Royal College of
Obstetricians and Gynaecologists

Bringing to life the best in women's health care

Green-top Guideline No. 42

2nd edition | March 2012

Shoulder Dystocia

Shoulder Dystocia

This is the second edition of this guideline. The first edition was published in 2005 under the same title.

1. Background

Shoulder dystocia is defined as a vaginal cephalic delivery that requires additional obstetric manoeuvres to deliver the fetus after the head has delivered and gentle traction has failed.[1] An objective diagnosis of a prolongation of head-to-body delivery time of more than 60 seconds has also been proposed[2,3] but these data are not routinely collected. Shoulder dystocia occurs when either the anterior, or less commonly the posterior, fetal shoulder impacts on the maternal symphysis, or sacral promontory, respectively.

There is a wide variation in the reported incidence of shoulder dystocia.[4] Studies involving the largest number of vaginal deliveries (34 800 to 267 228) report incidences between 0.58% and 0.70%.[5–10]

Evidence level 2+ and Evidence level 3

There can be significant perinatal morbidity and mortality associated with the condition, even when it is managed appropriately.[7] Maternal morbidity is increased, particularly the incidence of postpartum haemorrhage (11%) as well as third and fourth-degree perineal tears (3.8%). Their incidences remain unchanged by the number or type of manoeuvres required to effect delivery.[11,12]

Evidence level 2+

Brachial plexus injury (BPI) is one of the most important fetal complications of shoulder dystocia, complicating 2.3% to 16% of such deliveries.[7,11,13,14]

Evidence level 2+ and Evidence level 3

Most cases of BPI resolve without permanent disability, with fewer than 10% resulting in permanent neurological dysfunction.[15] In the UK and Ireland, the incidence of BPI was 0.43 per 1000 live births.[16] However, this may be an underestimate as the data were collected by paediatricians, and some babies with early resolution of their BPI might have been missed.

Evidence level 2+

There is evidence to suggest that where shoulder dystocia occurs, larger infants are more likely to suffer a permanent BPI after shoulder dystocia.[17,18]

Evidence level 4

A retrospective review of all BPIs in one American hospital reported an incidence of 1 in 1000 births, with a permanent injury rate of 0.1 per 1000.[19] Another review of 33 international studies reported an incidence of BPI of 1.4 in 1000 births, with a permanent injury rate of 0.2 per 1000 births.[20]

Neonatal BPI is the most common cause for litigation related to shoulder dystocia and the third most litigated obstetric-related complication in the UK.[21]

Evidence level 3

The NHSLA (NHS Litigation Authority) has reported that 46% of the injuries were associated with substandard care.[21] However, they also emphasised that not all injuries are due to excess traction by healthcare professionals, and there is a significant body of evidence suggesting that maternal propulsive force may contribute to some of these injuries.[22,23]

Evidence level 3 and 4

Moreover, a substantial minority of BPIs are not associated with clinically evident shoulder dystocia.[24,25] In one series, 4% of injuries occurred after a caesarean section,[26] and in another series 12% of babies with a BPI were born after an uncomplicated caesarean section.[27] When BPI is discussed legally, it is important to determine whether the affected shoulder was anterior or posterior at the time of delivery, because damage to the plexus of the posterior shoulder is considered unlikely to be due to action by the healthcare professional.[22]

Evidence level 4

2. Purpose and scope

The purpose of this guideline is to review the current evidence regarding the possible prediction, prevention and management of shoulder dystocia; it does not cover primary prevention of fetal macrosomia associated with gestational diabetes mellitus. The guideline provides guidance for skills training for the management of shoulder dystocia, but the practical manoeuvres are not described in detail. These can be found in the PROMPT (PRactical Obstetric Multi-Professional Training) course manual.[28]

3. Identification and assessment of evidence

This RCOG guideline was revised in accordance with standard methodology for producing RCOG Green- top Guidelines. A search was performed in the OVID database, which included Medline, Embase, the Cochrane Database of Systematic Reviews, the Cochrane Control Register of Controlled Trials (CENTRAL), the Database of Abstracts of Reviews and Effects (DARE), the ACP Journal Club, the National Guidelines Clearing House and the Confidential Enquiry into Maternal and Child Health (CEMACH) reports. The search was restricted to articles published between January 1980 and May 2011 and limited to humans and the English language. Search terms included: 'shoulder dystocia', 'macrosomia', 'McRoberts' manoeuvre', 'obstetric manoeuvres', 'complications, labour/delivery', 'brachial plexus injury', 'Erb's palsy', 'Klumpke's palsy', 'symphysiotomy', 'Zavanelli manoeuvre','skill drills','rehearsal of obstetric emergencies' and 'medical simulation'. Reference lists of the articles identified were hand-searched for additional articles and some experts within the field were contacted. Relevant key original papers published prior to 1980 were also obtained and are referenced within this guideline.

Owing to the emergency nature of the condition, most published series examining procedures for the management of shoulder dystocia are retrospective case series or case reports. Areas lacking evidence are annotated as good practice points.

4. Prediction

4.1 Can shoulder dystocia be predicted?

Clinicians should be aware of existing risk factors in labouring women and must always be alert to the possibility of shoulder dystocia. **D**

Risk assessments for the prediction of shoulder dystocia are insufficiently predictive to allow prevention of the large majority of cases. **C**

A number of antenatal and intrapartum characteristics have been reported to be associated with shoulder dystocia (table 1), but statistical modelling has shown that these risk factors have a low positive predictive value, both singly and in combination.[29,30] Conventional risk factors predicted only 16% of shoulder dystocia that resulted in infant morbidity.[29] There is a relationship between fetal size and shoulder dystocia,[13] but it is not a good predictor: partly because fetal size is difficult to determine accurately, but also because the large majority of infants with a birth weight of ≥4500g do not develop shoulder dystocia.[31] Equally important, 48% of births complicated by shoulder dystocia occur with infants who weigh less than 4000g.[6]

Infants of diabetic mothers have a two- to four-fold increased risk of shoulder dystocia compared with infants of the same birth weight born to non-diabetic mothers.[13,29] Evidence level 2+ and Evidence level 3

A retrospective case-control study to develop a predictive model of risk for shoulder dystocia with injury was published in 2006.[33] The authors reported that the best combination of variables to identify neonatal injury associated with shoulder dystocia were maternal height and weight, gestational age and parity and birthweight. A score over 0.5 detected 50.7% of the shoulder dystocia cases with BPI, with a false positive

rate of 2.7%.[33] However, the statistical modelling for this prediction tool was based on actual birth weight and not estimated fetal weight. Clinical fetal weight estimation is unreliable and third-trimester ultrasound scans have at least a 10% margin for error for actual birth weight and a sensitivity of just 60% for macrosomia (over 4.5 kg).[34,35] The use of shoulder dystocia prediction models cannot therefore be recommended.[9,35]

Table 1. Factors associated with shoulder dystocia

Pre-labour	Intrapartum
Previous shoulder dystocia	Prolonged first stage of labour
Macrosomia >4.5kg	Secondary arrest
Diabetes mellitus	Prolonged second stage of labour
Maternal body mass index >30kg/m2	Oxytocin augmentation
Induction of labour	Assisted vaginal delivery

5. Prevention of shoulder dystocia

5.1 Management of suspected fetal macrosomia

5.1.1 Does induction of labour prevent shoulder dystocia?

Induction of labour does not prevent shoulder dystocia in non-diabetic women with a suspected macrosomic fetus. Grade D D

Induction of labour at term can reduce the incidence of shoulder dystocia in women with gestational diabetes. Grade B B

There are a number of evidence-based reviews that have demonstrated that early induction of labour for women with suspected fetal macrosomia, who do not have gestational diabetes, does not improve either maternal or fetal outcome.[36,37] Evidence level 4

A systematic review and meta-analysis of randomised controlled trials of the effect of treatment in women with gestational diabetes[38] concluded that the incidence of shoulder dystocia is reduced with early induction of labour. Evidence level 2+

The NICE diabetes guideline recommends that pregnant women with diabetes who have a normally grown fetus should be offered elective birth through induction of labour, or by elective caesarean section if indicated, after 38 completed weeks.[39]

5.1.2 Should elective caesarean section be recommended for suspected fetal macrosomia to prevent brachial plexus injury (BPI)?

