A template for reviewing the strength of evidence for obstetric brachial plexus injury in clinical negligence claims

Tim Draycott, Dr Carolyn Sanders, Dr Joanna Crofts and Joanna Lloyd

Abstract

Obstetric brachial plexus injury (OBPI) is uncommon but accounts for a significant proportion of obstetric clinical negligence claims. There is debate in the medical literature and in legal proceedings regarding the causation of OBPI, particularly whether OBPI is caused by the accoucheur applying excessive traction or simply through the forces of labour itself.

This paper reviews the medical literature and legal case law surrounding OBPI and presents a template for reviewing the strength of evidence for OBPI in clinical negligence claims. The template contains factors more likely to be present if the OBPI was caused by the maternal forces of labour 'propulsion injury' (injury to the posterior arm, no documented evidence of shoulder dystocia, up-to-date training, appropriate shoulder dystocia management, no evidence of excessive traction, correct number of birth attendants, precipitous second stage, temporary injury) and factors more likely if the injury is iatrogenic (injury to the anterior arm, shoulder dystocia, no recent training, incorrect shoulder dystocia resolution manoeuvres used, evidence of excessive traction, insufficient birth attendants, fundal pressure, permanent injury). Each factor does not, in itself, establish causation, but the template may provide a useful aid to legal teams reviewing medical notes.

Introduction

Obstetric brachial plexus injury (OBPI) is a relatively rare occurrence but accounts for a significant proportion of obstetric clinical negligence claims.[1]

Until recently, all OBPI were deemed the fault of the accoucheur, who must have applied excessive traction during difficult delivery of the shoulders: *res ipsa loquitur* (the thing speaks for itself). However, over the past decade there have been increasing reports of OBPI in the absence of reported/coded shoulder dystocia (SD) or excessive traction.[2–5] The NHS Litigation Authority has recognized this change in their house journal: '...while undue pressure [sic] is causative in some instances; it is far too simplistic to regard that as the only reason for this condition'.[6]

The literature on causation of obstetric brachial plexus palsy has influenced recent judicial decisions regarding the causation of OBPI. Based on this literature and case law, a simple template is proposed to provide guidance for those assessing issues of causation in clinical negligence claims (Table 1).

The template consists of two columns, one related to propulsion injury (i.e. caused during the labour itself) and the other an iatrogenic injury. There are eight subclasses under each heading and although each by itself does not establish causation, we suggest that the more positives there are in the iatrogenic injury group, the more likely the injury is to have been caused by the accoucheur.

The template should also help the legal team collect the relevant information for each case as a checklist.

Justification

Posterior shoulder

The traditional view of causation attributes nerve damage to the application of lateral and downward traction to the fetal head, while the anterior shoulder is fixed against the pubic symphysis.[7] This theory provides an explanation for injury to

Table 1 A template for reviewing strength of evidence obstetric brachial plexus injury in clinical negligence claims

Propulsion injury	Iatrogenic injury
Posterior arm injured	Anterior arm injured
No SD	SD
Up-to-date training	No recent training
Appropriate protocol followed and all manoeuvres correctly performed	Incorrect manoeuvres/persistence with an ineffective manoeuvre
No evidence of excess traction	Evidence of excess traction
Correct number of birth attendants	Insufficient birth attendants
Precipitous second stage	Fundal pressure
Temporary injury	Permanent injury

SD = shoulder dystocia

Tim Draycott MD, Consultant Obstetrician and Gynaecologist, Southmead Hospital, Bristol BS10 5NB, UK; **Dr Carolyn Sanders BSc**, Solicitor, Foundation Programme Doctor, Royal Devon and Exeter Hospital, Exeter; **Dr Joanna Crofts BMBS**, Specialist Registrar in Obstetrics and Gynaecology, Taunton and Somerset NHS Trust, Taunton; **Joanna Lloyd**, Partner, Bevan Britten LLP, Bristol, UK
Email: tdraycott@gmail.com

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the anterior arm; however, in at least two case series the posterior shoulder was injured in 33–39% of cases.[8,9]

The posterior shoulder theory suggests that the injury occurs when the posterior shoulder is caught on the sacral promontory and the uterine forces continue to push the baby down the birth canal which may stretch the fetal brachial plexus. This is recognized in a recent UK medicolegal review: this (a posterior shoulder injury) is not due to any negligent action of the accoucheur,[7] whereas an anterior shoulder injury may be due to negligent action of the accoucheur.

