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Shoulder Dystocia: A Comprehensive Overview of Causes, Management, and Outcomes

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Abstract

Shoulder dystocia is a serious and potentially life-threatening complication that can occur during childbirth, characterized by the baby's shoulder becoming stuck in the mother's pelvic area after the head has been delivered. This obstructed delivery can lead to severe difficulties in the birth process, requiring immediate and skilled intervention to prevent harm to both the mother and baby. Shoulder dystocia occurs when one or both of a baby's shoulders are too wide to pass through the birth canal, or when the baby's positioning causes the shoulders to become lodged against the mother's pelvis. It is typically unpredictable and can happen during a vaginal delivery, even when there are no apparent risk factors. This condition is classified as an obstetric emergency because of the immediate risks it poses. For the baby, complications, such as brachial plexus injury (nerve damage), fractures (especially of the clavicle), or oxygen deprivation (hypoxia) can occur due to the prolonged time the baby spends in the birth canal. These risks can lead to short- or long-term physical and neurological impairments, including Erb's palsy, a form of paralysis caused by nerve damage in the arm. Furthermore, lack of oxygen can result in brain injury or, in the most extreme cases, death. For the mother, shoulder dystocia can lead to significant complications, such as severe bleeding (postpartum hemorrhage), uterine rupture, or genital trauma. These outcomes may necessitate surgery and can lead to longer recovery periods and a higher risk of complications in future pregnancies. Early recognition of shoulder dystocia is critical to improving outcomes, as timely and effective interventions can resolve the situation in most cases. Skilled management, including the use of specific maneuvers and sometimes the assistance of specialized equipment, is essential for ensuring the safety of both the mother and the baby. When managed promptly and effectively, most cases of shoulder dystocia are resolved without long-term harm.

Keywords: Childbirth, shoulder dystocia, pelvis, trauma, oxygen

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INTRODUCTION

Shoulder dystocia is a rare but serious complication that can occur during vaginal delivery when the baby's shoulder becomes wedged in the mother's pelvis after the head has been delivered. This condition interrupts the normal progress of labor and creates a medical emergency that requires immediate intervention to ensure the safety of both the mother and the baby. Despite being uncommon, shoulder dystocia poses significant risks to both individuals, making it a major concern in obstetric care. It is considered one of the most challenging and unpredictable complications of childbirth, often happening without warning. The cause of shoulder dystocia is the inability of the baby's shoulders to move

through the mother's pelvic cavity once the head has been delivered. This can occur due to various factors that prevent the shoulders from passing easily through the birth canal. The primary concern in shoulder dystocia is the increased risk of injury to the baby, as prolonged or difficult maneuvering to resolve the obstruction can result in severe outcomes. If not addressed promptly, this condition can result in oxygen shortage, potentially leading to brain damage or, in severe cases, death. Additionally, the baby may suffer physical injuries, such as brachial plexus injury (nerve damage that affects the arm and hand), clavicle fractures, or shoulder dislocations [1].

Several factors contribute to the occurrence of shoulder dystocia, with certain conditions increasing the likelihood of this complication. One of the most significant risk factors is a large fetal size, often referred to as macrosomia, which can make it difficult for the baby's shoulders to pass through the birth canal. Maternal diabetes, particularly gestational diabetes, is another key risk factor, as it can lead to an increase in fetal size and abnormal fetal positioning. Prolonged labor, especially if the second stage of labor is extended, can also increase the risk of shoulder dystocia. Additionally, factors, such as maternal obesity, a history of shoulder dystocia in previous deliveries, or a large pelvis may further elevate the risk of this complication [2].

Though shoulder dystocia remains an unpredictable and potentially dangerous complication, advancements in clinical practice have significantly improved the management and outcomes of affected deliveries. Obstetricians are trained to recognize signs of shoulder dystocia and to act swiftly using a variety of techniques designed to release the impacted shoulder. These maneuvers may include techniques, such as the McRoberts maneuver, where the mother's legs are flexed toward her abdomen to open the pelvis, or the use of suprapubic pressure to free the shoulder. In more severe cases, additional interventions like the Zavanelli maneuver or even the use of surgical delivery techniques may be necessary. These approaches, combined with a multidisciplinary care team, have significantly increased the likelihood of a safe resolution in most cases [3].

