

Shoulder Dystocia: An Obstetrical Emergency

Contact Hours: 2

First Published: March 8, 2013

Course Expires: August 31, 2017

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Acknowledgments

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Purpose

The purpose of this two contact hour continuing education course is to provide nurses with a thorough understanding of shoulder dystocia and the emergency management of this condition. Risk factors, management techniques and potential complications will be explored, as well as the role of each member of the labor and delivery team.

Learning Objectives

1. Define shoulder dystocia.
2. Identify three risk factors for shoulder dystocia.
3. Discuss brachial nerve injuries.
4. Describe the technique to be used for McRobert's and Rubin's Maneuvers, and the application of suprapubic pressure.
5. Discuss the labor and delivery nurse's role in managing shoulder dystocia.
6. List two possible complications of shoulder dystocia.

Introduction

Shoulder dystocia is an obstetrical complication during vaginal delivery, in which the infant's shoulder becomes lodged behind the mother's pubic symphysis (Colombara et al., 2011). The most frequently used definition of shoulder dystocia is the "*inability to birth the shoulders of the infant after the head has been delivered*" (Collins & Collins, 2001 in Camune & Brucker, 2007).

The entrapment of the infant's shoulders, after the delivery of the head, is an emergency situation. Thus, it is imperative that all members of the delivery team are comfortable with the particular role they will be expected to play in this emergent situation, and are able to coordinate efforts to deliver the infant's shoulders safely and in a timely manner. This will achieve best outcomes for both mother and infant.

Shoulder dystocia is often the cause of serious birth injuries, and is essentially an unpredictable and unpreventable occurrence that can occur in any delivery (Lerner, 2006a).



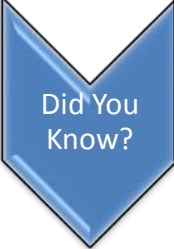
- Shoulder dystocia most commonly occurs when the bisacromial (breadth of the shoulders) diameter exceeds the diameter of the pelvic inlet, and attempts at gentle downward traction are unsuccessful (Gobbo et al., 2012).

Incidence of Shoulder Dystocia

Although the failure to birth the shoulders is a true shoulder dystocia, many healthcare professionals use the term broadly, to include deliveries in which the presentation of the shoulders are not obstructed, but are merely a tight fit. This makes the prevalence of shoulder dystocia difficult to ascertain with certainty.

Shoulder dystocia is estimated to occur in 0.2-3% of births in the U.S. (Gherman, 2002 in Camune & Brucker, 2009). Although this obstetrical emergency occurs relatively infrequently, severe life-threatening injuries may result if the delivery is not handled correctly.

Rates of shoulder dystocia have escalated over the past few decades, which have intensified the importance of understanding how to handle these emergencies and lessen the risk for infant morbidity (Inglis et al., 2011).



Did You Know?

- Lawsuits involving brachial plexus injuries following shoulder dystocia are now the second most common type of lawsuit in obstetrics, exceeded only by those due to neurologic damage from birth asphyxia (Professional Insurance Association, 2005 in Lerner, 2006a).

Risk Factors for Shoulder Dystocia

The risk of shoulder dystocia presentations in a woman is dependent upon a variety of factors, including:

- Macrosomia
- Gestational diabetes
- Instrument delivery
- Prolonged second stage of labor
- Induction or augmentation of labor

(Colombara et al., 2011)

Identification of risk factors prior to delivery can greatly improve obstetrical outcomes.

Macrosomia

Macrosomia is an infant with excessive birth weight. The American College of Obstetricians and Gynecologists (ACOG) defines macrosomia as an infant who weighs 4,500 grams (9 lbs., 1 oz.) or more (ACOG, 2012).



An 11 lb Infant. Image courtesy of Wikipedia (2013). Reproduced under the GNU Free Documentation License.

Since increased birth weight is associated with shoulder dystocia, the nurse should recognize factors associated with a larger baby:

- History of large infants in the family
- Large size difference between parents
- History of gestational diabetes in a previous pregnancy

(Camune & Brucker, 2007)

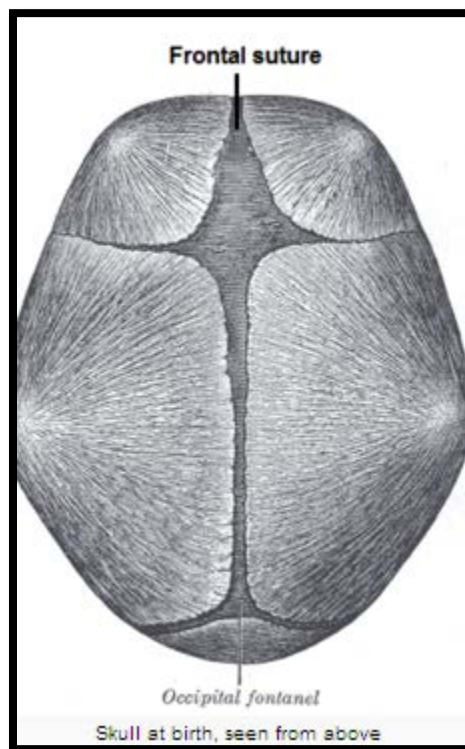
Note: It should be noted that although infants with macrosomia may be at greater risk for shoulder dystocia during delivery, the majority of shoulder dystocias occur in average-sized infants (Camune & Brucker, 2007). Thus, providers should be aware that shoulder dystocia can occur at any birth.

Gestational Diabetes (GD)

It is well-known that gestational diabetes is a risk factor for a large fetus. When a mother develops gestational diabetes, the extra glucose in the maternal bloodstream crosses the placenta, and triggers extra insulin production in the fetal pancreas. This can result in a macrosomic infant.

In addition, in macrosomia, the growth of the fetal chest circumference is usually larger than the typical growth seen in infants with non-diabetic in-utero exposure (Nesbitt et al, 1998 in Camune & Brucker, 2007). During delivery, the chest of a macrosomic infant of a mother with diabetes will be the largest area of the body to pass through the birth canal.

The head of the infant can mold and adapt to the dimensions of the birth canal, due to the presence of soft sutures and fontanel. However, the shoulders cannot mold in any way and are thus dependent upon position and rotation to navigate the birth canal (Camune & Brucker, 2007).



Frontal Suture. Image provided by Wikipedia (2013).

Forceps Delivery and Vacuum Extraction

Assisted delivery with either forceps or vacuum extraction has been associated with a higher risk of shoulder dystocia (McFarland et al., 1986 in Camune & Bracker, 2007). The association may be explained by the interruption of the mechanisms of labor related to internal rotation.



Sarindam7 (2008). Copyright permission granted under the Creative Commons Attribution-Share Alike 3.0

Prolonged Second Stage of Labor

Prolonged second stage of labor (greater than two hours, or more than three hours with an effective epidural) in a primigravida (a woman pregnant for the first time), may signal an increased risk for shoulder dystocia (Camune & Bracker, 2007).

A second stage greater than one hour should increase suspicion for a multiparous woman to have a shoulder dystocia (Camune & Bracker, 2007).

Additional Risk Factors

There are other factors associated with shoulder dystocia, in addition to increased birth weight:

- **Maternal obesity:** Is a significant risk factor for birth injuries. According to the literature, previous shoulder dystocia seems to be one of the most accurate predictors for recurrent shoulder dystocia (Lerner, 2006b). This makes sense, as the pelvic anatomy of a woman does not change in between pregnancies, and subsequent babies are likely to be larger than first or previous babies (Lerner, 2006b). Emerson (1962 in Lerner, 2006b) demonstrated that shoulder dystocia occurs twice as often in obese women as it does in normal weight women. However, although obese women do have a higher incidence of shoulder dystocia at delivery than that of thinner women, the rate of shoulder dystocia in women weighing over 250 pounds is no more than 5% (Lerner, 2006b). Thus even in this high risk population, 95% of extremely obese women will **not** have a shoulder dystocia at delivery.
- **Laxity of the birth canal or the intense forces of the uterus:** Can prevent the infant from completing the internal rotation that normally occurs. If internal rotation is not completed, the infant's shoulders become misaligned and are unable to pass under the symphysis pubis (Camune & Bracker, 2007).
- **Hispanic ethnicity:** Preliminary studies have identified a higher number of shoulder dystocias in women of Hispanic descent. This possible increased birth injury risk among Hispanic women raises a concern that language or communication barriers could be contributing to poorer outcomes (Colombara et al., 2011). However, the association between Hispanic ethnicity and birth injury requires additional study at this time.

Note!

