

SHOULDER DYSTOCIA

- I. Overview: Shoulder dystocia is an obstetrical emergency placing the pregnant woman and fetus at risk for injury. Shoulder dystocia occurs after the fetal head is delivered and further expulsion is prevented by impaction of the fetal shoulders anteriorly (pubic rami) or posteriorly (sacral promontory). Incidence ranges from one percent to two percent. Most cases of shoulder dystocia cannot be predicted or prevented because accurate methods for identifying which fetuses will experience this complication do not exist, and performing a cesarean delivery on all those women suspected of having a macrosomic fetus is inappropriate
- II. Maternal Complications
 - A. Patients who experience shoulder dystocia are at increased risk for postpartum hemorrhage
 - B. Patients who experience shoulder dystocia are at increased risk for soft tissue laceration (including vaginal and cervical, and 3rd and 4th degree lacerations)
- III. Fetal Complications
 - A. Brachial plexus injury has been described in 4-40% of shoulder dystocia cases; however most resolve without permanent injury
 - B. Fracture of the humerus
 - C. Fracture of the clavicle
 - D. Hypoxic brain damage
 - E. Neonatal death
- IV. Prediction: The ability to predict shoulder dystocia is poor; hence it is not usually preventable. Efforts should be made to anticipate and plan for it based on the presence or combination of clinical risk factors
 - A. Risk assessment
 - 1. Historical
 - a. Previous history of shoulder dystocia is associated with recurrence (1-17%)
 - b. Previous history of macrosomia
 - c. History of maternal diabetes
 - 2. Clinical findings
 - a. Macrosomia: Estimated fetal weight (EFN) >4,000 gm in diabetic pregnancy or 4500 gm in nondiabetic pregnancy. It should be noted that ultrasound evaluation to determine macrosomia has limited accuracy, and associated with a 10-15% error margin. To be 90% confident that EFW is at least 4000 gms, the EFW needs to be at least 4600 gms. Further, while macrosomia is strongly associated with shoulder dystocia, most cases of shoulder dystocia occur in normal weight infants
 - b. Maternal obesity (>200 lbs)
 - c. Gestational diabetes during this pregnancy. Efforts to look at chest or abdominal to head

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circumference or other fetal biologic parameters via ultrasound have not been supported

- d. Post dates pregnancy. Advanced gestation is associated with larger infants
 - e. Mid-pelvic delivery after second stage of labor lasting more than two hours
- V. Prevention of Shoulder Dystocia: Assessment must be made on a case by case basis. An informed decision should be made after physician consult with the patient discussing pregnancy and the delivery options' risks and benefits
- A. Planned cesarean delivery on the basis of suspected macrosomia could reduce the incidence of shoulder dystocia at considerable cost to the mother and society. A decision analysis model estimated an additional 2,345 cesareans would be required to prevent one permanent brachial plexus injury from shoulder dystocia at a cost of 4.9 million dollars annually, and one maternal death would result for every 3.2 neonatal injuries prevented
 - B. The American College Obstetric & Gynecologists (ACOG) has suggested that planned cesarean delivery may be a reasonable strategy for EFW >4500 gm in diabetics and >5000 gm in nondiabetics. Others suggest more lenient criteria (4,000-4200 gm and 4500 gm, respectively)
- VI. Diagnosis
- A. After delivery of the fetal head, there is recoil of the head back against the perineum usually caused by the impaction of the anterior shoulder behind the symphysis pubis, instead of delivery below the pubic symphysis
 - B. Restitution rarely occurs spontaneously
- VII. Management
- A. Whenever possible, anticipate occurrence and have an experienced team readily available for the delivery. The team should include a(n):
 - 1. Anesthesiologist
 - 2. Neonatal resuscitation team member(s)
 - 3. A second obstetrician
 - 4. Adequate nursing personnel
 - B. Consider location for delivery: Labor, delivery, recovery and post partum (LDRP) versus delivery room with the capability to perform and emergency cesarean delivery
 - C. Consider epidural anesthesia during labor for patients with risk factors for shoulder dystocia
 - D. Ensure emptying of the bladder during the second stage of labor
 - E. Guidelines for delivery
 - 1. Do not apply fundal pressure
 - 2. Do not apply excessive traction on to the head and neck. These maneuvers only serve to waste precious time and to impact the shoulders more firmly in the inlet. Furthermore, they may result

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in uterine rupture or brachial plexus injury