Despite its potential risks, shoulder dystocia can generally be managed effectively with prompt and appropriate interventions, ensuring that both mother and baby remain safe. Early identification and timely management are crucial to minimizing complications and ensuring positive outcomes for both maternal and neonatal health. This introduction aims to offer a thorough understanding of the causes, risk factors, and management approaches related to shoulder dystocia, highlighting the significance of readiness and expertise in addressing this rare yet crucial delivery complication [4].

SYMPTOMS OF SHOULDER DYSTOCIA

Shoulder dystocia has no symptoms and cannot be predicted in advance (Figure 1).

Physiology

1. During normal labor, the baby's head is delivered by extending through the pelvic outlet. The head then naturally realigns with the spine (restitution), positioning the shoulders in a front-to-back (anterior-posterior) alignment.
2. Shoulder dystocia occurs when the front shoulder gets stuck behind the mother's pubic bone, or the back shoulder gets stuck on the sacral bone. Delayed delivery of the shoulders can reduce oxygen supply (hypoxia) to the baby, with the risk increasing the longer the delay.
3. Pulling on the baby's head to free the shoulders can injure the brachial plexus nerves in the baby's shoulder and is a common reason for legal issues in obstetrics [5].

Causes of Shoulder Dystocia

- *Fetal macrosomia:* Your baby weighs more than 3.63 kg.
- Your baby is not in the correct position.
- Your pelvic opening is too narrow.
- Your position is limiting space in your pelvis.

Diagnosis of Shoulder Dystocia

1. You delivered your baby's head but cannot push the shoulders out.
2. More than a minute has passed since the head came out, but the body has not.
3. Your baby needs medical help to be delivered safely.

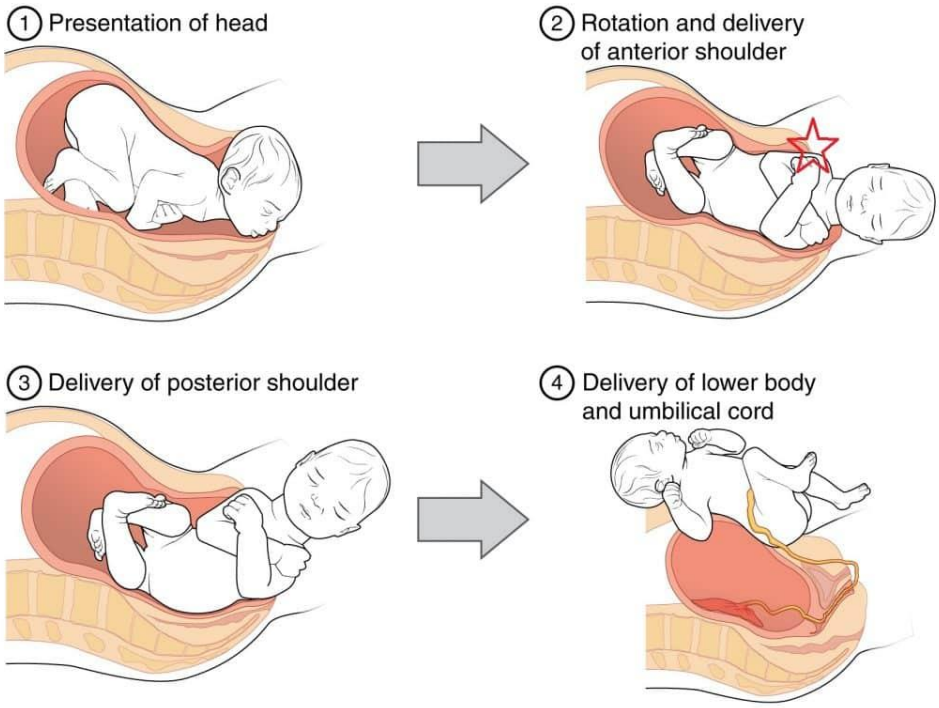

Figure 1. Shoulder dystocia process.