Elective caesarean section should be considered to reduce the potential morbidity for pregnancies complicated by pre-existing or gestational diabetes, regardless of treatment, with an estimated fetal weight of greater than 4.5 kg. D

Infants of diabetic mothers have a two- to four-fold increased risk of shoulder dystocia compared with infants of the same birth weight born to non-diabetic mothers.[13,29] A decision-analysis model estimated that in diabetic women with an EFW > 4.5kg, 443 caesarean sections would need to be performed to prevent one permanent BPI. In comparison, 3695 caesarean sections would be required to prevent one permanent BPI in the non-diabetic population.[34] Evidence level 3

Estimation of fetal weight is unreliable and the large majority of infants over 4.5kg do not experience shoulder dystocia.[32] In the USA, a decision-analysis model estimated that in non-diabetic women with an EFW of >4kg, an additional 2345 caesarean deliveries would be required, at a cost of US$4.9 million, to prevent one permanent injury from shoulder dystocia.[34] However, there is some difficulty in grouping all fetuses with an expected weight of >4.5 kg together: some fetuses will be much larger than this. The American College of Obstetricians and Gynecologists (ACOG) has recommended that an estimated fetal weight of over 5 kg should prompt consideration of delivery by caesarean section,[40] inaccuracy of methods of fetal size estimation notwithstanding.

Evidence level 4

The National Institute for Health and Clinical Excellence states that 'ultrasound estimation of fetal size for suspected large-for-gestational-age unborn babies should not be undertaken in a low-risk population'.[41]

5.2 What are the recommendations for future pregnancy?

What is the appropriate mode of delivery for the woman with a previous episode of shoulder dystocia?

Either caesarean section or vaginal delivery can be appropriate after a previous shoulder dystocia. The decision should be made jointly by the woman and her carers.

D

The rate of shoulder dystocia in women who have had a previous shoulder dystocia has been reported to be 10 times higher than the rate in the general population.[42] There is a reported recurrence rate of shoulder dystocia of between 1% and 25%.[6,10,30,42–46] However, this may be an underestimate owing to selection bias, as caesarean section might have been advocated for pregnancies after severe shoulder dystocia, particularly with a neonatal poor outcome.

Evidence level 3

There is no requirement to recommend elective caesarean birth routinely but factors such as the severity of any previous neonatal or maternal injury, predicted fetal size and maternal choice should all be considered and discussed with the woman and her family when making plans for the next delivery.

Evidence level 4

6. Management of shoulder dystocia

6.1 Preparation in labour: what measures should be taken when shoulder dystocia is anticipated?

All birth attendants should be aware of the methods for diagnosing shoulder dystocia and the techniques required to facilitate delivery.

✓

6.2 How is shoulder dystocia diagnosed?

Birth attendants should routinely look for the signs of shoulder dystocia.

✓

Timely management of shoulder dystocia requires prompt recognition. The attendant health carer should routinely observe for:

- difficulty with delivery of the face and chin
- the head remaining tightly applied to the vulva or even retracting (turtle-neck sign)
- failure of restitution of the fetal head
- failure of the shoulders to descend.

Routine traction in an axial direction can be used to diagnose shoulder dystocia but any other traction should be avoided.

D

Routine traction is defined as 'that traction required for delivery of the shoulders in a normal vaginal delivery where there is no difficulty with the shoulders'.[47] Axial traction is traction in line with the fetal spine i.e. without lateral deviation.

Evidence from cadaver studies suggests that lateral and downward traction, and rapidly applied traction,[48] are more likely to cause nerve avulsion. In a Swedish series, downward traction on the fetal head was strongly associated with obstetric BPI, and had been employed in all cases of residual BPI at 18 months old.[48] Therefore, downward traction on the fetal head should be avoided in the management of all births.

Evidence level 3

There is no evidence that the use of the McRoberts' manoeuvre before delivery of the fetal head prevents shoulder dystocia.[49] Therefore, prophylactic McRoberts' positioning before delivery of the fetal head is not recommended to prevent shoulder dystocia.

6.3.1 How should shoulder dystocia be managed?

Shoulder dystocia should be managed systematically (see appendix 1). ✓

Immediately after recognition of shoulder dystocia, additional help should be called. ✓

The problem should be stated clearly as 'this is shoulder dystocia' to the arriving team. ✓

Fundal pressure should not be used. D

McRoberts' manoeuvre is a simple, rapid and effective intervention and should be performed first. D

Suprapubic pressure should be used to improve the effectiveness of the McRoberts' manoeuvre. D

An episiotomy is not always necessary. D

The Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI) report on shoulder dystocia identified that 47% of the babies that died did so within five minutes of the head being delivered; however, in a very high proportion of cases, the fetus had a pathological cardiotocograph (CTG) prior to the shoulder dystocia.[50] A group from Hong Kong have recently reported that in their series there was a very low rate of hypoxic ischaemic injury if the head-to-body delivery time was less than five minutes.[51] It is important, therefore, to manage the problem as efficiently as possible to avoid hypoxic acidosis, and as carefully as possible to avoid unnecessary trauma.

Managing shoulder dystocia according to the RCOG algorithm (see appendix 2) has been associated with improved perinatal outcomes.[14]

Evidence level 3

Help should be summoned immediately. In a hospital setting, this should include further midwifery assistance, including the labour ward coordinator or an equivalent experienced midwife, an experienced obstetrician, a neonatal resuscitation team and an anaesthetist.[52]

Evidence level 4

Stating the problem early has been associated with improvements in outcomes in shoulder dystocia[53] and improved performance in other obstetric emergencies.[54]

Evidence level 3

Maternal pushing should be discouraged, as this may exacerbate impaction of the shoulders.[55]

Fundal pressure should not be used during the management of shoulder dystocia.[50] It is associated with a high neonatal complication rate[47] and may result in uterine rupture.[31]

Evidence level 3

The McRoberts' manoeuvre is flexion and abduction of the maternal hips, positioning the maternal thighs on her abdomen.[56] It straightens the lumbosacral angle, rotates the maternal pelvis towards the mother's head and increases the relative anterior-posterior diameter of the pelvis.[57] The McRoberts' manoeuvre is an effective intervention, with reported success rates as high as 90%.[8,11,58,59] It has a low rate of complication and is one of the least invasive manoeuvres, and therefore, if possible, should be employed first.

Evidence level 2+ and Evidence level 3

The woman should be laid flat and any pillows should be removed from under her back. With one assistant on either side, the woman's legs should be hyperflexed. If the woman is in the lithotomy position, her legs will need to be removed from the supports. Routine traction (the same degree of traction applied during a normal delivery) in an axial direction should then be applied to the fetal head to assess whether the shoulders have been released.