3. There is considerable debate about the benefits of cutting a generous episiotomy or episiotomy. Advocates suggest that this will provide additional space for manipulation
4. Ensure adequate anesthesia. General anesthesia may be required to obtain complete muscle relaxation
5. The following maneuvers should occur in a sequential fashion:
 - a. McRoberts Maneuver
 - i. Remove the patient's legs from the stirrups and hyperflex her thighs against her abdomen (knee-chest position) which is felt to increase the size of the posterior outlet. In one study, this was the only maneuver required in over 40% of cases
 - ii. Exert subpubic pressure
 1. This usually succeeds in bringing the anterior shoulder into and through the pelvis
 2. Assistant should ask physician which direction to apply pressure
 - iii. Delivery of the anterior shoulder (see figure)
 1. Place the hand deeply in the vagina in front of or behind the anterior shoulder
 2. Rotate the axis of the shoulders into an oblique diameter of the pelvis
 3. Attempt delivery of the shoulders
 - iv. If delivery of the anterior shoulder is unsuccessful, attempt delivery of the posterior arm (Woods corkscrew maneuver)
 1. The operator's entire hand is inserted along the hollow of the sacrum
 2. Reaching within the uterus, and with two fingers applying pressure to the mid-humerus, sweep the posterior arm across the fetal chest and deliver it
 3. Rotate the infant's trunk 180°, if necessary, to accomplish delivery
 4. The above maneuvers are associated with increased risk of fracture of the clavicle and/or humerus (15-25%), as well as neurologic injury (10%)
 5. Never apply excessive traction to the fetal head or neck
 - b. Alternative maneuvers
 - i. Gaskins maneuver
 1. Fully ambulatory patient without motor blockade can be placed on all fours and this may relieve dystocia. This is an alternative to the McRoberts maneuver
 - ii. Deliberate fracture of the clavicle may facilitate delivery by diminishing the rigidity and size of the shoulder girdle

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iii. Zavanelli maneuver

1. If restitution (external rotation) has occurred following expulsion of the head, the head is first manually returned to its pre-restitution position, full extension in a direct occipito-anterior position. The head is then manually flexed, recapitulating in reverse the birth of the head by extension. Upward pressure on the flexed fetal head is applied to force it into the vagina. A cesarean delivery is then emergently performed. This has been described with various success, albeit with significant maternal morbidity and neonatal morbidity and mortality

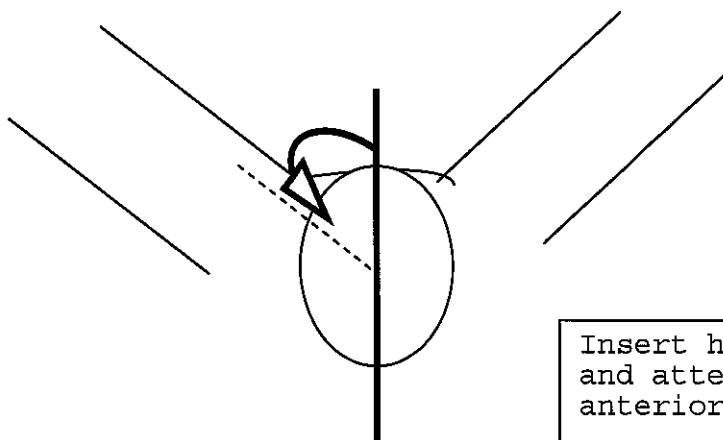
iv. Symphysiotomy

1. This procedure is limited primarily to remote countries as an alternative to cesarean delivery. It should be performed by someone experienced with the procedure. Care should be taken to provide lateral support for the maternal legs, sharp dissection of the symphysis, and protection and displacement of the urethra with an indwelling catheter to prevent injury

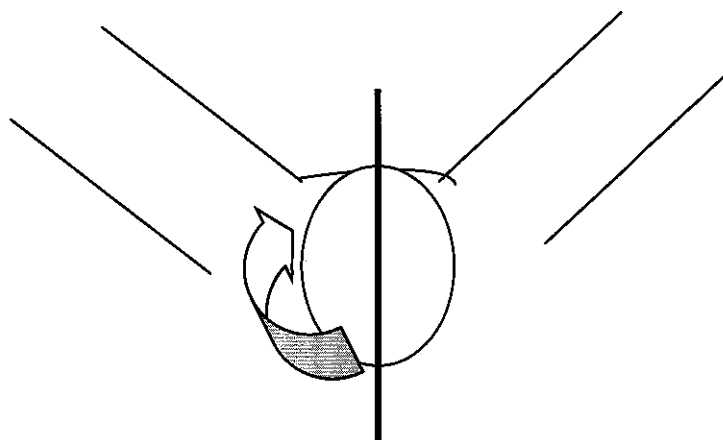
F. Quality improvement efforts and patient safety

1. Efforts should be made to provide a mechanism for simulation drills so all team members can practice the maneuvers, and learn to go through them in a standardized, systematic way
2. Documentation should be clear, legible and described maneuvers performed in the order in which they were conducted