MANAGEMENT AND TREATMENT

The HELPERR mnemonic is a tool that your healthcare team might utilize to manage shoulder dystocia.

HELPERR stands for:

- *H—Help:* The doctor will call for assistance and follow a safety checklist, bringing in additional healthcare providers, such as an anesthesiologist, neonatologist, and extra labor staff. Necessary equipment will be brought to the delivery room.
- *E—Evaluate for episiotomy:* The doctor will assess whether an episiotomy is required to aid in the delivery. This involves a small incision in the perineum to enlarge the vaginal opening, which is only done if it is essential for rotating the baby.
- *L—Legs:* The doctor may use the McRoberts maneuver, where you will be asked to pull your legs towards your chest. This helps to flatten and reposition the pelvis.
- *P—Pressure:* Suprapubic pressure may be applied by the doctor, which involves pressing down on your lower abdomen, just above the pubic bone. This helps in rotating and guiding the baby's shoulder through the birth canal.
- *E—Enter maneuvers:* The doctor may perform internal maneuvers by reaching into the vagina to help rotate or reposition the baby.
- *R—Remove posterior arm:* Jacquemier's maneuver may be used, where the doctor assists in gently guiding one of the baby's arms out of the birth canal, making it easier for the shoulders to pass.
- *R—Roll the patient:* The doctor may ask you to change position using the Gaskin maneuver, which involves turning onto your hands and knees to help reposition the baby.

In more severe cases where other methods have been unsuccessful, your doctor may consider one of the following techniques:

- *Clavicle fracture:* The doctor may deliberately break your baby's collarbone to help free their shoulders.
- *Zavanelli maneuver:* The obstetrician may push your baby's head back into the uterus and proceed with a C-section.
- *Symphysiotomy:* The obstetrician may make an incision in the cartilage between the pubic bones to widen the pelvic opening.

Complications

1. Severe postpartum bleeding (postpartum hemorrhage (PPH)).
2. Severe tearing between the vagina and anus (perineum).
3. Rectovaginal fistula: An abnormal connection between the vagina and rectum.
4. Uterine rupture: A tear in the uterus that occurs during labor.
5. Separation of the pubic bones.

DISCUSSION

Shoulder dystocia is an uncommon but critical obstetric emergency that occurs during vaginal deliveries when one or both of a baby's shoulders get stuck behind the mother's pubic bone after the head has been delivered. This condition can disrupt the labor process and demands urgent medical attention to avoid harm to both the mother and the baby. Although shoulder dystocia is uncommon, its potential to cause severe complications for both mother and baby makes it a crucial concern in obstetric care. Healthcare professionals must understand the causes, risk factors, and management strategies for shoulder dystocia to reduce negative outcomes [6].

Causes and Mechanisms of Shoulder Dystocia

The main cause of shoulder dystocia is the inability of the baby's shoulders to move through the mother's pelvic inlet after the head has been delivered. While the cervix and pelvic inlet typically allow passage of the head, the shoulders are often wider, and their delivery may be obstructed. This can occur when the anterior shoulder gets trapped behind the pubic bone, preventing further progression of the delivery. Several factors can contribute to this obstruction, which can be broadly categorized into fetal, maternal, and delivery-related factors [7].

Fetal factors, such as increased birth weight (macrosomia), are the most significant contributors to shoulder dystocia. Macrosomia, generally defined as a birth weight greater than 4, 000 grams, significantly increases the likelihood of shoulder dystocia, as larger babies have broader shoulders that may not fit through the birth canal. Maternal diabetes, including both pre-existing and gestational diabetes, is strongly associated with macrosomia and increases the risk of shoulder dystocia. High blood sugar levels during pregnancy promote excessive fetal growth, particularly in the shoulders, leading to a higher risk of obstructed labor. Other fetal factors include abnormal fetal positioning, such as shoulder or breech presentations, and maternal pelvic shape and size [8].

