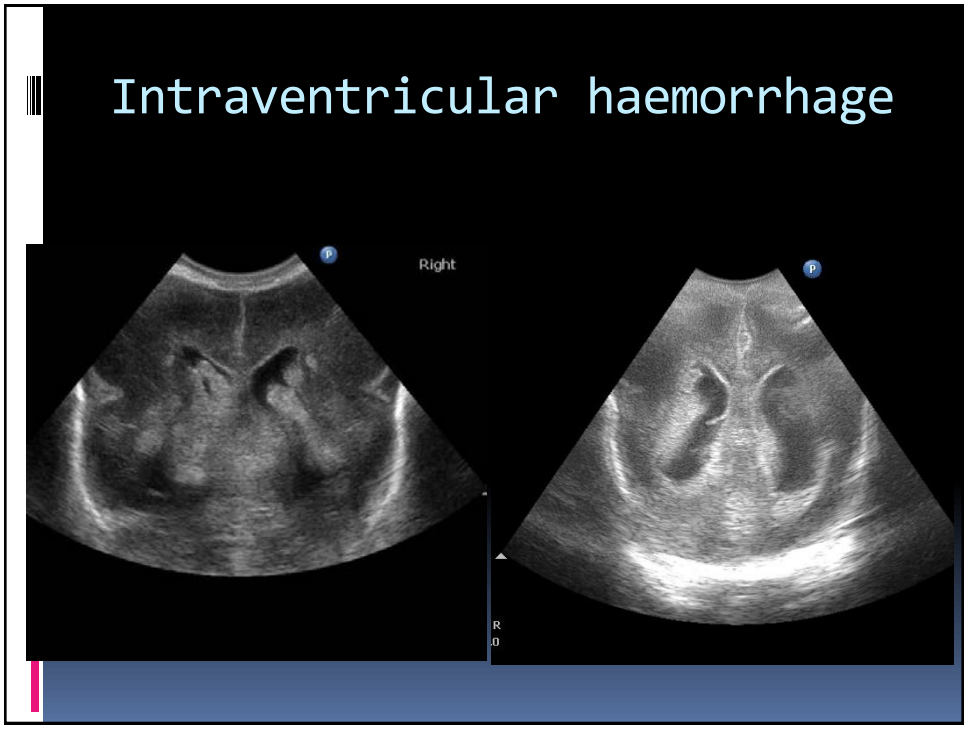
- What can we use?
  - Ultrasound
    - antenatal
    - postnatal
  - Computed tomography (CT)
  - Magnetic resonance imaging (MRI)
    - advanced imaging
    - fetal MRI

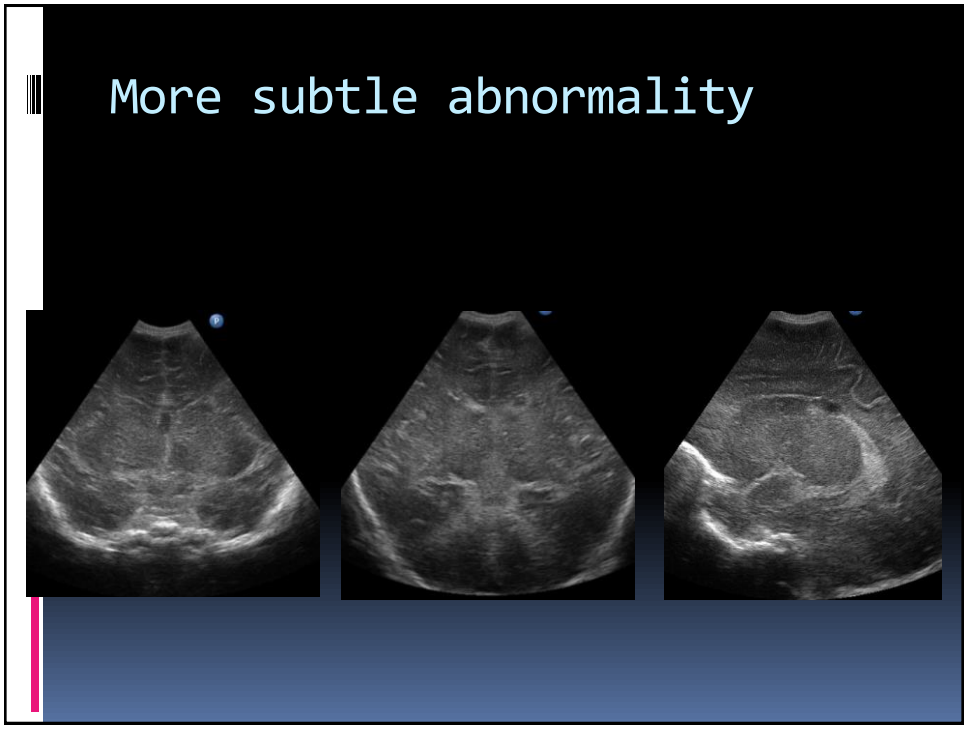
Ultrasound

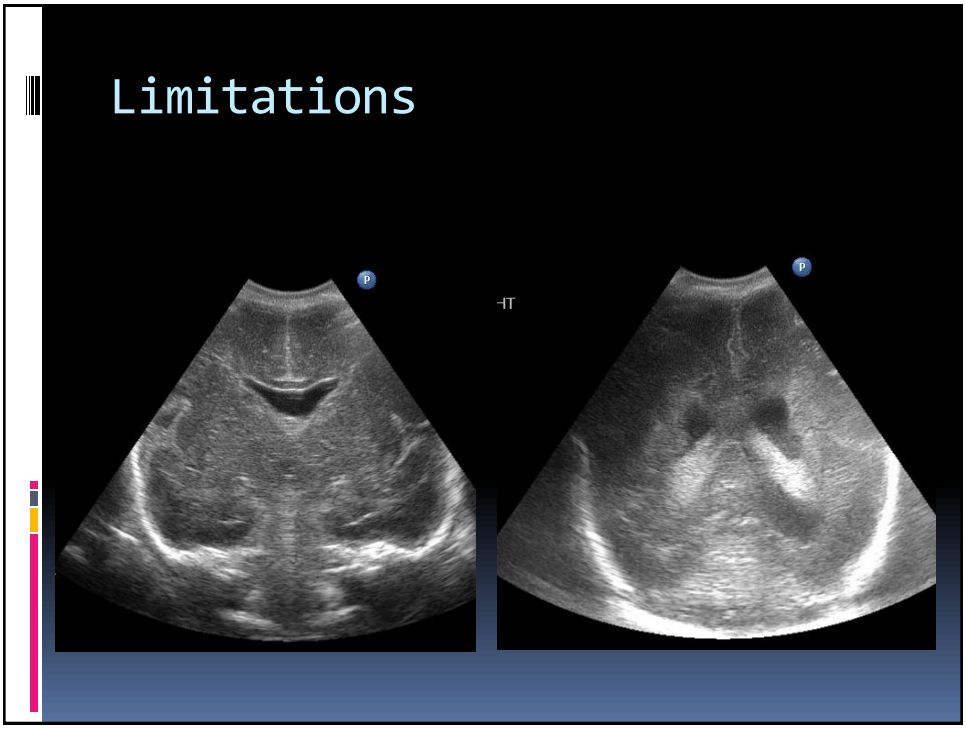
- Easily available at cotside
- Safe
- Transducer on fontanelle
- Good for intraventricular haemorrhage; ventricular size, established focal parenchymal lesions
- Poor for more subtle parenchymal pathology
- Operator dependent

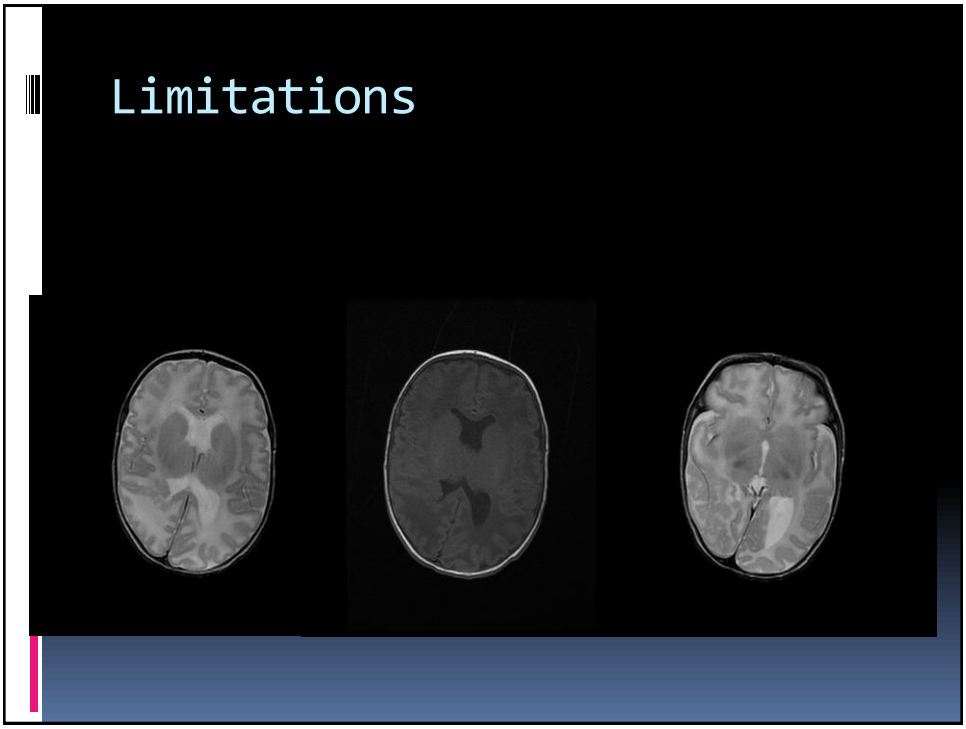
Ultrasound

- Relatively insensitive
- Parenchymal abnormalities take variable time to develop
  - Acute
  - Longer term
- Depends on severity of insult
- Changes usually not specific in terms of cause

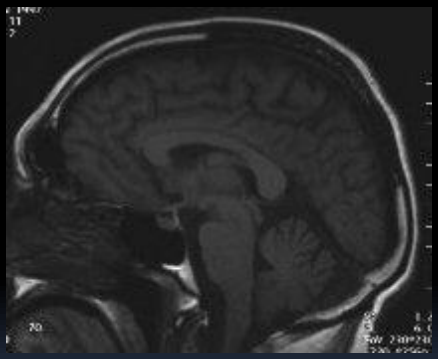

Intraventricular haemorrhage
Right

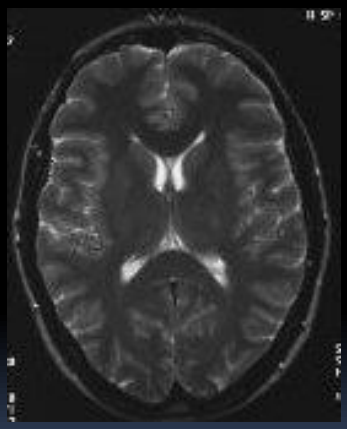

More subtle abnormality


Limitations


Limitations

Normal brain





Brain development

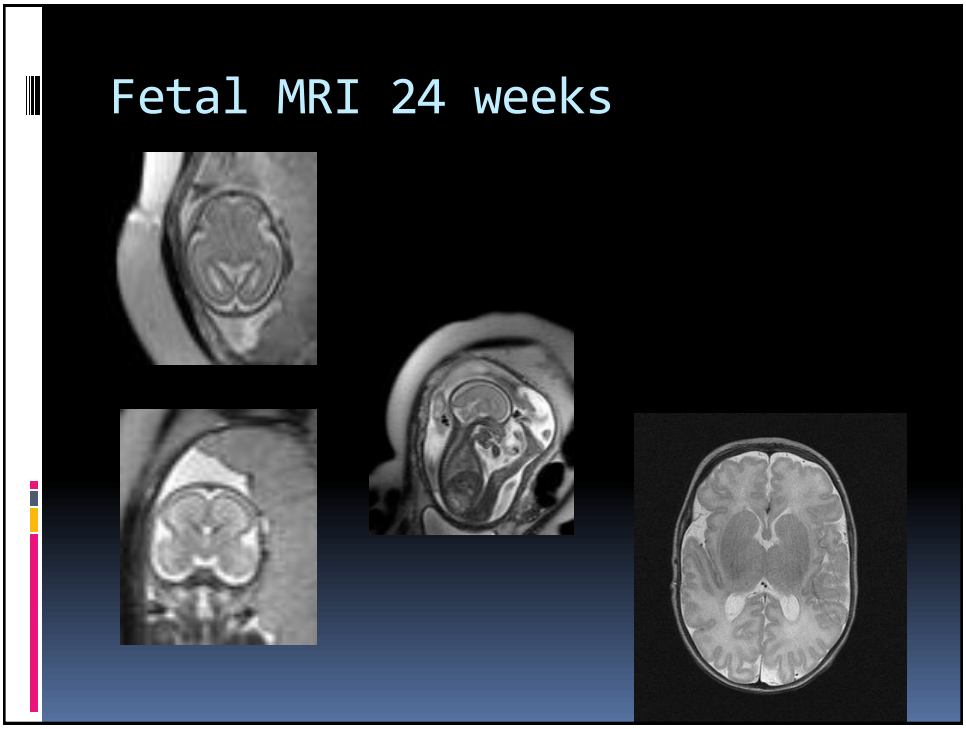
- Prenatal
- Postnatal

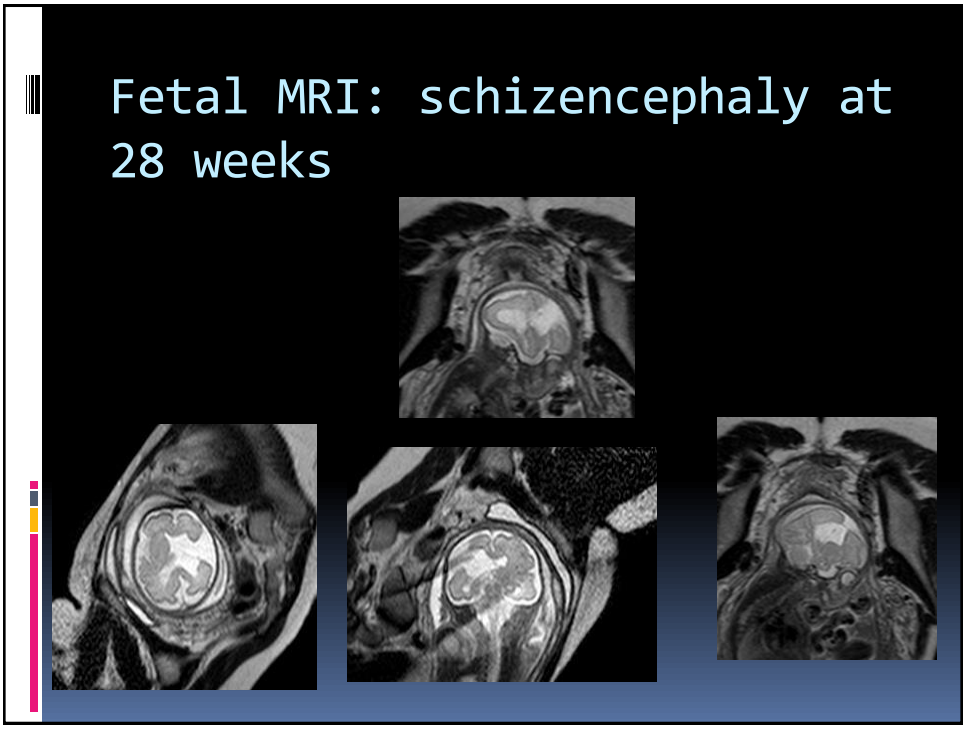
Brain development: prenatal

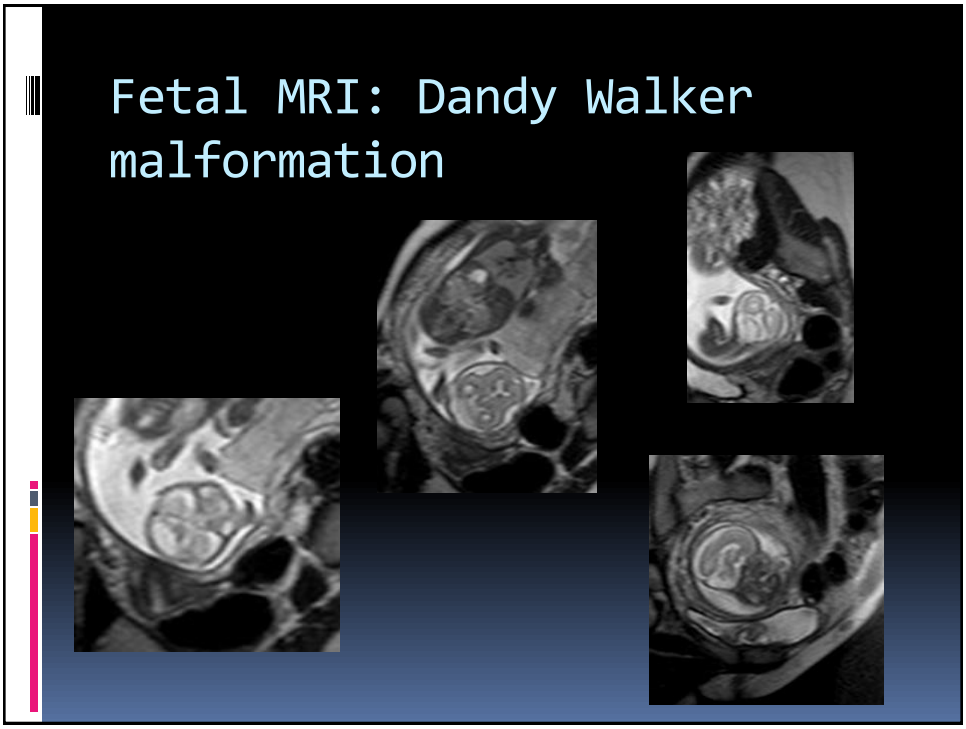
- Grey matter (nerve cells)
  - cell migration
- White matter (nerve fibres)
  - myelination
- Blood supply
- Synaptic maturation

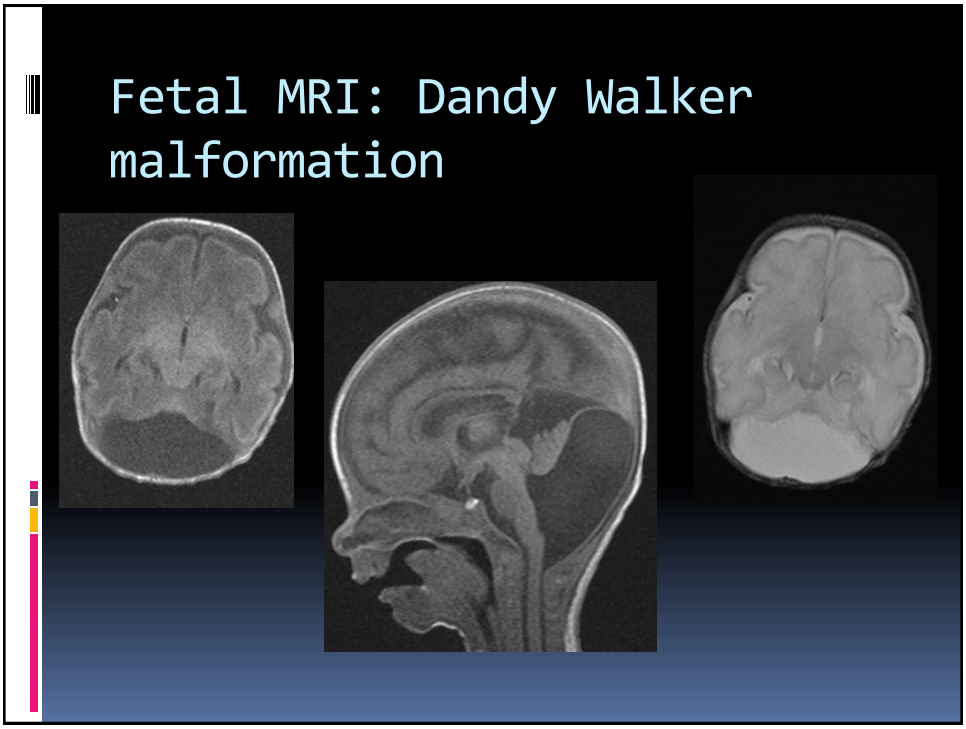
Fetal MRI

- Brain development
  - lots going on…
  - which means that…..
  - a barn door abnormality on a postnatal MRI
  - may not be evident on fetal MR


Fetal MRI 24 weeks


Fetal MRI: schizencephaly at 28 weeks


Fetal MRI: Dandy Walker malformation


Fetal MRI: Dandy Walker malformation

Brain development

- Good knowledge of normal appearances
- Know how appearances change with normal maturation
- Only then can abnormal be appreciated and interpreted

Brain development:postnatal

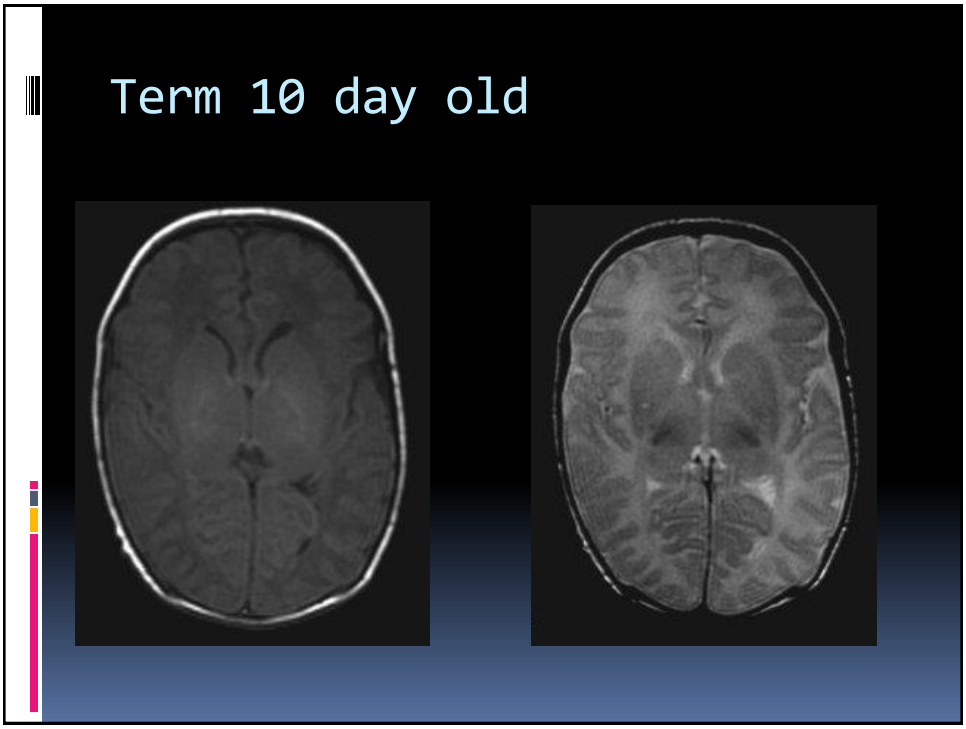
- Myelination
  - Term
  - Immature (unmyelinated) white matter
    - low signal T1
    - high signal T2

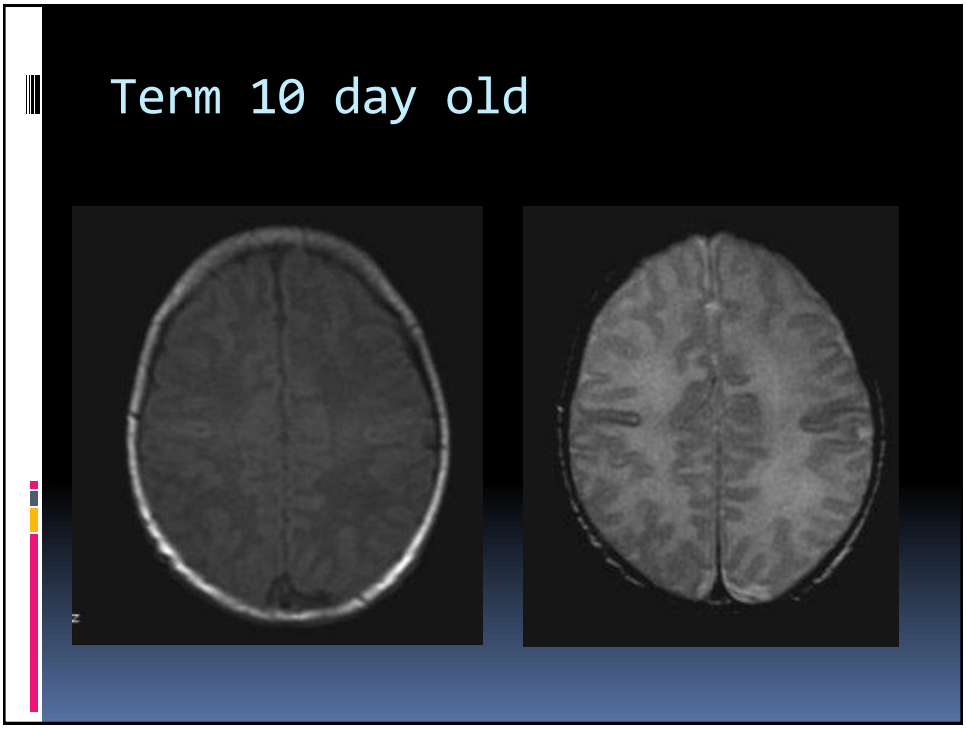
Myelination

- White matter maturation (myelination)
  - increasing T1 signal (becomes brighter)
  - decreasing T2 signal (becomes darker)