If the anterior shoulder is not released with the McRoberts' position and routine axial traction, another manoeuvre should be attempted.

Suprapubic pressure can be employed together with the McRoberts' manoeuvre to improve success rates.[11] Suprapubic pressure reduces the fetal bisacromial diameter and rotates the anterior fetal shoulder into the wider oblique pelvic diameter. The shoulder is then freed to slip underneath the symphysis pubis with the aid of routine axial traction.[58]

Evidence level 4

Suprapubic pressure should ideally be applied by an assistant from the side of the fetal back in a downward and lateral direction just above the maternal symphysis pubis. This reduces the fetal bisacromial diameter by pushing the posterior aspect of the anterior shoulder towards the fetal chest. There is no clear difference in efficacy between continuous pressure and 'rocking' movement. Only routine traction should be applied to the fetal head when assessing whether the manoeuvre has been successful. Again, if the anterior shoulder is not released with suprapubic pressure and routine traction, then another manoeuvre should be attempted.

An episiotomy will not relieve the bony obstruction of shoulder dystocia but may be required to allow the healthcare professional more space to facilitate internal vaginal manoeuvres. The use of an episiotomy does not decrease the risk of BPI with shoulder dystocia.[60]

Evidence level 3

An episiotomy should therefore only be considered if internal vaginal access of the healthcare professional's whole hand cannot easily be achieved to facilitate manoeuvres such as delivery of the posterior arm or internal rotation of the shoulders.[61]

Evidence level 4

6.3.2 What measures should be undertaken if simple techniques fail?

Internal manoeuvres or 'all-fours' position should be used if the McRoberts' manoeuvre and suprapubic pressure fail.

If simple measures (the McRoberts' manoeuvre and suprapubic pressure) fail, then there is a choice to be made between the all-fours position and internal manipulation.

Gaining access to the vagina for internal manoeuvres: the most spacious part of the pelvis is in the sacral hollow; therefore vaginal access should be gained posteriorly, into the sacral hollow. The whole hand should be entered posteriorly to perform internal rotation or delivery of the posterior arm.[62] The woman should be brought to the end of the bed, or the end of the bed should be removed, to make vaginal access easier. Delivery can then be facilitated by rotation into an oblique diameter or when possible by a full 180 degree rotation of the fetal trunk,[63,64] or by delivery of the posterior arm.[65]

Evidence level 4

Internal rotational manoeuvres were originally described by Woods[64] and Rubin.[63] Rotation can be most easily achieved by pressing on the anterior or posterior aspect of the posterior shoulder. Pressure on the posterior aspect of the posterior shoulder has the additional benefit of reducing the shoulder diameter by adducting the shoulders.[63] The shoulders should be rotated into the wider oblique diameter, resolving the shoulder dystocia. If pressure on the posterior shoulder is unsuccessful, an attempt should be made to apply pressure on the posterior aspect of the anterior shoulder to adduct and rotate the shoulders into the oblique diameter.

Evidence level 4

Delivering the posterior arm reduces the diameter of the fetal shoulders by the width of the arm. The fetal wrist should be grasped and the posterior arm should be gently withdrawn from the vagina in a straight line.[61] Delivery of the posterior arm is associated with humeral fractures with a reported incidence between 2% and 12%7,[14] but the neonatal trauma may be a reflection of the refractory nature of the case, rather than the procedure itself.[8]

Evidence level 3

There are no randomised comparative studies available comparing delivery of the posterior arm and internal rotation. Some authors favour delivery of the posterior arm over other manoeuvres,[59,66] particularly where the mother is large.[67] Others have reported that rotational methods and posterior arm delivery were similarly successful, but rotational manoeuvres were associated with reductions in both BPI and humeral fractures[68] compared to delivery of the posterior arm. Therefore, healthcare professionals should base their decision on their training, clinical experience and the prevailing circumstances.

Evidence level 4

'All-fours' technique: the 'all-fours' position has been described, with an 83% success rate in one case series.[69]

Evidence level 3

The individual circumstances should guide the healthcare professional as to whether to try the 'all-fours' technique before or after attempting internal rotation and delivery of the posterior arm. For a slim mobile woman without epidural anaesthesia and with a single midwifery attendant, the 'all-fours' position is probably more appropriate, and clearly this may be a useful option in a community setting. For a less mobile woman with epidural anaesthesia in place, internal manoeuvres are more appropriate.

Evidence level 4

6.3.3 Persistent failure of first- and second-line manoeuvres: what measures should be taken if first- and second-line manoeuvres fail?

Third-line manoeuvres should be considered very carefully to avoid unnecessary maternal morbidity and mortality, particularly by inexperienced practitioners. ✓

It is difficult to recommend an absolute time limit for the management of shoulder dystocia as there are no conclusive data available, but there appears to be a very low rate of hypoxic ischaemic injury up to five minutes.[51]

Evidence level 3

Several third-line methods have been described for those cases resistant to all standard measures. These include cleidotomy (surgical division of the clavicle or bending with a finger), symphysiotomy (dividing the anterior fibres of symphyseal ligament) and the Zavanelli manoeuvre. It is rare that these are required.

Vaginal replacement of the head (Zavanelli manoeuvre), and then delivery by caesarean section has been described[70,71] but success rates vary.[72] Intuitively, the Zavanelli manoeuvre may be most appropriate for rare bilateral shoulder dystocia, where both the shoulders impact on the pelvic inlet, anteriorly above the pubic symphysis and posteriorly on the sacral promontory. The maternal safety of this procedure is unknown, however, and this should be borne in mind, knowing that a high proportion of fetuses have irreversible hypoxia-acidosis by this stage, and it may not reduce the risk of BPI.[73]

Evidence level 4

Similarly, symphysiotomy has been suggested as a potentially useful procedure, both in the developing[74,75] and developed world.[76] However, there is a high incidence of serious maternal morbidity and poor neonatal outcome.[77] Serious consideration should be given to these facts, particularly where practitioners are not trained in the technique. Evidence level 4

Other techniques, including the use of a posterior axillary sling, have been recently reported but there are few data available.[78,79]

6.4 What is the optimal management of the woman and baby after shoulder dystocia?

Birth attendants should be alert to the possibility of postpartum haemorrhage and severe perineal tears. ✓

There is significant maternal morbidity associated with shoulder dystocia, particularly postpartum haemorrhage (11%) and third and fourth degree perineal tears (3.8%).[11] Other reported complications include vaginal lacerations,[80] cervical tears, bladder rupture, uterine rupture, symphyseal separation, sacroiliac joint dislocation and lateral femoral cutaneous neuropathy.[81,82] Evidence level 2+ and Evidence level 3

The baby should be examined for injury by a neonatal clinician. ✓

BPI is one of the most important complications of shoulder dystocia, complicating 2.3% to 16% of such deliveries.[7,11,13,14]

Other reported fetal injuries associated with shoulder dystocia include fractures of the humerus and clavicle, pneumothoraces and hypoxic brain damage.[15,83,84] Evidence level 3

An explanation of the delivery should be given to the parents (see section 9). ✓

7. Risk management

7.1 Training

7.1.1 What are the recommendations for training?

All maternity staff should participate in shoulder dystocia training at least annually. Grade D D

