

Observations From 450 Shoulder Dystocia Simulations

Lessons for Skills Training

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Poor neonatal outcomes after shoulder dystocia have been associated with inappropriate management. Until there are significant developments in the prediction and subsequent prevention of shoulder dystocia, improving shoulder dystocia management through practical training may be the most effective method of reducing the associated morbidity and mortality. Four hundred fifty simulated shoulder dystocia scenarios, managed by 95 midwives and 45 doctors from six U.K. hospitals during the course of 1 year, were video recorded during a study of obstetric emergency training. Analysis of recorded data revealed that, before training, 57% were unable to deliver the baby, almost two thirds failed to call for pediatric support, and 1 in 27 used fundal pressure. Recurring difficulties in management were observed: poor communication, inability to gain internal access, confusion over internal maneuvers, and the application of excessive traction. Significant improvements in management were observed after training and persisted up to 1 year after training. The lessons learned from this study can inform and improve future training and management. This article describes difficulties encountered by the participants and discusses how training may be focused to address these problems.

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Shoulder dystocia is an obstetric emergency with serious potential risks for both mother and baby.

Although there are many risk factors, including fetal macrosomia, maternal diabetes, and previous shoulder dystocia, a retrospective review of 267,228 vaginal births showed that even the most powerful predictors for shoulder dystocia have a sensitivity of just 12% and a positive predictive value of less than 5%.¹ At present, shoulder dystocia remains a relatively unpredictable and therefore largely unpreventable event.

There is a need for shoulder dystocia training. Poor outcomes after shoulder dystocia have been the result of inappropriate clinical management.^{2–4} The 5th Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI) in England and Wales found grade three suboptimal care (“avoidable factors were identified and different management could have reasonably been expected to have altered the outcome”) in 66% of neonatal deaths after shoulder dystocia, with a significantly greater proportion of suboptimal care reported in cases involving shoulder dystocia than any other deaths in this Enquiry. The 2003 National Health Service for England and Wales Litigation Authority Report on 264 claims for obstetric brachial plexus injury in England judged 46% (72/158) of the reviewed cases to involve substandard care.² The most common criticism is related to failure to



carry out standard shoulder dystocia resolution maneuvers. Furthermore, a study conducted in two English hospitals reported that 70 of the 166 (42%) midwives and junior obstetricians surveyed did not feel confident in the management of shoulder dystocia.⁵

Poor neonatal outcomes after shoulder dystocia are associated with a lack of staff confidence and competence, and, until there are significant developments in the prediction and subsequent prevention of shoulder dystocia, improving shoulder dystocia management through practical training may be the most effective method of reducing the associated morbidity and mortality. Indeed, the 5th CESDI Report recommended a “high level of awareness and training for all birth attendants” because “professionals will be exposed to it (shoulder dystocia) relatively infrequently, but urgent action is needed when it does occur.”⁶ Shoulder dystocia training is recommended by the Joint Commission in the United States⁷ and is a mandatory training requirement in the maternity Clinical Negligence Scheme for Trusts in the United Kingdom.⁸ However, there is little guidance on how shoulder dystocia management should be taught.

The SaFE Study

The SaFE (Simulation and Fire-drill Evaluation) Study was a trial commissioned by the Department of Health of England and Wales to investigate the effectiveness of multiprofessional obstetric emergency training. The management of shoulder dystocia was one of the obstetric emergencies investigated. During the SaFE Study, 450 simulated shoulder dystocia scenarios were video recorded and analyzed (140 pretraining, 132 at 3 weeks posttraining, 96 at 6 months posttraining, and 82 at 1 year posttrain-

ing).^{9,10} The training given to 45 doctors and 95 midwives involved a 40-minute practical session on shoulder dystocia management in multiprofessional groups of six staff. Pretraining data revealed that 80 of 140 (57%) were unable to deliver the fetus, almost two thirds (85/134, 63%) failed to call for pediatric support, and 1 in 27 (5/134, 4%) used a potentially harmful maneuver (fundal pressure).⁹ Before training, 75 of the 113 participants (66%) applied a force above 100N (22.5 lbs), and 12 (11%) applied more than 200N (45.0 lbs).¹¹ However, after training there was a significant improvement in the proportion of participants who successfully achieved the simulated delivery,