To date trials involving a 'posterior shoulder defence' have centred upon whether there was correct recording of the position of the presenting part during labour and whether the injured shoulder was anterior or posterior at delivery. On a practical note, these cases emphasize the importance of recording clearly the side of the occiput at delivery and after restitution, which will identify the posterior and anterior shoulders. The fetal position is documented by the relationship of the fetal occiput to the maternal position. Therefore if the fetal occiput is on the maternal left (often document as LOA – left occiput anterior) then the right fetal shoulder will be anterior. If the fetal face is facing the mother's left, then the left fetal shoulder will be anterior. This can also be deduced from the position of the baby in labour, which should be recorded at all vaginal examinations.

In *Kadeem F v Mayday Healthcare NHS Trust* [2001] MLC 0399, the Defendant argued that they had wrongly assessed fetal position during labour, since at delivery the injured left shoulder was posterior, which meant it must have been injured by propulsive forces. However, the Claimant successfully argued that the recorded assessment was correct; the left shoulder was anterior and damaged by excessive traction while wedged behind the pubic symphysis. The Judge nevertheless accepted that in rare cases, obstetric brachial plexus palsy may occur without traction, for example where the shoulder arrests on the sacral promontory.

Although *Oladipupo* (discussed below) is primarily a case on the degree of traction used in SD, it also sheds light on a judicial shift in opinion with regard to the posterior shoulder theory. Here, the Judge reviewed the medical literature before him and dealt with some common criticisms. He thought it likely that the incidence of OBPI in the absence of SD was overstated in retrospective data, through under-recognition of situations where damaging traction had dislodged the shoulder without there being awareness SD had occurred. But he did not think that there was likely to be misreporting of anterior arm injuries as posterior ones, and he thought that posterior arm injuries were 'far more than rare oddities'. Also, he did not rule out brachial plexus injury to the anterior arm in the absence of SD and excessive traction.

The posterior shoulder defence was first successfully pursued in *Rashid v Essex Rivers Healthcare NHS Trust* [2004] EWHC 1338 (QB). The Claimant's birth was complicated by SD and the Claimant's right brachial plexus was injured, though according to the midwifery notes the left shoulder was anterior. The Claimant alleged that the injury was caused by excessive force and that the fetal position must have been incorrectly assessed. The Defendants refuted this and argued that injury occurred as a result of propulsive forces on the posterior right shoulder lodged against the sacral promontory. The Judge accepted that the fetal position was correctly assessed, that there was no excessive traction and that the injury had therefore occurred through propulsive forces. The Claimant failed to prove an iatrogenic injury on the balance of probability.

Shoulder dystocia/no shoulder dystocia

There are a number of large series which demonstrate that between 44% and 56% of infants born with OBPI, there was no recorded/coded SD:[3,9–11] in one series over 3% of infants born with an OBPI were delivered by Caesarean section.[12]

Some authors have argued that this reflects a failure of diagnosis and/or documentation, i.e. the SD was not recorded,[13] rather than a different causation. However, there is at least one video of a baby being born without SD and without excess traction who subsequently developed an OBPI.[3]

In the absence of SD, it is difficult to imagine how the delivery management could be improved to prevent OBPI, assuming that the diagnosis of no SD is correct, and therefore the injury is more likely to be due to a function of the labour rather than any failure of the accoucheur. The template therefore separates these two situations.