The fifth CESDI report recommended that a 'high level of awareness and training for all birth attendants' should be observed.[50] Annual 'skill drills', including shoulder dystocia, are recommended jointly by both the Royal College of Midwives and the RCOG[85] and are one of the requirements in the Clinical Negligence Scheme for Trusts (CNST) maternity standards.[86] Evidence level 4

Where training has been associated with improvements in neonatal outcome, all staff received annual training.[14] Evidence level 3

One study looked at retention of skill for up to one year following training using simulation. If staff had the ability to manage a severe shoulder dystocia immediately following training, the ability to deliver tended to be maintained at one year.[87] Evidence level 2-

7.1.2 What is the evidence for the effectiveness of shoulder dystocia training?

Practical shoulder dystocia training has been shown to improve knowledge,[88] confidence[89] and management of simulated shoulder dystocia.[90–93] Training has also been shown to improve the actor-patients' perception of their care during simulated shoulder dystocia.[94] Evidence level 1-

The effect of training on actual perinatal outcomes have been variable: an eight year retrospective review of shoulder dystocia management before and after the introduction of annual shoulder dystocia training for all staff in one UK hospital demonstrated a significant reduction in neonatal injury at birth following shoulder dystocia (9.3% pre-training, 2.3% post-training).[14] There are other reports of improvements after training,[53,95] although in one recent USA study[95] there was increase in the caesarean section rate - from a pre-training rate of 29.90% to a post-training rate of 40.14% - which could account for at least some of the effect.

Evidence level 3

However, training has also been associated with no change in outcome[96] or even deterioration in neonatal outcome;[97] hospitals should therefore monitor the neonatal injury rate after the introduction of training to ensure it is effective.

7.1.3 What measures can be taken to ensure optimal management of shoulder dystocia?

Manoeuvres should be demonstrated in direct view, as they are complex and difficult to understand by description alone. ✓

Higher fidelity training equipment should be used. ✓

Practical training using mannequins has been associated with improvements in management in simulation[90–93] and in real life.[14]

The largest trial of shoulder dystocia training found that before training only 43% of midwives and doctors could successfully manage a severe shoulder dystocia simulation within five minutes.[91] Three weeks after a 40 minute simulation training session 83% of staff were able to successfully complete the delivery. Training on a high fidelity mannequin was more successful than training with lower fidelity rag doll and pelvis – with a significantly higher successful delivery rate (95% versus 72%), a shorter head-to-body interval and a lower total applied force successful delivery rate.[91]

Moreover, the traction used in simulated shoulder dystocia can be excessive[98,99] but training using models with force monitoring can reduce the traction used in simulated shoulder dystocia.[98,100,101]

Shoulder dystocia training associated with improvements in clinical management and neonatal outcomes was multi-professional, with manoeuvres demonstrated and practiced on a high fidelity mannequin.[14] Teaching used the RCOG algorithm (see appendix 2) rather than staff being taught mnemonics (e.g. HELPERR) or eponyms (e.g. Rubin's and Woods' screw).

7.2 Documentation

Documentation should be accurate and comprehensive. GPP ✓

The sixth CESDI annual report highlighted inadequate documentation in obstetrics, with potential medico-legal consequences.[102] Poor documentation of shoulder dystocia management has been highlighted[103,104] and it has been suggested that documentation should be included in shoulder dystocia training.[103] The use of a structured pro forma has been suggested to improve accurate record keeping in the clinical setting[5] and there is some evidence that they are effective.[106]

Evidence level 2+

An example is provided in appendix 3.

It is important to record within the birth record the:

- time of delivery of the head and time of delivery of the body
- anterior shoulder at the time of the dystocia

- manoeuvres performed, their timing and sequence
- maternal perineal and vaginal examination
- estimated blood loss
- staff in attendance and the time they arrived
- general condition of the baby (Apgar score)
- umbilical cord blood acid-base measurements
- neonatal assessment of the baby.[104,106]

It is particularly important to document the position of the fetal head at delivery as this facilitates identification of the anterior and posterior shoulder during the delivery.

8. Suggested audit topics

- incident reporting of shoulder dystocia (CNST standard)
- critical analysis of manoeuvres used in the management of shoulder dystocia
- neonatal team called at diagnosis of shoulder dystocia
- documentation of the event (see above)
- performance of cord blood gas analysis
- monitoring neonatal injury (BPI bony fractures) following shoulder dystocia
- staff attendance at annual training
- discussion of events with parents.

9. Support

An information leaflet for parents 'A difficult birth: what is shoulder dystocia?' produced by the RCOG is available online (http://www.rcog.org.uk/womens-health/clinical-guidance/difficult-birth-what-shoulder-dystocia).

The Erb's Palsy Group (www.erbspalsygroup.co.uk) provides an excellent support network for children and families affected by BPI.

References

1. Resnick R. Management of shoulder dystocia girdle. *Clin Obstet Gynecol* 1980;23:559-64.
2. Spong CY, Beall M, Rodrigues D, Ross MG. An objective definition of shoulder dystocia: prolonged head-to-body delivery intervals and/or the use of ancillary obstetric maneuvers. *Obstet Gynecol* 1995;86:433–6.
3. Beall MH, Spong C, McKay J, Ross MG. Objective definition of shoulder dystocia: a prospective evaluation. *Am J Obstet Gynecol* 1998;179:934–7.
4. Gherman RB. Shoulder dystocia: an evidence-based evaluation of the obstetric nightmare. *Clin Obstet Gynecol* 2002;45:345–62.
5. McFarland M, Hod M, Piper JM, Xenakis EM, Langer O. Are labor abnormalities more common in shoulder dystocia? *Am J Obstet Gynecol* 1995;173:1211–4.
6. Baskett TF, Allen AC. Perinatal implications of shoulder dystocia. *Obstet Gynecol* 1995;86:14–7.
7. Gherman RB, Ouzounian JG, Goodwin TM. Obstetric maneuvres for shoulder dystocia and associated fetal morbidity. *Am J Obstet Gynecol* 1998;178:1126-30.
8. McFarland MB, Langer O, Piper JM, Berkus MD. Perinatal outcome and the type and number of maneuvers in shoulder dystocia. *Int J Gynaecol Obstet* 1996;55:219–24.
9. Ouzounian JG, Gherman RB. Shoulder dystocia: are historic risk factors reliable predictors? *Am J Obstet Gynecol* 2005;192:1933–5; discussion 1935–8.
10. Smith RB, Lane C, Pearson JF. Shoulder dystocia: what happens at the next delivery? *Br J Obstet Gynaecol* 1994;101:713–15.
11. Gherman RB, Goodwin TM, Souter I, Neumann K, Ouzounian JG, Paul RH. The McRoberts' maneuver for the alleviation of shoulder dystocia: how successful is it? *Am J Obstet Gynecol* 1997;176:656–61.
12. Mazouni C, Menard JP, Porcu G, Cohen-Solal E, Heckenroth H, Gamerre M, Bretelle F. Maternal morbidity associated with obstetrical maneuvers in shoulder dystocia. *Eur J Obstet Gynecol Reprod Biol* 2006;129:15–8.
13. Acker DB, Sachs BP, Friedman EA. Risk factors for shoulder dystocia. *Obstet Gynecol* 1985;66:762–8.
14. Draycott TJ, Crofts JF, Ash JP, Wilson LV, Yard E, Sibanda T, Whitelaw A. Improving neonatal outcome through practical shoulder dystocia training. *Obstet Gynecol* 2008 ;112:14–20.
15. Gherman RB, Ouzounian JG, Miller DA, Kwok L, Goodwin TM. Spontaneous vaginal delivery: a risk factor for Erb's palsy? *Am J Obstet Gynecol* 1998;178:423–7.
16. Evans-Jones G, Kay SP, Weindling AM, Cranny G, Ward A, Bradshaw A, Hernon C. Congenital brachial plexus injury: incidence, causes and outcome in the UK and Republic of Ireland. *Arch Dis Child Fetal Neonatal Ed* 2003;88:F185–9.
17. Gherman RB, Ouzounian JG, Satin AJ, Goodwin TM, Phelan JP. A comparison of shoulder dystocia-associated transient and permanent brachial plexus palsies. *Obstet Gynecol* 2003;102:544–8.
18. Pondaag W, Allen RH, Malessy MJ. Correlating birthweight with neurological severity of obstetric brachial plexus lesions. *BJOG* 2011; 118:1098–103.
19. Chauhan SP, Rose CH, Gherman RB, Magann EF, Holland MW, Morrison JC. Brachial plexus injury: a 23-year experience from a tertiary center. *Am J Obstet Gynecol* 2005;192:1795–800; discussion 1800–2.