Staff should be taught about maneuvers to be avoided as well as recommended techniques.

from 60 of 140 (42.9%) pretraining to 110 of 132 (83.3%) posttraining ($P<.001$)⁹; the majority retained the ability to achieve delivery up to 1 year after training, with 80 of 95 (84%) able to deliver at 6 months and 75 of 82 (85%) at 12 months.¹⁰

Furthermore, a retrospective review of maternal and neonatal records has demonstrated that the introduction of similar practical shoulder dystocia training for all staff in one maternity hospital in the United Kingdom was associated with improved clinical management of shoulder dystocia and a significant reduction in neonatal injury after shoulder dystocia, from 9.3% before the introduction of training to 2.3% after the introduction of training.¹²

Overview

This commentary describes the qualitative difficulties encountered by the participants and discusses how training may be focused to address their problems. The main difficulties observed and associated training tips have been summarized (see Box).

Summary Training Points

Problem—Clearly state the problem
Pediatrician—Call for neonatologist
Pressure—Suprapubic (NOT FUNDAL) pressure
Posterior vaginal access—Gain vaginal access with whole hand using posterior approach
Pull—Do not pull but try another maneuver if shoulder dystocia is not resolved
Documentation—Comprehensive and clear documentation
Patient—Clear and calm communication with parents

Communication Problems

Inadequate communication between the obstetrician or midwife and the summoned assistant was observed during simulations; the clinical problem was stated in only 90 of 134 (67.2%) pretraining scenarios. In the remaining 32.8% of scenarios, obstetricians or midwives simply asked for McRoberts' position or suprapubic pressure without declaring the problem to be shoulder dystocia. Senior doctors were least likely to communicate well ($P=.001$), with only 7 of 22 (32%) stating the problem before training. Many obstetricians or midwives who did state the problem spent time giving an elaborate, descriptive handover rather than simply saying shoulder dystocia.

Only 37% of obstetricians or midwives called for a pediatrician



to attend the emergency. The CESDI report into fatal cases of shoulder dystocia found a pediatrician was present at the time of delivery of the body in only 55% of cases and recommends that a pediatrician should be called as soon as shoulder dystocia is identified.⁴ Our data confirm that, despite this recommendation, deficiencies in management remain. This issue should be specifically rehearsed during drills.

Training Message

Staff should understand the need to give prompt, brief, and accurate descriptions of the nature of the emergency in a calm manner. Pediatric help should be requested early, and precise, specific instructions should be given to those helping to perform the required maneuvers. The necessity of good communication should be reinforced and practiced during drills or rehearsals.

Posterior Access

Awareness and recall of basic actions (call for help, McRoberts' maneuver, and suprapubic pressure) were generally good, with 81% of obstetricians or midwives performing all basic actions before training.⁹ However, knowledge and performance of advanced techniques was much less satisfactory. Only 53% of multiple choice questions on advanced management (internal rotational maneuvers and delivery of the posterior arm) were answered correctly before training. Participants were able to define Woods' screw and Rubin II maneuvers in only 61% and 16% of cases, respectively. With regard to their actual ability to perform advanced techniques, although 81% attempted an advanced technique during simulation, only 32% were successful before training.