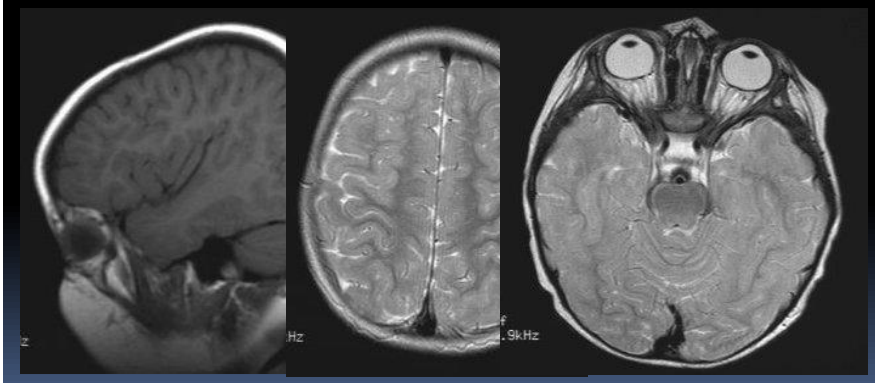
Myelination

- Assessment
  - T1 weighted images
    - better up to ~ 9 months
  - T2 weighted images
    - better after ~ 9 months
  - radiologically complete by 2 years post term


Term 10 day old


Term 10 day old

18 months



Brain injury

- Scans can show evidence of structural brain damage
  - Acute: swelling / oedema
  - Long term: scarring (gliosis); tissue loss / atrophy
- Functional change can occur in absence of structural change

Brain injury and myelination

- Unmyelinated white matter = higher signal on T2 scans
- Most acute injury associated with increased tissue water = increased signal on T2 scans
- Gliosis (scarring) = increased signal on T2 scans

Assessment of structural brain damage

- Myelination complete (scan appearances) at 2 years of age
- Best time to assess extent of changes is therefore after the age of two years
- May not be able to adequately assess presence and / or extent of damage until then

Issues

- What is the likely nature of the causative event?
  - MRI pretty good at this
- When did it occur?
  - MRI (or any other imaging modality) not good at this
  - Requires correlation with obstetric and paediatric evidence

Patterns of pre / perinatal injury

- Asphyxia
  - Acute near total
  - Chronic partial
  - Mixed
- Periventricular leukomalacia
- Perinatal infarcts
- Hypoglycaemia
- Trauma

Cerebral palsy

- Imaging pattern predicts clinical findings
  - parasagittal (watershed) brain injury
    - spastic quadriplegia
  - isolated basal ganglia damage
    - choreo-athetosis
  - periventricular leukomalacia
    - spastic diplegia
  - focal brain infarcts
    - hemiplegia

Asphyxiated term infants

- Pattern of abnormality relates to
  - severity of hypoxia / hypoperfusion
    - mild
    - moderate
    - severe
  - duration of insult
    - short
    - long or intermittent
  - Susceptibility
    - gestational age
    - superimposed insult

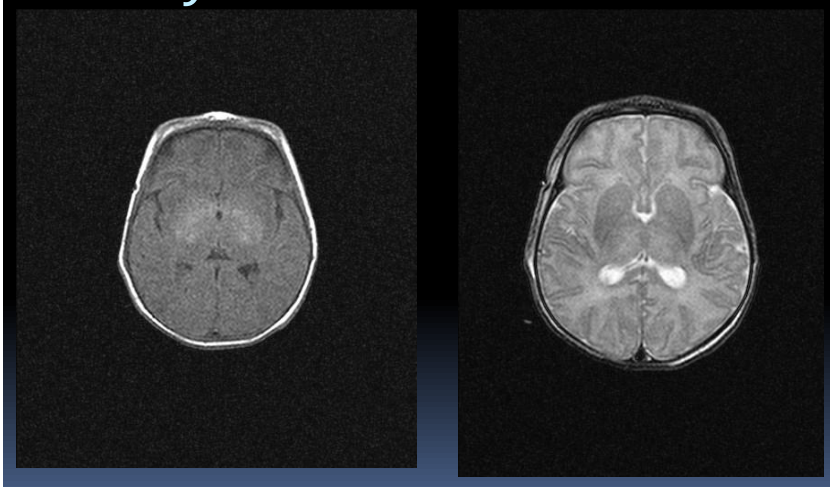
Asphyxiated term infants

- Acute near total asphyxia
  - Placental abruption / prolapsed cord / shoulder dystocia
  - lesions occur in most metabolically active areas
    - posterior putamina (basal ganglia)
    - ventrolateral nuclei of thalami
    - perirolandic white matter and cortex
    - hippocampus

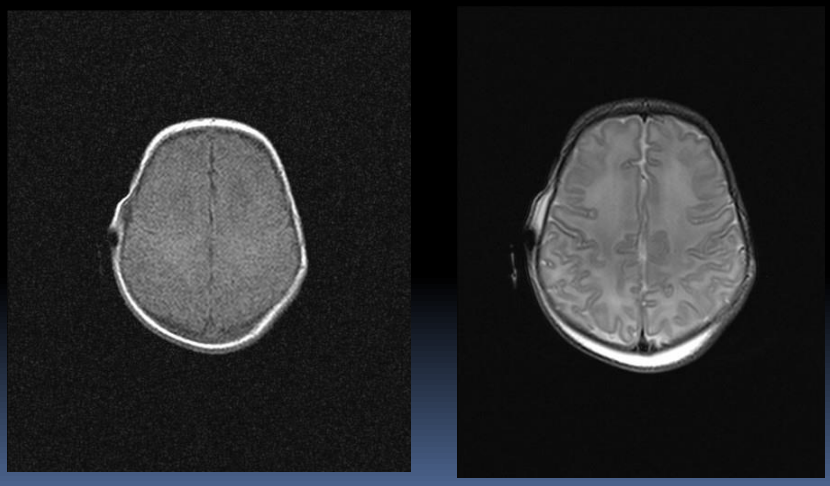
Acute near total asphyxia

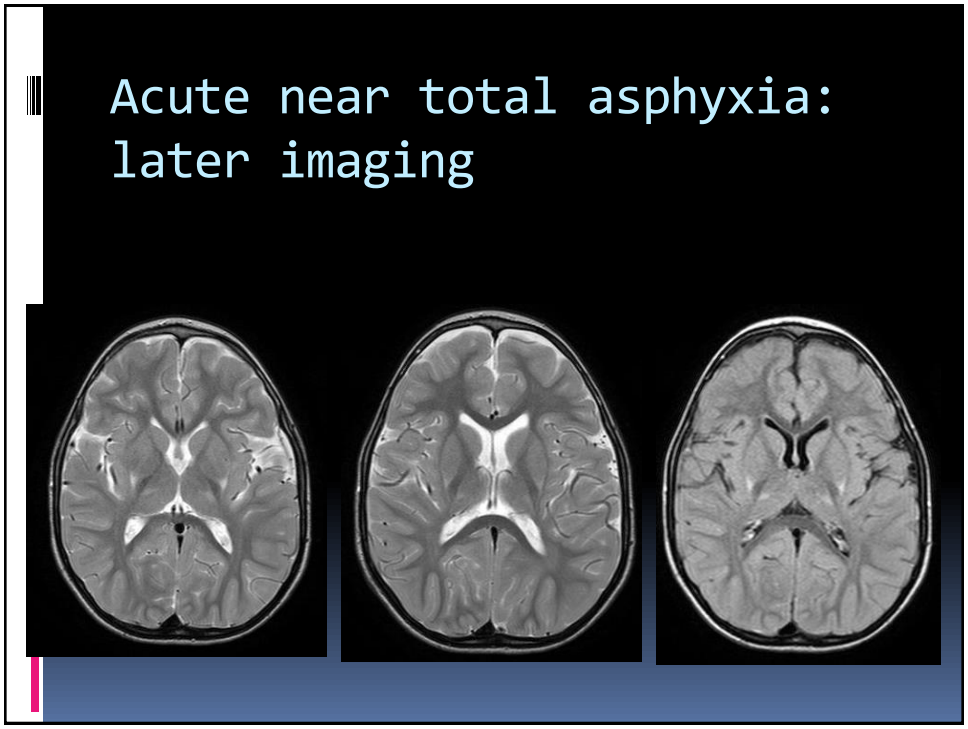
- Gospel:
- Normal infant can withstand 10 minutes of such an insult
- Unlikely to survive insults 25 min +
- Assessment of duration
  - Putamina only: closer to lower end of time window
  - Full house: closer to longer end of time window

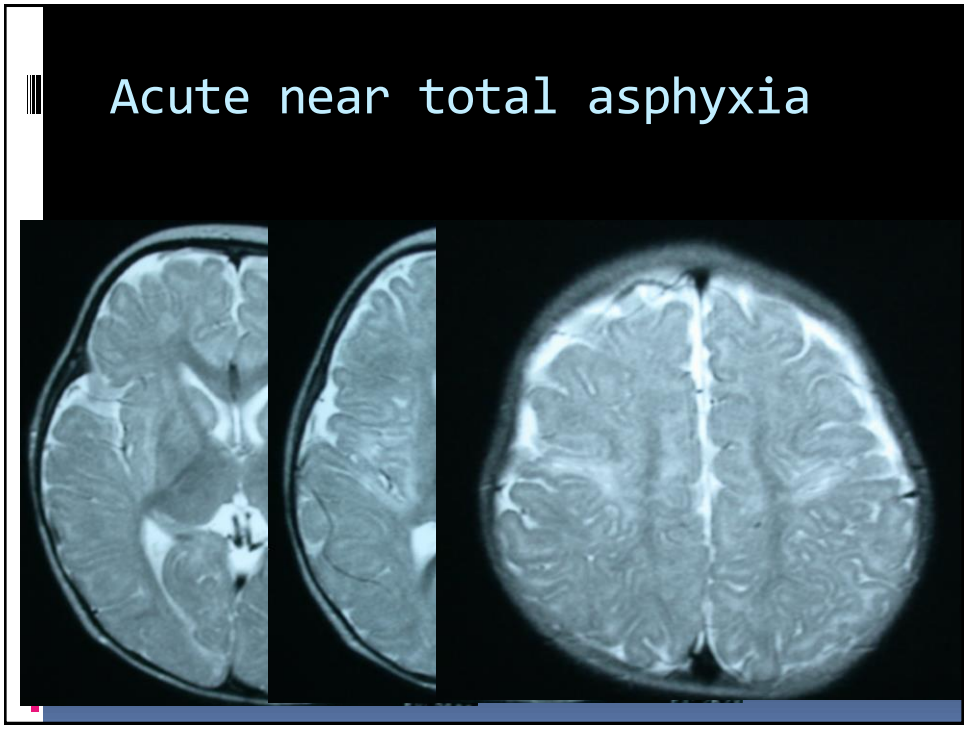
Acute near total asphyxia: early scan



Acute near total asphyxia

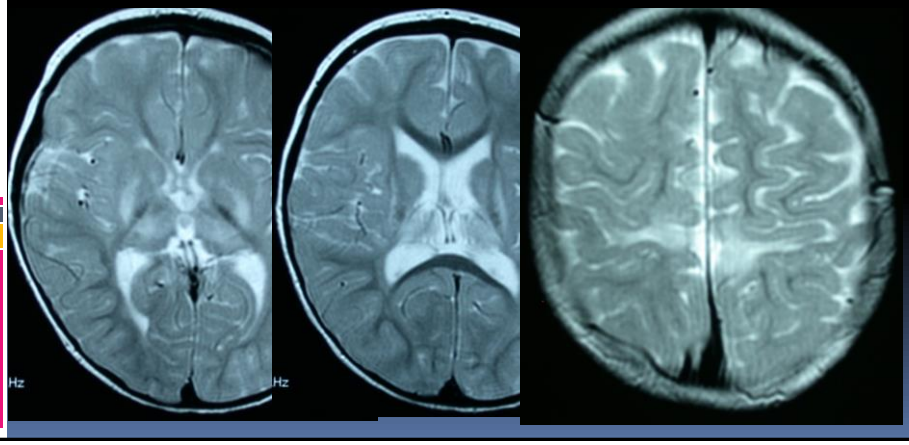



Acute near total asphyxia:
later imaging

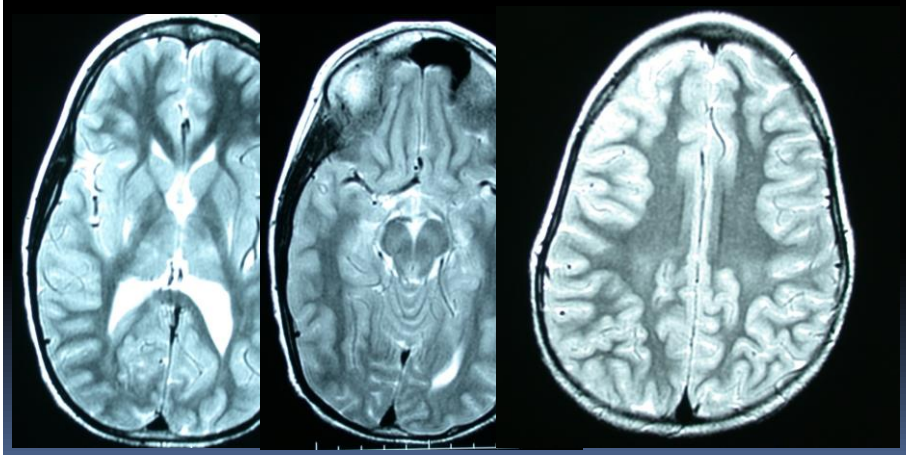

Acute near total asphyxia

Acute near total asphyxia

- Imaged at 15 months



Acute near total asphyxia: imaged at 18 years



Chronic partial insults

- Watershed areas
- Cerebral perfusion from two sources
  - Vessels from Circle of Willis (majority)
  - Vessels from pial covering of brain (minority)
- From ~ 36 weeks gestation these meet at around the level of the depths of the sulci

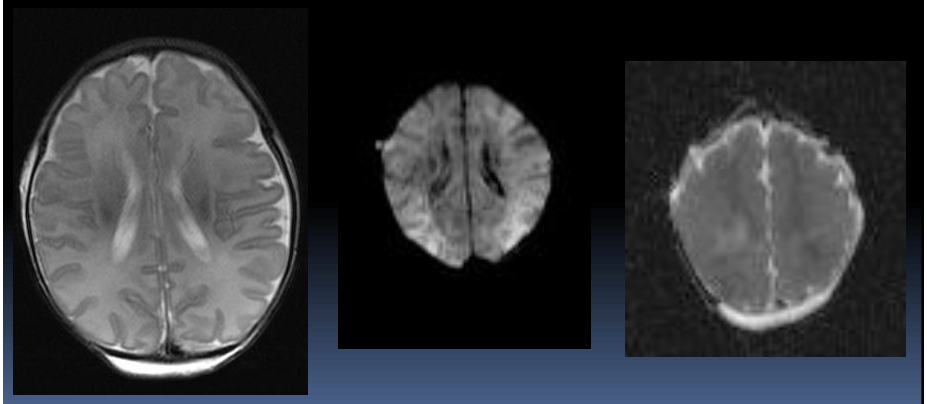
Chronic partial hypoxia / hypoperfusion

- Moderate hypoxia over longer period or intermittent hypoxia
  - lesions in
    - cortex: ulegyria = atrophy at base of gyri
    - subcortical white matter: parasagittal, anterior and posterior watershed areas
    - more susceptible to perinatal events if previous intermittent hypoxia / poor perfusion / placental insufficiency

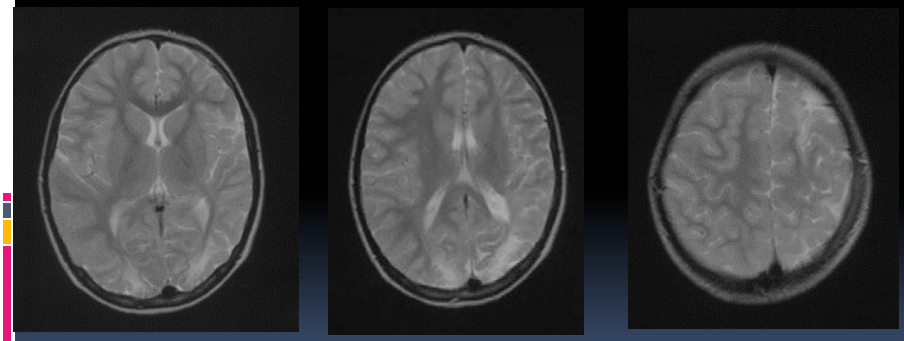
Chronic partial hypoxia

- Gospel: Normal infant can withstand 1 hour of such an insult before brain damage begins

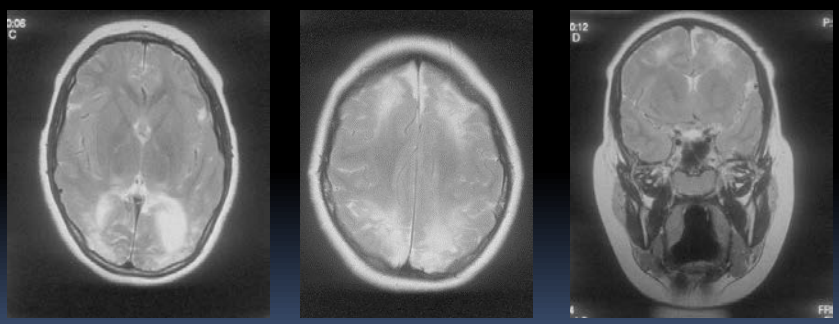
Chronic partial insult:neonatal imaging



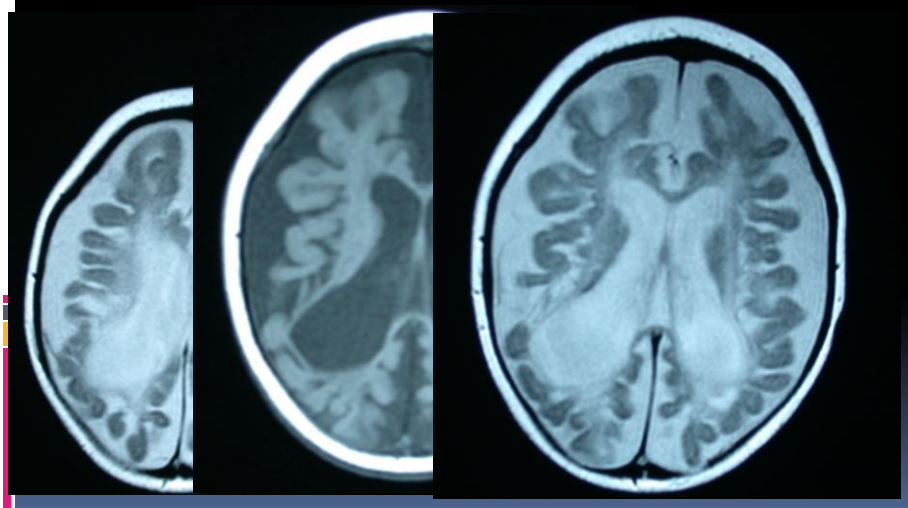
Chronic partial insult: later imaging



Chronic partial insult: later imaging gliosis,atrophy and ulegyria



Severe chronic partial insult



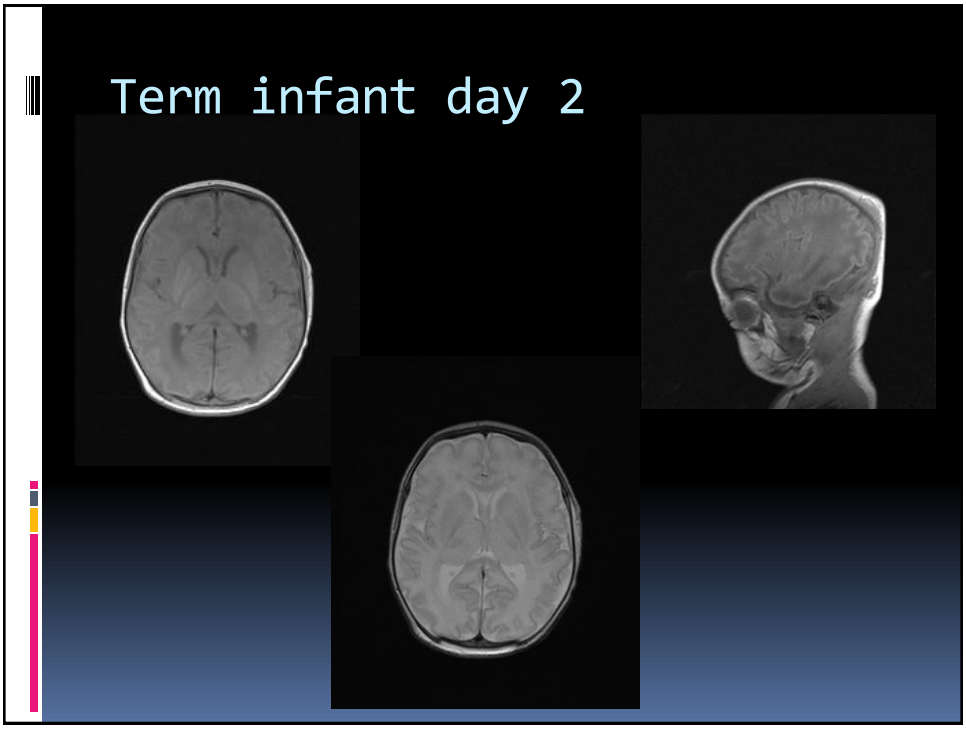
Progression of changes

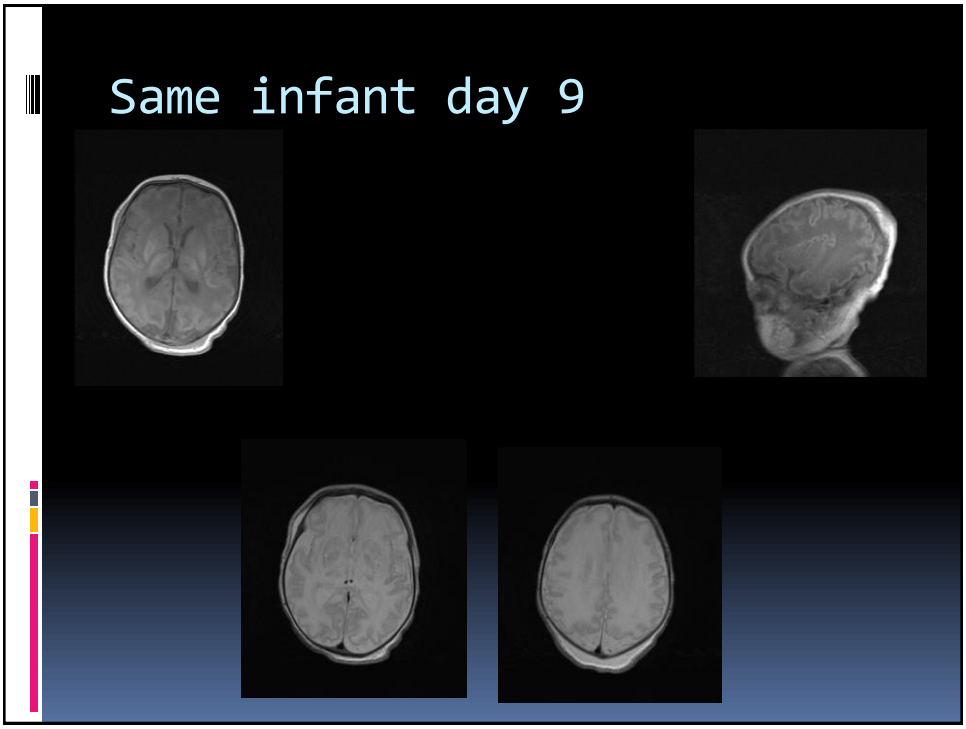
- Acute event

  Effects not static

  Scan appearances = snapshot

  Prognosis may not be clear from early scans alone


Term infant day 2


Same infant day 9

Longer term effects

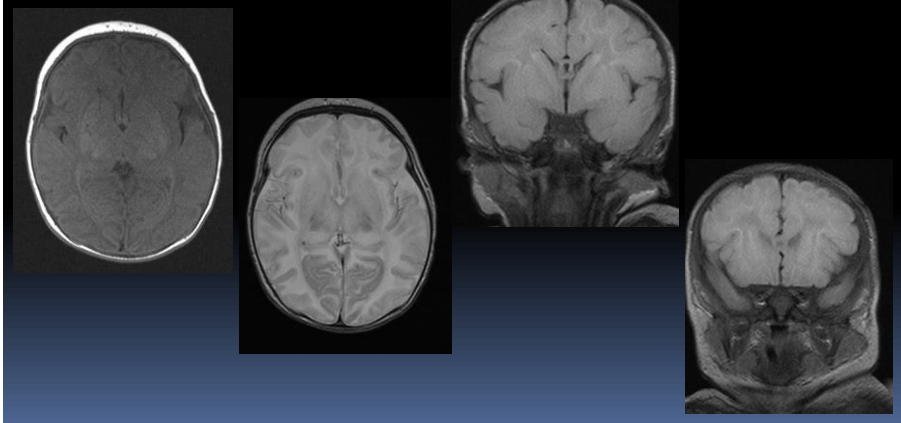
- Severe injuries:
  - white matter volume loss
  - microcephaly
  - Chronic partial
    - white matter gliosis (more than just subcortical WM affected)
  - Acute near total
    - white matter normal signal (secondary degeneration)