20. Gherman RB, Chauhan S, Oh C, Goodwin TM. Brachial plexus palsy. *Fetal Matern Med Rev* 2005; 16:221–43.
21. Menjou M, Mottram J, Petts C, Stoner R. Common intrapartum denominators of obstetric brachial plexus injury (OBPI). NHSLA J 2003;2 suppl:ii–viii.
22. Draycott T, Sanders C, Crofts J, Lloyd J. A template for reviewing the strength of evidence for obstetric brachial plexus injury in clinical negligence claims. *Clin Risk* 2008;14:96–100.
23. NHSLA. Case 3 - Obstetrics. *NHSLA J* 2005;5: 6.
24. Sandmire HF, DeMott RK. Erb's palsy without shoulder dystocia. *Int J Gynaecol Obstet* 2002;78:253–6.
25. Allen RH, Gurewitsch ED. Temporary Erb-Duchenne palsy without shoulder dystocia or traction to the fetal head. *Obstet Gynecol* 2005;105:1210–2.
26. Gilbert WM, Nesbitt TS, Danielsen B. Associated factors in 1611 cases of brachial plexus injury. *Obstet Gynecol* 1999;93:536–40
27. Gherman RB, Goodwin TM, Ouzounian JG, Miller DA, Paul RH. Brachial plexus palsy associated with cesarean section: an in utero injury? *Am J Obstet Gynecol* 1997;177:1162–4.
28. Draycott T, Winter C, Crofts J, Barnfield S (Eds). PROMPT PRactical Obstetric Multi-Professional Training Course Manual. Vol. 1. London: RCOG Press; 2008.
29. Nesbitt TS, Gilbert WM, Herrchen B. Shoulder dystocia and associated risk factors with macrosomic infants born in California. *Am J Obstet Gynecol* 1998;179:476–80.
30. Bahar AM. Risk factors and fetal outcome in cases of shoulder dystocia compared with normal deliveries of a similar birthweight. *Br J Obstet Gynaecol* 1996;103:868–72.
31. Gross TL, Sokol RJ, Williams T, Thompson K. Shoulder dystocia: a fetal-physician risk. *Am J Obstet Gynecol* 1987;156:1408–18.
32. Naef RW 3rd, Martin JN Jr. Emergent management of shoulder dystocia. *Obstet Gynecol Clin North Am* 1995;22:247–59.
33. Dyachenko A, Ciampi A, Fahey J, Mighty H, Oppenheimer L, Hamilton EF. Prediction of risk for shoulder dystocia with neonatal injury. *Am J Obstet Gynecol* 2006;195:1544-9.
34. Rouse DJ, Owen J, Goldenberg RL, Cliver SP. The effectiveness and costs of elective cesarean delivery for fetal macrosomia diagnosed by ultrasound. *JAMA* 1996; 13;276:1480–6
35. Gupta M, Hockley C, Quigley MA, Yeh P, Impey L. Antenatal and intrapartum prediction of shoulder dystocia. *Eur J Obstet Gynecol Reprod Biol* 2010;151:134–9.
36. Centre for Reviews and Dissemination, NHS National Institute for Health Research. Expectant management versus labor induction for suspected fetal macrosomia: a systematic review. *Database of Abstracts of Reviews of Effectiveness* 2004;2:2.
37. Irion O, Boulvain M. Induction of labour for suspected fetal macrosomia. *Cochrane Database Syst Rev* 2000;2: CD000938.
38. Horvath K, Koch K, Jeitler K, Matyas E, Bender R, Bastian H, et al. Effects of treatment in women with gestational diabetes mellitus: systematic review and meta-analysis. *BMJ* 2010;340:c1395.
39. National Institute for Health and Clinical Excellence. *Diabetes in pregnancy. Management of diabetes and its complications from pre-conception to the postnatal period*. Clinical Guideline 63. London: NICE; 2008.
40. Sokol RJ, Blackwell SC; American College of Obstetricians and Gynecologists. ACOG Practice Bulletin: shoulder dystocia. *Int J Gynaecol Obstet* 2003;80:87–92.
41. National Institute for Health and Clinical Excellence. *Antenatal care: Routine care for the healthy pregnant woman*. Clinical Guideline 62. London: NICE; 2008.
42. Mehta SH, Blackwell SC, Chadha R, Sokol RJ. Shoulder dystocia and the next delivery: outcomes and management. *J Matern Fetal Neonatal Med* 2007;20:729–33.
43. Usta IM, Hayek S, Yahya F, Abu-Musa A, Nassar AH. Shoulder dystocia: what is the risk of recurrence? *Acta Obstet Gynecol Scand* 2008;87:992–7.
44. Lewis DF, Raymond RC, Perkins MB, Brooks GG, Heymann AR. Recurrence rate of shoulder dystocia. *Am J Obstet Gynecol* 1995;172:1369–71.
45. Ginsberg NA Moisidis C. How to predict recurrent shoulder dystocia. *Am J Obstet Gynecol* 2001;184:1427–30.
46. Lewis DF, Edwards MS, Asrat T, Adair CD, Brooks G, London S. Can shoulder dystocia be predicted? Preconceptive and prenatal factors. *J Reprod Med* 1998;43:654–8.
47. Metaizeau JP, Gayet C, Plenat F. Les Lesions Obstetricales du Plexus Brachial. *Chir Pediatr* 1979;20:159–63.
48. Mollberg M, Wennergren M, Bager B, Ladfors L, Hagberg H. Obstetric brachial plexus palsy: a prospective study on risk factors related to manual assistance during the second stage of labor. *Acta Obstet Gynecol Scand* 2007;86:198–204.
49. Poggi SH, Allen RH, Patel CR, Ghidini A, Pezzullo JC, Spong CY. Randomized trial of McRoberts versus lithotomy positioning to decrease the force that is applied to the fetus during delivery. *Am J Obstet Gynecol* 2004;191:874–8.
50. Focus Group Shoulder Dystocia. In: Confidential Enquiries into Stillbirths and Deaths in Infancy. *Fifth Annual Report*. London: Maternal and Child Health Research Consortium;1998 p 73–9.
51. Leung TY, Stuart O, Sahota DS, Suen SS, Lau TK, Lao TT. Head-to-body delivery interval and risk of fetal acidosis and hypoxic ischaemic encephalopathy in shoulder dystocia: a retrospective review. *BJOG* 2011;118:474–9.
52. Hope P, Breslin S, Lamont L, Lucas A, Martin D, Moore I, et al. Fatal shoulder dystocia:a review of 56 cases reported to the Confidential Enquiry into Stillbirths and Deaths in Infancy. *Br J Obstet Gynaecol* 1998;105:1256–61.
53. Grobman WA, Miller D, Burke C, Hornbogen A, Tam K, Costello R. Outcomes associated with introduction of a shoulder dystocia protocol. *Am J Obstet Gynecol* 2011;205:513-7.
54. Siassakos D, Bristowe K, Draycott TJ, Angouri J, Hambly H, Winter C, et al. Clinical efficiency in a simulated emergency and relationship to team behaviours: a multisite cross-sectional study. *BJOG* 2011;118:596–607.
55. Gonik B, Zhang N, Grimm MJ. Defining forces that are associated with shoulder dystocia:the use of a mathematic dynamic computer model. *Am J Obstet Gynecol* 2003;188:1068–72.
56. Gonik B, Stringer CA, Held B. An alternate maneuver for management of shoulder dystocia. *Am J Obstet Gynecol* 1983;145:882–4.
57. Buhimschi CS, Buhimschi IA, Malinow A, Weiner CP. Use of McRoberts' position during delivery and increase in pushing efficiency. *Lancet* 2001;358:470–1.
58. Lurie S, Ben-Arie A, Hagay Z. The ABC of shoulder dystocia management. *Asia Oceania J Obstet Gynaecol* 1994;20:195–7.
59. O'Leary JA, Leonetti HB. Shoulder dystocia: prevention and treatment. *Am J Obstet Gynecol* 1990;162:5–9.
60. Gurewitsch ED, Donithan M, Stallings SP, Moore PL, Agarwal S, Allen LM, Allen RH. Episiotomy versus fetal manipulation in managing severe shoulder dystocia: a comparison of outcomes. *Am J Obstet Gynecol* 2004;191:911–16.
61. Hinshaw K. Shoulder dystocia. In: Johanson R, Cox C, Grady K, Howell C (Eds). *Managing Obstetric Emergencies and Trauma: The MOET Course Manual*. London: RCOG Press; 2003. p. 165–74.
62. Crofts JF, Fox R, Ellis D, Winter C, Hinshaw K, Draycott TJ. Observations from 450 shoulder dystocia simulations: lessons for skills training. *Obstet Gynecol* 2008;112:906–12
63. Rubin A. Management of shoulder dystocia. *JAMA* 1964;189:835–7.
64. Woods CE, Westbury NYA. A principle of physics as applicable to shoulder delivery. Am J Obstet Gynecol 1943;45:796-804.
65. Barnum CG. Dystocia due to the shoulders. *Am J Obstet Gynecol* 1945;50:439–42.
66. Hoffman MK, Bailit JL, Branch DW, Burkman RT, Van Veldhusien P, Lu L, et al. A comparison of obstetric maneuvers for the acute management of shoulder dystocia. *Obstet Gynecol* 2011;117:1272–8.
67. Poggi SH, Spong CY, Allen RH. Prioritizing posterior arm delivery during severe shoulder dystocia. *Obstet Gynecol* 2003;101:1068–72.
68. Leung TY, Stuart O, Suen SS, Sahota DS, Lau TK, Lao TT. Comparison of perinatal outcomes of shoulder dystocia