The observation of the 450 simulated shoulder dystocias revealed

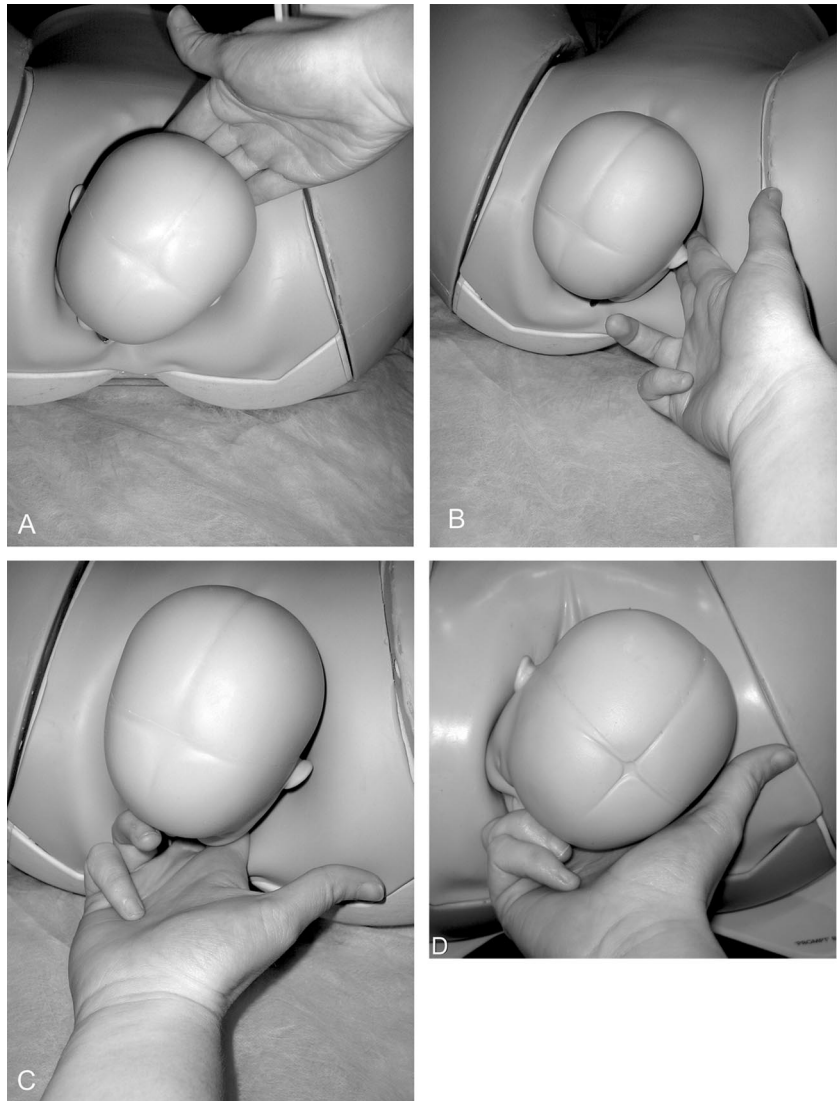


Fig. 1. Difficulties gaining vaginal access. **A.** Attempting to gain anterior access. **B.** Attempting to gain lateral access. **C.** Entering with two fingers as if performing a routine vaginal examination. **D.** Leaving the thumb out.

Crofts. Lessons for Shoulder Dystocia Training. Obstet Gynecol 2008.

four recurring difficulties to gaining internal vaginal access (Fig. 1):

1. Attempting to gain access to the vagina using an anterior approach
2. Attempting to gain access to the vagina using a lateral approach
3. Entering the vagina with two fingers as if performing a routine vaginal examination
4. Leaving the thumb outside the vagina

These difficulties with gaining access may have been encouraged by obstetric and midwifery textbooks' including diagrams of internal maneuvers being performed with just two fingers. We suggest that it is much easier to perform internal maneuvers using the whole hand. Moreover, the hand can be more easily inserted into the vagina by using a posterior approach, thus making use of the space in the sacral hollow (Fig. 2).





Fig. 2. Facilitation of vaginal access. Posterior vaginal access with whole hand. Crofts. *Lessons for Shoulder Dystocia Training. Obstet Gynecol* 2008.

We have successfully used the following descriptions to help obstetricians or midwives understand how to gain access with the examining hand. We have likened the process to (Fig. 3):

1. Performing a manual removal of a placenta
2. Putting on a tight bracelet
3. Removing the last potato chip in the tube!