Mixed picture

- Severe chronic partial
  - can affect deep grey matter
  - more uniform basal ganglia and thalamic abnormality
  - white matter loss with gliosis
- Severe acute near total
  - more extensive deep grey matter involvement but
  - may be more widespread white matter involvement than just perirolandic
  - white matter loss without gliosis

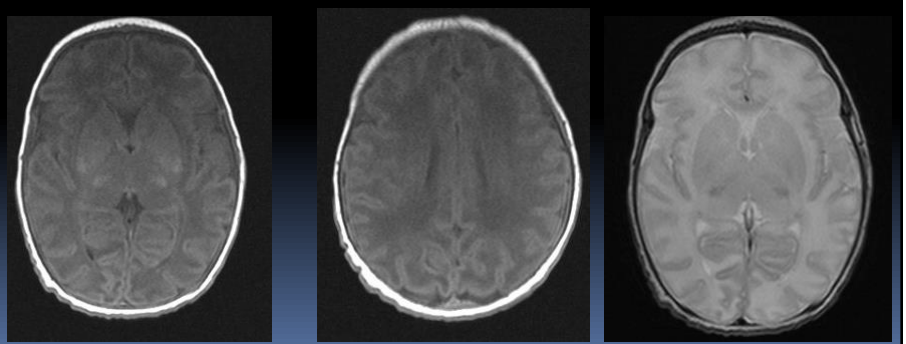
Mixed insults: neonatal imaging

- Acute near total with chronic partial



Mixed insults: neonatal imaging

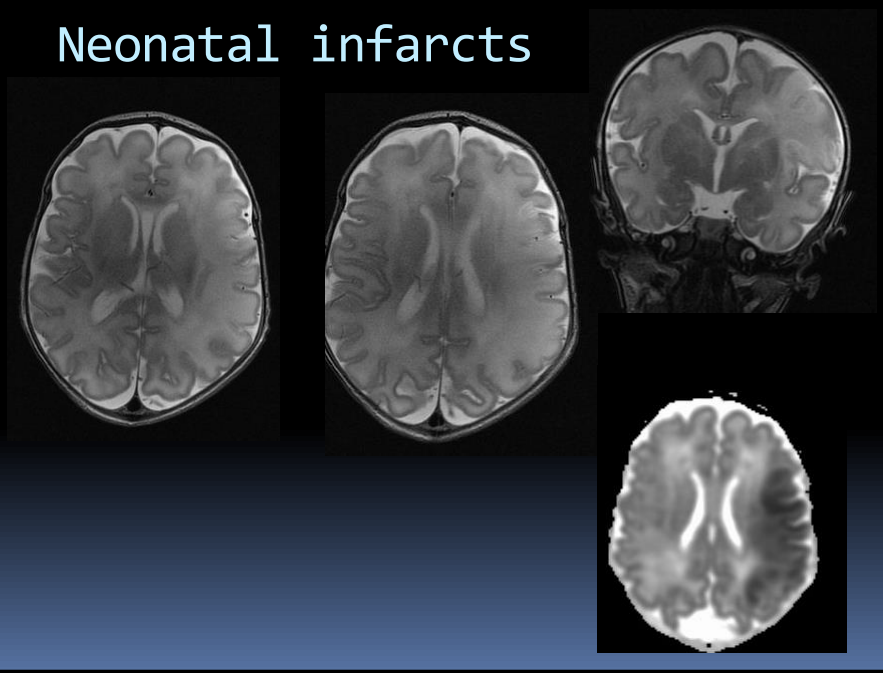
Acute near total insult with diffuse hemispheric signal change: commonly seen and resolves with no permanent change



Perinatal infarcts

- No cause found in 25 – 47%
- Many conditions implicated as associated
- Asphyxia not really one of those conditions

Neonatal infarcts



Periventricular leukomalacia

- Commoner in pre-term infants
- Not causally specific
  - Hypoxia / hypoperfusion
  - Cytokine release due to ascending infection (chorio-amnionitis)
  - Hypocarbia
  - IVH

Periventricular leukomalacia

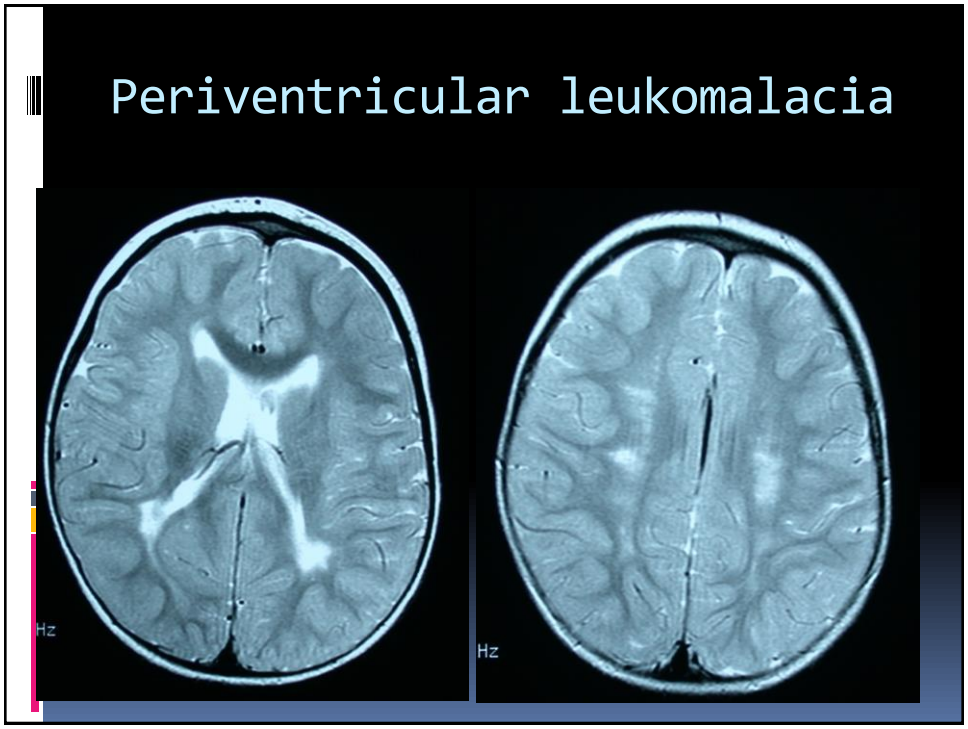
- Commonly occurs following insult ~ 26 – 34 weeks gestation
  - Damages pre-oligodendrocytes
  - Reduced white matter volume
- Causative insult at 28 weeks +
  - Gliosis and irregular ventricles
- Causative insult before 26 - 28 weeks (ish)
  - No gliosis and smoother ventricular margins

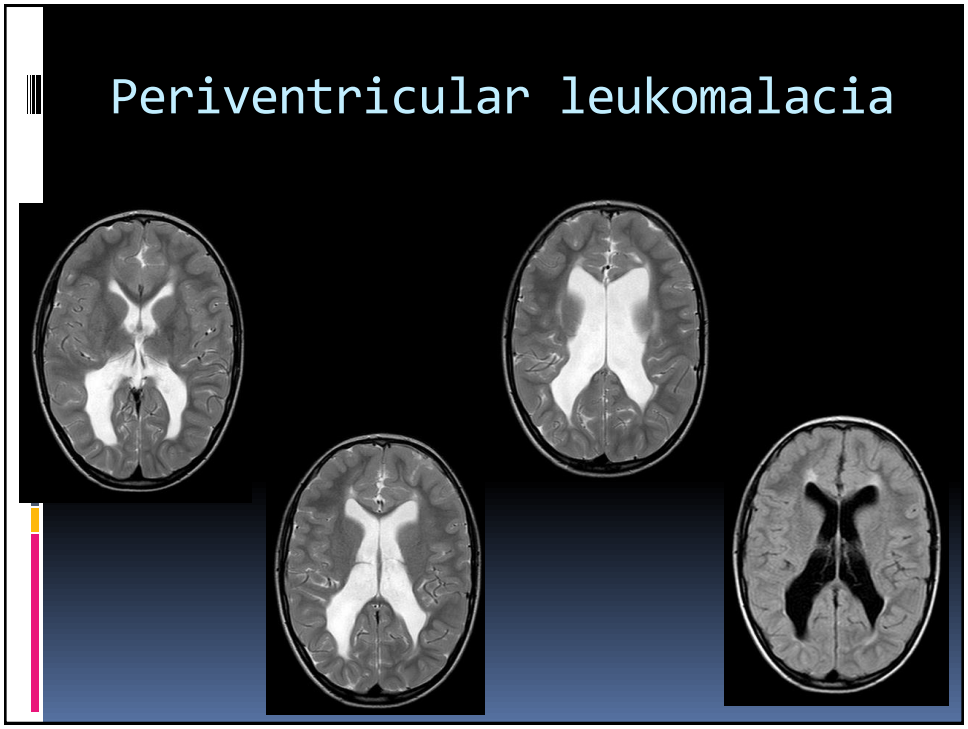
PVL

- Ultrasound
  - increased reflectivity min 24 - 48 hours post insult
  - cysts may evolve over 2 - 4 weeks
    - normal scan does not necessarily mean that insult has not already occurred

PVL

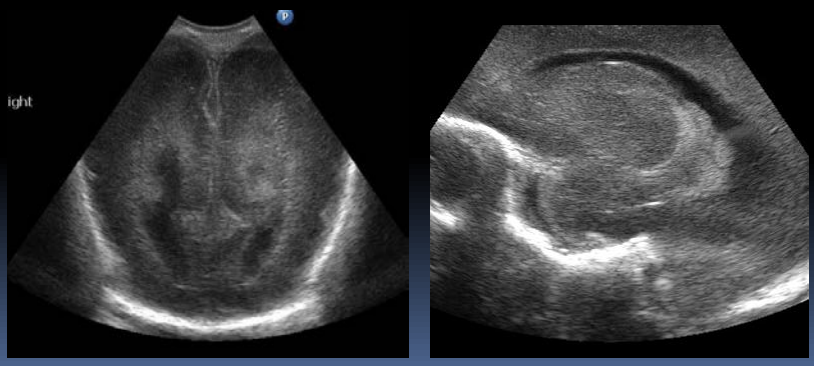
- MRI
  - classical appearances
    - large ventricles due to reduced volume of white matter
    - reduced white matter especially around trigones of posterior horns
    - irregular ventricular margins
    - gliosis (scarring) of residual white matter


Periventricular leukomalacia
Hz
Hz


Periventricular leukomalacia

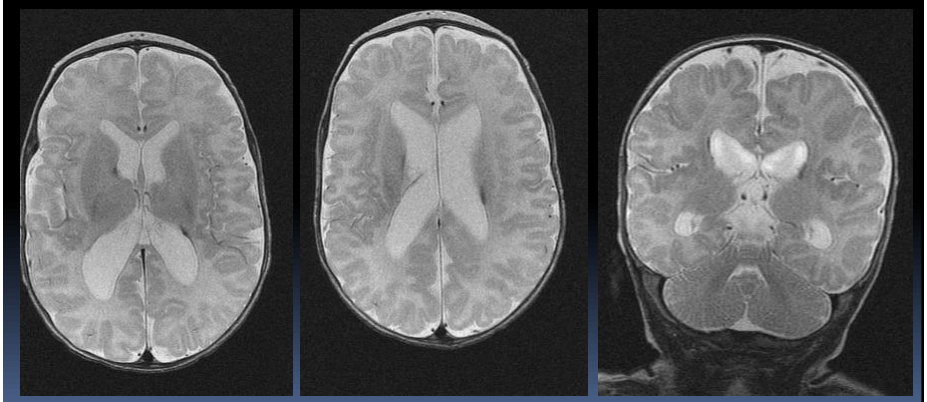
PVL

26 week twin: cerebral ultrasound day 1



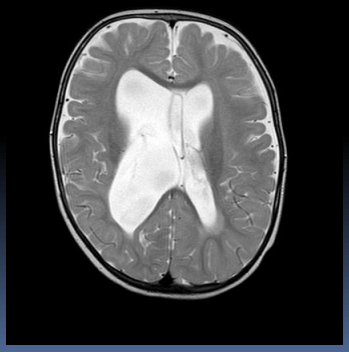
PVL

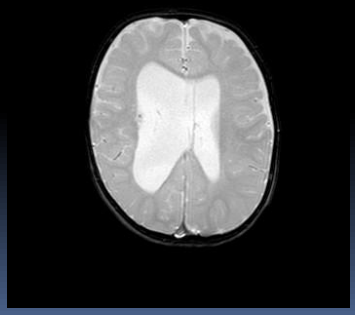
- MRI at 6 weeks post term



PVL

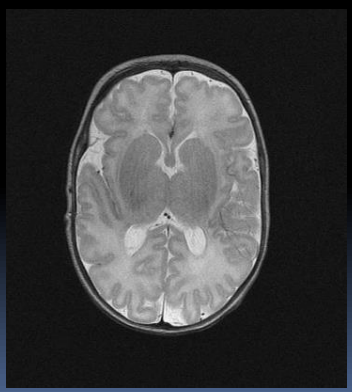
- 1 year later





Prematurity not enough

Ex - prem 24 week scanned at term equivalent age



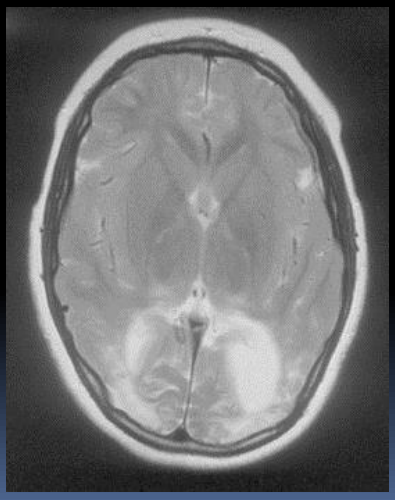
Hypoglycaemia

- Generalised insult
- Energy failure (cf hypoxia / hypoperfusion)
- Typically localised rather than generalised distribution
- Inferior parietal and occipital regions

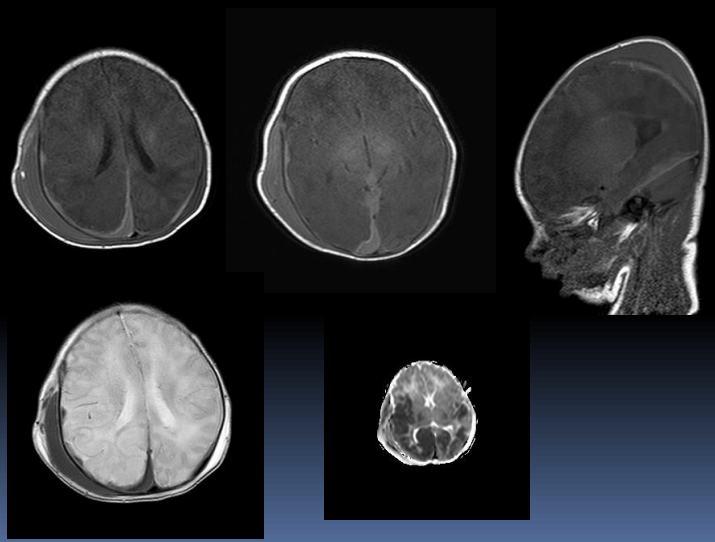
Hypoglycaemia

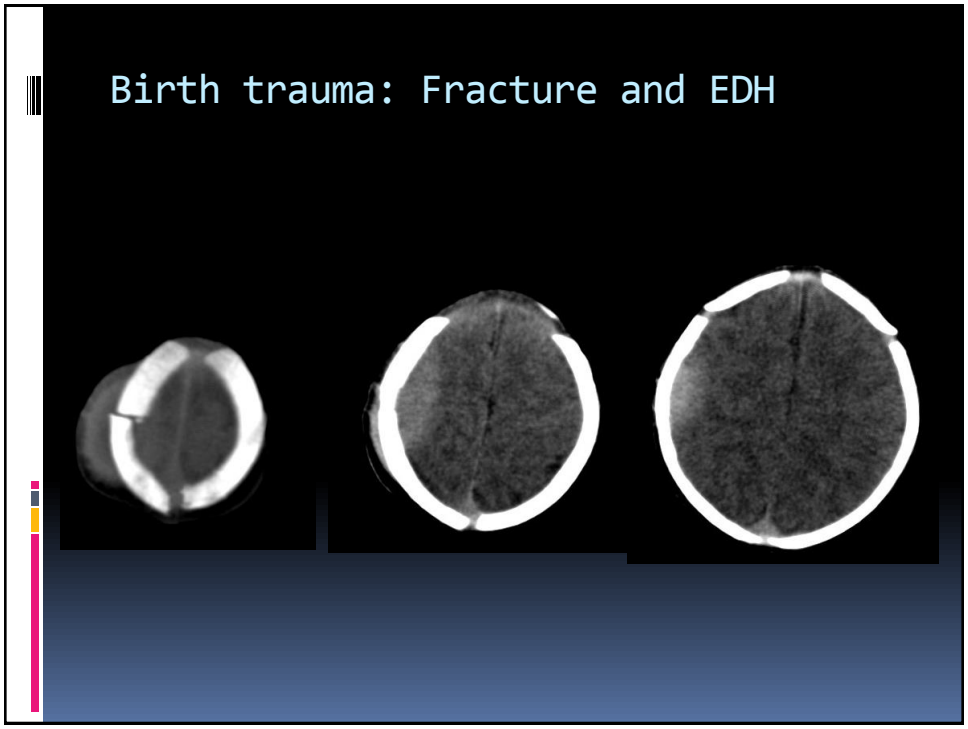
- Usually following profound / prolonged hypoglycaemia
- Unrecordable blood sugar
- In symptomatic infants: seizures

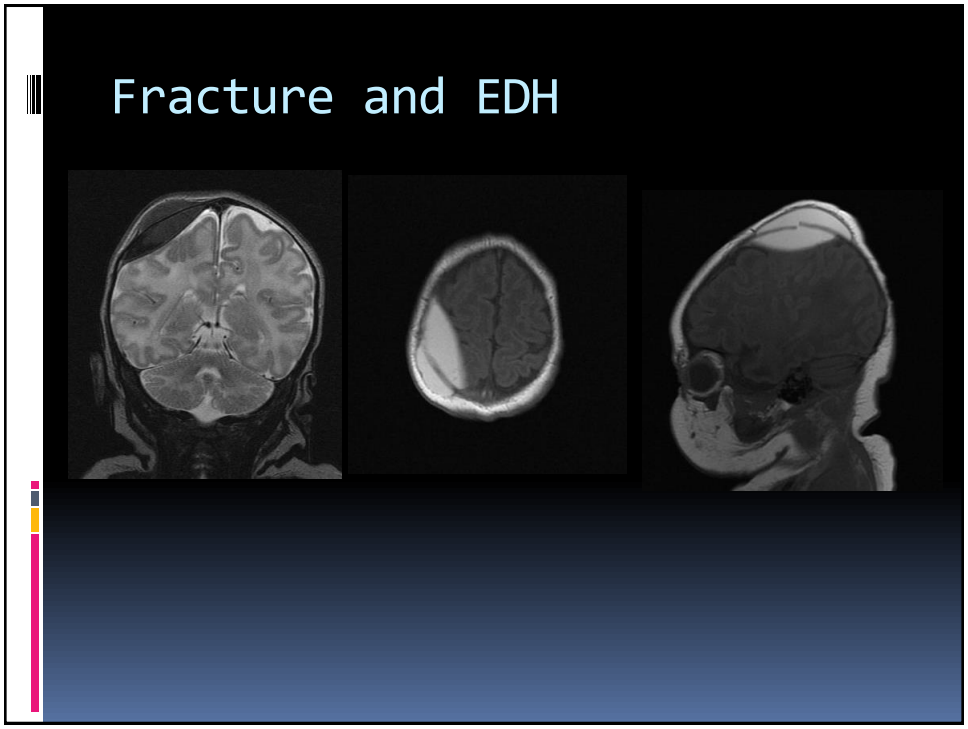
Hypoglycaemia



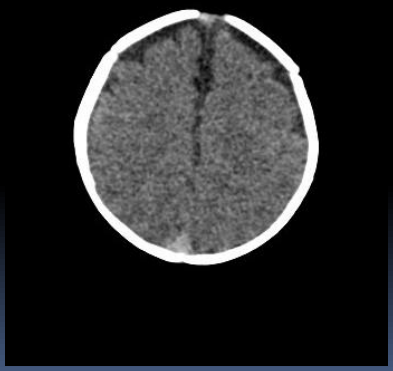
Birth trauma: Failed forceps

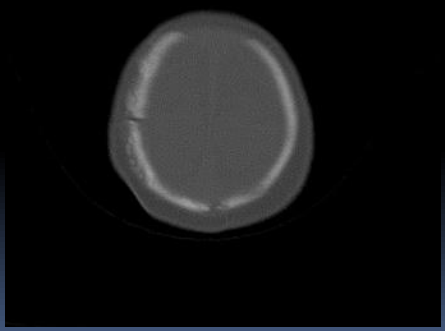



Birth trauma: Fracture and EDH


Fracture and EDH

6 Weeks later





Hypoxia and hippocampus

- Hippocampus very sensitive to hypoxia
- Hippocampal damage seen in cases of birth asphyxia
- Complex functions including memory circuits

- ?? Relation of birth asphyxia to later memory problems

Hypothesis

- Birth asphyxia causes hippocampal damage in absence of typical structural changes on scans
- Hippocampal damage leads to identifiable problems with certain types of memory
- Implies direct causal effect

Memory problems

- Impairments of episodic memory
  - Memory for events
- Relative preservation of semantic memory
  - Memory for facts

Structure v function

- Evidence base: main papers:
  - Gadian et al Brain (2000) 12: 499-507
  - Cooper et al Cerebral Cortex (2015) 25: 1469 - 1476

Results

- Both show reduced hippocampal volume in index cases
- Reduced regional deep grey matter volume
- Possible structural correlates

Evidence base

- Possible problems
  - Case selection
  - Study groups
  - Confounding variables
  - ? Study with infants with known structural damage secondary to HIE?

Conclusions

- MR best modality for demonstrating damage
- Assessment of long term damage best made at 2 years +
- Good at assessing type of insult(s)
- Cannot assess timing of insult from scan appearances alone

Every picture tells a story

- It just might not be the one you want to hear!