alleviated by different type and sequence of manoeuvres: a retrospective review. *BJOG* 2011;118:985-90.
69. Bruner JP, Drummond SB, Meenan AL, Gaskin IM. All-fours maneuver for reducing shoulder dystocia during labor. *J Reprod Med* 1998;43:439–43.
70. Sandberg EC. The Zavanelli maneuver: a potentially revolutionary method for the resolution of shoulder dystocia. *Am J Obstet Gynecol* 1985;152:479–84.
71. Vaithilingam N, Davies D. Cephalic replacement for shoulder dystocia: three cases. *BJOG* 2005;112:674–5
72. Spellacy WN. The Zavanelli maneuver for fetal shoulder dystocia. Three cases with poor outcomes. *J Reprod Med* 1995;40:543–4.
73. Gherman RB, Ouzounian JG, Chauhan S. Posterior arm shoulder dystocia alleviated by the Zavanelli maneuver. *Am J Perinatol* 2010;27:749–51.
74. Van Roosmalen J. Shoulder dystocia and symphysiotomy. *Eur J Obstet Gynecol Reprod Biol* 1995;59:115–16.
75. Hartfield VJ. Symphysiotomy for shoulder dystocia. *Am J Obstet Gynecol* 1986;155:228.
76. Wykes CB, Johnston TA, Paterson-Brown S, Johanson RB. Symphysiotomy: a lifesaving procedure. *BJOG* 2003;110:219–21.
77. Goodwin TM, Banks E, Millar LK, Phelan JP. Catastrophic shoulder dystocia and emergency symphysiotomy. *Am J Obstet Gynecol* 1997;177:463–4.
78. Gherman R. Posterior axillary sling traction: another empiric technique for shoulder dystocia alleviation? *Obstet Gynecol* 2009;113(2 Pt 2):478–9.
79. Hofmeyr GJ, Cluver CA. Posterior axilla sling traction for intractable shoulder dystocia. *BJOG* 2009;116:1818–20.
80. Sheiner E, Levy A, Hershkovitz R, Hallak M, Hammel RD, Katz M, Mazor M. Determining factors associated with shoulder dystocia: a population-based study. *Eur J Obstet Gynecol Reprod Biol* 2006;126:11–5.
81. Gherman RB. Shoulder dystocia: prevention and management. *Obstet Gynecol Clin North Am* 2005;32:297–305.
82. Heath T, Gherman RB. Symphyseal separation, sacroiliac joint dislocation and transient lateral femoral cutaneous neuropathy associated with McRoberts' maneuver. A case report. *J Reprod Med* 1999;44:902–4.
83. Ouzounian JG, Korst LM, Phelan JP. Permanent Erb palsy: a traction-related injury? *Obstet Gynecol* 1997;89:139–41.
84. Nocon JJ, McKenzie DK, Thomas LJ, Hansell RS. Shoulder dystocia: an analysis of risks and obstetric maneuvers. *Am J Obstet Gynecol* 1993;168:1732–9.
85. Royal College of Obstetricians and Gynaecologists, Royal College of Midwives. *Towards Safer Childbirth. Minimum Standards for the Organisation of Labour Wards: Report of a Joint Working Party*. London: RCOG Press; 1999.
86. NHS Litigation Authority. *Clinical Negligence Scheme for Trusts Maternity Clinical Risk Management Standards*, 2010: London.
87. Crofts JF, Bartlett C, Ellis D, Hunt LP, Fox R, Draycott TJ. Management of shoulder dystocia: skill retention 6 and 12 months after training. *Obstet Gynecol* 2007;110:1069–74.
88. Crofts JF, Ellis D, Draycott TJ, Winter C, Hunt LP, Akande VA. Change in knowledge of midwives and obstetricians following obstetric emergency training: a randomised controlled trial of local hospital, simulation centre and teamwork training. *BJOG* 2007;114:1534-41.
89. Sørensen JL, Løkkegaard E, Johansen M, Ringsted C, Kreiner S, McAleer S. The implementation and evaluation of a mandatory multi-professional obstetric skills training program. *Acta Obstet Gynecol Scand* 2009;88:1107–17.
90. Goffman D, Heo H, Pardanani S, Merkatz IR, Bernstein PS. Improving shoulder dystocia management among resident and attending physicians using simulations. *Am J Obstet Gynecol* 2008;199:294.e1–5.
91. Crofts JF, Bartlett C, Ellis D, Hunt LP, Fox R, Draycott TJ. Training for shoulder dystocia: a trial of simulation using low-fidelity and high-fidelity mannequins. *Obstet Gynecol* 2006;108:1477–85.
92. Crofts JF, Attilakos G, Read M, Sibanda T, Draycott TJ. Shoulder dystocia training using a new birth training mannequin. *BJOG* 2005;112:997–9.
93. Deering S, Poggi S, Macedonia C, Gherman R, Satin AJ. Improving resident competency in the management of shoulder dystocia with simulation training. *Obstet Gynecol* 2004;103:1224–8.
94. Crofts JF, Bartlett C, Ellis D, Winter C, Donald F, Hunt LP, Draycott TJ. Patient-actor perception of care: a comparison of obstetric emergency training using manikins and patient-actors. *Qual Saf Health Care* 2008;17:20–4.
95. Inglis SR, Feier N, Chetiyaar JB, Naylor MH, Sumersille M, Cervellione KL, Predanic M. Effects of shoulder dystocia training on the incidence of brachial plexus injury. *Am J Obstet Gynecol* 2011;204:322.e1–6.
96. Walsh JM, Kandamany N, Ni Shuibhne N, Power H, Murphy JF, O'Herlihy C. Neonatal brachial plexus injury: comparison of incidence and antecedents between 2 decades. *Am J Obstet Gynecol* 2011;204:324.e1–6.
97. MacKenzie IZ, Shah M, Lean K, Dutton S, Newdick H, Tucker DE. Management of shoulder dystocia: trends in incidence and maternal and neonatal morbidity. *Obstet Gynecol* 2007;110:1059–68.
98. Crofts JF, Ellis D, James M, Hunt LP, Fox R, Draycott TJ. Pattern and degree of forces applied during simulation of shoulder dystocia. *Am J Obstet Gynecol* 2007;197:156.e1–6.
99. Deering SH, Weeks L, Benedetti T. Evaluation of force applied during deliveries complicated by shoulder dystocia using simulation. *Am J Obstet Gynecol* 2011;204:234.e1–5.
100. Kelly J, Guise J-M, Osterweil P, Li H. 211: Determining the value of force-feedback simulation training for shoulder dystocia. *Am J Obstet Gynecol* 2008;199(Suppl A):S70.
101. Vanderhoeven J, Marshall N, Segel S, Li H, Osterweil P, Guise J-M. 201: Evaluating in-situ simulation and team training on response to shoulder dystocia. *Am J Obstet Gynecol* 2008;199(Suppl A):S67.
102. The '4kg and over' enquiries. In: *Confidential Enquiries into Stillbirths and Deaths in Infancy. Sixth Annual Report*. London: Maternal and Child Health Research Consortium; 1999. p35–47.
103. Deering S, Poggi S, Hodor J, Macedonia C, Satin AJ. Evaluation of residents' delivery notes after a simulated shoulder dystocia. *Obstet Gynecol* 2004;104:667–70.
104. National Health Service Litigation Authority: Summary of substandard care in cases in brachial plexus injury. *NHSLA J* 2003;2 suppl:ix-xi
105. Acker DB. A shoulder dystocia intervention form. *Obstet Gynecol* 1991;78:150–1.
106. Crofts JF, Bartlett C, Ellis D, Fox R, Draycott TJ. Documentation of simulated shoulder dystocia: accurate and complete? *BJOG* 2008;115:1303–8.
107. Royal College of Midwives. Clinical risk management Paper 2: Shoulder dystocia. *RCM Midwives J* 2000;3.