Maternal factors also contribute to the risk of shoulder dystocia. For instance, obesity and excessive weight gain during pregnancy can lead to increased fetal size and a narrower birth canal, both of which may contribute to difficulty during delivery. The history of shoulder dystocia in a previous pregnancy is another strong risk factor, as it increases the likelihood of recurrence. Advanced maternal age and multiparity (multiple previous pregnancies) can also increase the chances of shoulder dystocia, although these factors may not be as strongly linked as fetal and obesity-related factors.

Clinical Implications and Risks

Shoulder dystocia presents significant risks to both the mother and the baby. For the baby, the most serious complications include nerve damage, specifically brachial plexus injury, which can lead to

conditions, such as Erb's palsy, a form of paralysis affecting the arm. Fractures of the clavicle or collarbone can occur as the obstetrician manipulates the baby to free the shoulder. Prolonged shoulder dystocia may also result in hypoxia (oxygen deprivation), which can cause brain damage or, in the worst-case scenario, fetal death. The risks of trauma to the baby increase with the duration of shoulder dystocia, underscoring the importance of prompt recognition and management.

For the mother, shoulder dystocia can lead to significant birth trauma. The most common maternal complication is PPH, which can result from uterine atony or tearing of the vaginal or perineal tissues. In rare cases, the use of forceful manipulations during delivery can lead to uterine rupture. Additionally, trauma to the pelvic region can result in lasting pelvic floor dysfunction, which may cause incontinence, sexual dysfunction, or chronic pain. There is also the psychological toll, as the stress and potential complications of shoulder dystocia can lead to long-term emotional distress.

Management and Interventions

Given the potential risks associated with shoulder dystocia, early recognition and immediate intervention are essential to improving outcomes. Healthcare providers are trained to anticipate and manage shoulder dystocia through a variety of established techniques designed to release the impacted shoulder while minimizing harm to both mother and baby. The key to successful management is timely intervention, as the longer the obstruction persists, the higher the risk of complications.

Several obstetric maneuvers have been designed to help resolve shoulder dystocia. The McRoberts maneuver, which involves bending the mother's legs toward her abdomen to widen the pelvic opening, is typically the first method used. This maneuver can create extra space in the pelvis, making it easier for the shoulders to pass through. Another frequently used technique is suprapubic pressure, where gentle pressure is applied just above the pubic bone to help release the anterior shoulder. These maneuvers can often resolve shoulder dystocia quickly, reducing the need for more invasive procedures [9].

If these initial techniques are unsuccessful, further measures may be required, including rotational maneuvers or even more advanced techniques, such as the Zavanelli maneuver, in which the baby's head is returned to the birth canal to facilitate cesarean delivery. In extreme cases, surgical intervention, such as a symphysiotomy (surgical widening of the pelvis) or cesarean section, may be necessary to prevent injury to the mother or baby [10].

Prevention and Risk Reduction

While shoulder dystocia is unpredictable, there are several strategies that may reduce the risk of its occurrence. Early prenatal care and appropriate screening for conditions like gestational diabetes are critical, as they can help identify high-risk pregnancies. Tight glycemic control in diabetic mothers may reduce the incidence of macrosomia, lowering the risk of shoulder dystocia. Additionally, avoiding excessive weight gain during pregnancy and using ultrasound to monitor fetal growth can help predict and manage potential complications. Elective cesarean delivery may be considered for pregnancies at high risk for shoulder dystocia, particularly when the baby's size is significantly large or if previous shoulder dystocia has occurred.

CONCLUSIONS

Shoulder dystocia remains a rare but serious obstetric complication with the potential for significant maternal and neonatal morbidity. Its unpredictable nature requires skilled and prompt management to avoid adverse outcomes. By understanding the risk factors, potential complications, and management techniques, healthcare providers can significantly improve the chances of a positive outcome. Continued research into shoulder dystocia will help to refine prevention strategies and optimize treatment protocols, ultimately reducing the impact of this serious childbirth complication.

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