Determining Causation in Cerebral Palsy & Brain Injury Cases

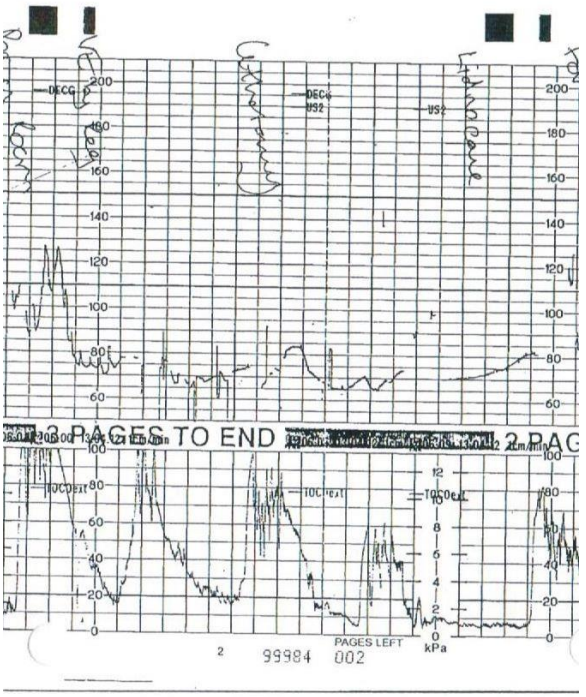
March 2018

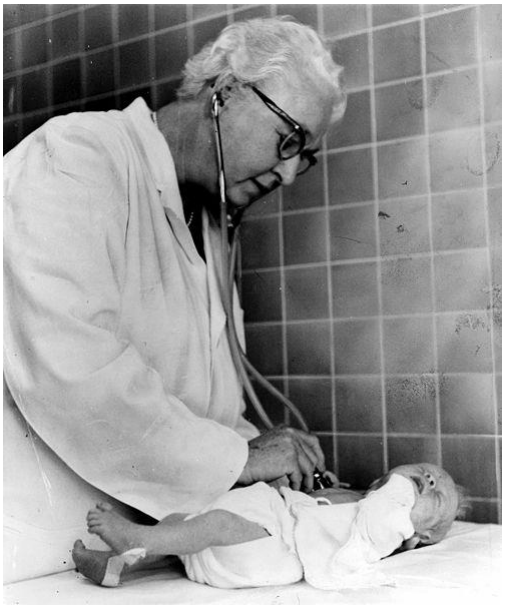
Dr Philip Jardine,
Consultant Paediatric Neurologist, Bristol

Facts

- Mum/dad/family statement
- Records (mum, child, red book) CTG, scalp pH, foetal movements, cord gases, Apgar scores, neonatal condition
- Cooled?
- Imaging
- SUI report
- See child

- Normal pregnancy
- SOL
- 39 +6
- Intermittent monitoring
- Concerns about bradycardia
- Brady 80/min (1725)
- Category 1 CS (birth at 1745). No comment about placenta or cord
- Cord gases taken
- Birth: Apnoeic and bradycardic (Apgars 0, 3). Cardiac massage and intubation
- Heart rate greater than 100 at 5 mins of age
- Neonatal encephalopathy with seizures
- Cooled
- MRI scan showed thalamic high signal
- Dyskinetic CP



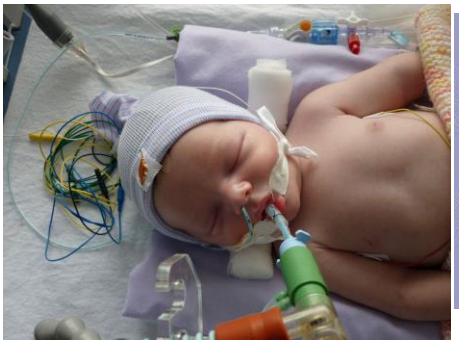


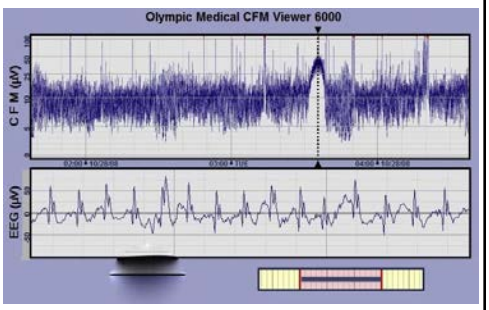
Apgar score

	0	1	2
Heart rate (P)	Absent	<100	>100
Respiratory effort (R)	Absent	Weak	Good, crying
Muscle tone (A)	Flaccid	Some flexion	Well flexed
Reflex irritability (G)	No response	Grimace	Cough or sneeze
Colour (A)	Pale or blue	Body pink, hands/feet blue	Completely pink

Neonatal encephalopathy

	MILD (1)	MODERATE (2)	SEVERE (3)
Conscious level	Hyperalert	Lethargic	Stuporose
Tone	Normal	Mild hypotonia	Flaccid
Suck	Weak	Weak or absent	Absent
Seizures	None	Common	Uncommon

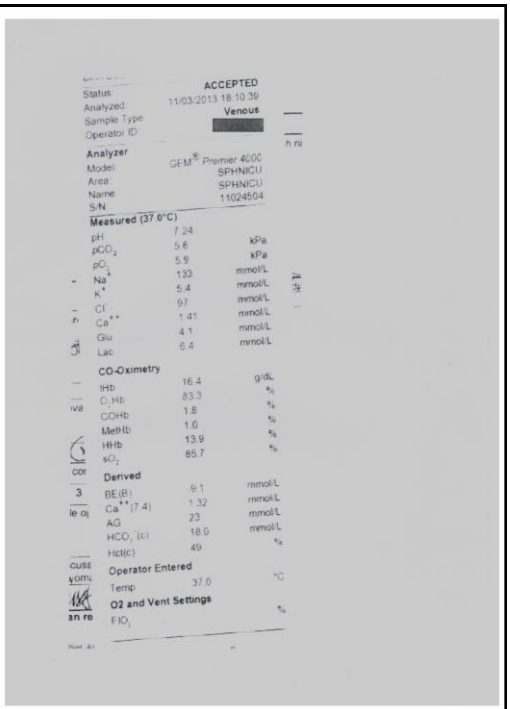




Normal Umbilical Cord Blood Gases

	Venous Blood Normal Range (Mean ± 2SD)	Arterial Blood Normal Range (Mean ± 2SD)
pH	7.25 – 7.45	7.18 – 7.38
PCO_2 (mmHg) *(kPa)***	26.8 – 49.2 *3.57 – 6.56*	32.2 – 65.8 *4.29 – 8.77*
PO_2 (mmHg) *(kPa)***	17.2 – 40.8 *2.29 – 5.44*	5.6 – 30.8 *0.75 – 4.11*
HCO_3^- (mmol/L)	15.8 – 24.2	17 – 27
BD* (mmol/L)	0 to 8	0 to 8

Table 1
Reprinted with permission from Elsevier, in part from Yeomans ER, Hauth JC, Gilstrap LC III, Strickland DM. Umbilical cord pH, PCO_2, and bicarbonate following uncomplicated term vaginal deliveries Am J Obstet Gynecol 1985;151:798-800.
Data are mean values ± 2 standard deviations (SD).
* Base deficit, estimated from data.
** 1 kPa = 7.50 mmHg; 1 mmHg = 0.133 kPa
Note: "Normal" is arbitrarily defined as the mean ± two times the standard deviation (approximately 95.4% of a normally distributed population).



Normal Umbilical Cord Blood Gases		
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pH	7.25 – 7.45	7.18 – 7.38
Pco_2 (mmHg) *(kPa)***	26.8 – 49.2 *3.57 – 6.56*	32.2 – 65.8 *4.29 – 8.77*
Po_2 (mmHg) *(kPa)***	17.2 – 40.8 *2.29 – 5.44*	5.6 – 30.8 *0.75 – 4.11*
HCO_3^- (mmol/L)	15.8 – 24.2	17 – 27
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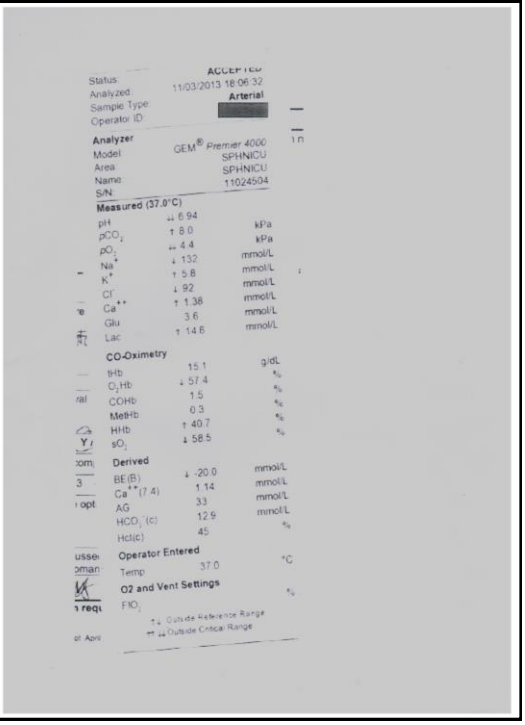


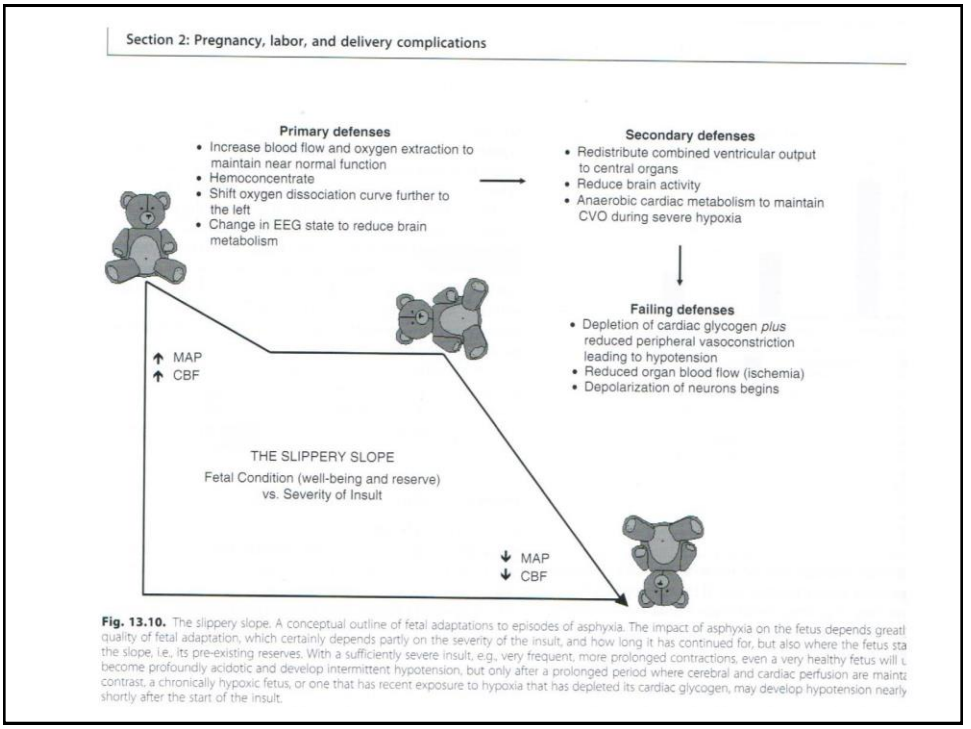
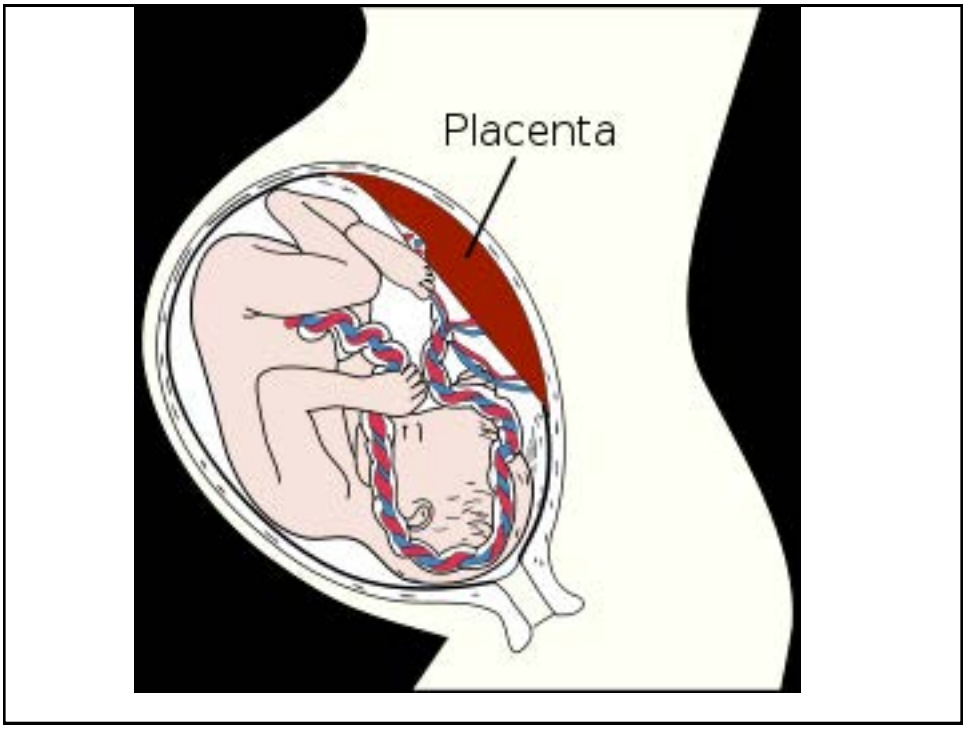
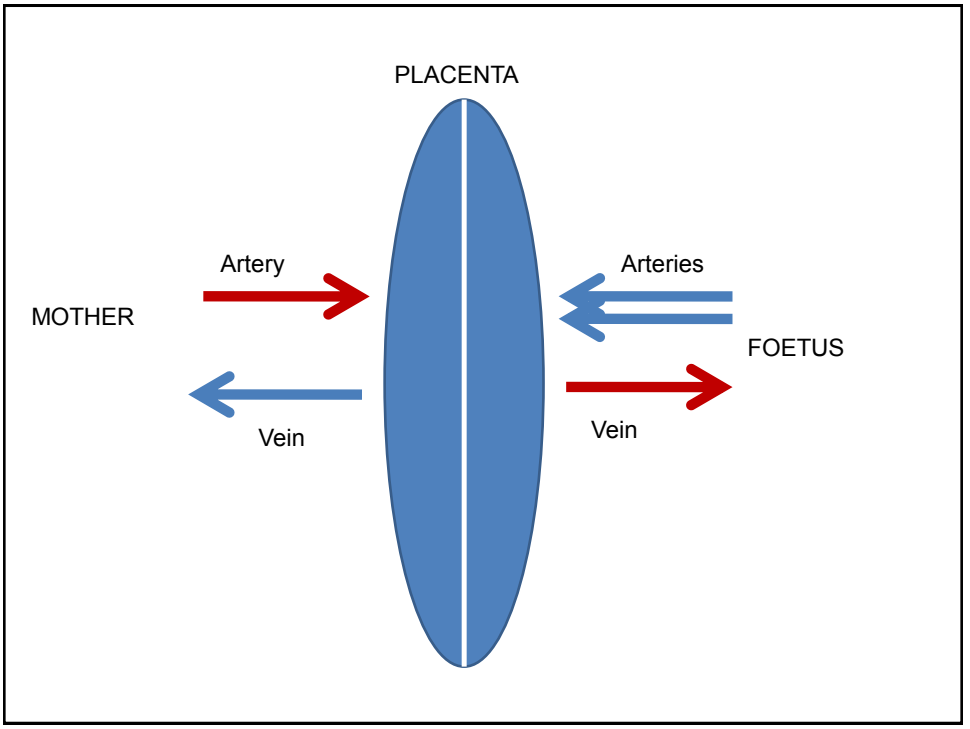
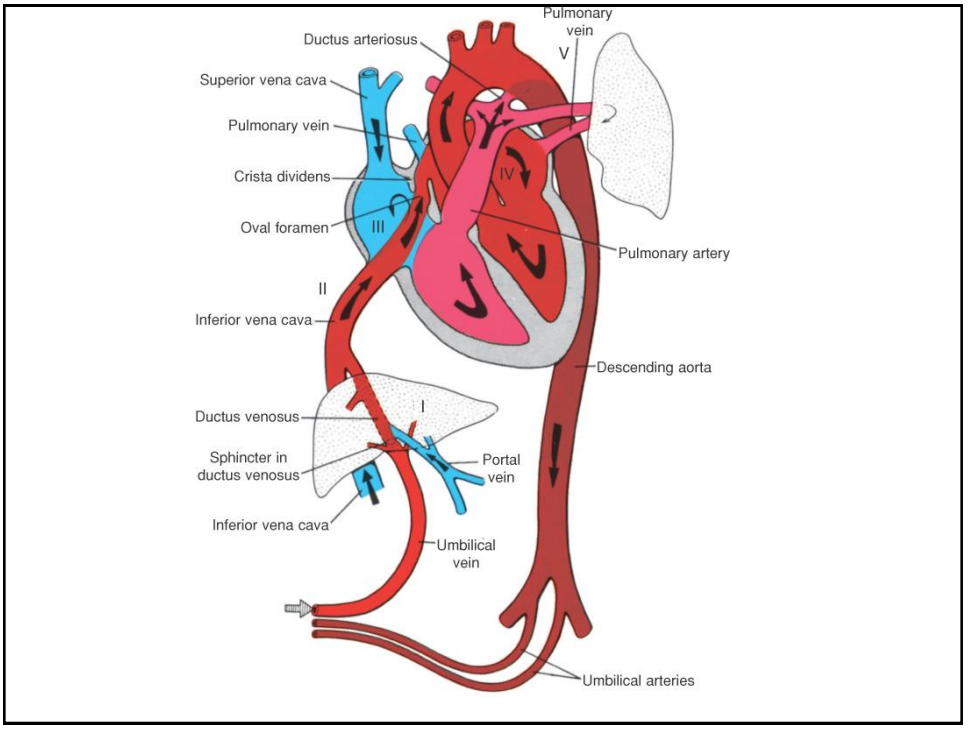


Fig. 13.10. The slippery slope. A conceptual outline of fetal adaptations to episodes of asphyxia. The impact of asphyxia on the fetus depends greatl quality of fetal adaptation, which certainly depends partly on the severity of the insult, and how long it has continued for, but also where the fetus sta the slope, i.e., its pre-existing reserves. With a sufficiently severe insult, e.g., very frequent, more prolonged contractions, even a very healthy fetus will u become profoundly acidotic and develop intermittent hypotension, but only after a prolonged period where cerebral and cardiac perfusion are maintz contrast, a chronically hypoxic fetus, or one that has recent exposure to hypoxia that has depleted its cardiac glycogen, may develop hypotension nearly shortly after the start of the insult.


Placenta

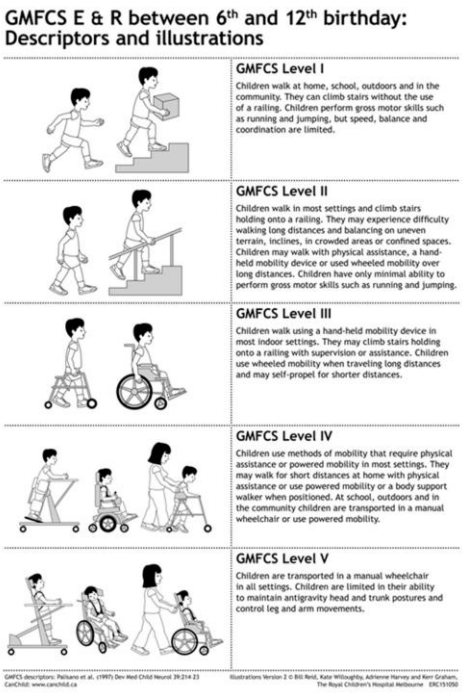

PLACENTA
Artery
MOTHER
Vein
Arteries
FOETUS
Vein



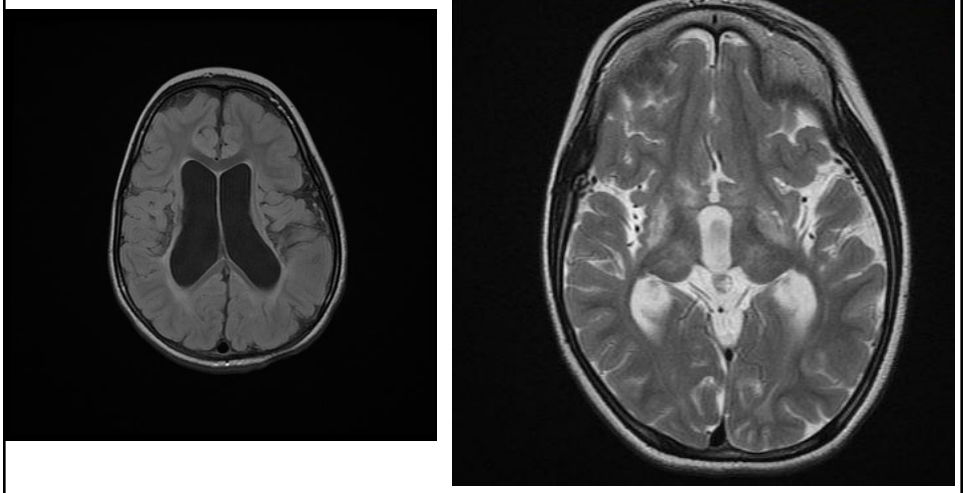
- Is there neurological impairment?
- Is there injury?
- What type of injury is it?
- How long was the insult?
- When did it start?
- When did it finish?
- When did it become damaging?
- When would delivery have to have been to avoid all injury?
- What was the mechanism?

- Working back and working forward approach

TOTAL PERIOD OF HYPOXIC ISCHAEMIA	BRAIN DAMAGING PERIOD OF HYPOXIC ISCHAEMIA	CLINICAL FINDINGS	
0-10 mins	Zero	Normal	
10-15 mins	0-5 mins	Bilateral dystonic (extrapyramidal) cerebral palsy ambulant (likely to be) self feeding and able to use speech (but dysarthric). Any learning difficulties are usually mild. Speech often dysarthric.	GMFCS Level II
15-20 mins	5-10 mins	Bilateral dystonic (extrapyramidal) cerebral palsy usually non-ambulant) and hand function impaired. bulbar palsy leading to speech and feeding difficulties and a requirement for communication aids. Intellect usually impaired to some degree	GMFCS Level III
20-25 mins	10-15 mins	Bilateral spastic/dystonic CP, non ambulant and often quite a paucity of movement with very poor motor function. Intellectual impairment significant. Very dependent children often requiring gastrostomy feeds and usually wholly dependent for hygiene etc. Usually no speech.	GMFCS Levels IV or V
>25 mins	>15 mins	Death or unable to move or swallow (usually gastrostomy fed). Severe or profound cognitive impairment. Microcephaly	GMFCS Level V



	Acute profound	Chronic partial
Insult duration	0-25 mins	At least an hour-days
Reserve	10 mins	Very variable
Parts of brain damaged	Basal ganglia first	"Watershed"
Type of CP	Dyskinetic	Spastic/Learning difficulties
Mechanism	Cord compression	Placental failure (and others)



Independent risk factors for cerebral palsy (adapted from 2017 NICE CP guideline)

Antenatal Factors

- Preterm birth
- Chorioamnionitis
- Maternal respiratory tract infection or genito-urinary infection treated in hospital

Perinatal Factors

- Low birth weight (at increased risk if birth weight <1.5kg)
- Chorioamnionitis
- Neonatal encephalopathy (as a result of, eg, sepsis, hypoxic-ischaemic injury)
- Neonatal sepsis
- Maternal respiratory tract infection or genito-urinary infection treated in hospital

Postnatal Factors

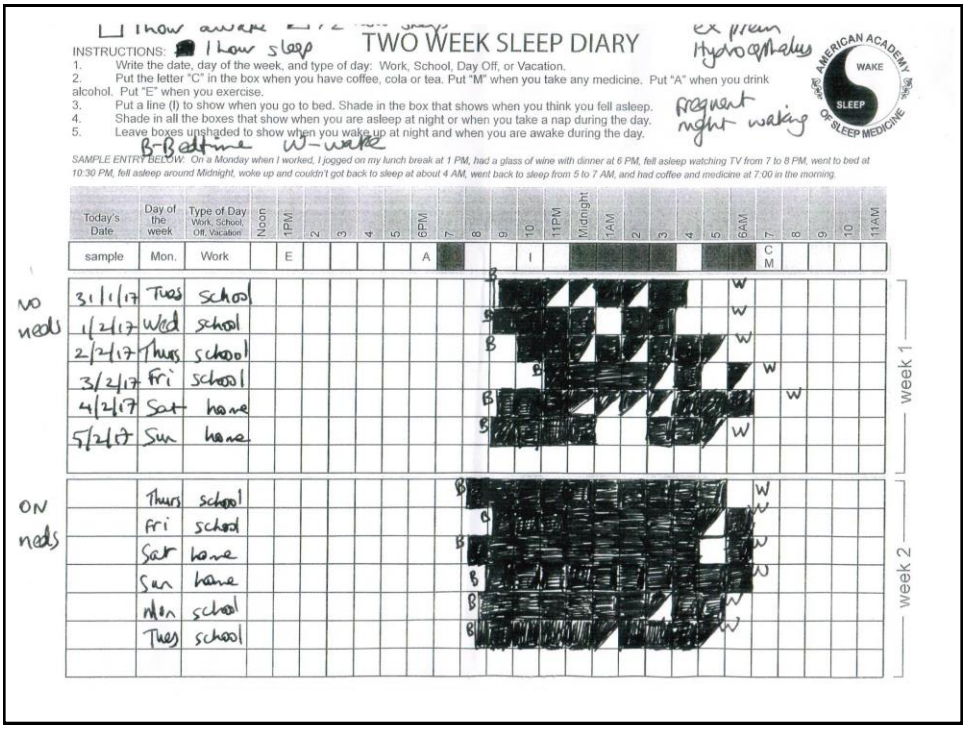
- Meningitis or other infections
- Head injury

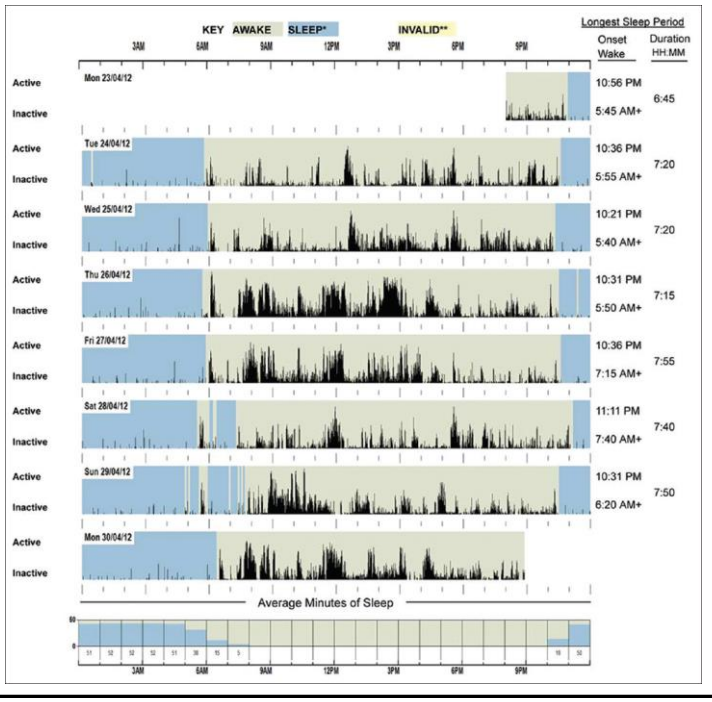
Sleep (or lack of it) is back in fashion. Two recent books, *Why We Sleep* by neuroscientist Matthew Walker and *The Business of Sleep* by clinical psychologist Vicki Culpin, warn in the strongest terms that regularly sleeping less than seven hours a night is a disaster for our mental and physical wellbeing.