APPENDIX 1

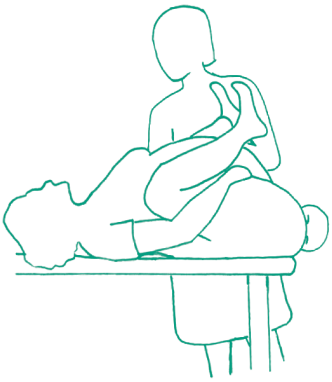


Figure 1. The McRoberts' manoeuvre (from the SaFE study)

Figure 2 Suprapubic pressure (from SaFE study)

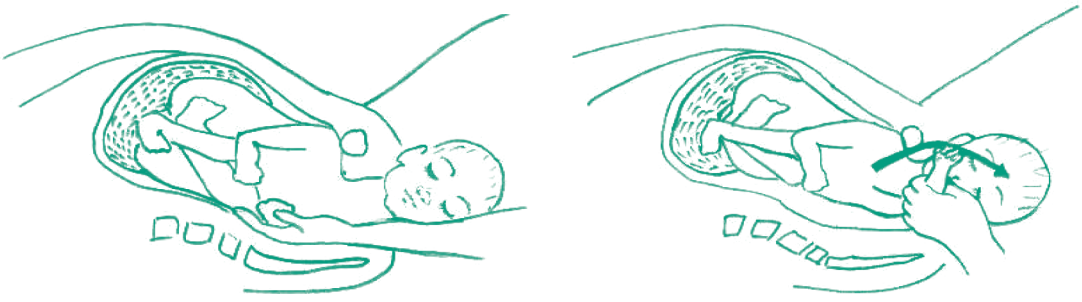
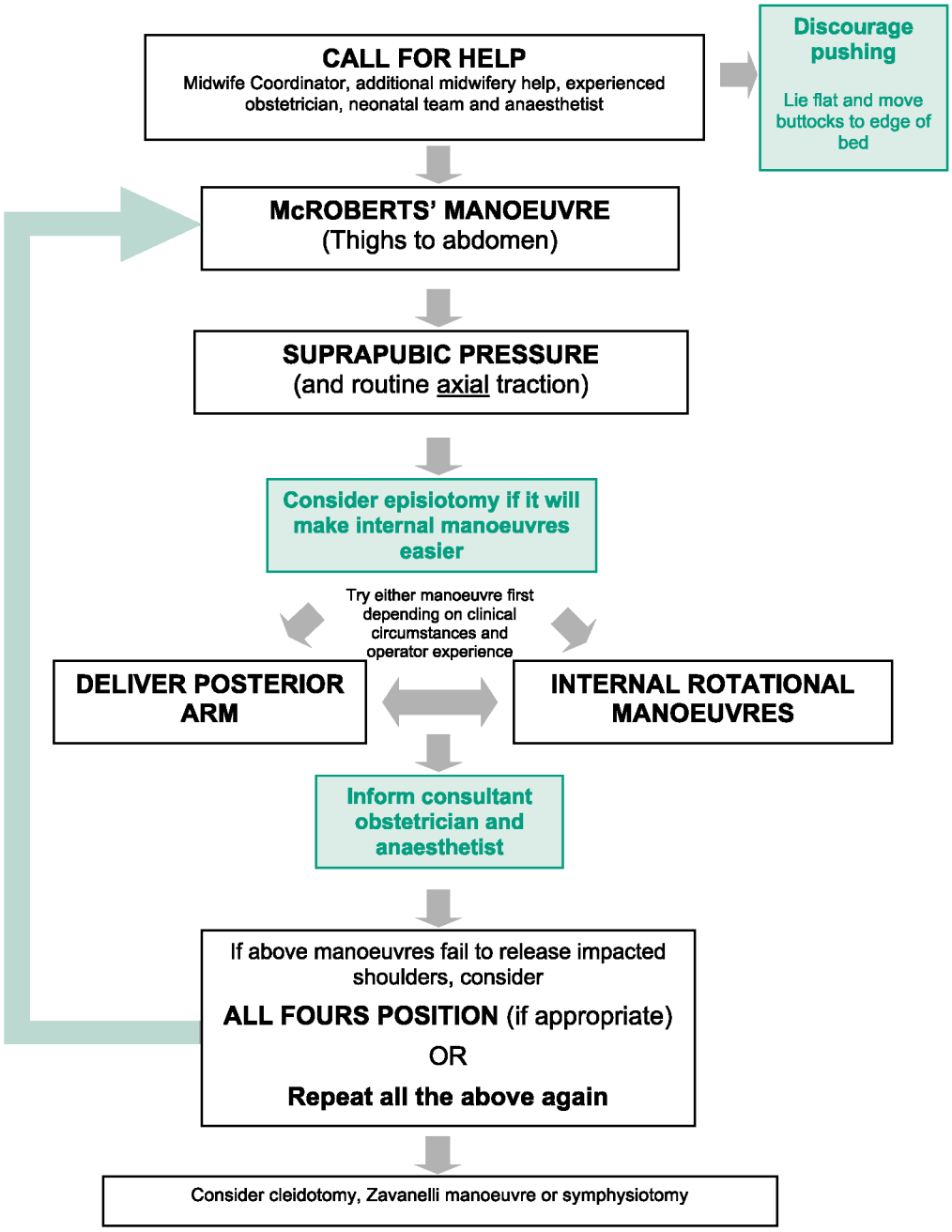