Up-to-date training

SD is unpredictable and unpreventable,[14] and therefore training may be the only effective intervention to reduce poor care and consequent OBPI. Training for SD has been mandated in all UK units since 2000,[15] and there are a number of courses that predate even this,[16] but until recently the OBPI rate has remained static for 40 years.[17]

However, evidence is accruing that simulation training can improve simulated performance in the management of SD[18–20] and can reduce the total force the accoucheur uses during delivery.[19]

A recent trial compared the effect of training on high fidelity mannequins incorporating force perception training with that on traditional mannequins. Both groups improved post-training performance in terms of the number of successful deliveries and the use of basic manoeuvres (calling for help, McRoberts positioning, suprapubic pressure) in simulated scenarios, but the addition of force perception training also resulted in a shorter head-to-body delivery time and a reduction in the total force applied during simulated delivery compared with that used prior to training.[19]

In addition, two obstetric units in the UK have reported an improved clinical outcome following recorded SD after the introduction of training.[21,22]

Case law suggests that less than adequate training may not be negligent provided an appropriate standard of care was provided. In *Lobb v Hartlepool and East Durham NHS Trust* (2002) Lloyd's Rep Med 442 a midwife did not apply suprapubic pressure due to lack of training, but this was not held causative of injury but did reflect poor practice. Given that annual training may reduce the incidence of brachial plexus injuries, it seems likely that lack of up-to-date training could become a more prominent allegation in future,

and a training record should be obtained for all members of staff involved in the index delivery.

Protocol followed

Best practice recommendations for the management of SD have led to the development of standard protocols, which require McRoberts' as a first-line manoeuvre. McRoberts' positioning is currently recognized as the single-most effective intervention, relieving up to 39% of SDs. Combined with suprapubic pressure it relieves up to 54%.[23] If this is unsuccessful, the next step is an internal manoeuvre to rotate the fetal shoulders or deliver the posterior arm, depending upon clinical circumstances and individual experience.[14]

The use of suprapubic pressure was discussed in *Jackson v Bro Taf Health Authority* [2002] EWHC QB 2344. The main allegation was that the midwife/SHO failed to use it before applying strong traction as a last resort. The Judge found that suprapubic pressure was used once SD was apparent. Evidence was heard as to when it should be applied; it was accepted that there is variation in clinical views as to whether it should be applied simultaneously with downward but not excessive traction, or whether all traction should be avoided until suprapubic pressure dislodges the shoulder.

Several cases suggest failing to follow protocol exactly is not negligent per se provided management is competent and clinically justifiable. For example, in *Ellis* (below), DJ Leighton QC accepted a clinician's explanation as to why he proceeded to manage a delivery complicated by shoulder dystocia with the mother in the extended lithotomy position rather than McRoberts' position. As it has now been shown that annual protocol-based training can improve clinical outcome, arguments that deviation from protocol was causative of injury may carry more weight in future.

Since the Royal College of Obstetricians and Gynaecologists guideline was published in 2005[14] there is a clear algorithm for both which manoeuvres to use and their sequence; failure to follow it could be considered negligent.

Inappropriate manoeuvres

Fundal pressure should not be used for the treatment of SD[14,24,25] because it drives the obstructed shoulder into the symphysis. It is associated with an unacceptably high neonatal complication rate and may result in uterine rupture.[11]

The SaFE study established that up to 4% of midwives and obstetricians in the south-west used fundal pressure in a simulated SD pretraining[19] and therefore it may also be mistakenly used in the management of actual SD.

Where an inappropriate manoeuvre like fundal pressure is documented, the injury is more likely to have been caused by the accoucheur on the template.

Traction

Routine traction has been defined as 'that traction required for delivery of the shoulders in a normal vaginal delivery in which there is no difficulty with the shoulders'.[14] Excessive traction will not free an impaction and may well contribute to injury of the brachial plexus.