Sleep problems in CP

- Brain
- Behaviour
- Breathing

Cerebral Palsy & Brain Injury Cases
8th March 2018 Doubletree by Hilton
Bristol City Centre

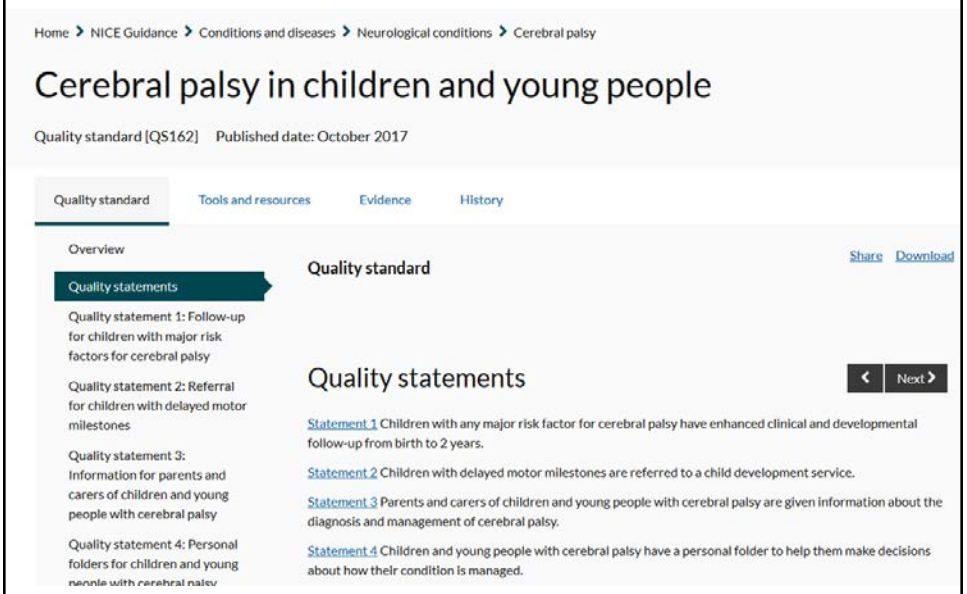




Cerebral palsy in under 25s: assessment and management (NICE Guideline NG62) Jan 2017

Diagnosing cerebral palsy:

- Identify independent risk factors for cerebral palsy. Refer any child with one or more risk factors for clinical and developmental follow-up, by a multidisciplinary team, until 2 years corrected gestational age.
- Recognise abnormal signs suggestive of cerebral palsy and make an urgent referral to a child development service for a multidisciplinary assessment
- Arrange an MRI scan if the aetiology of cerebral palsy is unclear from the history, developmental assessment, clinical examination or cranial ultrasound results.



Pain, sleep and mental health (NICE CP guideline)

- Ask about signs of pain or discomfort and sleep disturbance and explore any emotional difficulties during consultations. Assessing such symptoms can be challenging in those with communication or learning difficulties.
- Manage pain, discomfort or distress
- Identify treatable causes of sleep disturbance, such as obstructive sleep apnoea, seizures, pain, poor sleep hygiene, night-time interventions, need for repositioning and medication side effects. Consider a trial of melatonin in the absence of a treatable cause. Refer to specialist sleep services, if disturbances are ongoing.
- Use validated tools to assess mental health problems and refer for specialist psychology assessment if there are concerns. Address possible contributing factors, such as communication difficulties, medication side effects and polypharmacy, comorbidities or social care needs.

Types of disabilities

- Motor (Cerebral palsy)
- Visual impairment/deafness
- Learning difficulties (mental retardation, developmental delay)
- Autism and other behavioural disorders
- Epilepsy
- Specific cognitive problems (especially memory)

What is cerebral palsy?

Cerebral palsy describes a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication, behaviour, by epilepsy and by secondary musculoskeletal problems. (Modified after Bax et al. 2005)

Other features associated with cerebral palsy

- Mental retardation
- Epilepsy
- Visual/hearing impairment
- Feeding and swallowing difficulties
- Behavioural difficulties
- Contractures/hip dislocation/scoliosis

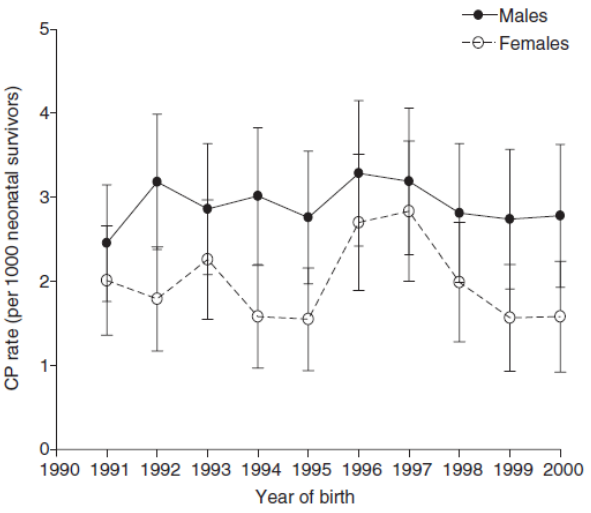


Figure 1 Prevalence rates of cerebral palsy (CP) in singletons (per 1000 neonatal survivors) by year of birth and infant sex, 1991–2000.

nianaia SV, Rankin J, Colver A, *et al. Arch Dis Child* (2010). doi:10.1136/adc.2010.183939

Estimates of proportion of cerebral palsy in term and near-term infants attributed to major causes in population based studies

Neuroimaging based	
Stroke	22%
Congenital malformation	15%
White matter disorder	12%
Hypoxia/ischaemia	5%
Clinical studies	
Intrauterine exposure to inflammation	11-12%
Intrapartum hypoxia/ischaemia	6%
Complications of multiple birth	5%

(from Nelson et al 2008)

avma
action against medical accidents

Types of cerebral palsy

- Spastic (diplegia, hemiplegia, quadriplegia)
- Dyskinetic
- Others (ataxic, hypotonic)

- Different types of CP are commoner at different gestations (preterm-diplegia, term dyskinetic, hemiparesis, quadriplegia)
- Different types of CP have different causes:

  Hemiplegia: strokes and malformations

  Diplegia: intrauterine infection, preterm membrane rupture, multiple gestation

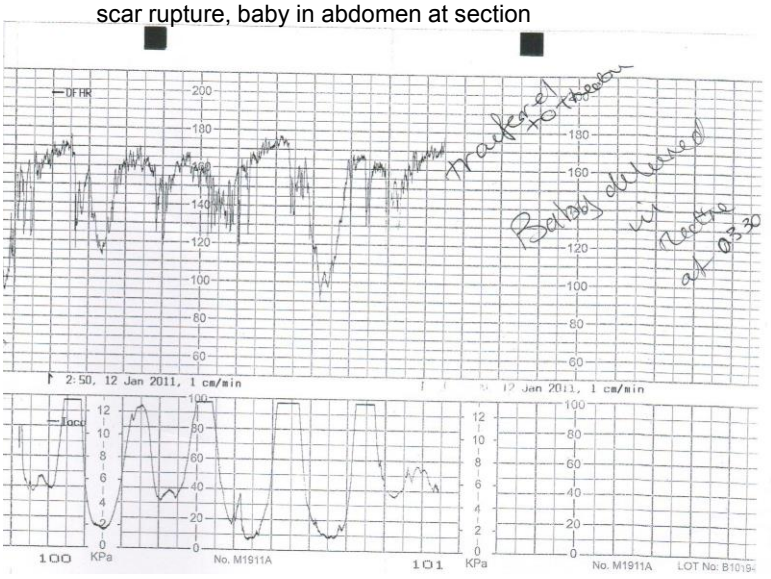
  Dyskinetic CP: acute profound hypoxia/ischaemia, kernicterus, genetic

  Spastic quadriparesis: chronic partial hypoxia/ischaemia, genetic, infections

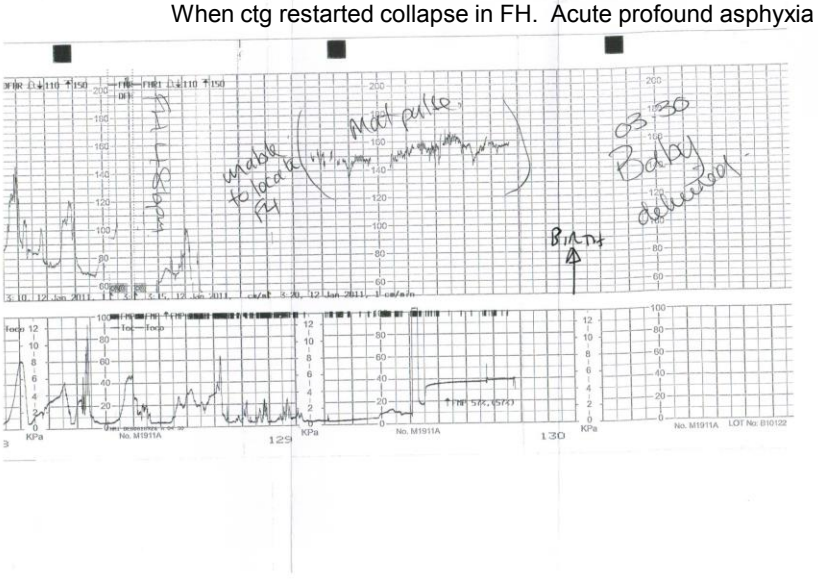
Causation

- Is the diagnosis of cerebral palsy correct and what is the type (physical examination)?
- If so what has caused it (neuroradiology report on MRI scan)
- **Was there evidence of intrapartum hypoxia/ischaemia of potentially damaging severity (CTG, history, scalp pH)?**
- What was the condition at birth? (Apgar scores, cord gases)
- Was there neonatal encephalopathy? (neonatal notes)
- Is the outcome one that intrapartum hypoxia/ischaemia could explain?

Previous LSCS, syntocinon, frequent contractions, scar rupture, baby in abdomen at section



When ctg restarted collapse in FH. Acute profound asphyxia



Potential causes of brain injury at or around the time of birth (acute or chronic)

Mother	Placenta/Uterus	Cord	Foetus/baby
Shock	Excessive uterine action	Prolapse	Infection
Trauma	Abruption	Compression	Bleeding
Maternal hypotension	Poor function	Entanglement	Twin complications
	Chorioamnionitis		
	Emboli		
	Uterine rupture		

action against medical accidents

Electronic monitoring (CTG)

- Assume prevalence of CP is 3/1000 live births
- Assume 10% of CP is caused by intrapartum hypoxia/ischaemia
- 0.3/1000 is prevalence of CP due to intrapartum hypoxia/ischaemia (an uncommon cause of a rare outcome)
- Would need study of very large numbers of labours to show reduction in CP
- "Birth can be a hazardous journey: electronic fetal monitoring does not help"

Causation

- Is the diagnosis of cerebral palsy correct and what is the type (physical examination)?
- If so what has caused it (neuroradiology report on MRI scan)
- Was there evidence of intrapartum hypoxia/ischaemia of potentially damaging severity (CTG, history, scalp pH)?
- **What was the condition at birth? (Apgar scores, cord gases)**
- Was there neonatal encephalopathy? (neonatal notes)
- Is the outcome one that intrapartum hypoxia/ischaemia could explain?

Causation

- Is the diagnosis of cerebral palsy correct and what is the type (physical examination)?
- If so what has caused it (neuroradiology report on MRI scan)
- Was there evidence of intrapartum hypoxia/ischaemia of potentially damaging severity (CTG, history, scalp pH)?
- What was the condition at birth? (Apgar scores, cord gases)
- **Was there neonatal encephalopathy? (neonatal notes)**
- Is the outcome one that intrapartum hypoxia/ischaemia could explain?

Neonatal encephalopathy ("HIE")

- Thought to be an inevitable intermediary between asphyxial birth injury and CP.
- Causes of neonatal encephalopathy (intrapartum hypoxia/ischaemia, metabolic, infections)

Table 1. Hypoxic ischaemic encephalopathy score.

Sign	Score 0	1	2	3
Tone	Normal	Hyper	Hypo	Flaccid
LOC	Normal	Hyper alert, stare	Lethargic	Comatose
Fits	None	Infreq $< 3\ d^{-1}$	Frequent>2/day	
Posture	Normal	Fisting, cycling	Strong, distal flexion	Decerebrate
Moro	Normal	Partial	Absent	
Grasp	Normal	Poor	Absent	
Suck	Normal	Poor	Absent ± bites	
Resp.	Normal	Hypervent	Brief apnoea	IPPV (apnoea)
Font	Normal	Full, not tense	Tense	
				Total score per day–

Cooling for newborns with hypoxic ischaemic encephalopathy (Review)

Jacobs SE, Berg M, Hunt R, Tarnow-Mordi WO, Inder TE, Davis PG

THE COCHRANE COLLABORATION®

PLAIN LANGUAGE SUMMARY

Cooling for newborns with hypoxic ischaemic encephalopathy

There is evidence that induced hypothermia (cooling) of newborn babies who may have suffered from a lack of oxygen at birth reduces death or disability, without increasing disability in survivors. This means that parents should expect that cooling will decrease their baby's chance of dying, and that if their baby survives, cooling will decrease his/her chance of major disability. A lack of oxygen before and during birth can destroy cells in a newborn baby's brain. The damage caused by the lack of oxygen continues for some time afterwards. One way to try to stop this damage is to induce hypothermia - cooling the baby or just the baby's head for hours to days. This treatment may reduce the amount of damage to brain cells. This review found that there is evidence from trials to show that induced hypothermia helps to improve survival and development at 18 to 24 months for term and late preterm newborn babies at risk of brain damage. More research is needed to understand which infants need cooling and the best way of cooling, including duration of treatment and method of cooling.

Table 2. Main Neurodevelopmental Outcomes at 18 Months.

Outcome	Cooled Group	Noncooled Group	P Value	Relative Risk (95% CI)
	no./total no. (%)			
Primary outcome				
Combined death and severe neurodevelopmental disability	74/163 (45)	86/162 (53)	0.17	0.86 (0.68–1.07)
Secondary outcomes*				
Death	42/163 (26)	44/162 (27)	0.78	0.95 (0.66–1.36)
Severe neurodevelopmental disability	32/120 (27)	42/117 (36)	0.13	0.74 (0.51–1.09)
Survival without neurologic abnormality	71/163 (44)	45/162 (28)	0.003	1.57 (1.16–2.12)
Multiple neurodevelopmental disabilities	21/112 (19)	33/110 (30)	0.05	0.63 (0.39–1.01)

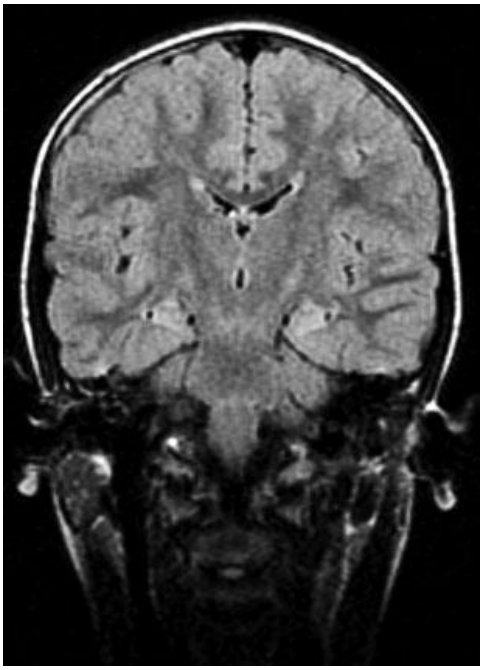
Causes of brain injury around the time of birth other than intra-partum hypoxia/ischaemia

- Kernicterus
- Hypoglycaemia
- Hypernatraemia
- Birth trauma
- Failure of adequate resuscitation (Antoniades and East Sussex NHS Trust)
- Hydrocephalus
- Over ventilation

Can intrapartum hypoxia/ischaemia lead to outcomes other than CP?

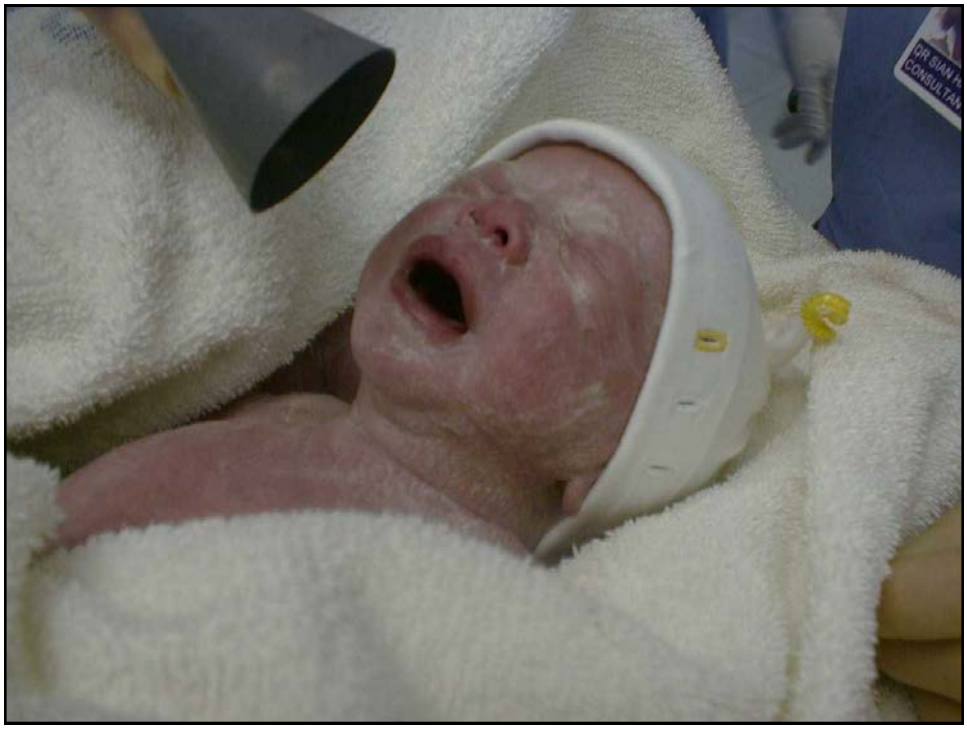
- Learning/behaviour
- Developmental amnesia
- ? Autism, ? other disorders

Apgar score at 1 and 5 min was 4 and 5 respectively;
Umbilical cord pH 6.84.
Early seizures.
Age 2 years thought to be normal
Age 5: concern about school progress
Neuropsychology: severe defect of episodic memory



Normal imaging

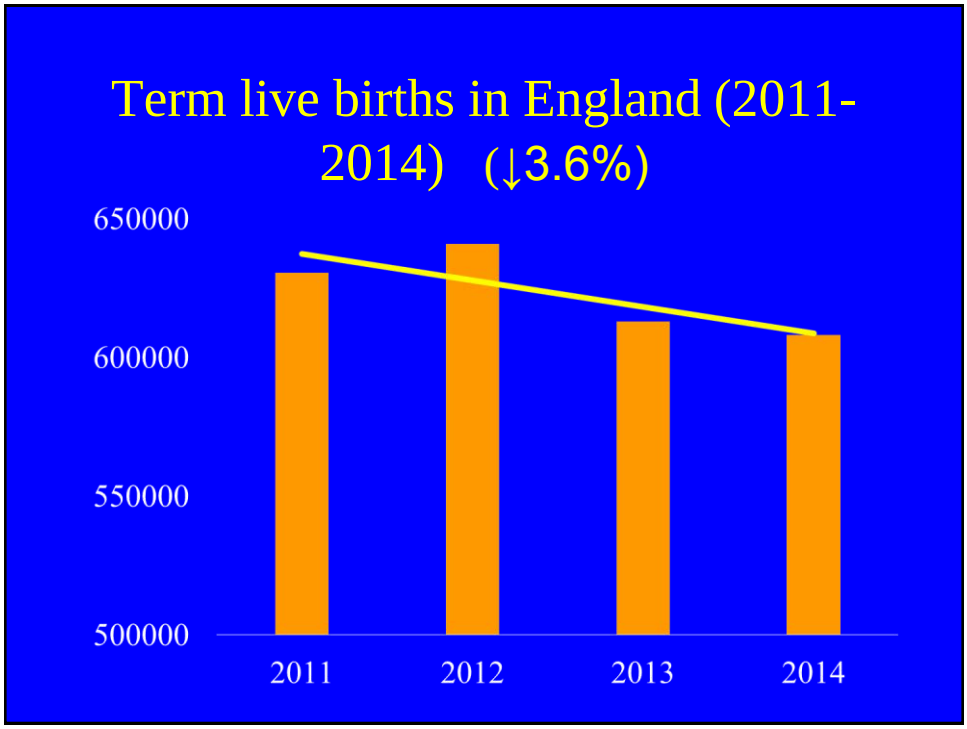
- Seen in about 15% of CP
- ? Repeat scan
- ? Neuroradiology report
- Is it damage that cant be seen with present technology
- Metabolic/genetic

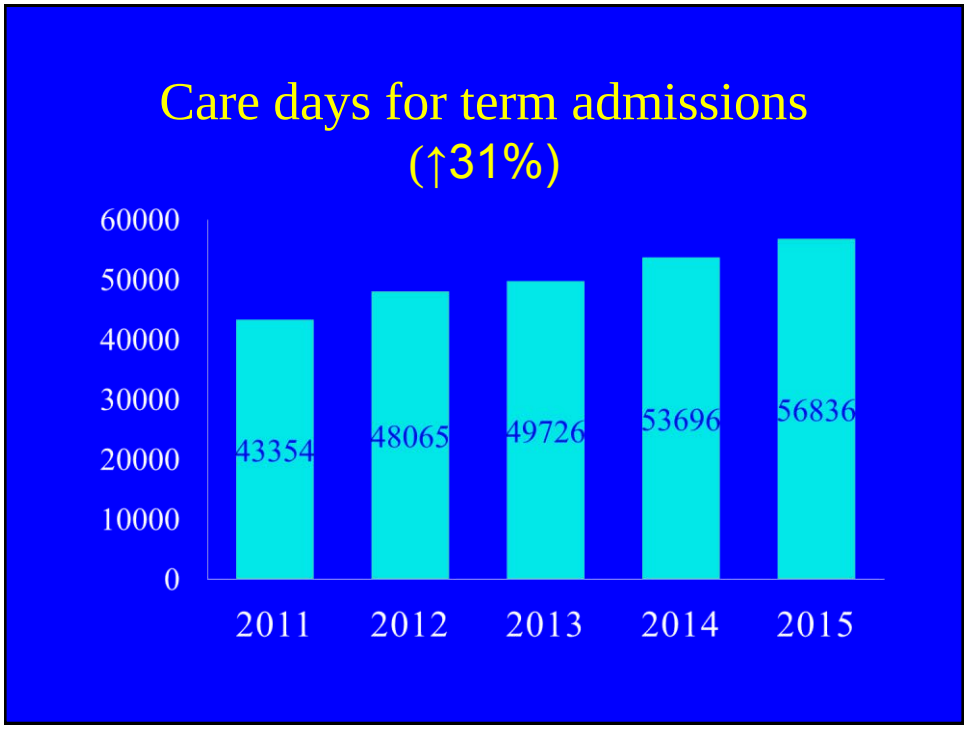


RESOURCE ALERT

https://improvement.nhs.uk/resources/preventing-avoidable-admissions-full-term-babies/