- Despite the identification of numerous risk factors for shoulder dystocia, physicians agree that it is impossible to predict shoulder dystocia accurately, even when there are several risk factors present.

Predicting Shoulder Dystocia

Although many risk factors have been identified in the literature, there is little consensus about how to actually predict the occurrence of shoulder dystocia (Camune & Bracker, 2007).

Researchers have found that shoulder dystocia may be recurrent. A woman who has experienced shoulder dystocia in a previous pregnancy may have a higher than average risk of experiencing it again (Gherman, 2005 in Camune & Bracker, 2007).

Similarly, women whose infants had fractured clavicles at birth may have experienced a shoulder dystocia that resolved spontaneously, without external manipulation. Thus, there is an implied risk of shoulder dystocia occurring in a subsequent delivery, when a mother has birthed a previous infant with a clavicular fracture.

Experts agree that most shoulder dystocias cannot be predicted, and thus the elective scheduling of a cesarean section for a possible prediction of shoulder dystocia is impractical. Most clinicians in the United States follow the American College of Obstetricians and Gynecologists (ACOG) acknowledgement that a planned cesarean delivery for shoulder dystocia prevention may be a reasonable management option in pregnancies where the estimated fetal weight is > 5000 g (11 lbs) in a non-diabetic woman or > 4500 g (9 lbs) in a woman with diabetes (ACOG, 2002 in Gobbo et al., 2012).

Test Yourself

A predictive risk for shoulder dystocia includes:

- A. An unusual presentation of the fetus.
- B. An infant weighing more than 6 pounds.
- C. A history of clavicular fracture in a previous delivery.

The correct answer is C.

Why Dystocia is So Difficult to Predict

Although the risk of shoulder dystocia is higher in women with diabetes, a macrosomic fetus, obesity, or a previous shoulder dystocia, the predictive value of these factors is so low and their false-positive rate so high they cannot be used reliably in clinical decision-making (Lerner, 2006a).

Even if prediction were possible, the only preventive option is elective cesarean section. This is the only intervention that might potentially avoid the possibility of brachial plexus injury. In addition, the strategy of inducing labor several weeks prior to the due date to prevent a baby from becoming “too big” has been shown in many studies to be ineffective in lowering the shoulder dystocia rate (Delpapa et al., 1999 in Lerner, 2006a).

Guidelines for Identifying at Risk Deliveries

There are generally accepted guidelines for attempting to ascertain which patients are at the absolute highest risk for shoulder dystocia:

- Any woman with gestational diabetes: For any given week of gestation in the third trimester, the ratio of thorax and shoulder size to head volume is larger in babies of diabetic mothers. Thus, in these women, it is important to estimate fetal weight near term to determine whether a trial of vaginal delivery makes sense.
- A larger than average size fetus may increase the risk of shoulder dystocia. Indications of size may come from palpation of the maternal abdomen, fundal height measurements, ultrasound estimation of large fetal weight, or maternal perception. In these cases, ultrasound imaging is advisable near term to estimate fetal weight. This estimate can be factored into the selection of delivery mode (Lerner, 2006a).



Note!

•ACOG defines macrosomia in the context of shoulder dystocia as a fetal weight exceeding 5,000 g in a nondiabetic woman and 4,500 g in a diabetic woman (ACOG, 2002). Planned cesarean delivery to prevent shoulder dystocia may be considered for suspected fetalmacrosomia within the above weight parameters (ACOG, 2002).

Presenting Signs of Shoulder Dystocia

At the time of birth, there are two signs that are used to diagnose a shoulder dystocia event.



Image provided courtesy of M. Salmon (2013).

- **Turtling:** Occurs when the head emerges and then retracts (pulls back) against the perineum, like a turtle in its shell. This causes the baby's cheeks to bulge.



The Turtle Sign. Image provided courtesy of Kristina Kruzan (2013).

- **Failure of spontaneous external rotation and restitution:** On occasion, the fetal head wiggles from side to side and doesn't rotate into the oblique parameter of the pelvis. When this occurs, a moderate amount of traction is not enough to deliver the anterior shoulder.

(Camune & Brucker, 2007)

These signals should be recognized by the physician, midwife, or nurse stationed at the perineum, and be communicated to the other team members, in a calm and controlled manner.

Note!

- The inability to continue the delivery of the fetal shoulders after the head with gentle pressure alone indicates shoulder dystocia (Camune & Brucker, 2007).

Image of the Pelvic Outlet

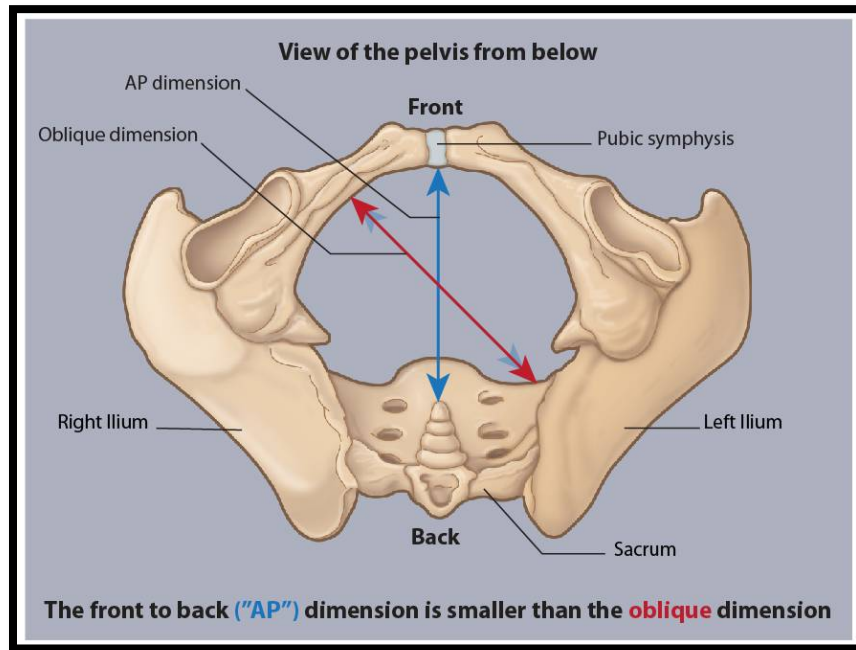


Image used with permission from birthinjury.org (2013). www.birthinjury.org

Management of Shoulder Dystocia

Recognizing a shoulder dystocia and implementing proper interventions and a timely delivery are the goals of the medical team in emergencies such as shoulder dystocia (Camune & Brucker, 2007). The time interval considered safe from the moment of the delivery of the fetal head to the resolution of the shoulder dystocia and delivery of the infant is not clear (Gobbo et al., 2012).

Once the fetal head has delivered during a shoulder dystocia, umbilical cord compression between the fetus and the maternal pelvis could result in fetal hypoxemia, metabolic acidosis, and permanent neurological damage or death, if the delivery of the body is not expedited (Gobbo et al., 2012).

Collaborative Team Work

Thus it is imperative that each and every team member is able to recognize the occurrence of a shoulder dystocia, and work together to calmly resolve the dystocia. To achieve this, each team member needs to be comfortable in his or her own role and be aware of the responsibilities and actions to be taken. Familiarity with the facility's protocol and procedures for shoulder dystocia is also imperative.

It is also recommended that the labor nurses prepare for a full neonatal resuscitation of the infant after delivery.



- The goal of management is to deliver the shoulders and fetus with methodical care to avoid trauma and injury to the mother and fetus (Gobbo et al., 2012).

The Team Approach

A team approach to the management of shoulder dystocia will allow for a calm, organized, and systematic delivery of the infant with minimal trauma to mother and baby. A team may include a midwife or obstetrician, a neonatologist, two labor and delivery nurses to assist with maneuvers, another labor nurse to document and bring supplies, and a NICU nurse capable of caring for the newborn.

A neonatology team also needs to be on stand-by for the delivery, and neonatal resuscitation equipment should be ready for use. NICU staff should be alerted regarding an impending complicated delivery.

Anesthesia staff should be called in to administer medications as needed.

A unit clerk should be available and prepared to assist in summoning appropriate individuals to the delivery room. This may involve developing a priority list of individuals to contact (Gobbo et al., 2012).

Preparing the Patient

During delivery, it is important to keep the maternal bladder empty. When possible, the laboring woman should be encouraged to empty her bladder frequently. In prolonged deliveries, catheterization should be considered. If an indwelling catheter is present, it needs to be removed as the head crowns (Camune & Brucker, 2007).

