

Shoulder Dystocia

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Introduction

Shoulder dystocia is, by definition, a mechanical problem occurring during a vaginal delivery characterized by one of the following parameters:

- failure to deliver the fetal shoulders using solely gentle downward traction
- the requirement of additional delivery maneuvers are needed to successfully deliver the baby
- a documented head-to-body interval of greater than 1 minute

Unpredictable and often unavoidable obstetric emergencies complicate 0.6% to 1.4% of all vaginal deliveries. All obstetric providers are required to be knowledgeable regarding the risk factors and management of shoulder dystocia[1][2].

Etiology

While the cause of shoulder dystocia is unknown, several risk factors have been identified. Fetal macrosomia is the most significant risk factor for shoulder dystocia. Other known risk factors include pregestational and gestational diabetes, prior history of shoulder dystocia and operative vaginal delivery, particularly with the use of the vacuum. Other risk factors such as maternal obesity, excessive maternal weight gain, and labor dysfunction are controversial since studies have had conflicting results. Attempts to predict shoulder dystocia based on these risk factors have shown poor reliability and poor predictive value[3].

Epidemiology

There are potential maternal and fetal consequences following shoulder dystocia. Maternal consequences include postpartum hemorrhage and an increased risk of third or fourth-degree lacerations. Certain "heroic maneuver" such as the Zavanelli maneuver is associated with significant maternal morbidity. Fetal consequences include fetal brachial plexus injuries, fetal clavicular or humeral fracture, Hypoxic Ischemic Encephalopathy syndrome, and even fetal death. Most brachial plexus injuries are transient and resolve with time and physical therapy. Fetal fractures typically heal without consequences[4][5][6].

Pathophysiology

The anterior fetal shoulder may become impacted behind the maternal pubic symphysis. Rarely, the posterior fetal shoulder may be obstructed on the sacral promontory[6][7].

History and Physical

The comprehensive history and physical examination components hinge on critically detailed documentation of the entire vaginal delivery. A comprehensive maternal history should be obtained. Documentation of the delivery process should be thorough and focused on all potential elements that would be considered consistent with a shoulder dystocia presentation. Shoulder dystocia is, by definition, a mechanical problem occurring during a vaginal delivery characterized by one of the following parameters:

- failure to deliver the fetal shoulders using solely gentle downward traction
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Retraction of the fetal head toward the perineum may be noted following delivery of the fetal head. This is called the "turtle sign". The latter is a risk factor for shoulder dystocia.

Evaluation

Shoulder dystocia remains a subjective diagnosis. All providers should recognize the limitations in the objective evaluation and limitations regarding establishing objective diagnostic criteria. Moreover, the sole objective element in making the diagnosis is the presence of a head-to-body delivery interval of greater than 60 seconds.

Treatment / Management

Once the diagnosis of shoulder dystocia is made, it is important to recognize the situation and inform other team members about the dystocia. This allows other members of the team to assist with the maneuvers as well as call for help. The provider can then attempt maneuvers to assist with relieving the shoulder dystocia. Maneuvers are typically divided into first-line and second-line maneuvers^{[8][9][6]}.

Shoulder dystocia is an obstetric emergency that requires preparation and training for proper management by delivering providers. Not only does the baby need to be delivered quickly, but care must also be taken to mitigate the risk of injury to the mother and the infant

First-Line Maneuvers

- McRoberts Maneuver: this is commonly the first maneuver performed along with suprapubic pressure. The patient's thigh is hyper flexed towards the abdomen. This will straighten the maternal sacrum on the lumbar spine.
- Suprapubic pressure: the goal of suprapubic pressure is to decrease the fetal bisacromial diameter by adducting the anterior fetal shoulder. Pressure is applied to the suprapubic area in a downward fashion or a rocking motion from the fetal back toward the front.

Second-Line Maneuvers

Rotational Maneuvers (Rubin or Woodscrew)

- Rubin's maneuver: performed by placing a hand into the vagina and applying pressure to the posterior aspect of the most accessible fetal shoulder towards the fetal chest. This will lead to adduction of the fetal shoulder which would then allow the anterior shoulder to rotate and deliver from behind the pubic bone where it is impacted.