Atain programme


Term live births in England (2011-2014) (↓3.6%)
650000
600000
550000
500000
2011
2012
2013
2014


Care days for term admissions (↑31%)
60000
50000
40000
30000
20000
10000
0
43354
48065
49726
53696
56836
2011
2012
2013
2014
2015

Why is this important

- Effects of infant maternal separation at birth profound and can be lasting
- Significant but avoidable cost to NHS, families
- Signal of sub optimal care during antenatal, intrapartum or post natal period
- Signal of inappropriate policies or failure to apply suitable policies

5

RESUSCITATION AFTER FETAL HYPOXIA-ISCHAEMIA

- Staff present with appropriate competence
- ABCD
- Start with air
- When to stop
- Communication
- Documentation
- Simulation training

ROLE OF THERAPEUTIC HYPOTHERMIA

- Acute profound hypoxia-ischaemia
- Standard of care since 2010
- Early passive
- Active in specialist centre
- 30% reduction in adverse outcome

PERINATAL STROKE

- Associated with complications of labour and delivery but causal link unknown
- Rare blood disorder
- May be silent
- Clinical signs not specific

NEONATAL INFECTION

- NICE guidance 2012
- GBS, Gram negative, herpes simplex
- Antenatal, intrapartum, postnatal acquisition
- Early signs very subtle
- Associated pathology
- Narrow therapeutic window
- Low threshold to screen and treat

NEONATAL JAUNDICE

- NICE guidance 2010
- Gestation specific thresholds
- Clinical signs may be subtle
- Often narrow therapeutic window
- But placing by a window not effective
- Underlying pathology esp meningitis
- Kernicterus – hearing, basal ganglia

NEONATAL METABOLIC ADAPTATION

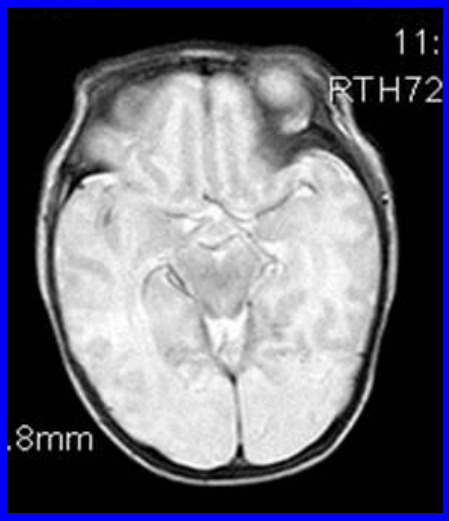
1. Blood glucose control

2. Alternative fuels -
   lactate, ketone bodies

Hypoglycaemia and brain injury.

1920s	Insulin overdose in adults
1933	Insulin treatment of psychiatric disorder 30 mins hypoglycaemic coma
1950s	Neuronal necrosis demonstrated
Present	Insulin, OHAs - treatment error or self harm Insulin producing tumours and IEMs Failure of metabolic adaptation

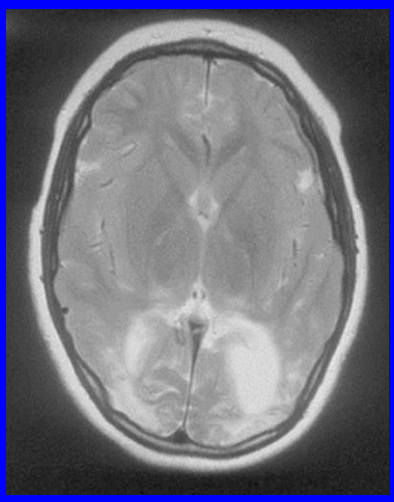
Imaging – acute (courtesy of Dr N Stoodley)



Term baby, 5 days, admitted at 3 days poor feeding, fitting, unrecordable blood glucose.

Increased parenchymal signal and loss grey-white matter differentiation in posterior parietal and occipital regions

Imaging – long term (courtesy of Dr N Stoodley)



Imaging on childhood following neonatal hypoglycaemia

Atrophy, gliosis and ulegyria in posterior parietal and occipital regions

Adverse neurodevelopmental outcome of moderate neonatal hypoglycaemia

661 infants 6808 samples

Bwt 1337g (315) Gest 30.5 (2.7)

Age 48hrs - 8 weeks

Causal relationship with signs in 5

Lucas et al, 1998

Occurrence of hypoglycaemia

	Plasma glucose (mmol/l)		
	<0.6	<1.6	<2.6
Overall	10%	28%	66%*
On 1 day	8%	20%	32%
On 2 days	1%	4%	18%
On ≥3 days	1%	4%	16%**

Variation between centres: * 53-79%
** 4-31%

Lucas et al, 1998

Factors associated with hypoglycaemia

- Neonatal unit
- Apgar 5 < 5
- Bwt <1000g
- SGA

Lucas et al, 1998

Regression analysis

Dependent variables:	Bayley motor and developmental scales
Independent variables:	Days hypoglycaemia*
	Sex
	Birthweight
	<10th centile
	Gestation <30/40
	Clinical complications*
	SBR >170
	Apgar 5 <5
	Social and educational*

Lucas et al, 1998

Relative risk of neurodevelopmental impairment (Bayley score ≤70 or CP)

Days hypoglycaemia	Adjusted RR
0	1
1-2	1.1
3-4	2.2
> 5	3.5 (1.3-9.4)

Lucas et al, 1998

Hyperinsulinaemic newborn monkeys

Pre and post delivery sub cut insulin by pump
Not fed after birth

Tested 8 months:
Pre-training - emotionality and adaptability
Matching to sample tasks
Delayed matching to sample - memory

Schrier et al, 1990

Hyperinsulinaemic newborn monkeys

Results:

10 hr hypo -
- more training difficulties
- more procedural alterations (adaptability)
- additional help from tutors (motivation)

No differences in -
- completion of tasks (with extra attention)
- personality characteristics
- neurology

Schrier et al, 1990

Operational thresholds

- The concentration of plasma or whole blood glucose at which intervention should be considered to increase the glucose level.

Operational thresholds

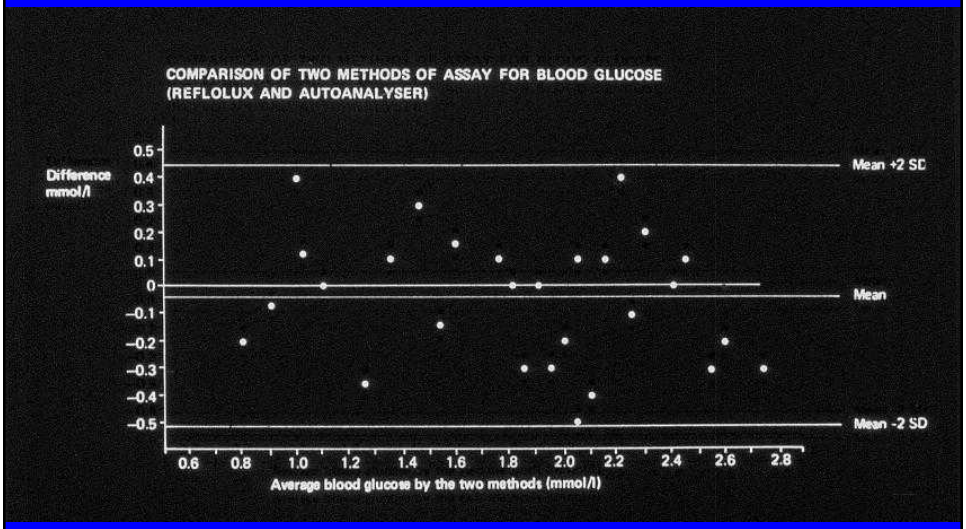
Infants with clinical signs:

2.5 mmol/l

Infants at risk:

Persistently <2.0 mmol/l

<1.0 mmol/l at any time



Neonatal hypoglycaemia?

38 weeks

Labetalol in pregnancy and postnatal
Fetal distress in labour, NVD
Placenta small and gritty
Good condition, no resuscitation
Birthweight 2192g (2nd centile)
Head circumference 33cm (25th-50th centile)

Neonatal hypoglycaemia?

1hr: paed informed of weight, "watch feeding and temperature"

11 hours: paed examination normal

14 hours: discharged

28 hours: MW visit, baby floppy and unresponsive, cardioresp depression

28.5 hours: NNU, BM unrecordable, cardiac arrest, fits, renal impairment

Neonatal hypoglycaemia?

Follow up:

MRI: parieto-occipital cortical and white matter injury

Global developmental delay

Autistic features

Neonatal hypoglycaemia?

37 weeks

Emergency CS for breech

Meconium stained liquor

Good condition, no resuscitation

Birthweight 2900g (50th-75th centile)

Head circumference 34cm (75th-91st centile)

Neonatal hypoglycaemia?

Meconium obs normal, discontinued

Support to attach at breast

12 hours: unsettled not feeding, EBM by syringe

16 hours: lethargic, placed skin to skin, would not suck, gasping, paed informed

16.5 hours: BM unrecordable, paed attended, NNU

17 hours: cardiorespiratory arrest x 3, fits, renal impairment

Neonatal hypoglycaemia?

Follow up:

MRI: injury to basal ganglia, cortex, white matter

Very long chain acyl coA dehydrogenase deficiency

Microcephaly, epilepsy and severe disability

Neonatal hypoglycaemia?

37 weeks

Diet controlled gestational diabetes
Emergency CS for CTG abnormalities
Good condition, no resuscitation
Birthweight 2566g (25th centile)
Head circumference 33cm (25th centile)

Neonatal hypoglycaemia?

Planned to breast fed
18 hours - not fed, sleepy
BG 0.4mmol/l
Took bottle slowly, remained sleepy
BG 1.4mmol/l
Admitted NNU
IV glucose, infection screen

Neonatal hypoglycaemia?

Age (hrs)	BG (mmol/l)
18	0.4
19	1.4
20	1.6
21	3.7
25	5.8

Neonatal hypoglycaemia?

BG	1.8 mmol/l
Ammonia	112 umol/l
Cortisol	87 nmol/l
TSH	3.27 mU/l
Thyroxine	30.3 pmol/l
Insulin	<1.0 mU/l
BOH	533 umol/l
Acac	234 umol/l

Organic acids, amino acids, carnitine profile - normal
Infection screen negative

Neonatal hypoglycaemia?

Maximum glucose requirement 6mg/kg/min

Remained sleepy until day 4

No further low BG

Day 2 - EBM tube feeds commenced

Day 3 - Successfully weaned from iv glucose

Day 4 - Fully breast/cup fed (pulled tube out)

Follow up - no neurodevelopmental concerns

Infants at risk of abnormal neonatal metabolic adaptation

- **Altered maternal metabolism**
  -intrapartum administration of glucose
  -maternal drug treatment
  -diabetes
- **Secondary to neonatal complications**
  -infection
  -polycythaemia
  -perinatal hypoxia-ischaemia
  -hypothermia
  -prematurity
- **IUGR**
- **Neonatal hyperinsulinism – transient or prolonged.**
- **Endocrine disorders**
- **Inborn errors of metabolism**

Blood glucose and brain injury
The evidence

Healthy full term	None
Preterm	Prolonged hypoglycaemia Confounding factors
IUGR	None direct ? ADD
Prolonged with signs	Cortical loss, global delay

Clinical recommendations
Healthy, term, AGA babies

- Support breast feeding
- No routine blood glucose monitoring

Clinical recommendations
Very preterm or sick babies

- Regular glucose monitoring
- Milk or IV glucose to maintain BG >2.5mmol/l
- Expressed breast milk as tolerated

Clinical recommendations
Small or vulnerable babies

- Support breast feeding
- Maintain rigorous clinical monitoring
- Expressed breast milk or formula supplements according to clinical signs and BG

And above all: Identify and **document**

- Risk factors
- Coexisting conditions
- Clinical signs/ normality
- Accurate blood glucose measurements
- Response to treatment
- Investigations for underlying pathology

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OPEN ACCESS

Neonatal hypoglycaemia: learning from claims

Jane M Hawdon,[1] Jeanette Beer,[2] Deborah Sharp,[3] Michele Upton,[4] On behalf of NHS Improvement Patient Safety Programme 'Reducing Term Admissions to Neonatal Units'

[1]Women's and Children's Health, Barts Health NHS Trust, London, UK
[2]Safety and Learning Lead (Obstetrics), National Health Service Litigation Authority, London, UK
[3]University of Hertfordshire, UK
[4]NHS Improvement, London, UK

Correspondence to
Dr J M Hawdon, Women's and Children's Health, Barts Health NHS Trust, Executive Offices, Newham University Hospital, Glen Road, London E13 8SL, UK; jane.hawdon@bartshealth.nhs.uk

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ABSTRACT

Objectives Neonatal hypoglycaemia is a potential cause of neonatal morbidity, and on rare but tragic occasions causes long-term neurodevelopmental harm with consequent emotional and practical costs for the family. The organisational cost to the NHS includes the cost of successful litigation claims. The purpose of the review was to identify themes that could alert clinicians to common pitfalls and thus improve patient safety.

Design The NHS Litigation Authority (NHS LA) Claims Management System was reviewed to identify and review 30 claims for injury secondary to neonatal hypoglycaemia, which were notified to the NHS LA between 2002 and 2011.

Setting NHS LA.

Patients Anonymised documentation relating to 30 neonates for whom claims were made relating to neonatal hypoglycaemia. Dates of birth were between 1995 and 2010.

Interventions Review of documentation held on the NHS LA database.

Main outcome measures Identifiable risk factors for hypoglycaemia, presenting clinical signs, possible deficits in care, financial costs of litigation.

Results All claims related to babies of at least 36 weeks' gestation. The most common risk factor for hypoglycaemia was low birth weight or borderline low birth weight, and the most common reported presenting sign was abnormal feeding behaviour. A number of likely deficits in care were reported, all of which were avoidable. In this 10-year reporting period, there were 25 claims for which damages were paid, with a total financial cost of claims to the NHS of £162 166 677.

Conclusions Acknowledging that these are likely to be the most rare but most seriously affected cases, the clinical themes arising from these cases should be used for further development of training and guidance to reduce harm and redivert NHS funds from litigation to direct care.

What is already known on this topic?

- The majority of babies make successful metabolic adaptation to postnatal nutrition without developing clinically significant hypoglycaemia.
- When there are risk factors for impaired metabolic adaptation, there must be monitoring and management to prevent progression to clinically significant hypoglycaemia.
- Treatment of neonatal hypoglycaemia associated with abnormal clinical signs is a clinical emergency.

What this study adds?

- Cases of neonatal hypoglycaemia sufficiently severe to cause brain injury and resulting in litigation are rare.
- In these rare cases, in addition to human costs to the family, there are enormous financial costs to the NHS in terms of payments against claims.
- Despite standard texts and guidelines, deficits in clinical care result in delayed diagnosis and management of neonatal hypoglycaemia.

INTRODUCTION

Neonatal hypoglycaemia continues to be a source of clinical concern and of some controversy. In the absence of a robust evidence base, recent guidance has by necessity been pragmatic and based upon clinical experience.[1 2] Clinicians seek to avoid the harm which results from unrecognised and untreated neonatal hypoglycaemia, while adopting practices which avoid unnecessary separation of mother and baby. This is a focus of the Neonatal Hypoglycaemia Working Group, chaired by JMH and DS, which is contributing to the NHS Improvement Patient Safety Programme to reduce admissions of full-term and near-term babies to neonatal units (https://www.england.nhs.uk/patientsafety/re-act/red-term-ad).

Despite the described controversy, it is well recognised that neonatal hypoglycaemia on rare but tragic occasions causes long-term neurodevelopmental harm to the baby with consequent human cost for the family. The organisational cost to the NHS of potentially avoidable harm has not been quantified but includes the cost of successful litigation claims.

The NHS Litigation Authority (NHS LA) was established in 1995 as a special health authority. It is a not-for-profit arm of the NHS providing indemnity cover for legal claims against the NHS, assisting the NHS with risk management, sharing lessons from claims and providing other legal and professional services for its members. When managing claims, the NHS LA acts on behalf of its members to ensure justified claims are settled fairly and quickly and to defend unjustified claims robustly to protect NHS resources. Ninety-six per cent of justified claims are resolved out of court to minimise legal costs.

An important aspect of the work of the NHS LA is to share information on the learning from claims

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with individual trusts and across the NHS to support learning and improvements in safety. This is accomplished by sharing with NHS organisations examples of avoidable harm in order to improve patient safety, which brings both human and organisational benefits.

The NHS LA has to manage two competing interests to minimise the overall costs of clinical negligence to the NHS—settling justified claims efficiently and defending unjustified actions robustly. The appropriate balance is sought to ensure individual patients (and staff where applicable) are properly compensated while protecting the public purse.

The numerical volume of claims related to obstetrics/maternity (including potential neonatal harm) received by the NHS LA represents 10% of the total volume of claims received by the NHS LA. However, the monetary value associated with these claims at £479 530 652 is 41% of the total £1 169 586 958, and is significantly greater than that for any other specialty.[3] The goal of providing safer care is to minimise harm, but these figures indicate that, in addition, safer care would release money which can in turn be invested to provide better care.

METHODS

Research Ethics Committee approval was not required, as this was a retrospective anonymised study using routinely collected anonymised data from NHS LA database.

Claims notified to NHS LA between 2002 and 2011 (inclusive) alleging that neonatal hypoglycaemia caused harm were identified from the NHS LA Claims Management System. Anonymised documentation, with no patient identifiers, relating to the claims was reviewed by a consultant neonatologist (JMH) and the NHS LA Safety and Learning Lead (Obstetrics) (JB) to identify themes in terms of risk factors and clinical management which were likely to have caused or contributed to harm. Potential deficits in care were taken from letters of claim, letters of response, expert reports or equivalent documentation, and corroborated where necessary by reference to documents containing factual, non-identifiable information, for example, the baby's birth weight.

The NHS LA's Claims Management Database (CMS) interacts with a number of reporting tools to allow NHS trusts to examine claims relating to their own organisation. CMS is primarily designed for claims management, and holds patient-sensitive and legally privileged data. However, the data held on CMS is also used for financial forecasting, the pricing of the indemnity schemes managed by NHS LA, the management of internal performance, informing policy and responding to requests from the public and parliament for information in accordance with the procedures for Freedom of Information, Data Protection Act and Parliamentary questions. The database was searched for keywords, for example, neonatal and hypoglycaemia, and then manually checked by JB and JMH for the relevance of claims to each enquiry.

The following data were extracted where available from documentation held on the database for each case, and the clinical experience of JMH was applied where necessary in interpretation of data:

- Source of admission
- Healthcare professional making assessment of the baby, hospital versus community
- Risk factor for hypoglycaemia (eg, low birth weight) identifiable at the time of birth
- Feeding method
- Likely aetiology of hypoglycaemia
- Reported clinical signs before or at diagnosis
- If identifiable risk factors were present, was blood glucose monitoring instituted?
- Method of blood glucose measurement

Possible deficits of care extracted from documents were grouped as follows, based on the expected chronology of postnatal care and according to clinical experience of JMH:

- Failure to commence blood glucose monitoring when identifiable risk factors present
- Early discharge of baby with risk factors without assurance that feeding was sufficient to maintain blood glucose, or without assessment of abnormal neurological signs
- Insufficient advice to mother on discharge
- Not paying heed to maternal concerns
- Failure to recognise and document abnormal clinical signs, including abnormal feeding behaviour, and assessment of baby for cause of signs
- Delayed testing for blood glucose level and/or to obtain result after clinical signs identified
- Delayed appropriate action for low blood glucose result
- Delayed referral for medical review
- Delayed medical review after referral
- Delayed admission to neonatal unit
- Delayed administration of intravenous glucose
- Insufficient intravenous glucose delivery

RESULTS

Forty-one potential claims were initially identified during the search period. Of these, 30 were suitable for thematic review. Reasons for excluding the other 11 cases were as follows:

5—No letter of claim/allegations
2—Not hypoglycaemia claims
2—Papers archived
1—No claim made
1—Not a neonatal case

The babies were born between 1995 and 2010, inclusive. All babies were >36 weeks' gestation.

The average time elapsed between date of alleged incident and notification of the claim to the NHS LA was 4.8 years, range 3–72 months. The reasons why some claims took longer to be submitted to the NHS LA are as follows:

- Some claims were submitted following an internal complaints process at the trust
- Some parents were not aware of the extent of the damage to their babies until some of the early milestones were missed
- A claimant solicitor firm may ask the trust for copies of the hospital records and seek their own expert evidence before submitting a formal letter of claim

For one baby, there were claims against two provider trusts regarding the same alleged injury. Details of these were merged into one case for review.

For one claim, no care issues were identified, and the baby had not been documented as experiencing neonatal hypoglycaemia; therefore, there were no identifiable themes.

Data were therefore extracted from claims relating to 28 babies, and those relating to provision of care grouped in themes.

While clinical outcomes were not in the scope of the review, the following quotes from documentation reviewed demonstrate the extent of injury in some cases:

> The child is severely disabled and requires 24 hour care support. It has not been established whether the brain injury will have any impact upon life expectancy although limited mobility and cognitive deficits would contribute to a loss of life expectancy and her medical needs for the rest of her life are likely to be complex.

She is mobile indoors but cannot walk properly on uneven ground or on even ground for more than 200 metres. She requires assistance with dressing, cleaning after toileting and has to have food cut up. She has no sense of danger to herself or others, acts in a dangerous and destructive way and requires constant close supervision.

Documentation

The quantity and nature of documentation available on NHS LA database varied according to how far the litigation process had progressed before the claim was settled. For example, where NHS LA advised early settlement, data were taken from limited documents, for example, letter of claim and letter of response. For others that progressed to trial, there were more documents, for example, expert reports.

Source of referral

Fifteen babies presented with neonatal hypoglycaemia on a postnatal ward, 11 developed clinical signs at home, one baby was in a midwifery-led unit and one baby initially presented on a postnatal ward and was treated on a neonatal unit but had recurrence of neonatal hypoglycaemia on discharge home.

Risk factors and aetiology for neonatal hypoglycaemia

The most common risk factor for development of hypoglycaemia identified by the authors was low birth weight or borderline low birth weight (birth weight around or below 2.5 kg) (table 1). This was the case for 16/28 (57%) babies, some of whom were above 40 weeks' gestation. In 14 of these 16 babies, there was documentation that, in addition, the babies developed abnormal feeding behaviour or hypothermia prior to diagnosis of hypoglycaemia. It is acknowledged that some clinical signs, for example, poor feeding may be the cause of hypoglycaemia, or the consequence of hypoglycaemia, or both.

Table 1 Likely aetiology of hypoglycaemia

Case number	LBW	Poor feeding	Cold	Infection	IDM	Hyper insulinism
1		x				
2		x				
3	x					
4					x	
5						x
6	x	x				
7	x	x				
8				x		
9	x	x				
10	x	x	x			
11	x	x				
12	x	x				
13	x		x			
14	x	x				
15		x			x	
16	x	x				
17		x	x			
18	x	x	x			
19	x					
20	x	x				
21		x	x			
22		x	x			
23		x				
24		x				
25		x				
26	x		x			
27	x	x				
28	x	x	x			x

IDM, infant of diabetic mother; LBW, low birth weight for gestational age (around or below 2.5 kg). x, likely aetiology for each baby.

Two (7%) babies were born after maternal diabetes in pregnancy.