Even when vaginal access was achieved, other difficulties also were observed, in particular, confusion with the internal rotational

maneuvers. Participants became fixated on the definition of the maneuver rather than its execution. Some participants stated that they would perform Woods' screw maneuver but could not remember whether they should be pressing on the anterior aspect of the posterior shoulder or the posterior aspect of the posterior shoulder and so froze and did neither.

Internal rotational maneuvers are conceptually quite simple: 1) to move the fetal shoulders (the bisacromial diameter) out of the nar-

rowest diameter of the pelvis (the anterior-posterior) and into a wider pelvic diameter, most commonly the oblique; 2) to reduce the fetal bisacromial diameter by pressing on the posterior aspect of the fetal shoulder, thereby adducting the shoulders¹³; 3) utilize the pelvic anatomy: as the fetal shoulders are rotated within the pelvis, there is corresponding descent due to the bony architecture of the pelvis.¹⁴

We, like others,¹⁵ have come to believe that it is unhelpful to teach using eponyms. In our experience, teaching the concepts that underlie maneuvers (Woods' screw and Rubin II maneuvers) and the practical details of their execution is much more effective than teaching the precise definitions of each maneuver. Woods¹⁴ and Rubin¹³ in their original descriptions both describe the use of fundal pressure as part of their maneuver, a practice that is no longer recommended nor considered part of the maneuvers currently described as Woods' screw or Rubin II.

Internal rotation can be achieved by first gaining vaginal access with the whole hand posteriorly and then rotating the fetal shoulders by pressing on the anterior (Woods' screw) or posterior (posterior Rubin II) aspect of the posterior fetal shoulder. If rotation in one direction is not successful, rotation in the opposite direction should be attempted. If pressure in both directions is unsuccessful, an attempt can be made to rotate the anterior fetal shoulder by pressure on the posterior aspect of the anterior fetal shoulder (anterior Rubin II) via the hand that has entered the pelvis in the sacral hollow.

There was also uncertainty over delivery of the posterior arm. Some obstetricians or midwives attempted to deliver the posterior shoulder (by hooking their finger in the posterior axilla and pulling) rather than grasping the hand, flex-