There has been a lot of discussion in the medical literature about traction during SD and while there are undoubtedly other causes of OBPI, excessive traction probably does happen in practice: in the SaFE study before training over 60% of participants used a traction force >100 N,[19] a theoretical in vivo threshold for injury.[26,27]

After force training with a high fidelity 'force' mannequin, there was a significant reduction in the total applied force.[19] Moreover, in a recent investigation of the pattern of OBPI in a single UK unit, documentation of excessive force was significantly less in the period 1996–2000 compared with 2001–2005, when there was a 70% reduction in the incidence of OBPI after SD[28] after training was introduced in 2000.

Therefore, evidence of excessive force adds weight to an iatrogenic cause of the injury.

Case law does not suggest traction should never be used, rather, to paraphrase the Judge in *Gaughan v Bedfordshire HA* [1996] 8 Med LR 182, it is not an acceptable method of dealing with SD after the point where there has been a modest increase in force above that normally required to deliver the body. The question of degree of force and the concept of 'diagnostic traction' have been central issues in recent case law.

In *Gaughan v Bedfordshire HA* [1996] evidence regarding traction came from the Claimant's parents and the midwife's own description of applying continuous and steadily increasing pressure. The Judge found her negligent for using more traction than acceptable and for persisting with traction longer than acceptable after realizing she was dealing with obstruction of the anterior shoulder. He heard evidence from the Claimant's experts that 4–6 seconds of traction was long enough after SD became apparent, but did not specify how long is to be regarded excessive. During a difficult delivery of the shoulders, clear recording of the timing of events by a nominated member of the delivery team should help address allegations of inappropriate persistence with traction.

The judgment in *Sutcliffe v Countess of Chester Hospital NHS Trust* (2002) Lloyd's Rep Med 449 rested upon a finding that the obstetrician failed to recognize SD and consequently applied excessive traction during ventouse delivery rather than using more appropriate manoeuvres. The Defence contended that SD did not occur and that the injury must have been caused by uterine contractions and maternal expulsive efforts on the anterior shoulder, before delivery of the head. Mr Justice Thomas gave detailed consideration to the evidence underpinning the medical experts' opinions and was critical of the evidence base underlying the propulsive forces theory. In particular, he attached weight to the Claimant's argument that literature supporting the occurrence of OBPI in the absence of SD failed to take account of situations where SD occurred but was unrecorded because of a failure to recognize it. A similar comment was made in *Oladipupo* (below).

In *Oladipupo v East London and City Health Authority* [2001] Medical Litigation Cases 0416, the Defendants argued that in theory all perinatal brachial plexus injuries could result from propulsive forces and therefore the Claimant couldn't prove that damage was caused by

traction, though it was acknowledged that usual traction was used before SD was identified. However, HH Judge Reid QC opined that where there is evidence of SD, traction and a serious brachial plexus injury the balance of probability is weighted against the propulsive forces theory. Despite little factual evidence regarding the force of traction, he took the view that it must have been excessive, accepting the Claimant's expert's reliance on a paper by Gonik *et al.*,[29] which relates the seriousness of injury to the amount of traction applied. A similar approach was taken in *Alexander Catnach v North Tees Health NHS Trust* [2000] MLC 0267. This approach has subsequently been rejected in *Jackson v Bro Taf Health Authority* [2002] EWHC QB 2344 Case No. CF 020143 and in *Ellis v Royal Surrey County Hospitals NHS Trust* [2003] MLC 1089.

In *Jackson v Bro Taf Health Authority* [2002], both parties agreed the injury was secondary to the traction exerted after delivery of the head and the main issue was whether the traction was excessive. The midwife stated she applied 'firm but not excessive' traction, describing this as a guiding movement rather than pulling. This evidence was supported by colleagues present and there was no strong evidence to the contrary. The Claimant argued that injury could only have been caused by traction against resistance but this reasoning was rejected by the Judge, who stated that 'there is no support for it in the literature that was put before me for the view that Erb's palsy is avoidable with proper care . . . the injury can occur despite competence on the part of those carrying out the delivery. He accepted that 'diagnostic traction', i.e. appropriate traction to test whether delivery could be achieved, could cause injury. A similar decision was reached in *Lobb* where it was accepted injury probably resulted from traction but it was denied traction was excessive. The Judge said it was acceptable to apply proportionate traction as long as it was stopped once resistance was felt and that it was permissible to apply periodic proportionate traction to assess if progress was being made.