- Woods corkscrew maneuver: the obstetrician places a hand on the anterior aspect of the posterior fetal shoulder and rotates the shoulder toward the fetal back. The goal is to attempt to rotate the fetal shoulder 180 degrees. This allows the fetus to descend while the rotation is occurring.
- Delivery of the posterior arm: the obstetrician slides a hand along the fetal posterior shoulder and arm, and the fetal forearm or wrist is grasped and swept across the anterior fetal chest to effect delivery of the posterior arm. If the fetal forearm is not easily accessible, one can follow the posterior fetal arm and put pressure on the antecubital fossa, and this will typically lead to flexion of the fetal arm, allowing access to the fetal forearm. With successful delivery of the posterior arm, the axillo-acromial diameter becomes the presenting part, and it is typically about 3 centimeters shorter and leads to delivery of the anterior shoulder.
- Gaskin Maneuver: with the patient on her hands and knees (all fours position) or in a racing start or sprinter position, gentle downward traction is applied to the posterior shoulder (the shoulder against the maternal sacrum) or upward traction is applied on the anterior shoulder (the shoulder against the maternal symphysis).

Posterior Axillary Traction (Menticoglou or posterior axillary sling traction) - may be especially helpful in situations where the fetal arms are extended. With each method, the assistant should hold the fetal head and flexes it upward toward the anterior shoulder.

- Menticoglou maneuver: the obstetrician, places their middle fingers under the posterior fetal axilla and applies downward and outward traction which leads to delivery of the posterior shoulder; this is then followed by delivery of the posterior arm.
- Posterior axilla sling traction: a suction catheter or firm urinary catheter is used as a sling. Traction is applied to the sling to deliver the posterior shoulder followed by the arm. Alternatively, the sling can be used to rotate the shoulders by applying lateral traction towards the baby's back while the other hand is placed on the anterior shoulder putting pressure towards the fetal chest.

Heroic Measures

- Intentional clavicular fracture: the fetal clavicle is intentionally fractured by pulling the anterior clavicle outward. If successful, this will decrease the bisacromial diameter. Disadvantages: difficult to execute, the possibility of injury to underlying vascular and pulmonary structures.
- Zavanelli maneuver: the fetal head is rotated to its pre-restitution attitude, flexed and elevated up to the vagina and back into the uterus. A Cesarean section then achieves delivery.
- Abdominal rescue: If cephalic replacement or the Zavanelli maneuver is unsuccessful, a low transverse hysterotomy is performed, and the fetal shoulders are manually rotated to an oblique diameter through the transabdominal incision. Once the fetal shoulders are rotated, vaginal delivery is then attempted.
- Symphysiotomy: with the patient in the lithotomy position, a Foley catheter is placed. The urethra is retracted laterally with the Foley catheter. The skin and subcutaneous tissues are incised with a scalpel to the level of the pubic symphysis as well as the anterior fibers of the pubic symphysis. Recommended only as a last resort when all the other measures have failed or in cases where immediate access to an operating room facility for Zavanelli or abdominal rescue is not available.

Differential Diagnosis

The differential diagnosis for shoulder dystocia includes, but is not limited to:

- umbilical cord prolapse
- breech delivery
- other elements consistent with an emergent delivery and/or perimortem cesarean section (c-section) delivery

Prognosis

Simulation-based training has decreased the overall rate of shoulder dystocia and other obstetric-related complications [10][11][12].

Complications

Complications of shoulder dystocia can include, but are not limited to the following:

- obstetric brachial plexopathies (i.e. Erb's, Klumpke's palsy); (OBBP)
 - shoulder dystocia is a known risk factor for developing an OBBP injury
 - the incidence rate of 3% to 17% in the setting of shoulder dystocia diagnosis
- Clavicular fracture (1.7 to 9.5%)
- Humerus fracture (0.1 to 4.2%)
- Permanent brachial plexus palsy (0.5 to 1.6%)
- Hypoxic-ischemic encephalopathy (0.3%)
- Death (0 to 0.35%)

Deterrence and Patient Education

Patients should be educated regarding the known risk factors for putting the infant at risk of shoulder dystocia. In the setting of a history of prior delivery complicated by a shoulder dystocia, it is important to convey to the mother that she has a 6- to 30-fold increased risk of shoulder dystocia recurrence with any subsequent vaginal deliveries[13].

Pearls and Other Issues

Avoid applying fundal pressure as this only serves to impact the anterior fetal shoulder into the pubic bone further, making the shoulder dystocia worse. When performing the Zavanelli, tocolytics such as halogenated inhalational anesthetics, or Nitroglycerin may be given to assist with cephalic replacement. Following any shoulder dystocia, counseling the patient about the event and the 15% recurrence risk is important. The event should be properly documented in the medical record.

Enhancing Healthcare Team Outcomes

The multidisciplinary team must coordinate care. The nurse is often required to apply fundal pressure or administer medications. The pharmacist is responsible for ensuring adequate stocks of analgesics, anesthetics, and other medication are available.

Questions

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