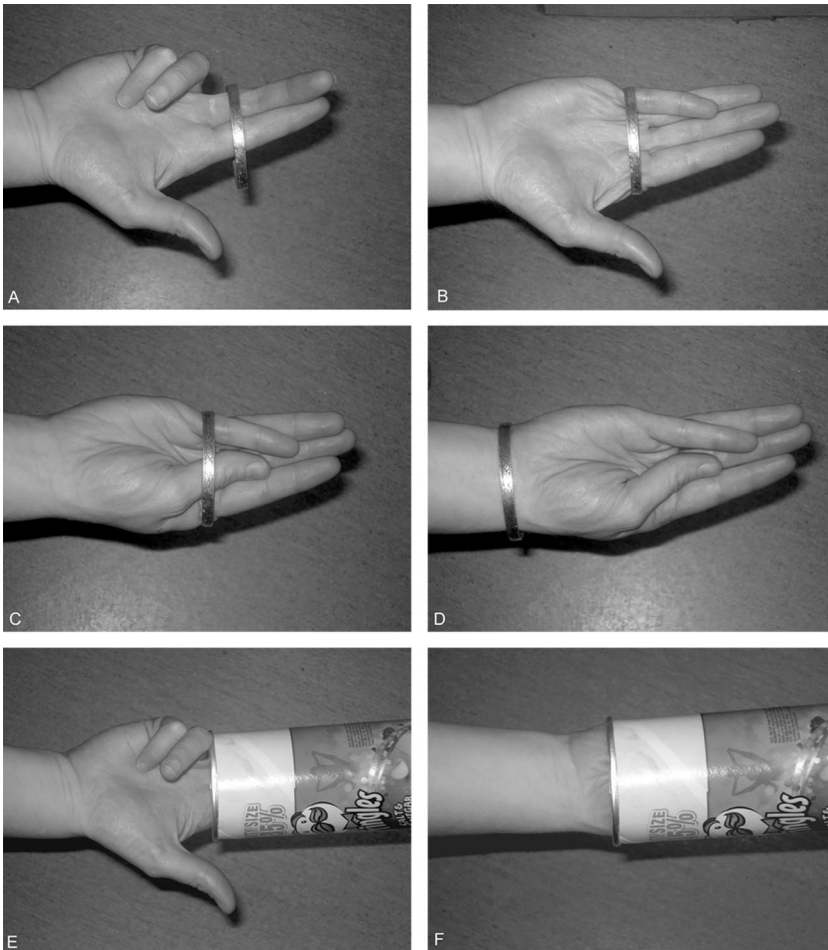


Fig. 3. Vaginal access training. **A.** Incorrect. **B.** Incorrect. **C.** Correct. **D.** Correct. **E.** Incorrect. **F.** Correct.

Crofts. *Lessons for Shoulder Dystocia Training. Obstet Gynecol 2008.*

ing the elbow and delivering the arm by traction on the hand. Others pulled directly on the upper arm, rather than on the wrist or forearm. This may explain why delivery of the posterior arm is sometimes associated with humeral fractures. Attempts at delivery of the anterior arm, rather than the posterior arm, also were observed.

We have found that during shoulder dystocia training there is often debate about whether internal rotation should be attempted before delivery of the posterior arm or vice versa. Currently, there is no evidence supporting the use of one maneuver over the other. Obstetri-

cians or midwives with experience with internal maneuvers tend to try their previously most successful maneuver first. However, many of the obstetricians or midwives we taught had never attempted internal rotation or delivery of the posterior arm and were confused about which to attempt first. We have simplified our management algorithm: both delivery of the posterior arm and internal rotational maneuvers commence with the same action (inserting the whole hand into the posterior sacral hollow). If the posterior arm is flexed and easily reached, delivery of the posterior arm may be the most

straightforward maneuver to attempt first; if the posterior arm is straight, first attempting internal rotation may be easier.

Training Message

All internal maneuvers are most easily achieved by gaining internal vaginal access into the sacral hollow with the whole of the hand using a posterior approach. Internal maneuvers need to be described simply, demonstrated, and practiced. It is best to avoid complicated, eponymous descriptions and to concentrate on the underlying concepts.

Pressure

Fundal pressure was mentioned in 11% of pretraining simulations and actually was performed in 4%; in a further 2% of pretraining scenarios, left lateral position was suggested as a potential maneuver to resolve shoulder dystocia.⁹ Lateral positioning and fundal pressure are no longer recognized or recommended as maneuvers for the resolution of shoulder dystocia. They waste valuable time and are potentially harmful. The fact that they are still performed, despite having been discouraged for more than 15 years, highlights the importance of continued education throughout a professional career. There is a danger that junior obstetric staff who are unaware of the potential dangers of fundal pressure in relation to shoulder dystocia and are used to performing it during caesarean deliveries may perform fundal pressure if asked directly, unless they are specifically taught that it has no place in the management of shoulder dystocia.

Training Message

Staff should be taught about maneuvers to be avoided as well as recommended techniques. It is



particularly important to emphasize that fundal pressure is a potentially dangerous maneuver and that suprapubic pressure should be used to release the obstruction.

Pull

Applied force was measured during each simulation. Despite all participants managing the same scenario with an identical fetus-and-pelvic mannequin, there was enormous variation in the pattern and degree of traction, with two thirds pulling more than 100N,¹¹ a level of force at which neonatal injury has been observed.³ Ever greater force tended to be applied as the delay after delivery of the head increased, perhaps as a reflection of increasing anxiety, even though the mannequin was set so that an advanced maneuver would easily relieve the obstruction. This was observed in both senior and junior obstetricians and midwives. The wide range of applied force suggests a need for instruction in the use of “minimal traction”; indeed, we demonstrated that those staff who received force perception training subsequently applied a significantly lower total force during shoulder dystocia simulations when compared with those who did not receive the training.¹¹ Training must aim to instill the notion that traction will not overcome the bony obstruction of shoulder dystocia and that the recommended sequence of maneuvers must be followed appropriately.