Figure 3 Delivery of the posterior arm (from the SaFE study)

APPENDIX 2

Algorithm for the management of Shoulder Dystocia



Baby to be reviewed by neonatologist after birth and referred for Consultant Neonatal review if any concerns

DOCUMENT ALL ACTIONS ON PROFORMA AND COMPLETE CLINICAL INCIDENT REPORTING FORM.

APPENDIX 3

SHOULDER DYSTOCIA DOCUMENTATION

Date ……

Time ……...

Person completing form …… **Designation**……..

Signature ……..

Mother's Name _____

Date of birth _____

Hospital Number _____

Consultant _____

Called for help at:		**Emergency call via switchboard at:**		
Staff present at delivery of head:		**Additional staff attending for delivery of shoulders**		
Name	**Role**	**Name**	**Role**	**Time arrived**

Procedures used to assist delivery	**By whom**	**Time**	**Order**	**Details**	**Reason if not performed**
McRoberts' position					
Suprapubic pressure				From maternal **left** / **right** (circle as appropriate)	
Episiotomy				Enough access / tear present /already performed (circle as appropriate)	
Delivery of posterior arm				**Right** / **left** arm (circle as appropriate)	
Internal rotational manoeuvre					
Description of rotation					
Description of traction	Routine axial (as in normal vaginal delivery)	Other -		Reason if not routine axial:	
Other manoeuvres used					

Mode of delivery of head		**Spontaneous**		**Instrumental – vacuum / forceps**	
Time of delivery of head			**Time of delivery of baby**	**Head-to-body delivery interval**	
Fetal position during dystocia		Head facing maternal **left** **Left** fetal shoulder anterior 		Head facing maternal **right** **Right** fetal shoulder anterior 	
Birth weight	**kg**	**Apgar**	**1 min :**	**5 mins :**	**10 mins :**
Cord gases		**Art pH :**	**Art BE:**	**Venous pH :**	**Venous BE :**
Explanation to parents		Yes	By	**AIMS form completed**	Yes

Neonatologist called? Yes Neonatologist arrived: …….. Name: ……
If neonatologist not called or didn't arrive, give reason: ……...

Baby assessment after birth (maybe done by M/W):			**If yes to any of these questions for review and follow up by Consultant neonatologist**
Any sign of arm weakness?	Yes	No	
Any sign of potential bony fracture?	Yes	No	
Baby admitted to Neonatal Intensive Care Unit?	Yes	No	
Assessment by ……			

Please copy x 2 copies: x1 maternal notes, x 1 attached to AIMS form.

APPENDIX 4

Clinical guidelines are 'systematically developed statements which assist clinicians and women in making decisions about appropriate treatment for specific conditions'. Each guideline is systematically developed using a standardised methodology. Exact details of this process can be found in Clinical Governance Advice No.1: *Development of RCOG Green-top Guidelines* (available on the RCOG website at **http://www.rcog.org.uk/guidelines**). These recommendations are not intended to dictate an exclusive course of management or treatment. They must be evaluated with reference to individual patient needs, resources and limitations unique to the institution and variations in local populations. It is hoped that this process of local ownership will help to incorporate these guidelines into routine practice. Attention is drawn to areas of clinical uncertainty where further research might be indicated.

The evidence used in this guideline was graded using the scheme below and the recommendations formulated in a similar fashion with a standardised grading scheme.

Classification of evidence levels

1++	High-quality meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a very low risk of bias
1+	Well-conducted meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a low risk of bias
1–	Meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a high risk of bias
2++	High-quality systematic reviews of case–control or cohort studies or high-quality case–control or cohort studies with a very low risk of confounding, bias or chance and a high probability that the relationship is causal
2+	Well-conducted case–control or cohort studies with a low risk of confounding, bias or chance and a moderate probability that the relationship is causal
2-	Case–control or cohort studies with a high risk of confounding, bias or chance and a significant risk that the relationship is not causal
3	Non-analytical studies, e.g. case reports, case series
4	Expert opinion

Grades of recommendations

A	At least one meta-analysis, systematic review or randomised controlled trial rated as 1++ and directly applicable to the target population; or A systematic review of randomised controlled trials or a body of evidence consisting principally of studies rated as 1+ directly applicable to the target population and demonstrating overall consistency of results
B	A body of evidence including studies rated as 2++ directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1++ or 1+
C	A body of evidence including studies rated as 2+ directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2++
D	Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+

Good practice point

✓	Recommended best practice based on the clinical experience of the guideline development group

This guideline was produced on behalf of the Royal College of Obstetricians and Gynaecologists by:
Dr J Crofts MRCOG, Bristol; Professor TJ Draycott MRCOG, Bristol; Dr I Montague FRCOG, Plymouth; Ms C Winter, Midwife, Bristol; and Mr R Fox FRCOG, Taunton.

and peer reviewed by:
BMFMS; Consumers' Forum; Erb's Palsy Group; RCM; Dr HM Cameron FRCOG, Sunderland; Mr D I Fraser FRCOG, Norwich; Mr IZ MacKenzie FRCOG, Oxford; Mr KT Moriarty MRCOG, Wirral, Merseyside; and Mr DJ Tuffnell FRCOG, Bradford.

The guidelines committee lead reviewers were: Dr R Ashe FRCOG, County Antrim, Northern Ireland and Mr M Griffiths FRCOG, Luton.

Conflicts of interest; none declared.

The final version is the responsibility of the guidelines committee of the RCOG.

The guidelines review process will commence in 2015 unless evidence requires an earlier review.