If the mother does not have an epidural, local anesthesia instruments and xylocaine (1-2%) should be made available, if an episiotomy becomes necessary.

A common misconception is that an episiotomy is always required with a shoulder dystocia. The dystocia is caused by the limitations of the bony pelvis, and an episiotomy is an incision into soft tissue. However, an episiotomy may be helpful after the delivery of the head if there is not enough room for the hands of the birth attendant to perform internal maneuvers (Gherman, 2005 in Camune & Brucker, 2007).



Foley Catheter. © Can Stock Photo Inc. / Razvanjp.

Maternal Positioning

Positioning of the mother is important in all births but even more so when a large baby is expected and shoulder dystocia is more likely than usual. If at all possible, there should be a firm board or CPR board to slide under the mattress of the mother to provide a firm surface on which to deliver the infant.

The mother of a macrosomic infant may push more effectively in a squatting position or semi-upright position. Research indicates that having the mother on her hands and knees enlarges the pelvis by approximately one centimeter (Bruner et al., 1998 in Camune & Brucker, 2007). Sometimes, the movement of the mother from the semi-fowlers position to the hands-and-knees position is enough to dislodge the shoulders. In this position, the infant will be born with the posterior shoulder presenting first.

Another maternal position that may be helpful is squatting. Some midwives refer to the squatting position as “McRoberts with gravity”.

Another position that may be used is the supine position, but this can cause bradycardia in the infant due to increased pressure on the mother’s vena cava. If the nurse must place the mother flat, the woman should still be placed in a pelvic tilt at least (Camune & Brucker, 2007).

The physician or midwife may ask for assistance with positioning the mother.



- A disadvantage of the hands-and-knees position is the difficulty in applying suprapubic pressure (Camune & Brucker, 2007).

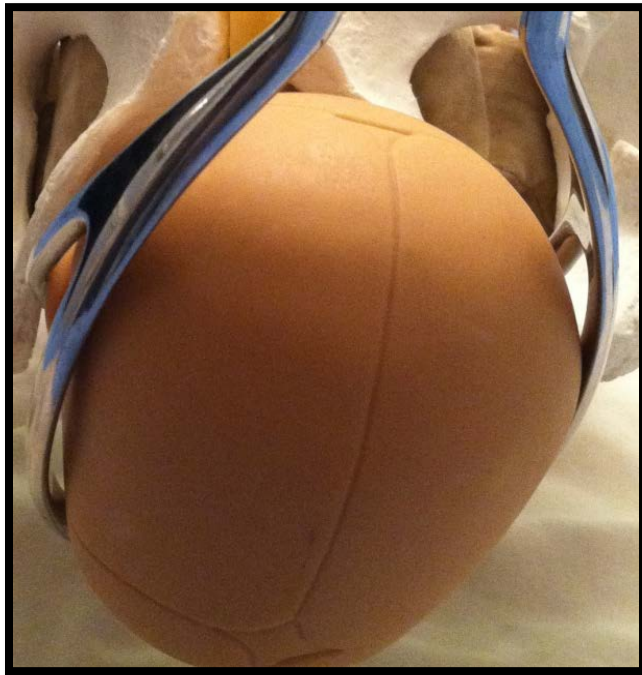
Labor Management: Prolonged Second Stage and Instrumental Delivery

The literature identifies a correlation between increased rates of shoulder dystocia with prolonged second stage of labor and instrumental deliveries (Lerner, 2006a). Most experts believe this trend merely reflects the fact that larger infants encounter shoulder dystocia more frequently than do smaller babies.

Attention to a prolonged labor or observation of a high estimated birth weight can help the nurse identify women at potential risk for shoulder dystocia. The management of shoulder dystocia should follow standard practices regarding arrest of labor and descent or a prolonged second stage (Lerner, 2006a). The use of forceps, however, should be avoided whenever possible (Lerner, 2006a).

Note!

- All attempts at routine traction should be ceased immediately upon the diagnosis of shoulder dystocia (Lerner, 2006a).



Forceps Delivery. Image provided courtesy of M. Salmon (2013).

Delivery Options in Shoulder Dystocia

Once the head has delivered, there is a limited period of time in which the body must be delivered to avoid fetal hypoxemia and acidosis. If the shoulders will not deliver with gentle traction on the head during an active push, the clinician should instruct the woman to stop all pushing activity, and inform the delivery team that a shoulder dystocia may be present.



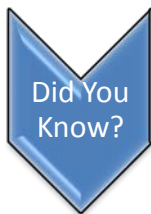
•It's believed that a newborn can survive for approximately six minutes before irreversible brain and organ damage occurs (Goodwin, 1999 in Camune & Brucker, 2007).

Determining a Course of Action

When shoulder dystocia presents, the initial response of the labor and delivery team is to expedite delivery as quickly as possible. However, rapid and uncontrolled delivery can result in serious fetal injuries (Leung et al., 2011). Most infants can tolerate a delay in delivery of about 5-6 minutes without ill effect (Gobbo et al., 2012). During this time, maneuvers can be carried out to deliver the shoulders in a calm, organized and safe manner.

Weighing the Options

It is imperative that the delivery team first determine fetal shoulder orientation and maternal obstruction in a systematic manner and avoid the use of excessive force, tugging, jerking, and fundal pressure (Gobbo et al., 2012).



- Once cord pH is less than 7.00, fetal brain asphyxia and neurological impairment will become more likely (Gobbo et al., 2012).

Guidelines for Shoulder Dystocia Management

Many professional organizations have established guidelines for a systematic approach to delivery when shoulder dystocia is evident. This can minimize the risk of fetal injury and facilitate a controlled delivery without inflicting harm on the infant or mother.

These guidelines usually recommend following a series of maneuvers, designed to free the impacted shoulder in a gentle and controlled manner. The guidelines advocate the use of the

least invasive maneuver first, followed by rotational methods and delivery of the posterior arm. The last resorts, which are seldom performed, are the most invasive and include procedures such as symphysiotomy or the Zavanelli maneuver (Leung et al., 2011).

Maneuvers for Shoulder Dystocia

The four maneuvers generally used by obstetricians to resolve shoulder dystocia are considered acceptable protocol for managing shoulder dystocia:

1. McRobert's maneuver
2. Suprapubic pressure
3. Woods screw maneuver
4. Delivery of the posterior arm

Order of Maneuvers

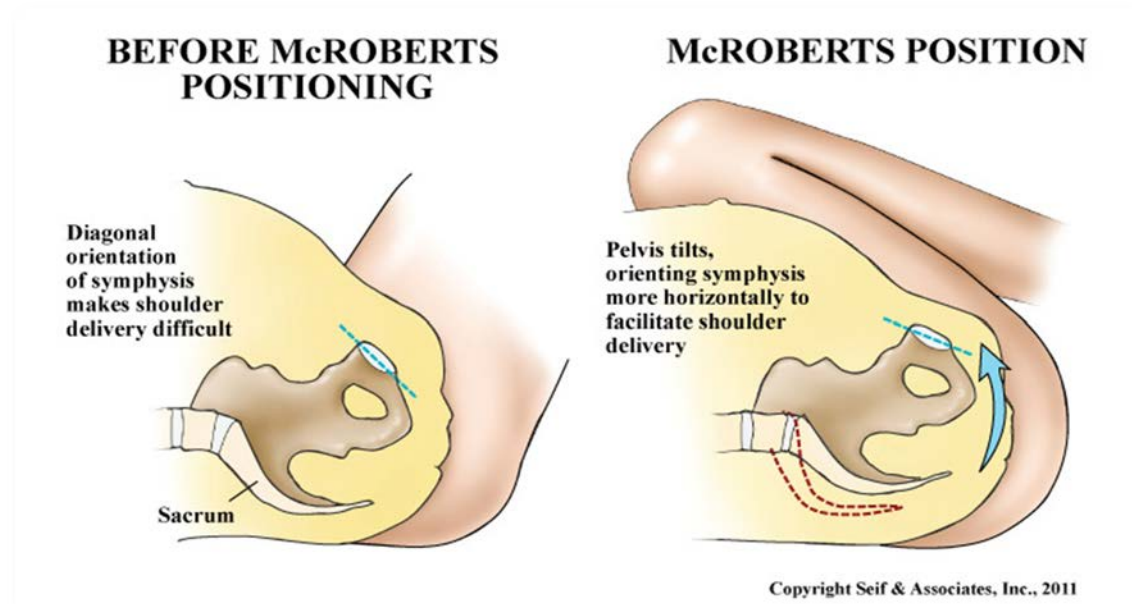
Although the order in which the maneuvers will be described is the usual order in which they are performed, there is no evidence that any one is more effective than another, or that the order in which they are implemented makes any difference (Lerner, 2006a). However, most clinicians execute the maneuvers in the chronological order as discussed in this course.

