REVIEW ARTICLE

Shoulder Dystocia

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Introduction

Shoulder dystocia is defined as a complication of vaginal delivery that requires additional obstetric manoeuvres to release the shoulders of the baby. Shoulder dystocia is an unpredictable obstetric complication with the incidence of 0.15% to 2%. An increase in the incidence of shoulder dystocia has been recorded over the last 20 years (1).

Risk Factors

The risk factors for shoulder dystocia include fetal macrosomia, fetal malformations and tumors, maternal adiposity, excessive weight gain during pregnancy, diabetes mellitus, pathologic pelvis, multiparity, short maternal stature, advanced maternal age, postterm pregnancy, so-called midforceps delivery or vacuum extraction, prolonged delivery stage II, oxytocin labor induction, premature fetal expression according to Kristeller, and previous shoulder dystocia in macrosomatic children (1).

Sequels

The sequels of shoulder dystocia and obstetric maneuvers for incarcerated shoulder release include clavicular fracture, brachial plexus lesions, sternocleidomastoid muscle distension with or without hematoma, diaphragmatic paralysis, Horner's syndrome, peripartal asphyxia and consequential cerebral lesions (cerebral palsy) and peripartal death. Brachial plexus injuries are one of the most important fetal complications of shoulder dystocia. Some cases results in permanent brachial plexus dysfunction (1).

Obstetric brachial plexus palsy (OBPP), is an injury of the brachial plexus at childbirth affecting the nerve roots of C5-6 (Erb-Duchenne palsy-nearly 80% of cases) or less frequently the C8-T1 nerve roots (Klumpke palsy). Most infants with OBPP have no known risk factors. Shoulder dystocia increases the risk for OBPP 100-fold. The reported incidence of OBPP after shoulder dystocia varies widely from 4% to 40% (2). However, a significant proportion of OBPPs are secondary to in utero injury. The propulsive forces of labor, intrauterine maladaptation, and compression of the posterior shoulder against the sacral promontory as well as uterine anomalies are possible intrauterine causes of OBPP. Many risk factors for OBPP may be unpredictable. Early identification of risk factors for shoulder dystocia, as well as appropriate management when it occurs, may improve our ability to prevent the occurrence of OBPP in those cases that are caused by shoulder dystocia (3).

Maternal Complications

Maternal complications due to shoulder dystocia are postpartal hemorrhage, cervical and vaginal lacerations, frequent infections during the puerperium, symphysiolysis and rupture of the uterus and secondary cesarean section with related complications due to unsuccessful obstetric procedures or as continuation of Zavanelli's maneuver (1).

Prevention

The only prevention option is elective cesarean section. ACOG has recommended that an estimated fetal weight of over 5 kgs should prompt consideration of delivery by cesarean section to reduce potential morbidity (4). There is no evidence to support induction of labour in women without diabetes mellitus at term when the foetus is thought to be macrosomic. It does not improve maternal or foetal outcome.

Diagnosis

One often described feature is the turtle sign which involves the appearance and retraction of the fetal head (analogous to a turtle withdrawing into its shell) and the erythematous, red puffy face indicative of facial flushing. This occurs when the baby's shoulder is impacted in the maternal pelvis.

Can it be predicted ?

Birthweight and maternal height are the only independent antenatal variables. The antenatal model could calculate an individual's risk; the intrapartum model could also calculate the risk if an instrumental delivery are undertaken. Both show 0.7% women to have a risk of shoulder dystocia of >10%. Although the antenatal model have high predictability (area under curve 0.89), it is no better than birthweight alone and have a sensitivity of 52.4%. Where birthweight is excluded, prediction of shoulder dystocia is poor. Antepartum and labour calculation of the risk of shoulder dystocia is possible.

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However, shoulder dystocia cannot be predicted with sufficient accuracy to allow universal screening.

Management (5-7)

Management of shoulder dystocia has become a focus point for many obstetrical nursing units worldwide. Courses such as the Candian more- OB program encourage nursing units to do routine drills to prevent delays in delivery which adversely affect both mother and fetus. A common treatment algorithm is ALARMER

- Ask for help: This involves requesting the help of a senior obstetrician, anesthetist and neonatologist for subsequent resuscitation of the infant.
- Leg hyper flexion (Mc Roberts manoeuvre)
- Anterior shoulder disimpaction (Suprapubic pressure)
- Rubin's manoeuvre
- Manual delivery of posterior arm
- Episiotomy
- Roll over on all fours

The advantage of proceeding in the order of ***ALARMER*** is that it goes from least to most invasive, thereby reducing harm to the mother in the event that the infant delivers with one of the earlier manoeuvres. In the event that these manoeuvres are unsuccessful a skilled obstetrician may attend some of the additional procedures listed below. Intentional clavicular fracture is a final attempt at non-operative vaginal delivery prior to Zavanelli's manoeuvre or symphysiotomy, both of which are considered extraordinary treatment measures.

The obstetrician should manage this complication in the following stepwise manner: -

1. Step 1 (Preparation)

A). Have the time noted when the problem is recognized and have minutes counted off by a designated individual.
B). Call anesthetist and alert the operating room.
C). Call for somebody to help during the delivery.
D). Do not pull the baby's head.
E). Do not apply fundal pressure

Step 2 (Diagnosis)

A).Enlarge the episiotomy.
B).Explore manually behind the baby's head and find out whether the posterior shoulder of the baby is in the hollow of the sacrum.