In *Ellis v Royal Surrey County Hospitals NHS Trust* [2003], the baby had a left brachial palsy and it was common ground that SD had occurred. It was pleaded that the Registrar had used excessive traction and the Claimant's expert gave evidence that brachial plexus injuries could only be caused by excessive traction. The Registrar's evidence was that after rotation of the head with Kjelland's forceps and use of quite significant traction to deliver it, only diagnostic traction was used to deliver the shoulders. DJ Leighton QC accepted that the traction used was not excessive and said that the expert evidence did not establish that brachial plexus injury could only be caused by excessive traction. He declined to determine at what stage injury had occurred and was not satisfied that the posterior shoulder must have caught on the sacral promontory as was proposed by the Defendant's expert, but he accepted that the normal propulsive forces of labour may cause a brachial plexus injury.

Number of attendants

Despite the unpredictable nature of SD, up-to-date training should facilitate earlier recognition and a timely call for help by the birth attendant, thereby ensuring sufficient attendants to perform recommended management: one person to manage the delivery, two to hold the patient's legs in the McRoberts' position and another to apply suprapubic pressure.

Proper execution of these manoeuvres, in particular McRoberts, ideally requires at least four attendants. If there are less than four, it is unlikely that the manoeuvres could have been executed properly and therefore the injury is once again more likely to have been caused by traction after failures in the management of delivery itself.

Precipitous second stage

A short second stage is more common in cases of OBPI occurring in the absence of SD than in cases with antecedent SD,[9] which suggests propulsive forces may be responsible for injury in these instances. Poggi *et al.*[30] identified a precipitous second stage is the most prevalent labour abnormality prior to SD. They also compared temporary and permanent palsies occurring after SD, but they were unable to identify any characteristics of second stage labour that predisposed to permanent injury.

There is some cadaveric work, which suggests that increasing the speed of the application of a standard force increases the rate of nerve rupture in 20 postmortem brachial plexus nerves.[31]

Therefore, a short second stage may result in a faster application of these propulsive forces, i.e. more of a jerk, which may make the OBPI less likely to have been iatrogenic.

Permanent versus temporary injury

Gurewitsch *et al.*[32] have recently suggested that more than 90% of permanent brachial plexus palsies follow SD, but others have suggested that OBPI occurring without SD may be a qualitatively different injury from that occurring with SD, and that it persists longer in the non-dystocia group.[33] However, other authors have suggested that the incidence of permanent brachial plexus palsy is the same in the two groups.[34,35]

It remains to be clarified whether injury persists longer where there is iatrogenic causation, but there is accruing evidence that permanent injuries may be more likely to be iatrogenic. This may not be a very useful discriminator as it is predominantly permanent injuries that come to court.

Conclusion

Causation of obstetric brachial plexus injuries is multifactorial; evidence suggests that while some cases are traction mediated, others may not be. There is a growing acceptance in both the medical literature and case law that the propulsive forces of uterine contraction may play a part.

The assumption that the presence of an injury is evidence that traction must have been applied is no longer valid. Injury may occur regardless of the best efforts of the accoucheur. Diagnostic traction is acceptable and Claimants now need to demonstrate factual evidence of the use of excessive force or other inappropriate management to succeed in arguing negligent management.

Certain factors may tip the balance of probability towards an iatrogenic cause or a propulsive cause of injury in individual cases; using the table outlined in this paper as a template to review factors relevant to causation may help provide a structure to critically evaluate the evidence. None of the categories by themselves are evidence of causation, but more evidence in one group should help direct the litigation team.

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