Other maneuvers have been described, but are not widely used.

McRobert's Maneuver

The McRobert's maneuver is an extremely effective maneuver that can be used to increase the diameter of the pelvis. It is the most widely used maneuver for shoulder dystocia, and is often the only maneuver needed to resolve shoulder dystocia.

In this maneuver, two assistants are needed to hyperextend the mother's legs onto her abdomen. This movement flattens the sacrum and changes the angle of the symphysis pubis in relation to the baby's anterior shoulder, often freeing the fetal shoulder (Lerner, 2006b).



A family member can be asked to assist with holding one leg if needed, providing that the nurse instruct the assistant in the correct movement of the limbs. The nurse is ultimately responsible for placing the legs in proper position to avoid causing harm to the hips and ligaments of the mother and to accomplish the McRobert's maneuver successfully (Camune & Brucker, 2007).

Note!

- The McRobert's maneuver straightens the maternal sacrum relative to the lumbar spine, and increases the angle of inclination between the symphysis pubis and the sacral promontory (Gherman et al, 2000 in Leung et al., 2011).

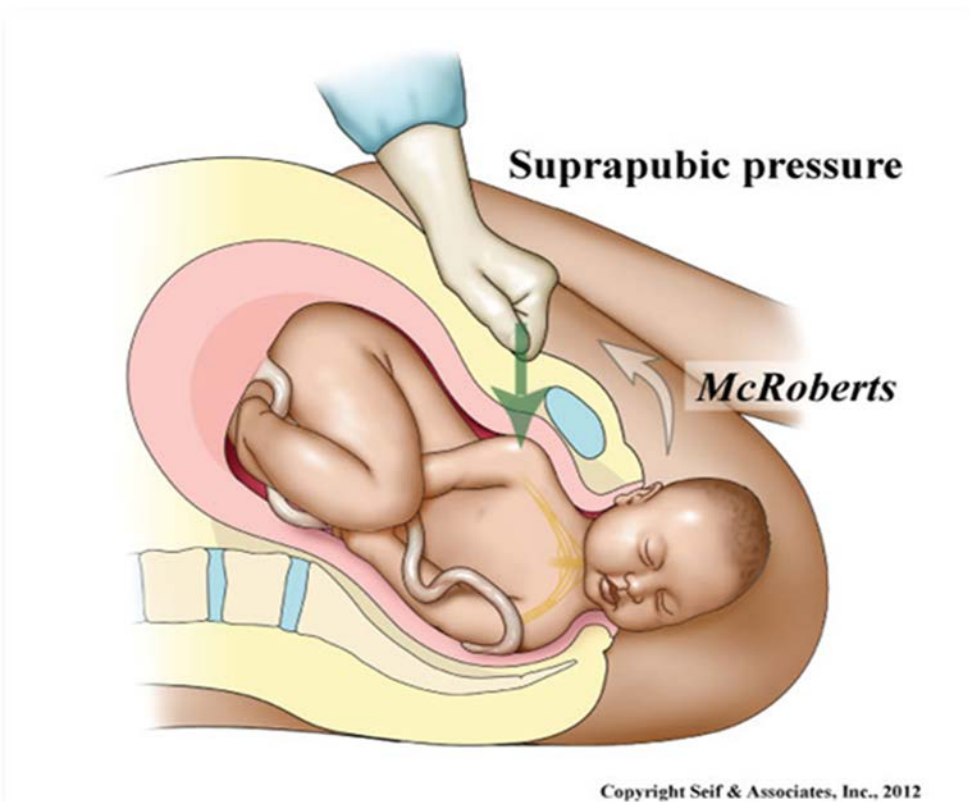
Once the McRobert's maneuver is employed, the mother's legs should remain in this position until the infant is fully delivered (Gonik et al., 1983 in Camune & Brucker, 2007).

Suprapubic Pressure

In this maneuver, the labor nurse places direct pressure with an open hand or fist just above the mother's symphysis pubis. The pressure can be directed straight down or to the left or right. Wherever it is directed, the aim of the pressure is to push the baby's anterior shoulder out of its position behind the mother's pubic bone.

Did You Know?

- The combination of McRobert's maneuver and suprapubic pressure can resolve shoulder dystocia in as many as 58% of cases (McFarland et al., 1996 in Alerner, 2006a).



Suprapubic pressure can be applied immediately above the symphysis pubis to assist the infant in adducting the arms closer to the body and releasing the impacted shoulder. It can be applied by one of the labor nurses, and used in conjunction with McRobert's maneuver, to free the shoulders from the pelvic bone. Suprapubic pressure can also be used to sweep the shoulder externally into an oblique position in the pelvis that allows for delivery (Lerner, 2006b).

Suprapubic Pressure: Technique Involved

The nurse needs to be knowledgeable about hand placement and the purpose of this technique. Open or closed hand can be used (Beall et al., 2003 in Camune & Brucker, 2007). If the nurse is unsure of the technique, another nurse should do it.

Suprapubic pressure should not be applied for more than 30 seconds while the delivering clinician continues gentle traction. The hand that will apply suprapubic pressure should be placed over the fetus' anterior shoulder, applying downward pressure in a firm constant manner. This will encourage the movement of the fetal shoulder under the symphysis pubis (Gobbo et al., 2012).

Initially, the pressure can be continuous, but if delivery is not accomplished, a rocking motion is recommended to dislodge the shoulder from behind the pubic symphysis (Gobbo et al., 2012). If this procedure fails after 30 seconds, the next procedure should be immediately attempted.

Note! Fundal pressure (the application of pressure over the fundus of the uterus) is never appropriate and only serves to worsen the impaction, potentially injuring the fetus and/or mother (Gobbo et al., 2012).



•The pressure should be applied from the side of the mother that will allow the heel of the assistant's hand to move in a downward and lateral motion on the posterior aspect of the fetal shoulder (Camune & Brucker, 2007).

Test Yourself

Suprapubic pressure should be applied for no longer than:

- A. 10 seconds

- B. 30 seconds
- C. 1 minute

The correct answer is B.

Hazards of Suprapubic Pressure

When applied correctly, and without excessive force, suprapubic pressure, together with McRobert's maneuver, can loosen the infant's trapped shoulders. However, incorrect hand placement can delay the birth, rupture the uterus or cause the shoulder to become further impacted (Camune & Brucker, 2007).

Avoiding Fundal Pressure

On the other hand, fundal pressure should be avoided at all times. Any fundal pressure on the abdomen in the area of the uterine fundus or above the umbilical area could produce harm to both the mother and infant.



- Although some physicians were trained to use fundal pressure in the past, current evidence has shown that this kind of manipulation is harmful, and should not be employed (Hankins, 1998 in Camune & Brucker, 2007).

Rubin II Maneuver

If the shoulders are not released with McRobert's maneuver and suprapubic pressure, the clinician should try to rotate the shoulders, using the Rubin maneuver (Camune & Brucker, 2007).

In this maneuver, one hand supports the infant's head, while the other hand is inserted in the birth canal posteriorly or anteriorly, on the dorsal aspect of the fetal shoulder. The shoulder is then rotated inward (adduction) so that the shoulders come to lie in the oblique diameter of the pelvis. By applying pressure to the dorsal aspect of the shoulder, the rotation itself adducts the fetal shoulders, thereby reducing their bisacromial diameter (Lerner, 2006b).



Rubin II Maneuver. Image provided courtesy of M. Salmon (2013).

After the maneuver has been used, it is appropriate to apply moderate traction to the baby's head to determine whether the baby can be delivered (Lerner, 2006a).



Note!

- Note that it is never proper to pull on the shoulders simultaneously.

Test Yourself

The main purpose of Rubin's maneuver is to:

- Deliver the posterior arm first.
- Loosen the fetal shoulders to facilitate descent.
- Rotate the shoulders into the oblique diameter of the pelvis.

The correct answer is C.

Woods Screw Maneuver

Woods' screw maneuver involves pushing on the posterior surface of the posterior shoulder in a corkscrew fashion to release the opposite impacted anterior shoulder. This leads to turning the anterior shoulder to the posterior and vice versa. This maneuver is somewhat the opposite of Rubin II maneuver. In addition to the corkscrew effect, pressure on the posterior shoulder has the advantage of flexing the shoulders across the chest. This decreases the distance between the shoulders, thus decreasing the dimension that must fit through the pelvis.