If the posterior shoulder is not in the hollow of the sacrum, the diagnosis is bilateral shoulder dystocia and the best thing to do is restitute the baby's head inside the vagina and perform a cesarean section.

If the posterior shoulder is in the hollow of the sacrum, the problem is unilateral shoulder dystocia and the chances of correcting the problem are good. The obstetrician should perform the Mc Roberts manoeuvre.

Step 3 (Mc Robert's manoeuvre)

A). Remove the mother's legs from stirrups
B). Flex the thighs at the hips, abduct and externally rotate them so that they rest on the abdomen. This causes straightening of lumbo- sacral angle, rotates the maternal pelvis cephalad and is associated with an increase in uterine pressure and amplitude of contractions. Success rate is 90% and is associated with low complication rate6.
C). Ask your assistant to apply firm suprapubic pressure. Suprapubic pressure can be exerted by the base of the palm to adduct and rotate the anterior shoulder just above the pubis to enter the oblique diameter of the pelvis. It reduces the bisacromial diameter and rotates the anterior shoulder into the oblique pelvic diameter. The shoulder is then free to slip underneath the pubic symphysis with the aid of routine traction.
D). The operator should apply constant, moderate traction on the fetal head for a count of 30. Avoid intermittent pulling.

If the Mc Roberts manoeuvre and suprapubic pressure fail to solve the shoulder dystocia, attempts should be made to rotate the anterior shoulder into the oblique diameter of the pelvis.

Step 4

A.Rubin II Manoeuvre :- Apply pressure on the posterior aspect of the impacted anterior shoulder to move it from the anteroposterior to the oblique diameter of the inlet. Suprapubic pressure on the same direction should be applied simultaneously. If there is not enough room under the symphysis to perform the manoeuvre or if it fails, try the corkscrew Manoeuvre

B. Corkscrew Manoeuvre of woods:- Apply pressure on the posterior aspect of the posterior shoulder, attempting to rotate it anteriorly under the symphysis. Suprapubic pressure in the opposite direction should be applied simultaneously.

If the prior steps have been unsuccessful in resolving the shoulder dystocia, the next thing to do is to extract the posterior arm.

Step 5

Jacquemier's or Barnums Manoeuvre :-Slide the hand in the vagina behind the posterior shoulder and along the posterior humerus, and sweep the posterior arm of the fetus across the chest keeping the arm flexed at the elbow. Grasp the fetal head and pull the hand and the arm along the fetal head delivering the posterior arm.If extraction of the posterior arm is unsuccessful, proceed to step 6.

Step 6 (Zavanelli restitution) (5)

A).Turn the baby's head to the original position at the time of delivery (usually occipito anterior)
B).Flex the baby's head and apply upward pressure to

push the fetal head back into the birth canal followed by cesarean section. The step by step application of different manoeuvres to solve the shoulder dystocia should not take more than 5 minutes.

The various other manoeuvres which can be performed to manage shoulder dystocia include:

- Gaskin manoeuvre, named after certified professional mid wife, Ina may Gaskin. It involves moving the mother to an all fours position with the back arched, widening the pelvic outlet.
- Intentional clavicular fracture which reduces the diameter of the shoulder girdle that requires to pass through the birth canal.
- Symphysiotomy, which makes the opening of the birth canal laxer by breaking the connective tissue between the two pubic bones facilitating the passage of the shoulders.
- Abdominal rescue described by O' Shaughnessy, where a hysterotomy facilitates vaginal delivery of the impacted shoulder (6).

McRoberts' maneuver (or Gaskin maneuver) is recommended as the initial procedure for shoulder release in case of shoulder dystocia. If it fails, other obstetric procedures such as Resnik's suprapubic pressure and Woods' grip with posteriorly placed arm release should be used, always with gross lateral episiotomy. The performance of all these obstetric procedures requires skilfull and highly experienced obstetrician and obstetric team as a whole.

Comparative Study

In a study comparing McRoberts' and Rubin's maneuvers for initial management of shoulder dystocia, it was sugested that Rubin's maneuver requires the least traction for delivery and produces the least amount of brachial plexus tension (7).

Recent Advances

A 3-dimensional computer model of shoulder dystocia has been developed, including both fetus and a maternal pelvis. In which application of suprapubic pressure, rotation of the infant's shoulders, and delivery of the posterior arm following shoulder dystocia can be modeled, and delivery force and brachial plexus stretch can be thus, predicted.

Compared with lithotomy alone, the maneuvers using same coumpter model reduced both the required delivery force and brachial plexus stretch. The greatest effect was seen with delivery of the posterior arm, which showed a 71% decrease in anterior nerve stretch (3.9% vs 13.5%) and an 80% decrease in delivery force.This standard maneuvers met the objective of reducing the necessary delivery force compared with the lithotomy position alone. Brachial plexus stretch can also be reduced when this maneuvers is used rather than continuing the delivery in lithotomy position (8).

Conclusion

Shoulder dystocia represents an obstetric emergency. Prompt recognition of shoulder dystocia and skillful use of an orderly sequence of steps can prevent fetal asphyxia and avoid maternal and fetal physical injury. Shoulder dystocia is at times associated with both fetal and maternal morbidity which can lead to litigations. In order to get protected from these litigations, accurate documentation of a difficult and traumatic delivery should be done.

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