Ten out of 28 (36%) babies had no clear risk factors that would have been detectable at the time of birth. One of these babies had subsequent diagnosis of neonatal hyperinsulinism, and one baby had subsequent diagnosis of gram-negative septicaemia. Both of these babies presented with abnormal clinical signs before the diagnosis of hypoglycaemia and underlying pathologies were made. The remaining eight babies with no risk factors had no identified underlying cause for becoming hypoglycaemic, but all presented with abnormal feeding behaviour (including not waking for feeds, not latching at the breast, not sucking effectively, appearing unsettled and demanding very frequent feeds). The majority of babies in the cohort were initially breast fed, but some of these were subsequently offered formula feeds.

Presenting clinical signs

For 21/28 (75%) babies, it was the abnormal feeding behaviour (see Risk Factors and Aetiology) which caused clinical concern. Of these 21 babies, 2 were also described as hypotonic, 5 also as cold, 1 also as irritable and 1 also as sleepy.

Eight out of 28 (29%) babies were described as hypothermic, either in isolation or in combination with poor feeding or being sleepy.

One baby was described as being hypotonic in isolation, and one baby presented with cardiorespiratory collapse.

For two babies presenting clinical signs were not documented.

Likely deficits in care

The following likely deficits in care were identified; for most babies, there was more than one likely deficit of care:

- For 24 babies (96%):
  - The initial method of blood glucose estimation was a near-patient testing device.
  - For the remaining baby, there was no near-patient test result, as the unit policy was to use laboratory methods only. However, the adherence to this policy resulted in excessive delay in diagnosis and treatment, as the sample was analysed in a distant laboratory.
- For 20 babies (71%):
  - Failure to make an adequate and documented assessment of risk factors (including birth weight) or clinical signs and history (including feeding history)
  - Failure to recognise the significance of abnormal clinical signs (including abnormal feeding behaviour)
  - Failure to assess the underlying cause of clinical signs
  - For 16 babies, this was by staff in hospital maternity or emergency departments, for 3 by staff in the community and for 1 by staff in both settings.
- For 10 babies (36%):
  - Failure to take into account maternal concerns (box 1)
- For 9 babies (32%):
  - Failure to commence blood glucose monitoring for a baby with identifiable risk factors
- For 9 babies (32%):
  - Discharge from postnatal ward to community of baby with risk factors or abnormal clinical signs without assurance that feeding was sufficient to prevent hypoglycaemia

- For 4 babies (14%):
  Delay in acting upon blood glucose result once available
- For 3 babies (11%):
  Delayed referral to paediatrician after concerns identified
- For 3 babies (11%):
  Delayed admission to neonatal unit following diagnosis of clinically significant hypoglycaemia
- For 2 babies (7%):
  Delayed administration of intravenous glucose after admission to neonatal unit
- For 2 babies (7%):
  Insufficient intravenous glucose to correct hypoglycaemia; one baby was born after maternal diabetes, and one had unexpected neonatal hyperinsulinism
- For 1 baby:
  Delayed attendance by a paediatrician after midwife's request
- For 1 baby:
  Delay in obtaining blood glucose result after taking sample (see method of blood glucose estimation)
- For 1 baby:
  Failure to provide appropriate advice to the mother on discharge

Financial settlements

Of the 30 cases reviewed, damages were paid in 25 cases. For one case, no legal costs or damages were paid by NHS LA, and for four, defence costs only (total £135 772) were paid.

The total value (value of all claims whether open/closed or subject to periodic payments) of the 25 claims where damages +legal costs were paid is £162 166 677. The allocation of these costs, in terms of proportion paid to the claimant and proportion allocated to legal costs, is demonstrated in figure 1. To date, £48 798 635 has been paid in legal costs and damages. The remaining £118 474 042 will be paid out over time as either part of a Periodic Payment Order or once the case is closed and final costs and damages agreed.

Range for individual claims, inclusive of costs, was £2 465 000–£12 640 000, median £6 300 000.

Box 1 Examples of concerns raised by mothers of babies in the review cohort as expressed in documents reviewed

'By the third day he was sleepy and disinterested in feeding. His mother asked for assistance to latch him onto the breast and voiced concerns that he was not feeding. His mother continued to alert staff to her problems in getting the baby to feed and the fact that he was sleepy.'

'The mother informed the midwifery staff on the ward on a number of occasions on this and subsequent days following the baby's birth, that she was concerned the baby was not sucking when feeding was attempted and she was concerned he was not feeding properly. These concerns were not heeded, resulting in the baby not being fed adequately and ultimately causing his collapse due to hypoglycaemia.'

'The mother felt she had expressed concerns on multiple occasions about baby's feeding technique both on delivery unit and on the ward but she felt she had not received adequate support. These concerns were not listened to.'

'The parents brought the baby to the accident & emergency department with feeding problems and episodes of rolling his eyes. Seen by the paediatric team. After giving advice on feeding to the parents, baby was discharged home. The parents continued to be concerned and brought baby back to accident & emergency 3 days later. Blood glucose levels were not measured and parents told they could take him home.'

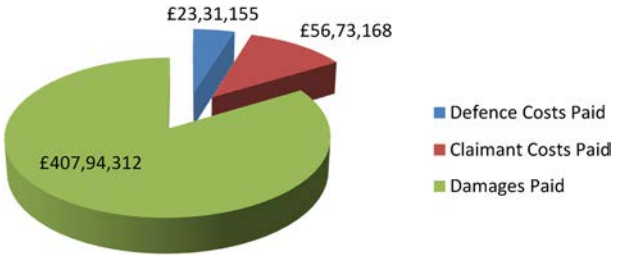

Figure 1 Allocation of total costs in 25 claims in which damages were awarded (as of December 2015).

DISCUSSION

The immense personal impact on the child and family when harm occurs in the neonatal period cannot be quantified financially and cannot be ignored. This paper highlights the additional financial costs to the NHS of potentially avoidable harm. Added to these costs are the costs of acute neonatal care and the ongoing costs of healthcare, education and social care. The rationale for including the financial data in this paper is to highlight that prevention of even these few cases of injury would release immense NHS resource to improve patient care. Despite the costs involved in litigation, it is to an extent reassuring that the vast majority is passed to the claimants who have suffered harm, and the minority is legal costs.

It is recognised that the babies in this cohort are not typical of the population of babies at risk for or presenting with neonatal hypoglycaemia. They are likely to be babies with severe and prolonged hypoglycaemia such that harm was sustained and whose parents identified potential deficits in care. It is likely that a small number of babies who have come to harm have not been reported to NHS LA through the litigation process, or were not detected in the database search. However, the total of 25 cases over a 10-year period should be viewed in the context of the UK birth rate of around 800 000/year.

The authors acknowledge that the variable nature of documentation held on the NHS LA database has prevented full ascertainment of clinical details, as would be the case if medical records were studied. Consideration should be given to seeking approval to applying 'confidential enquiry' methodology to such a cohort.

The severity and duration of hypoglycaemia and the likely consequent neurological deficit are outside the scope of this paper, as there were insufficient details in documents reviewed to determine this.

While not all of the above possible deficits of care have been forensically proven, there are themes which reinforce standard published guidance and introduce new areas for consideration. While individual trust guidelines for management of the infant at risk of neonatal hypoglycaemia were not included in the documentation reviewed, one author (JMH) has experience of

reviewing a large number of such guidelines and considers that, had guidelines in common use been applied, a number of cases would have been prevented. However, it is possible that recognition of early abnormal clinical signs, abnormal feeding behaviour and maternal concerns are not sufficiently emphasised in guidelines or in education of maternity health professionals. The Neonatal Hypoglycaemia Working Group of the NHS Improvement Patient Safety Programme, 'Reducing Term Admissions to Neonatal Units', is reviewing current guidance and practice. Findings of this review and the current paper will inform the Framework for Practice (see below).

There were insufficient details in documents available of feeding patterns, feed frequency, mode of feeding at each feed and measures to monitor feeding at each feed, to draw conclusions as to how feeding support and monitoring contributed to clinical harm. However, the findings of this review indicate that future guidance should include greater emphasis on support and monitoring of feeding and well-being, even in the baby without apparent risk factors. It is recommended that maternity services adopt the UNICEF UK Baby Friendly standards[4] to inform training in assessment and monitoring of infant feeding. It is anticipated that the Framework for Practice expert group will consider the use of a feeding assessment tool, such as that recommended by UNICEF UK Baby Friendly[4] for babies in the first week after birth. This tool provides a professional assessment of the effectiveness of feeding and early identification of feeding problems, which can then be addressed by individualised feeding plans and referral for paediatric advice where necessary.

All babies should be assessed at birth for risk of hypoglycaemia. For those with risk factors, the BAPM NEWTT chart is likely to be a useful adjunct.[5]

In almost all cases, near-patient blood glucose measurement devices were used, which are acknowledged to be an insufficiently accurate method to monitor for and diagnose neonatal hypoglycaemia.[1] There was insufficient information available to determine whether inaccuracy of measurement contributed to harm in these cases. In one case, perversely, a policy of not using such a device and relying on distant laboratory measurement is likely to have caused harm.

Unlike NHS trust reporting systems for incidents, which for the most part are contemporaneous, there is time delay from the incident occurring and a claim being made. Therefore, there may have been changes in practice since the time of the incident. However, the authors' experience is that the themes identified are likely to remain pertinent and informative of practice.

The authors propose the following learning points drawn from the analysis of the cases described:

1. A small number of babies with no identifiable risk factors develop clinically significant neonatal hypoglycaemia.
2. Although a birth weight of below 2.5 kg is often used as a threshold for initiation of blood glucose monitoring, a number of babies born after 40 weeks' gestation with this birth weight, and a number with birth weight slightly above 2.5 kg may have experienced intrauterine growth restriction and are at risk of developing hypoglycaemia if there is insufficient milk intake. Clinicians should make a clinical assessment of the adequacy of intrauterine nutrition when examining a newborn baby, for example, 'clinically wasted' appearance. The BAPM NEWTT chart includes a table of second centile birth weights at gestational ages of 37–42 weeks.[5] Consideration should also be given to recently developed customised growth charts to determine whether these may more accurately predict the risk of neonatal hypoglycaemia. These considerations will be covered by the Framework for Practice expert group (see below).
3. Babies presenting with abnormal clinical signs, including abnormal feeding behaviour and hypothermia, must undergo detailed and documented assessment including measurement of blood glucose levels and investigations for underlying cause, for example, infection, inborn error of metabolism and endocrine disorder. If it is not possible to differentiate between 'the reluctant feeder' and the baby with abnormal clinical signs, experienced assistance should be sought.
4. Maternal concerns, especially with regards to feeding, should not be discounted and should be followed by a detailed and documented history and assessment of the baby's condition.
5. In the presence of clinical signs, once a diagnosis of hypoglycaemia is suspected or made, this constitutes a clinical emergency.
6. Babies with risk factors for neonatal hypoglycaemia or abnormal feeding behaviour should not be discharged from postnatal ward to the community without assurance that the milk intake is sufficient to prevent hypoglycaemia.
7. Emergency department staff should include neonatal hypoglycaemia as a differential diagnosis when an unwell newborn baby presents from home.
8. All clinical areas should have access to rapid and accurate blood glucose measurement.
9. If blood glucose level does not rapidly recover with initial treatment, neonatal hyperinsulinism and the requirement for a higher glucose delivery rate should be considered.

These learning points are covered in the training of maternity and paediatric health professionals (as relevant to their discipline) and feature in many standard texts, but these claims indicate that they are not always sufficiently well communicated or followed. The authors acknowledge the continuing controversy as to which babies should undergo blood glucose monitoring.[1 2] However, all health professionals in maternity and neonatal services should be aware that the apparently 'normal' infant may have a latent disorder such as infection or hypoglycaemia, and assessing for and acting upon abnormal clinical signs in the broader population of babies is a more rational approach than 'blanket' screening.

The Neonatal Hypoglycaemia Working Group contributing to the NHS Improvement Patient Safety Programme has commissioned an expert group to develop a national Framework for Practice. This framework will be informed by a prospective audit of factors which result in admission of babies to neonatal units with a diagnosis of hypoglycaemia, existing published guidance and the learning from claims. It is anticipated that the Framework for Practice will provide a single document to inform effective and safe care of mothers and babies, to reduce admissions of babies to neonatal units and to prevent harm secondary to neonatal hypoglycaemia, but at the same time ensuring that feeding outcomes and the experience of families are optimised.

Contributors JMH and JB devised and carried out the review of documents and drafted the paper. MU and DS made subsequent comments and amendments.

Competing interests JMH receives occasional expenses and honoraria for invited articles and chapters and speaking at conferences on the subject of neonatal hypoglycaemia, and receives fees for expert reporting on litigation claims, some of which relate to neonatal hypoglycaemia, the latter being carried out outside of NHS hours. JMH is a member of the board of trustees of the charity Bliss and a member of the NICE guideline development committee, 'Intrapartum care for high-risk pregnancy'.

Provenance and peer review Not commissioned; externally peer reviewed.

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Neonatal hypoglycaemia: learning from claims

Jane M Hawdon, Jeanette Beer, Deborah Sharp and Michele Upton

Arch Dis Child Fetal Neonatal Ed published online August 23, 2016

Case Management Input – The costs Involved

Cerebral Palsy and Brain Injury Cases, AVMA conference
8 March 2018

T: 01722 742442 E: mail@indliv.co.uk @IndependentLiv www.indliv.co.uk

Susie Quinlan

- Case Manager/Occupational Therapist
- Learning & Development Manager

An Increased Understanding of…

- What is Case Management
- What is included in the Case Management Immediate Needs Assessment (INA)
- How costs for Case Canagement (CM) are estimated
- The different factors that can impact on the ongoing cost of (CM) input for clients

Case Management…..

- What is it?


'It is the duty and responsibility of case managers to support people to get the most out of their lives'
'A case manager is someone who will get on with the job and get their hands dirty and make things happen'
Ref: What do personal injury solicitors expect of case managers? Susan Bidswell 2013

‘My right hand man….’

What is Case Management?

*“Case management is a **collaborative process**, which assesses, plans, implements, coordinates ,monitors, and evaluates the options and services required to **meet an individual’s health and wellbeing, education and/or occupational needs**, using communication and available resources to promote **quality**, **cost effective** and **safe** outcomes.”*

British Association of Brain Injury Case Managers (BABICM)

The Immediate Needs Assessment

What is covered in an INA?

1) Background information

2) Activities of daily living assessment

3) Identification of immediate needs and case management recommendations to meet them

4) Estimate of costs

Case Managers often identify needs in the following areas:

- Care/Support
- Accommodation
- School/College/Work
- Leisure
- Therapy
- Equipment

Introducing Sophie….

Sophie's Needs

- Physiotherapy
- Accommodation
- Occupational Therapy
- Behavioural Optometry
- Psychology
- School
- Care

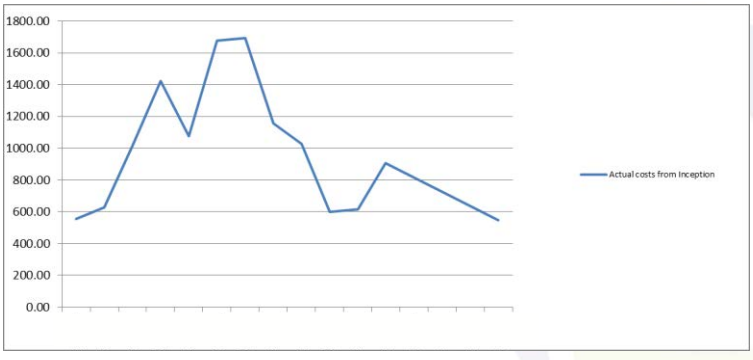
Estimate of Case Management Costs for Sophie – Any ideas?

£15,167.20

Sophie Case Management Costs

Predicted Costs - £15,167.20

Actual Costs Spent - £8,754.64



Often our Estimated costs are fairly accurate

But we don't have a crystal ball…….

William and George:

- 6 years old
- Severe cerebral palsy
- Gastrostomy fed
- Hoisted for all transfers
- Dependent on others for all of care needs
- No verbal communication
- Live with their parents and two siblings
- Attended specialist schools
- Similar travel distances involved for case manager

Estimated costs for first Year of CM input in INA

- William - £13,688.00
- George - £13,731.50

Actual Costs Spent In First Year

- William - £4,059.25
- George - £22,572.50

Costs for Second Year of CM input

	Estimate	Actual
William	£6,455.38	£5,580.42
George	£24,144.72	£24,311.70

‘It is not so much the disability the person has but the person the disability has….’

Case Management Costs for sorting out care….

Recruitment and Management of Carers

Recruitment Issues
Retention Issues
Carers and client/family relationship difficulties
Carers

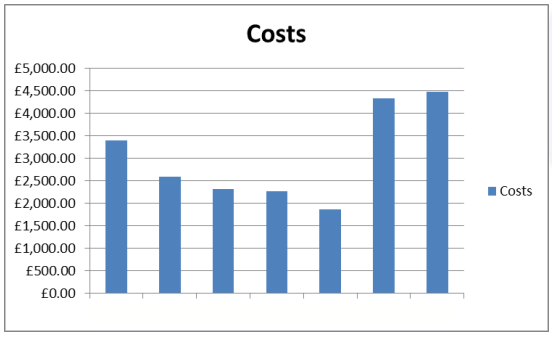
- Resign
- Suffer a bereavement
- Become ill
- Have to be dismissed
- Raise a grievance

Responses to recruitment Campaigns vary significantly...

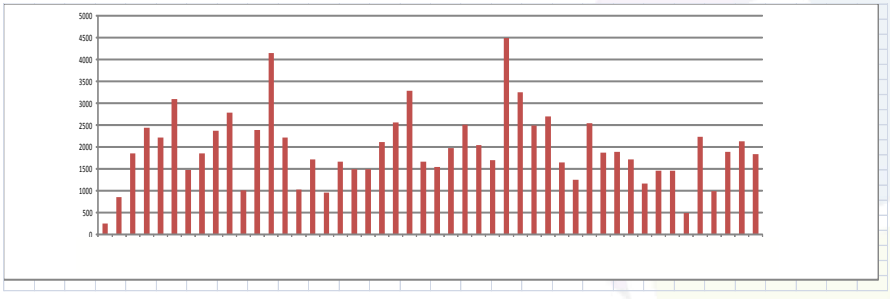
Highest ever	124 enquiries 46 applicantions
In contrast	0 enquiries 0 applications received
Some	15 enquires 3 applications

Recruitment fine, retention is the issue…..

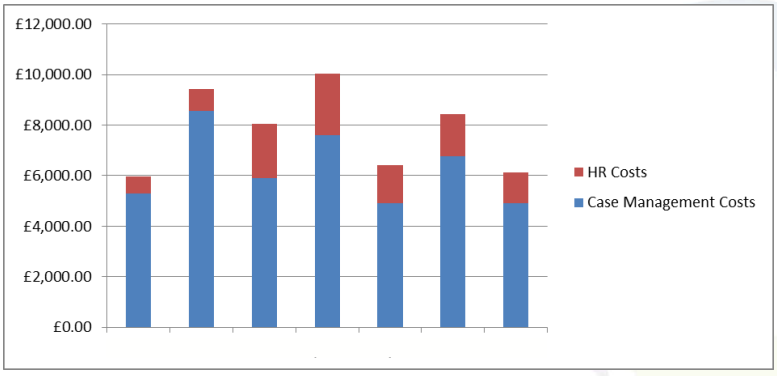
Mary Stephens



Graph showing 4 years of case management costs for a child with severe cerebral palsy who had a team of carers supporting him at home

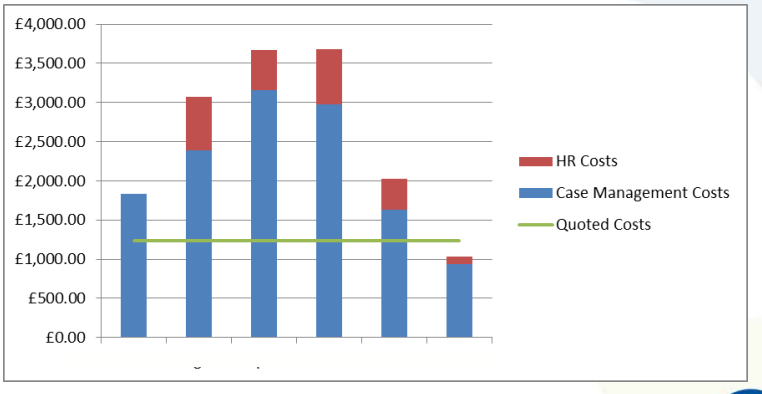


Daniel Smith



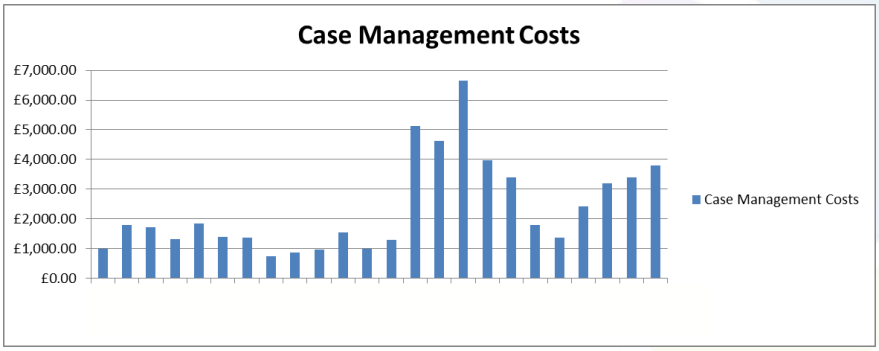
Change in Situation

Max Evans



Life Events and Complex Situations

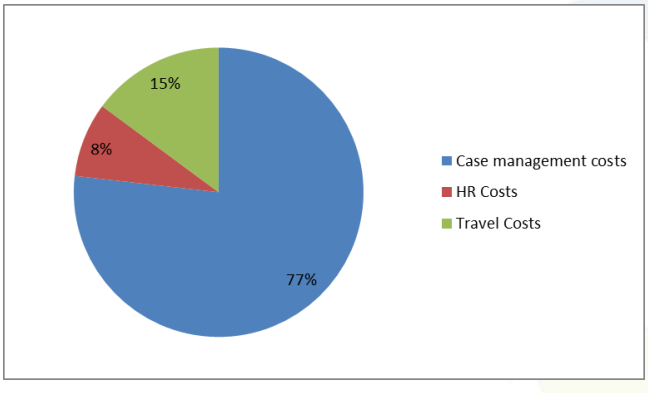
Joanne Mason



"Case management needs will increase during hard to predict crises…"

'In the real world of disability, people's lives are fraught with risks and challenges that need to be carefully handled and sometimes can take up disproportionate amounts of time which is none-the-less necessary…..'

James Heyward



To ensure you do the best for your clients, you need to have an understanding of the realities of Case Management input and care, including costs, for **each of your clients.**

One set formula <u>does</u> not work!

A good case manager will…..

- work in the client's best interests at all times and be able to clearly explain what they have done and why they have done it….

- have a clear understanding of the cost of their input and be able to articulate what they have achieved or not and the reasons for this….

- will have all of the above clearly documented in their case notes, goals and reports….

'Don't neglect the emotional dimensions both for the client and the family.....'

*'When a case manager was first mentioned I couldn't see why I would need one, **it seemed an unnecessary cost**. Nicola's above and beyond approach, her care, tact and sensitivity and ability to deal with pretty much anything has made me change my mind completely. She has brought an in depth knowledge, excellent manner and organisation and assisted me immeasurably. Without her valued input and assistance my family and I would be in a much worse situation.'*

Thank you for listening….

Any Questions?

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Independent Living Solutions Ltd
2 Wilton Business Centre • Salisbury • Wiltshire • SP2 0AH

T: 01722 742442 E: mail@indliv.co.uk @IndependentLiv www.indliv.co.uk

The role of the Speech and Language Therapist for Children with Cerebral Palsy and Brain Injury

About me…

- 3 years working at a known and suspected brain injury unit in Perth, Australia
- 3 years working within specialist children's team for complex and multiple diagnosis
- 5 years as Head of Therapies at Scope school for children with Cerebral Palsy and other neurological conditions
- 4 years independent practice, across homes, schools and colleges

"The nitty gritty of everything a SALT has the potential to do when working within the world of Cerebral Palsy and Brain Injury"

Speech

- After the creation of the message (concept of thought) and the lexico-grammatical structure in our mind (vocab and grammar), we need a representation of the sound sequence and a number of commands which will be executed by our speech organs to produce the utterance. So, we need a phonetic plan of and a motor plan (Belinchón, Igoa y Rivière, 1994: 590)

Speech includes:

- Articulation: How we make speech sounds using the mouth, lips and tongue.
- Voice: How we use our vocal folds and breath to make sounds. We can make our voice loud or soft, high or low pitched.
- Fluency: The rhythm of our speech.