Delivery of Posterior Arm

Another maneuver that can be useful is the removal of the posterior arm. Most likely, the infant has arms at the sides or across the chest. The nurse should place her/his hand in the vagina at the six o'clock position and follow the arm past the elbow to find the infant's hand. Grasping the hand, the arm can be moved gently in a sweeping motion toward the center of the body with the hand passing over the head as it exits the vagina.



Image provided courtesy of Breastfeedinc.com (2013).

The whole arm will be delivered. Then the infant can be turned by using the Rubin maneuver again. Most likely the infant will come easily in conjunction with mother's pushing (Gherman, 2002 in Camune & Brucker, 2007).

It's important to note that the mother should not push, except when instructed to and only when it's believed the shoulder has been released. If the mother continues to push, her uterus

could rupture and the shoulder could be impacted more tightly with bruising. By the time that the above actions have been taken, it's likely that additional assistance will have arrived.

Last Resort Maneuvers

If shoulder dystocia remains unresolved at this point, it's time for the maneuvers of last resort. These are best undertaken by an experienced physician or nurse midwife and include deliberate clavicular fracture or performance of the Zavanelli maneuver, which consists of cephalic replacement of the fetal head by rotating it into a direct occiput anterior position and pushing it back into the pelvis until a cesarean section can be performed. The Zavanelli maneuver should not be performed by a labor nurse (Camune & Brucker, 2007).

Note!

- The delivery team has 4-6 minutes to resolve shoulder dystocia before the threat of central neurologic injury is significant (Lerner, 2006a).

Zavanelli Maneuver

This maneuver should be attempted only when all other efforts have failed (Lerner, 2006a). It involves flexing the fetal head and attempting to push the baby's head back into the vagina, followed by emergency cesarean section. Although case reports have described successful use of this maneuver, there also have been reports of fetal death, fractured spines, and other severe fetal damage.

Thus, this maneuver should be the absolute last resort in desperate emergencies. (Sandberg, 1985, Lerner, 2006a).

Moving Between Maneuvers

It is important for the clinician to recognize when a maneuver is not working, and to move quickly to the next maneuver. It is also more critical that the steps be employed efficiently, rather than in any particular order. Up to thirty seconds is recommended as the appropriate amount of time to spend on each maneuver (Gobbo et al., 2012). Although 3-5 minutes may seem like a brief window of time in which to act, it is adequate to conduct all of the maneuvers.

Each of these maneuvers is designed to do one of three things:

1. Increase the functional size of the bony pelvis.
2. Decrease the bisacromial diameter (width of the presenting shoulders).
3. Change the relationship of the shoulders-bisacromial diameter within the bony pelvis.

(Gobbo et al., 2012)

Success Rates of Maneuvers

Results from a study conducted by Leung et al (2011) indicate that most (94.6%) cases of shoulder dystocia can be resolved by the application of three maneuvers within four minutes.

The initial step of McRobert's maneuver with or without suprapubic pressure is generally recommended, but this may resolve only 25% of the cases, and carried a small risk of brachial plexus injury and clavicular fracture. Whereas the subsequent application of rotational methods and posterior arm delivery have similarly success rate of 72.0% and 63.6%, respectively, rotational methods might be associated with less risk of humeral fracture (Leung et al., 2011).

Leung et al (2011) also found that rotational methods following a failed McRobert's maneuver did not further increase the fetal injury rate when compared with those received only McRobert's maneuver, and carry a higher success rate.

As Leung et al. study is not a randomized trial to compare different maneuvers, further studies are necessary to confirm their findings.



- Lateral traction was the most dangerous method and must be avoided (Leung et al., 2011).

Standards of Care

There are four standards of care that all labor and delivery teams should be familiar with in caring for a patient who may experience shoulder dystocia during delivery:

1. The entire labor and delivery staff should know what to do and what each person's role is when shoulder dystocia is diagnosed.
2. Labor and delivery nurses should know how and when to initiate McRobert's maneuver and when to apply suprapubic pressure. These measures often resolve the dystocia by flattening the sacrum and altering the angle between the pubic bone and the baby's anterior shoulder (Lerner 2006).
3. The team should immediately obtain the assistance of another obstetrician, a pediatrician, and an anesthesiologist.
4. The team should be mentally prepared for the possibility of shoulder dystocia. This requires the ability to quickly recognize it, familiarity with the various techniques for resolving it, and avoidance of unnecessary traction.

(Lerner, 2006a)

Predicting shoulder dystocia in clinical practice is extremely difficult, thus improved management is the best way to minimize risk of morbidity (Inglis et al., 2011).

Emergency Measures

Essential emergent measure for managing a shoulder dystocia should include:

- Oxygen administration: Via oxygen mask at ten liters/min.
- Patent IV access: Preferably with a large bore needle for rapid fluid or blood administration.
- Fetal heart rate monitoring: With the use of a doppler or fetoscope.

Note!

• Electronic fetal monitoring may be limited, as application of a new scalp electrode will impede manipulation and the external fetal monitor does not pick up fetal heart rate (FHR) well under the symphysis pubis (Camune & Brucker, 2007).

Complications of Shoulder Dystocia

Injuries associated with shoulder dystocia may include:

- Transient and permanent brachial plexus injury
- Clavicular and humeral fracture
- Axillary and median nerve injury
- Fetal/neonatal death

(Colombara et al., 2011)

Note!

• Birth injuries associated with a shoulder dystocia are the most common reason for obstetric malpractice claims (Jevitt et al., 2005 in Colombara et al., 2011).

Brachial Plexus Injury

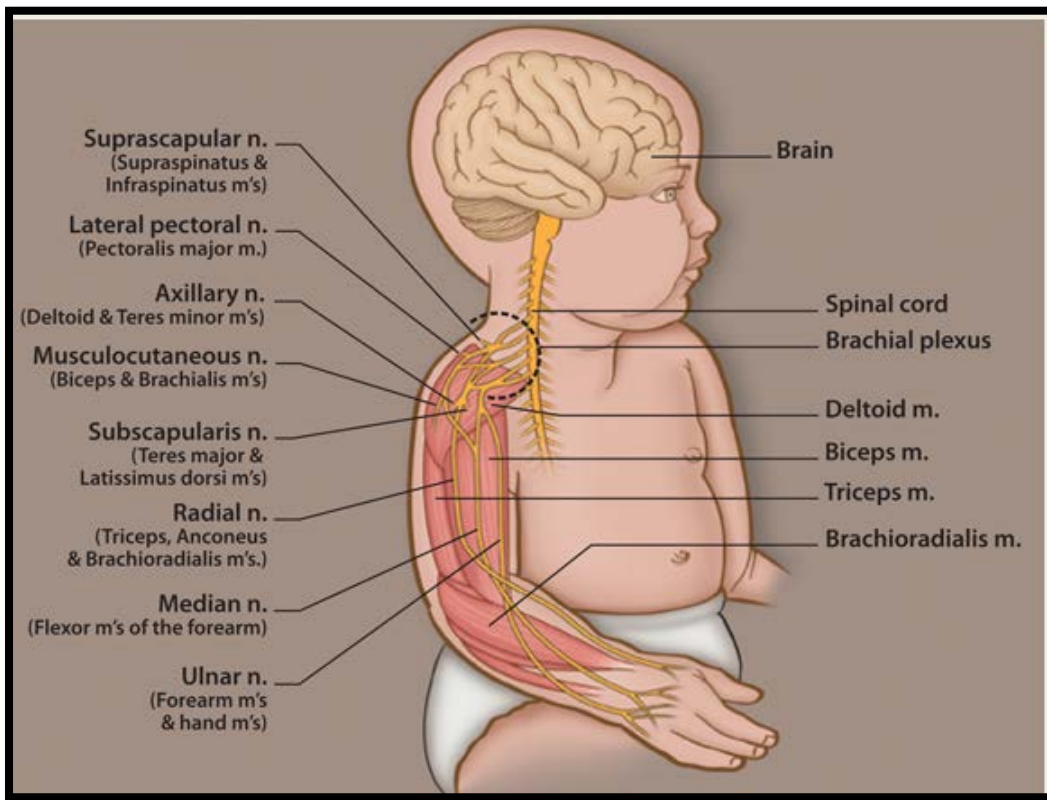
The brachial plexus is the major bundle of nerves that begins at the base of the neck and run through the shoulder, arm, and hand. Shoulder dystocia can result in a major disruption in oxygen transfer, resulting in impaired neurological development.