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Insert hand anteriorly,
and attempt to rotate
anterior shoulder down



Insert hand
posteriorly, and
attempt to rotate
posterior shoulder up

REFERENCES

- Acker, D. B., Sachs, B. P., & Friedman, E. A. (1985). Risk factors for shoulder dystocia. *Obstet Gynecol*, 66(6), 762-768.
- Acker, D. B., Sachs, B. P., & Friedman, E. A. (1986). Risk factors for shoulder dystocia in the average-weight infant. *Obstet Gynecol*, 67(5), 614-618.
- ACOG practice bulletin clinical management guidelines for obstetrician-gynecologists. Number 40, November 2002 (2002). *Obstet Gynecol*, 100(5 Pt 1), 1045-1050.
- Bendetti, T.J. (1991). Dystocia: Causes, consequences, correct response. *Contemp OB/GYN*, 36, 37-48.
- Crofts, J. F., Bartlett, C., Ellis, D., Hunt, L. P., Fox, R., & Draycott, T. J. (2006). Training for shoulder dystocia: a trial of simulation using low-fidelity and high-fidelity mannequins. *Obstet Gynecol*, 108(6), 1477-1485.
- Crofts, J. F., Fox, R., Ellis, D., Winter, C., Hinshaw, K., & Draycott, T. J. (2008). Observations from 450 shoulder dystocia simulations: lessons for skills training. *Obstet Gynecol*, 112(4), 906-912.
- Cunningham, F. Gary, & Williams, J. Whitridge (1993). *Williams obstetrics* (19th ed.). Norwalk, Conn.: Appleton & Lange.
- Draycott, T. J., Crofts, J. F., Ash, J. P., Wilson, L. V., Yard, E., Sibanda, T., et al. (2008). Improving neonatal outcome through practical shoulder dystocia training. *Obstet Gynecol*, 112(1), 14-20.
- Gabbe, Steven G., Niebyl, Jennifer R., & Simpson, Joe Leigh (2007). *Obstetrics : normal and problem pregnancies* (5th ed.). Philadelphia, PA: Churchill Livingstone/Elsevier.
- Gherman, R. B., Goodwin, T. M., Souter, I., Neumann, K., Ouzounian, J. G., & Paul, R. H. (1997). The McRoberts' maneuver for the alleviation of shoulder dystocia: how successful is it? *Am J Obstet Gynecol*, 176(3), 656-661.
- Goffman, D., Heo, H., Chazotte, C., Merkat, I. R., & Bernstein, P. S. (2008). Using simulation training to improve shoulder dystocia documentation. *Obstet Gynecol*, 112(6), 1284-1287.
- Gonik, B., Stringer, C. A., & Held, B. (1983). An alternate maneuver for management of shoulder dystocia. *Am J Obstet Gynecol*, 145(7), 882-884.
- Hirata, G. I., Medearis, A. L., Horenstein, J., Bear, M. B., & Platt, L. D. (1990). Ultrasonographic estimation of fetal weight in the clinically macrosomic fetus. *Am J Obstet Gynecol*, 162(1), 238-242.
- Jennett, R. J., Tarby, T. J., & Kreinick, C. J. (1992). Brachial plexus palsy: an old problem revisited. *Am J Obstet Gynecol*, 166(6 Pt 1), 1673-1676; discussion 1676-1677.
- Langer, O., Berkus, M. D., Huff, R. W., & Samueloff, A. (1991). Shoulder dystocia: should the fetus weighing greater than or equal to 4000 grams be delivered by cesarean section? *Am J Obstet Gynecol*, 165(4 Pt 1), 831-837.
- Lipscomb, K. (1994). *Management of common problems in obstetrics and gynecology* (3rd ed.). Boston: Blackwell Scientific Publications.
- O'Leary, J. A., & Leonetti, H. B. (1990). Shoulder dystocia: prevention and treatment. *Am J Obstet*

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Gynecol, 162(1), 5-9.

- Piper, D. M., & McDonald, P. (1994). Management of anticipated and actual shoulder dystocia. Interpreting the literature. *J Nurse Midwifery*, 39(2 Suppl), 91S-105S.
- Rouse, D. J., Owen, J., Goldenberg, R. L., & Cliver, S. P. (1996). The effectiveness and costs of elective cesarean delivery for fetal macrosomia diagnosed by ultrasound. *JAMA*, 276(18), 1480-1486.
- Sandberg, E. C. (1985). The Zavanelli maneuver: a potentially revolutionary method for the resolution of shoulder dystocia. *Am J Obstet Gynecol*, 152(4), 479-484.