ASHA, 2016

James and his dysarthria

- https://youtu.be/UF0G-u0hBns

Client scenario:

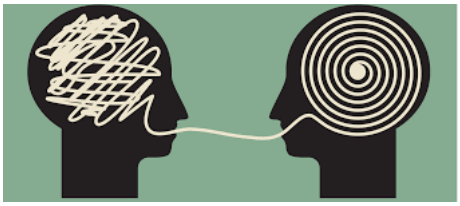
- Teenage male at mainstream academy
- Cerebral palsy, using a wheelchair
- Lots of ataxic movements
- Wants to be a lad
- 1500 students at lunch at one time

Solution:

- Positioning for head up, shoulders back, face the person and….
- James Bond position

Language

- Refers to the words we use and how we use them to share ideas and to get what we want, need, desire



Language includes:

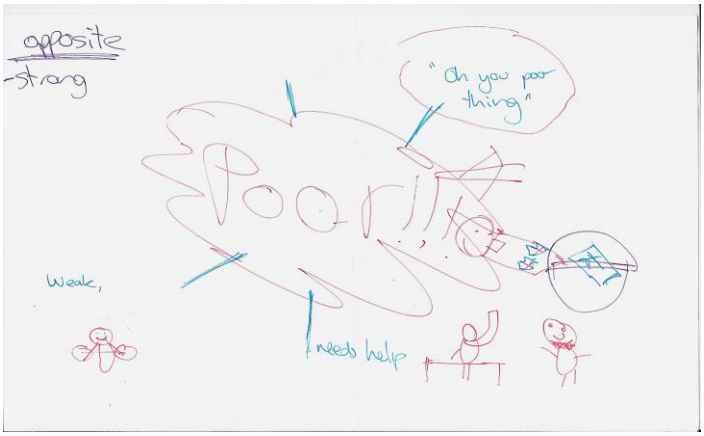
- What words mean. Some words have more than one meaning. For example "star" can be a bright object in the sky or someone famous.
- How to make new words. For example, we can say "friend, friendly, unfriendly" and mean something different.
- How to put words together. For example we can say "Peggy walked to the new store"
- What we should say at different times. For example, we might be polite and say "Would you mind moving your foot" instead of "Get off my foot!"

ASHA 2016

Client scenario:

- 12 year old boy at mainstream primary school
- Mild hemiplegia
- Sensorineural hearing loss, using a cochlear implant
- Last push before transition to secondary school
- SALT assessment revealed gap in receptive single word vocab and understanding spoken paragraphs

Solution:



Baseline assessment

- Get information
- Find functional, everyday evidence
- Map out strengths and weaknesses

AAC

- What does it mean?
- What is it?
- What shall we call it?

Easy AAC = Low tech

- Objects
- Photos
- Symbols
- Single switch
- Multiple switch controls

Whizz bang AAC = high tech

- iPads and tablets
- Eye Gaze
- https://youtu.be/_l9hx4Urvyk

Facts to consider about AAC

1. AAC can be slow to master and extremely frustrating.
2. AAC requires motor movement.
3. Eye gaze is extremely fatiguing to learn.
4. The client should always be engaged with programming.
5. Eye gaze isn't just communication.
6. Eye gaze + Alexa = MAGIC

Client scenario:

- 15 year old teenage male at special school.
- He has cerebral palsy and is in a wheelchair.
- He hasn't yet acquired the skills to drive his own chair and is reliant on adult staff to control his wheelchair.
- Other students in his class make loud noises and cause him to startle.
- He is becoming more and more irritated and anxious.

Solution:

- He decides what he wants programmed on the eye gaze.
- He has to chose a phrase that is allowed at school, without repercussions.
- He activates it to say "Leave me alone, buzz off"

Social Communication

- Not just in the world of autism
- EVERYONE needs social communication

SLANG

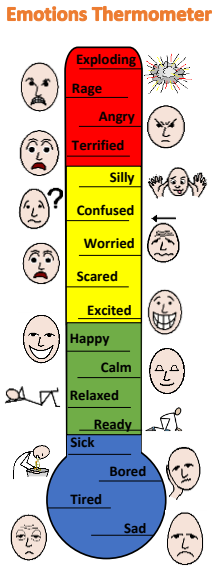
What's out:

- "Word on the street"
- "Cool"
- "Sic"

What's in:

- "Lit"
- "Bae"
- "Throw shade"

Emotions



Client scenario:

- Same teenage boy as before.
- He is developing from child to teenage emotions and feelings.
- Carers keep putting Barney on YouTube.
- He gets so annoyed that he can't use his eye gaze.

Solution:

- We used "zones of regulation".
- Taught him to recognise how his body reacted to emotion.
- Worked on signs that his body was feeling an emotion and to calm his body down first and then communicate.
- Hard work, something we all need

Eating and drinking

What happens inside

- https://youtu.be/sM6uxd1uS6M

Client scenario:

- 16 year old male who had a brain injury at age 12 years old.
- Remembers eating at restaurants before brain injury.
- Currently needs a wheelchair with intensive support to correct a side weakness and uncontrollable arm movements

Solution:

- Practiced sitting on a bench with no support at all.
- Once we could achieve bench sitting, we introduced food and then drink.
- We introduced noise and movement and spontaneously dropped plates.
- Food and drink were managed in small amounts and a restaurant visit was achieved.

Client scenario:

- An 8 year old boy not making weight gain, struggles with reflux, constantly uncomfortable with wind and pain
- Gastrostomy in place

Solution:

- Introduced blended food through gastrostomy.
- Introduced child blending his own food with a switch operated blender.
- Offered tastes of high calorie smoothie and created excitement and enjoyment about food.
- Now has warm, pureed food through gastrostomy and he loves having a full stomach.

Grief and Counselling

FINAL THOUGHTS

- Function, function, function
- Build upwards from baseline
- Work in a team
- Child and family are at the centre
- Enjoy the small steps
- Persevere


THANK YOU!

Maximising Hourly Rates and Tactical Budgeting

DOMINIC WOODHOUSE

PIC Your PARTNERS IN COSTS

Maximising Hourly Rates

The Indemnity Principle

- Review hourly rates on your files periodically
- Make sure you are able to charge to your client the hourly rates you would want to recover

Factors to be taken into account – CPR 44.4(3)

- (a) the conduct of all the parties, including in particular –
- (i) conduct before, as well as during, the proceedings; and
- (ii) the efforts made, if any, before and during the proceedings in order to try to resolve the dispute;
- (b) the amount or value of any money or property involved;
- (c) the importance of the matter to all the parties

Factors to be taken into account – CPR 44.4(3)

- (d) the particular complexity of the matter or the difficulty or novelty of the questions raised;
- (e) the skill, effort, specialised knowledge and responsibility involved;
- (f) the time spent on the case;
- (g) the place where and the circumstances in which work or any part of it was done; and
- (h) the receiving party's last approved or agreed budget.

Use of Counsel

- Be conscious that the use of counsel will likely impact the Court's perception of:
  - The responsibility undertaken by the fee earner
  - The specialised knowledge required of the fee earner
  - The extent to which features such as value and complexity should inform the hourly rate

Presenting your claim for costs

- Identify the CPR 44 factors that are relevant to your case
- Articulate the issues clearly in your bill narrative
- Demonstrate the ways in which you have brought your skill and expertise to bear

Realisation rates

- Real terms rate recovery impacted by time recovery
- Depending on your retainer and approach of your firm, may also be impacted by reductions to disbursements (i.e. if you absorb the shortfall)
  - Strike a bargain
  - Prepare third parties for reduction to their fees
  - Negotiate reduced fees

Capturing and supporting your time

- Record your time/work
- Optimise the information recorded to justify your work
- What did you do and why? Specifically what did you have to look at and consider? How many pages?
- Was any feature more difficult or problematic than may appear to be the case at face value?
- Why did you have to go over something again?

Capturing and supporting your time

- Be precise and concise
- Make it useful to the conduct of the case
- Don't use standard template justifications
- If you deal with a non-chargeable element or something unlikely to be recovered, make clear how much time was spent on that aspect

Obvious at risk items

- Dual fee earner attendances
- Obviously simple tasks that could/should have been delegated
- Reading in time – for new fee earners and assistants
- Internal processes
- Chasing
- Travel

Delegation

- Recognise the need to delegate
- Delegate clearly and efficiently
- Where possible, consistently involve the same personnel
- Recognise investment in employee development

Tactical Budgeting

Why?

- **'The purpose of costs management is that the court should manage both the steps to be taken and the costs to be incurred by the parties to any proceedings so as to further the overriding objective (CPR 3.12(2))'**

It's important because…

- CPR 3.18
  - In any case where a costs management order has been made, when assessing costs on the standard basis, the court will –

    (a) have regard to the receiving party's last approved or agreed budgeted costs for each phase of the proceedings;

- (b) not depart from such approved or agreed budgeted costs unless satisfied that there is good reason to do so; and
- (c) take into account any comments made pursuant to rule 3.15 (4) or paragraph 7.4 of Practice Direction 3E and recorded on the face of the order.'

To what purpose?

- Ensuring that your client has available to them sufficient resources to enable the case to be pursued successfully
- Ensuring that you make a profit

Budgeting only part of the case

- Absent any special direction by the Court, the budget covers all work and steps taken in the litigation up to and including trial, and provision should be made in the budget accordingly
- In substantial cases, the court may direct that budgets be limited initially to part only of the proceedings and subsequently extended to cover the whole proceedings (per paragraph 6(a) of PD3E).

Preparing your budget

- Plan your case and the costs
- Logical
- Credible
- Generously sensible

Findcharm Limited – v – Churchill Group Limited [2017] EWHC 1108 (TCC)

- 'Critical need to ensure that the Precedent R process is carefully and properly adhered to by parties to civil litigation'.
- Defendant's Precedent R budget discussion report was 'completely unrealistic'.
- Defendant's own budget was 'unrealistically low'.
- Defendant severely criticised.
- Claimant's budget approved as claimed (following some reduction made in the course of negotiation).

Firm foundations:

- Be very clear what you expect to happen
- Time
- Experts
- Counsel
- Other disbursements

Negotiate

- Identify opponent's strong arguments
- Identify your weaknesses

Budget discussion reports

- In the event that a party files and exchanges a budget under paragraph (1), all other parties, not being litigants in person, must file an agreed budget discussion report no later than 7 days before the first case management conference.

- The budget discussion report required by rule 3.13(2) must set out—

  (a) those figures which are agreed for each phase;

  (b) those figures which are not agreed for each phase; and

  (c) a brief summary of the grounds of dispute.

Negotiated Agreement

- Make sure you can work with any negotiated agreement before agreeing it
- Be clear (and record) on what basis the parties have reached agreements and the assumptions on which that agreement is made
- Re-plan your case and the work you can do

At the CCMC

- Be clear on the potential value of your claim
- Be knowledgeable about what incurred costs have been spent on and what has been achieved to date

Potential Problems on the CCMC

- Incurred costs

  Per paragraph 7.4 of PD 3E:

  > 'As part of the costs management process the court may not approve costs incurred before the date of any costs management hearing. The court may, however, record its comments on those costs and will take those costs into account when considering the reasonableness and proportionality of all budgeted costs.'

- C.F. *Redfern v – Corby Borough Council [2014] EWHC 4526 (QB)* and *CIP Properties (AIPT) Ltd v Galliford Try Infrastructure Ltd [2015] EWHC 481 (TCC)*

THE CAPITAL MARKETS CO (UK) LTD (2) GROVE HOLDINGS 2 SA v ANDREW TARVER & 8 ORS [2017] EWHC 2885 (Ch)

- Grapples with the way in which incurred costs should be taken into account in setting a budget for future costs
- Court declines to follow the approach in *CIP Properties (AIPT) Ltd v Galliford Try Infrastructure Ltd [2015] EWHC 481 (TCC),* as the Court could not confidently decide a sum it would consider reasonable for incurred costs
- Incurred costs were relevant in two respects:
  - For tasks which had commenced but were not yet complete, the budget for completion could only be evaluated by seeing how much had already been spent.
  - For tasks already completed, the court could assume, in the light of the very substantial costs already incurred, that the claimants had prepared their case to the maximum extent they could reasonably have been expected to by that stage and future costs should be budgeted on that assumption

Sir Cliff Richard OBE – v – The British Broadcasting Corporation & Chief Constable of South Yorkshire Police [2017] EWHC 1666 (Ch)

- Additional versions of budgets required, later updated, costs management postponed, and parties had to deal with a request for comment on incurred costs, matters which may well ordinarily be considered conventional.
- Accepted as exceptional for the purpose of paragraph 7.2 of PD 3E, and the caps imposed upon the costs of preparation of the budget and the process of dealing with the parties' budgets therefore lifted
- Chief Master Marsh requested to record a comment about the incurred costs
- Although the incurred costs 'appear to be substantial in absolute terms', it was 'quite impossible' for the Court 'to form any meaningful view' about whether they could be properly characterised as unreasonable or disproportionate.

Hourly Rates

- *PD 3E 7.3:*

'… The Court's approval will relate only to the total figures for budgeted costs of each phase of the proceedings, although in the course of its review the court may have regard to the constituent elements of each total figure. When reviewing budgeted costs, the court will not undertake a detailed assessment in advance, but rather will consider whether the budgeted costs fall within the range of reasonable and proportionate costs.'

- *PD 3E 7.10:*

'The making of a costs management order under rule 3.15 concerns the totals allowed for each phase of the budget. It is not the role of the court in the cost management hearing to fix or approve the hourly rates claimed in the budget. The underlying detail in the budget for each phase used by the party to calculate the totals claimed is provided for reference purposes only to assist the court in fixing a budget.'

Valerie Elsie May Merrix – v – Heart of England NHS Foundation Trust [2017] EWHC 346 (QB)

- 'The fact that hourly rates are not fixed at the costs budgeting stage is no obstacle to such a conclusion. As the notes to CPR 3.18 in the White Book reflect, the fact that hourly rates at the detailed assessment stage may be different to those used for the budget may be a good reason for allowing less, or more, than some of the phase totals in the budget.'

RNB v London Borough of Newham (4 August 2017, Case No: C01CL127, SCCO Ref: CCD 1702513)

- With no other good reason to depart from the approved budget, Master Campbell decided that the reduced hourly rates allowed for incurred costs should also be applied to the future budgeted costs

Proportionality

- *CPR 44.3(2) Where the amount of costs is to be assessed on the standard basis, the court will –*
  - *(a) only allow costs which are proportionate to the matters in issue. Costs which are disproportionate in amount may be disallowed or reduced even if they were reasonably or necessarily incurred;*

(1) Brian May (2) Anita May – v – (1) Wavell Group Ltd (2) Farid Bizzari (2017) CC (Central London) (Judge Dight, Master Whalan) 22.12.17

- Claimants' costs claimed at £208,236.54
- At first instance Master Rowley assessed 'reasonable' costs at £99,655.74
- Master Rowley then 'stepped back' and reduced costs globally to £35,000.00 plus VAT
- On appeal, Master Rowley held to have misdirected himself in a number of respects (e.g. value, complexity, the weight to be attached to factors)
- Appeal allows £75,000.00 as a proportionate and 'fair' figure bearing a reasonable relationship to the relevant factors

JACQUELINE DAWN HARRISON v UNIVERSITY HOSPITALS COVENTRY & WARWICKSHIRE NHS TRUST (2017) EWCA Civ 792 :

- 'I add that where, as here, a costs judge on detailed assessment will be assessing incurred costs in the usual way and also will be considering budgeted costs (and not departing from such budgeted costs in the absence of "good reason") the costs judge ordinarily will still, as I see it, ultimately have to look at matters in the round and consider whether the resulting aggregate figure is proportionate, having regard to CPR 44.3 (2)(a) and (5): a further potential safeguard, therefore, for the paying party.'

Valerie Elsie May Merrix – v – Heart of England NHS Foundation Trust [2017] EWHC 346 (QB):

- 'The proportionality test can be applied at the time of fixing the budget. If there is good reason to depart from that decision, the judge on detailed assessment can do so. Additionally, as the notes to CPR 3.18 in the White Book suggest, once pre-incurred costs have been assessed on the basis of reasonableness and added to the budgeted costs, the total figure is then subject to an overall assessment of proportionality. So, unless there is good reason to depart from the budget, the overall figure can never be less than the budget, but it can be less than the total of the budget sum plus the reasonably incurred and reasonable in amount non-budgeted sum.'

The overriding objective

- A procedural code with the overriding objective of enabling the court to deal with cases justly and at proportionate cost

- Dealing with a case justly and at proportionate cost includes, so far as is practicable –
- (a) ensuring that the parties are on an equal footing;
- (b) saving expense;

- (c) dealing with the case in ways which are proportionate –
- (i) to the amount of money involved;
- (ii) to the importance of the case;
- (iii) to the complexity of the issues; and
- (iv) to the financial position of each party;

- (d) ensuring that it is dealt with expeditiously and fairly;
- (e) allotting to it an appropriate share of the court's resources, while taking into account the need to allot resources to other cases; and
- (f) enforcing compliance with rules, practice directions and orders.

Court approved/assessed budget

- Be clear (and record) on what basis the Court has budgeted the matter and the assumptions it has made
- Re-plan your case and the costs
- Go back to counsel and experts and negotiate fees
- Focus your case and prioritise
- Involve your client

Monitor your budget

- Have a plan and work to it
- How will you monitor the plan and the budget?
- Electronic time recording – what capabilities?

Controlling your spend

- Prioritise and commit resources accordingly
- Involve the client in that decision – 'is it worth the candle'?
- Be imaginative in what costs can be avoided and which require (and therefore seek) your opponent's cooperation

- What costs can be avoided and are within your control? E.g. travel
- Think about staff/firm structure
- Administrative support
- Delegation
- Training and investment

Varying an approved budget

- **PD 3E 7.6** Each party shall revise its budget in respect of future costs upwards or downwards, if significant developments in the litigation warrant such revisions. Such amended budgets shall be submitted to the other parties for agreement. In default of agreement, the amended budgets shall be submitted to the court, together with a note of (a) the changes made and the reasons for those changes and (b) the objections of any other party. The court may approve, vary or disapprove the revisions, having regard to any significant developments which have occurred since the date when the previous budget was approved or agreed.

(1) JSC MEZHDUNARODNIY PROMYSHLENNIY BANK (2) STATE CORPORATION "DEPOSIT INSURANCE AGENCY" v SERGEI VICTOROVICH PUGACHEV & 13 ORS [2017] EWHC 1853 (Ch)

- Variation to an approved costs budget sought on the basis of an increase in trial length from 8.5 to 10 days
- The Claimant estimated that the issues driving the increased trial length would necessitate an additional 3 days preparation and two days closing for leading counsel, an additional three days for junior counsel and additional work for solicitors at a cost of £84,000.00.
- Court accepted this amounted to a significant development not catered for within the existing budget and approved the variation.
- 'I am satisfied that the hourly rates being charged and the daily rates by counsel and the solicitors for the infant children are reasonable and proportionate, at least for the purposes of approving a budget.'

The Court only manages future costs?

- CPR 3.15

  (1) In addition to exercising its other powers, the court may manage the costs to be incurred (the budgeted costs) by any party in any proceedings.

  (2) … By a costs management order the court will—

  (a) record the extent to which the budgeted costs are agreed between the parties;

- b) in respect of the budgeted costs which are not agreed, record the court's approval after making appropriate revisions;

  (c) record the extent (if any) to which incurred costs are agreed

- (3) If a costs management order has been made, the court will thereafter control the parties' budgets in respect of recoverable costs.
- (4) Whether or not the court makes a costs management order, it may record on the face of any case management order any comments it has about the incurred costs which are to be taken into account in any subsequent assessment proceedings.

JOHN MICHAEL SHARP & ORS v MAURICE VICTOR BLANK & 5 ORS (2017)EWHC 3390 (Ch)

- Where a CMO has already been made, and a party subsequently seeks to vary its approved budget, the Court has jurisdiction to control and budget costs incurred since the making of the CMO, notwithstanding that they have already been incurred by the time of the variation
- Further expert evidence representing a change from the agreed basis on which expert evidence would be provided could amount to a 'significant development'
- Questions put to the Defendants' experts did not amount to significant developments where 'uncertainties and inaccuracies were inherent' in the budgeting process, and which reflected contextually modest increase in costs.

So…

- Properly plan and prepare your budget
- Engage with the budgeting process and negotiation of budgets
- Monitor your budget and seek agreement to vary or apply in the absence of agreement where necessary
- Be alive to the threefold problems of:
  - Hourly rates
  - Incurred costs
  - Proportionality

QUESTIONS?

PIC
Your PARTNERS IN COSTS

Dominic Woodhouse

0114 321 6368
Dominic.woodhouse@pic.legal

Please complete your details:

Name: _____

Job Title: _____

Company: _____

E-mail: _____

Head of Training: _____

Cerebral Palsy & Brain Injury Cases

8 March 2018, Doubletree by Hilton Bristol City Centre

DELEGATE EVALUATION FORM

Dear Delegate

We value your opinion on all aspects of this conference and use this information to improve the quality and content of our forthcoming events. We would be grateful if you would spare a few moments to complete the following and either return it to the registration desk before you leave or send it to AvMA at your earliest convenience.

1. What was the major factor in the decision to attend this conference?

Interesting programme	☐	Networking Opportunities	☐	Cost	☐
Location of conference	☐	AvMA's reputation	☐	Other	☐

If other, please specify: _____

2. Please rate our speakers using the following scoring system.

	Excellent	Good	Satisfactory	Poor	Comments
Chair – Vanessa McKinlay					
Time-Keeping:	☐	☐	☐	☐	
Contribution:	☐	☐	☐	☐	_____
	Excellent	Good	Satisfactory	Poor	Comments
1) Matthew Phillips QC					
Overall Presentation:	☐	☐	☐	☐	_____
Subject Matter:	☐	☐	☐	☐	
Documentation:	☐	☐	☐	☐	
	Excellent	Good	Satisfactory	Poor	Comments
2) Simon Elliman					
Overall Presentation:	☐	☐	☐	☐	_____
Subject Matter:	☐	☐	☐	☐	
Documentation:	☐	☐	☐	☐	
	Excellent	Good	Satisfactory	Poor	Comments
3) Sonia Barnfield					
Overall Presentation:	☐	☐	☐	☐	_____
Subject Matter:	☐	☐	☐	☐	
Documentation:	☐	☐	☐	☐	
	Excellent	Good	Satisfactory	Poor	Comments
4) Dr Neil Stoodley					
Overall Presentation:	☐	☐	☐	☐	_____
Subject Matter:	☐	☐	☐	☐	
Documentation:	☐	☐	☐	☐	
	Excellent	Good	Satisfactory	Poor	Comments
5) Dr Philip Jardine					
Overall Presentation:	☐	☐	☐	☐	_____
Subject Matter:	☐	☐	☐	☐	
Documentation:	☐	☐	☐	☐	
	Excellent	Good	Satisfactory	Poor	Comments
6) Dr Jane Hawdon					
Overall Presentation:	☐	☐	☐	☐	_____
Subject Matter:	☐	☐	☐	☐	
Documentation:	☐	☐	☐	☐	

	Excellent	Good	Satisfactory	Poor	Comments
7) Susie Quinlan					
Overall Presentation:	☐	☐	☐	☐	_____
Subject Matter:	☐	☐	☐	☐	
Documentation:	☐	☐	☐	☐	

	Excellent	Good	Satisfactory	Poor	Comments
8) Annie Kingston					
Overall Presentation:	☐	☐	☐	☐	_____
Subject Matter:	☐	☐	☐	☐	
Documentation:	☐	☐	☐	☐	

	Excellent	Good	Satisfactory	Poor	Comments
9) Dominic Woodhouse					
Overall Presentation:	☐	☐	☐	☐	_____
Subject Matter:	☐	☐	☐	☐	
Documentation:	☐	☐	☐	☐	

3. How clear were the course aims and objectives? Very clear Quite clear Not very clear Not at all clear

4. How well did the course meet the objectives? Completely Quite well Fairly well Not that well Not at all

5. What did you find MOST useful about the Conference and why?

_____

---

6. What did you find LEAST useful about the Conference, and why?

_____

_____

7. What could AvMA have done to make this conference a better event?

_____

_____

8. What topics were omitted from the programme that you feel should have been included in the course?

_____

_____

9. Please give your opinion of the following:

	Excellent	Good	Satisfactory	Poor	Comments
Conference Rooms:	☐	☐	☐	☐	_____
Meals & Refreshments:	☐	☐	☐	☐	_____
Audio-visual facilities:	☐	☐	☐	☐	_____
AvMA Administration:	☐	☐	☐	☐	_____

10. FINALLY - How did you rate the conference overall?

Excellent ☐ Good ☐ Fair ☐ Disappointing ☐

Comments: _____

11. On what topics would you like AvMA to organise conferences?

1. _____ **2.**_____

3. _____ **4.**_____

12. Do you expect that you will use the learning from this event in your work? YES NO
If YES, please say how you think you will use the learning in your work:

_____

_____

_____