In addition, shoulder dystocia can cause birth trauma. Brachial plexus palsies are among the most common and worrisome complications of shoulder dystocia, and occur in 7-20% of infants whose deliveries were diagnosed with a shoulder dystocia (Gobbo et al., 2012).

While nearly all infants recover within 6-12 months, 1-2% will be left with a permanent and disabling injury (Gobbo et al., 2012).

Note! • The nurse plays a vital role in reassuring the parents during the difficult delivery, by providing simple explanations as the delivery progresses.

Brachial Nerve Plexus



The Brachial Nerve Plexus. Image used with permission from birthinjury.org (2013). www.birthinjury.org.

Types of Brachial Nerve Injuries

Nerve palsies are named by the level of spinal involvement.

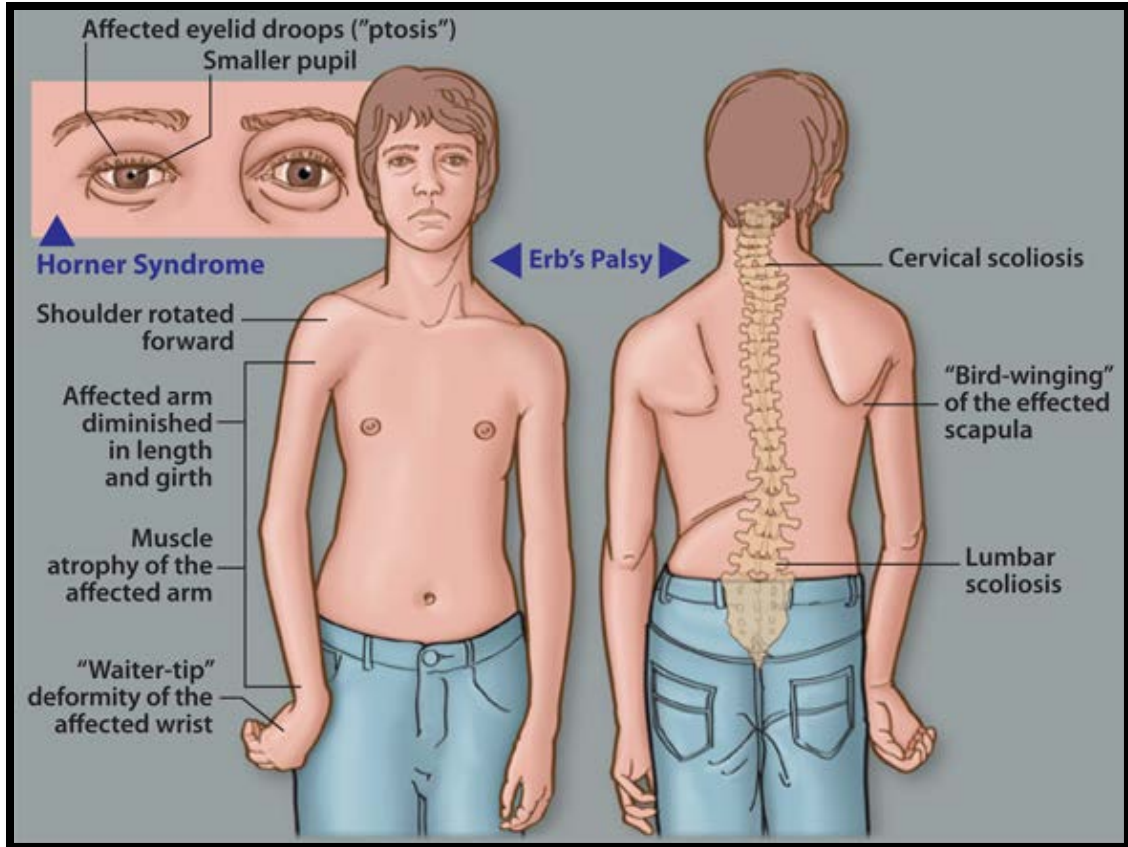
Two types of brachial nerve injury are generally described:

1. **Erb's Palsy:** Is the more commonly seen type of brachial nerve injury, and involves C5 to C6 nerve roots.
2. **Klumpke's Palsy:** Involves C8 to T1 nerve roots.

The most common brachial nerve injury is Erb's Palsy. This injury involves the C4–6 nerve roots. A combination of injuries and scar tissue development impact the optimal recovery and use of the affected arm. Avulsion (forcible detachment) of nerve roots produces the most severe deformities.



- Horner Syndrome is another type of brachial nerve injury, which generally presents with a drooping eyelid on the affected side.



Presentation of an Erb's Palsy Injury. Image used with permission from birthinjury.org (2013).
www.birthinjury.org

Incidence of Brachial Plexus Injuries

Brachial plexus injuries occur in about 7-20% of shoulder dystocia cases, and 10% of these injuries result in permanent injury (Lerner, 2006b).

Seventy percent of brachial plexus injuries are avoidable, and the majority of brachial nerve injuries are caused by poor management of shoulder dystocia (Gobbo et al., 2012). However, recent research has now shown that both the in-utero positioning of the infant and propulsive labor forces have been identified as causing brachial plexus palsies (Gherman et al., 2006 in Gobbo et al., 2012).

- Note!**
- Brachial plexus injury is the most common consequence of shoulder dystocia and can occur through bruising, stretching or avulsion of the nerve networks in the upper spine (Camune & Brucker, 2007).

Test Yourself

The incidence of brachial nerve injuries with shoulder dystocia is estimated to be between:

- A. 1-10% of deliveries with shoulder dystocia
- B. 7-20% of deliveries with shoulder dystocia
- C. 15-30% of all vaginal deliveries

The correct answer is B.

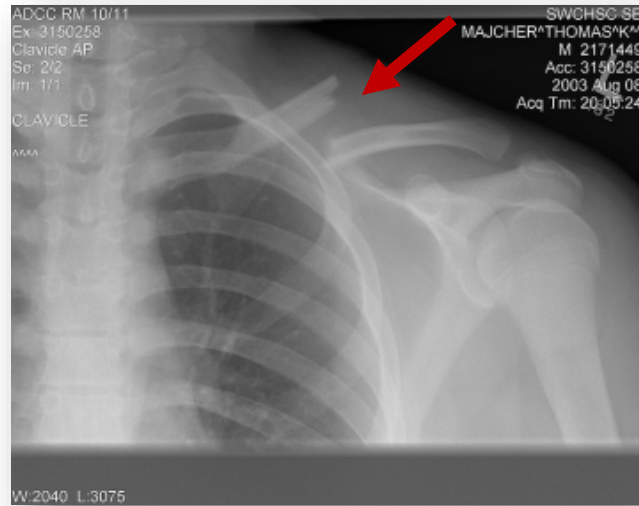
Resolution of Brachial Plexus Nerve Injuries

Mild injuries usually resolve by three months of age, with no residual effect. It's impossible to predict or diagnose the prognosis in the newborn period. A physical therapist needs to be consulted promptly, and exercises must be initiated in the early postpartum period. Frequent follow-up with a physical therapist and pediatric neurologist for evaluation of continuing weakness or movement problems is recommended.

Since most infants are born in the left occiput anterior position, the injury is most commonly found in the anterior shoulder. It's also possible to have a left-sided injury due to posterior arm impaction on the sacral promontory of the pelvis. Occasionally, both sides have been affected (Carson et al., 1995 in Camune & Brucker, 2007).

Clavicular and Humeral Fracture

The second most common injury to infants following shoulder dystocia deliveries is a fractured clavicle. The incidence of this injury following shoulder dystocia is 10% (Lerner, 2006b).



Clavicular Fracture. Wikipedia (2013).

When the fetal shoulders are relatively large in relation to the maternal pelvis, significant pressure may be placed on them as they pass through the birth canal. In some cases, this pressure may cause the clavicle to fracture. The overlapping of the ends of the broken clavicle reduces the diameter of the fetal chest and intra-shoulder distance and allows them to be delivered. This fracturing may in fact help reduce the incidence of severe brachial plexus injury (Lerner, 2006b).

A fracture of the humerus occurs in approximately 4% of infants with shoulder dystocia deliveries (Lerner, 2006b). Such injuries heal rapidly and are rarely result in litigation.

Choosing a Mode of Delivery

Risk factors for shoulder dystocia must be carefully considered prior to deciding upon a mode of delivery.

The clinician must determine whether the risk of shoulder dystocia is high enough to outweigh the maternal risks of an elective cesarean section.

When Is Cesarean Section Warranted?