Training Message

Instruction should emphasize that only routine, short-duration, “diagnostic traction” should be applied to the fetal head during shoulder dystocia and that the bony obstruction should be overcome by release maneuvers and not force. The avoidance of excessive downward

and lateral traction on the fetal neck also should be emphasized.

Documentation

Comprehensive, unambiguous note keeping is required for any obstetric emergency. The sequence of events during fatal cases of shoulder dystocia often has been found to be inadequately recorded,⁴ and Deering observed that residents’ documentation after simulated shoulder dystocia often lacked critical elements.¹⁶ Of 33 residents studied, 30 included the order of the maneuvers used during the delivery, but 27 did not document which shoulder was placed anteriorly and 18 failed to record the head-to-body delivery interval.¹⁶

Acker advised that careful documentation of a shoulder dystocia delivery should include the exact times of events, a description of the maneuvers used, and an estimation of the traction forces exerted. He also proposed the use of a standardized list of required elements for documentation of a shoulder dystocia delivery.¹⁷ This can usefully act as an aide memoire, but, given that many practitioners cannot correctly define Woods’ screw and Rubin II maneuvers, we suggest that a description of what was actually done (eg, “access to the vagina gained using posterior approach, and rotation of the fetal shoulders achieved by pressing on the anterior aspect of the posterior shoulder”) is likely to be more accurate than simple tick-box documentation of an eponymous maneuver (eg, “Woods’ screw”).

Training Message

Documentation should be comprehensive and unambiguous. Note keeping can be aided by a preformatted sheet, but instruction in the key components and the importance of their documentation still should be given.

Patient

During our shoulder dystocia simulations, a patient-actor was used to play the part of the mother. She was asked to score how informed, respected, and safe she felt during the delivery. Baseline assessments of communication were deemed good or excellent in only 57% of scenarios before training, and fewer than half of the patient-actors felt respected or safe.¹⁸ Good interprofessional communication during obstetric emergencies is clearly crucial to a successful outcome, but communication with the mother is also important to maintain her cooperation. The ability to simultaneously manage shoulder dystocia clinically and attend to the needs of the mother (and her companions) is a difficult, but essential, skill.

Training Message

Good communication with the mother during and after shoulder dystocia is likely to enhance cooperation and limit psychological and possibly medicolegal problems. Training programs should consider the inclusion of patient-actors with mannequins to increase the fidelity of simulation exercises.

SUMMARY

The standard of management of shoulder dystocia observed before training is likely to be an index of the quality of current training rather than a reflection of poor practice by poor practitioners. Although extrapolating data collected in the United Kingdom to other countries is difficult, we observed that staff who were working in different hospitals, had received their professional training from different institutions, and had never met repeatedly made the same mistakes. We therefore believe it likely that many of the problems we observed will also occur elsewhere.



Analysis of 450 simulations revealed a number of common deficiencies among practicing obstetricians or midwives, and understanding these difficulties should inform future shoulder dystocia training. Every effort must be made to further the understanding of the causes and prevention of shoulder dystocia and its associated morbidity. However, it is imperative that while shoulder dystocia remains a largely unpredictable and therefore unpreventable event, all clinical staff receive appropriate training, so that when they are faced with this frightening obstetric emergency it is managed carefully, calmly, and competently.

The evidence base for shoulder dystocia training remains limited; however, shoulder dystocia training is associated with improvements in management in simulation^{9,19,20} and clinical outcomes in real life.¹² Staff who are expected to manage shoulder dystocia deserve to be trained to effectively and efficiently manage this potentially life-threatening emergency. Equally, parents and their babies deserve and expect the best possible care. It is our hope that sharing some of the lessons we have learned while performing this large study of shoulder dystocia training may assist those training, enhance

the skills of those managing, and improve the outcomes for those affected by shoulder dystocia.

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