In deciding the answer to this question, the clinician must consider that inherent risks of cesarean section:

1. Excessive bleeding

2. Infection
3. Injury to bowel or bladder
4. Deep venous thrombosis
5. Need for hysterectomy

These adverse events occur much more frequently than does permanent brachial plexus injury (Creasy et al., 2004 in Lerner, 2006a). And the risks of surgery are even higher for the same patients at greatest risk for shoulder dystocia; those women who are diabetic and/or obese (Lerner, 2006a).

The option of cesarean section should be discussed with the parents, and possibly recommended for all women whose infants are estimated to weigh more than 5,000 g in the absence of diabetes and 4,500 g or more in women with diabetes (Lerner, 2006a).

It is extremely important that the woman be informed of the degree of risk to herself and her baby so that her decision is truly informed.



Image provided courtesy of paloma.cl flickr (n.d.), under the Creative Commons Attribution Sharealike 2.0 License.

Labor Management: The Use of Oxytocin

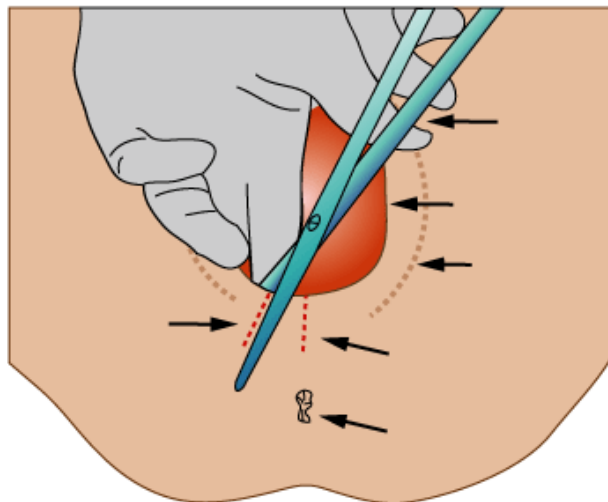
In cases of arrest of labor and descent, the use of oxytocin is appropriate (Lerner, 2006a). A laboring woman should be given adequate time to deliver on her own, especially if epidural or

spinal anesthesia has been used, but the delivery team should be on alert to act quickly should fetal distress occur. Cesarean section is a realistic and safe alternative, if labor fails to progress.

Episiotomies and Shoulder Dystocia: Should The Two Be Connected?

Multiple studies have shown that episiotomy is not necessary to resolve shoulder dystocia, although many textbooks still recommend it (Gurewitsch et al., 2004 in Lerner, 2006a). The obstructing factor in shoulder dystocia is not the soft tissue of the perineum but the bony symphysis pubis.

The only time episiotomy helps is when more room is needed for the obstetrician's or midwife's hand to enter the posterior aspect of the vagina to perform a shoulder dystocia maneuver. If the necessary maneuvers can be performed without episiotomy, an episiotomy should not be cut.



Medio-lateral episiotomy illustration, based on Jeremy Kemp's image (2005). Reproduced courtesy of Wikipedia (2013).

Communicating with Parents

When a shoulder dystocia event occurs, direct and clear communication with the parents is essential. The parents should be apprised of the situation by the nurse as soon as possible, in a calm and reassuring way. Involving the parents as members of the team empowers them and allows them to proactively participate in the management of shoulder dystocia.

The nurse should discuss any concerns with the person who delivered the infant in private, after the emergent situation is resolved. One should avoid speculation and document only what was observed. Internal maneuvers and strength of traction are not data that anyone can document with certainty, except the person performing them (Dunn et al., 2005 in Camune & Brucker, 2007).

McRobert's maneuver can be simply explained to parents in terms of adjusting the maternal position to allow the baby more space to pass through the pelvis.

Suprapubic pressure can be explained in terms of helping the baby to descend through the birth canal correctly. If a mother is to breathe through contractions, the nurse can coach her face-to-face, to keep her focused. Comprehensive and honest information about the situation needs to occur after the infant is born and stabilized.

Addressing Maternal Concerns

Often a mother will voice concern about whether she will be able to deliver her baby safely vaginally. She may feel that her infant is too big, that she is too small, or that her obesity will make her delivery more difficult. Do not casually ignore such concerns or provide blanket reassurances that everything will be okay (Lerner, 2006a).

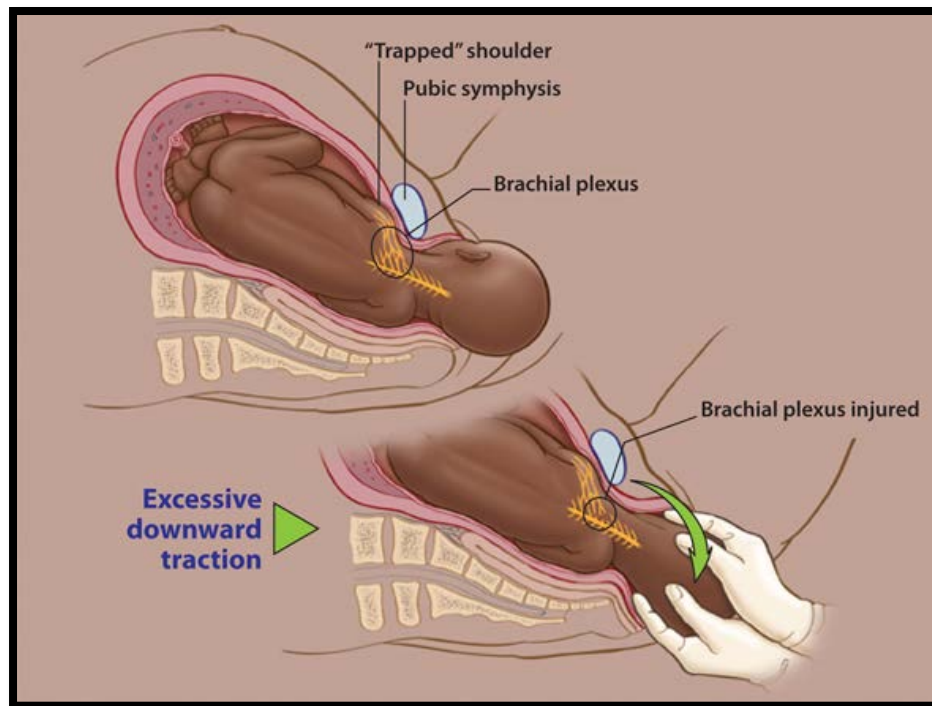
Instead, review with her any risk factors she may have for shoulder dystocia and discuss the specific risks of injury to her baby should dystocia arise. Then discuss the risks with her and the discomfort she will experience if she elects a cesarean section.

Patients have a right to know the risks. Although it is appropriate to be reassuring when there are no significant risk factors, patients deserve to understand the risks and to have these risks put into perspective. All discussions should be carefully documented in the medical record.

Procedures to Avoid During Delivery

Excessive Traction

The clinician delivering the infant should never continue to apply traction to the fetal head if the shoulder does not follow easily. Once shoulder dystocia is diagnosed, all attempts to deliver the baby by continued pulling should be ceased immediately. The shoulder dystocia maneuvers should then be systematically employed, without the use of excessive traction or force.



Excessive Downward Traction Can Cause Brachial Nerve Injury. Image used with permission from birthinjury.org (2013). www.birthinjury.org.

Procedures to Avoid During Delivery

Fundal Pressure

Fundal pressure (placing hand on the top on the maternal fundus and pushing the fetus and uterus towards the vagina) should be avoided at all cost when a shoulder dystocia occurs, as this pressure only serves to further impact the anterior shoulder behind the symphysis pubis (Lerner, 2006a).

Do not apply fundal pressure (Lerner, 2006a). The application of fundal pressure never helps resolve shoulder dystocia, but can further jam the impacted shoulder against the maternal pubic bone. It can also cause injury to the fetus or rupture the uterus.

Fundal pressure is often cited in court as a definite standard of care violation (Lerner, 2006a). Thus, documentation after the delivery should clearly state that **no** fundal pressure was applied during the delivery (Gobbo et al., 2012).

Test Yourself

True or false? Suprapubic pressure should never be applied during shoulder dystocia, as this can rupture the uterus and further jam the impacted shoulder in the pelvis.

Answer: False. Fundal pressure should never be applied during shoulder dystocia, however, the application of suprapubic pressure can facilitate the adduction of the fetal arms closer to the body, which can release the impacted shoulder.

Shoulder Dystocia Training Protocols (Inglis et al., 2011)

Shoulder dystocia training is now recommended by the Joint Commission (TJC) to decrease complications. Numerous studies have reported improved management of shoulder dystocia following training and practice using simulation models (Crofts et al., 2007 in Inglis et al., 2011).

Inglis et al. (2007) recommends that all labor and delivery units implement shoulder dystocia training. The goal of implementing the shoulder dystocia training protocol is to simplify and standardize the management of shoulder dystocia emergencies. The training covered risk factors, early recognition, management, and documentation of shoulder dystocia.

Standardized Training for Shoulder Dystocia

Standardized shoulder dystocia training is designed to be a simple, systematic set of procedures, which are activated by the labor and delivery staff upon first recognizing the signs of shoulder dystocia. Once shoulder dystocia has been identified, a “hands-off” approach (no hands and no traction on the fetal head) should be implemented.


The obstetrician or midwife should first assess the position of the anterior shoulder, and announce the findings to the team, who can then assist with positioning the patient for McRobert’s maneuver.

Shoulder Dystocia Drills

Nurses routinely practice CPR as part of their professional responsibilities. Nurses in obstetrics should routinely practice “shoulder dystocia drills” (Camune & Brucker, 2007). For example, a nurse can practice McRobert’s maneuvers and the technique for applying suprapubic pressure in a simulated environment, to keep the maneuver fresh in his or her memory. The only equipment needed is a pelvis and doll.

Drills are not an absolute necessity (Lerner, 2006a), but can be extremely useful in keeping labor and delivery personnel up-to-date and knowledgeable, in the event that a shoulder dystocia emergency arises. However, it is more important that each individual on the labor and delivery team know what his or her **role** is during such an emergency. Whether this is achieved through a practice drill or didactic instruction does not matter (Lerner, 2006a).

[Click here](#) to view an instructional video.



• The standard of care for shoulder dystocia is that every team member knows what to do, how to do it, when to do it, and how to document it (Lerner, 2006a).

The Importance of Documentation

Assigning adequate staff to assist with a shoulder dystocia emergency is of utmost importance. One nurse should be assigned the duties of documentation, obtaining designated equipment and supplies, and notifying the delivery clinician of time intervals.

Documentation of the maneuvers used and the duration of each maneuver may be valuable to prompt the clinician to move on to other maneuvers, rather than persisting in one that is not proving effective (Gobbo et al., 2012).



Note!

- Document early, frequently, and regularly.

Documentation is a Nursing Responsibility

Documentation is a key nursing responsibility and becomes particularly important in cases involving shoulder dystocia. Since birth injuries often leads to litigation, it is extremely important to document what happened during delivery as soon as possible, and in as much detail as possible. The accuracy of the documentation is also very important.

In a study conducted by Crofts et al., (2008), researchers found that one in five labor nurses incorrectly documented the contra-lateral shoulder as being anterior. This has repercussions for medico-legal case analysis as brachial plexus injury of the posterior shoulder is considered unlikely to be the result of clinical negligence (Crofts et al., 2008).

Documentation Guidelines

Documentation is an important component of healthcare; inaccurate or incomplete record keeping can place the nurse and facility at greater risk for litigation.


At minimum, the nurse should record:

- How shoulder dystocia was diagnosed.
- Which shoulder was anterior and which was posterior.
- A description of the force applied initially and in subsequent traction attempts, using descriptive terminology, such as “mild,” “moderate,” or “significant.”
- The duration of attempts to resolve the dystocia.
- The maneuvers performed and approximate length of time each maneuver was tried.
- The condition of the baby at delivery, including Apgar scores, a description of all injuries, and cord pH, if obtained.
- The time from delivery of the fetal head to delivery of the body.
- Documentation of the discussion with the patient following delivery.

(Lerner, 2006a)

The Legal Importance of Documentation

Given that the most frequent criticism of obstetricians in the courtroom in brachial plexus injury lawsuits is that they pulled too hard, the best defense consists of careful, complete, and contemporaneous documentation of one's actions at delivery.



Note!

- You can provide the best care in the world, but if you cannot demonstrate on paper years down the road that you did so, our current liability system will make it seem as if you did not.

Avoiding Lawsuits

Even when everything is done correctly, there is a very high likelihood that a lawsuit will be filed when there is a permanent brachial plexus injury following a difficult delivery with shoulder dystocia.

The two claims generally made against clinicians are:

1. The clinician should have predicted that the risk of shoulder dystocia was high, and should have performed a cesarean section, or at least offered that choice.
2. Since the baby has a permanent brachial plexus injury, the delivery clinician must have pulled too hard at delivery.

The best defense is, as always, to have practiced good medicine and to have documented care thoroughly and comprehensively years after the event, the medical records must be able to clearly demonstrate that you:

- Made appropriate prenatal judgments and were aware of risk factors.
- Informed the mother of such risk factors when they are significant.
- Provided safe obstetrical care.
- Documented in the medical record that you knew what you were doing and did it correctly.

(Lerner, 2006a)

Implications for Practice

Shoulder dystocia is an uncommon complication, yet can be a devastating occurrence. All labor and delivery staff should be knowledgeable in their roles and prepared for all emergencies. Always be familiar with the particular Policy & Procedure to follow in your facility.

It is wise to communicate with the obstetrician or midwife ahead of time about the delivery plan for an at-risk infant to facilitate the decision-making process and to ensure every team member is comfortable with individual roles and responsibilities.

Using Mnemonics

Although there is no regimented sequence of maneuvers, there are a few mnemonic suggested in the literature that can assist labor nurses in managing shoulder dystocia:

HELPER

The *HELPER* mnemonic is advocated by the American Academy of Family Physicians:

H: Call for help. This step refers to activating the pre-arranged plan for personnel to respond with necessary equipment to the labor and delivery unit.

E: Consider an episiotomy: If there is limited room for the insertion of the clinician's hand in the vagina to perform the necessary maneuvers. Since shoulder dystocia is a bony impaction, simply performing an episiotomy will not cause the shoulder to release, but will allow additional room for the clinician to perform the necessary maneuvers (Gobbo et al., 2012).

Note: An episiotomy can be very difficult to perform when the fetal head is tight against the perineum (Gobbo et al., 2012).

L: Elevate the legs (McRobert's maneuver): This is the first step in management of shoulder dystocia. When this maneuver is successful, normal traction will be sufficient to deliver the fetus. Delivery should be attempted in this position for approximately 30 seconds (Gobbo et al., 2012). McRobert's maneuver alone is believed to relieve more than 40% of all shoulder dystocias. Combined with suprapubic pressure and/or episiotomy, over 50% of dystocias can be delivered by McRobert's maneuver (Gherman, 1997 in Gobbo et al., 2012).

P: Provide suprapubic pressure

E: Enter maneuvers (Rubin and Woods)

R: Remove posterior arm

Using Mnemonics

BE CALM

Another mnemonic suggested by Camune & Brucker (2007) is the **Be Calm** mnemonic:

B: Breathe, do not push. Encourage the woman to breathe or even pant in order not to push.

E: Elevate the legs into a McRobert's position.

C: Call for help.

A: Apply suprapubic pressure (NOT fundal pressure).

L: Enlarge the vaginal opening with an episiotomy when additional hand room is needed.

M: Maneuvers (e.g., McRobert's, Rubin, or Woods).

(Camune & Brucker, 2007)

Each delivery unit should develop their own specific protocol and procedures to handle shoulder dystocias and select an appropriate mnemonic that all labor staff are familiar with.

Risk of Recurrence

Shoulder dystocia recurrence in subsequent deliveries may be related to risk factors, such as gestational diabetes, fetal macrosomia, maternal obesity, and instrument deliveries.

Identification of risk factors for subsequent birth injury can greatly improve obstetric outcomes and would provide guidance for women contemplating an additional pregnancy following a birth complicated by shoulder dystocia (Colombara et al., 2011).

Conclusion

Shoulder dystocia can be a frightening and unpredictable obstetrical emergency. Obstetricians, nurse-midwives, and labor nurses have a professional obligation to maintain current knowledge of shoulder dystocia and be comfortable performing maneuvers to deliver the shoulder safely.

As a responsible healthcare professional, you should be familiar with the risk factors for shoulder dystocia, be able to rapidly identify the presence of a shoulder dystocia, assist with the application of appropriate maneuvers, and consider alternatives to vaginal delivery in an emergent situation.

Understanding how shoulder dystocias can occur, recognizing shoulder dystocia, and having a pre-established plan of care for managing shoulder dystocia will assist the delivery team in providing safe, competent, and effective care.

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