
SHOULDER DYSTOCIA

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1. DEFINITION

Shoulder dystocia is defined as the difficulty in the spontaneous delivery of the shoulders that requires additional obstetric manoeuvres to produce fetal delivery after delivering the head.

A more objective definition had been proposed, considering that the time latency should be more than 1 minute between the delivery of the head and the delivery of the shoulders, but in clinical practice it is difficult to collect the temporal data and, given the need for a sensitive diagnostic method, it is preferred to define shoulder dystocia as any case in which maintained traction is not sufficient for delivery of the shoulders and additional manoeuvres are required.

This complication is caused by the impaction of one or both fetal shoulders on maternal pelvic structures. The impaction of the anterior shoulder in the pubic symphysis is more frequent than the posterior shoulder in the sacral promontory.

Its incidence, according to studies that report a large number of vaginal deliveries, is between 0.6% and 0.7%. The incidence in newborns between 2500-4000 g is 0.3% and between 4000-4500 g is 5-7%. However, almost 50% of cases happen in normal weight neonates. Therefore, it is an obstetric emergency that is unpredictable and not very preventable, since, in most of the cases, it is not associated with any identifiable antepartum or intrapartum risk factors. Moreover, it involves a moderate risk of neonatal morbimortality and there are legal implications that should be considered.

2. DIAGNOSIS

The diagnosis is clinical, the signs being:

1. Difficulty in delivery of the face and chin.
2. Retraction of the fetal head against the perineum ("the turtle sign").
3. Absence of shoulder delivery after moderate axial traction of the fetal head.

3. PREDICTION

Classically, shoulder dystocia has been associated with several antepartum and intrapartum risk factors, although none of them has shown a statistically significant association, and their positive predictive value is low.

Although weight is associated with this condition, we have already mentioned that 50% of instances of shoulder dystocia occur in neonates who weighed less than 4000 g.

It is important to remark that those born from diabetic mothers present a 2 to 4 times higher risk when compared to infants of the same weight born from non-diabetic mothers.

Risk factors should be correctly coded in the clinical history. A history of shoulder dystocia should be recorded on clinical reports for the following gestations of the women.

Table 1. Antepartum and intrapartum risk factors for shoulder dystocia

Antepartum	Intrapartum
History of shoulder dystocia (recurrence up to 25%)	Abnormal progression of labour
Diabetes Mellitus or Gestational Diabetes	Instrumented delivery
Large for gestational age fetus (>97th centile)	Prolonged second stage of labour
Prolonged pregnancy (chronologically prolonged gestation)	Use of oxytocin
Maternal obesity (BMI>30)	Hurried labour and delivery
Male fetus	
Advanced maternal age	
Low maternal height	
Excessive weight gain (>20 Kg)	
Pelvic abnormality	

4. PREVENTION

To prevent shoulder dystocia, the following is recommended:

During pregnancy:

- Good control of weight gain.
- Good metabolic control in diabetic patients.
- If third trimester ultrasound scan shows EFW >97th centile, we will repeat ultrasound scan at 38-39 weeks. Induction of labour in non-diabetic pregnant women with suspected macrosomia has not been shown to reduce the incidence of shoulder dystocia.
- Elective caesarean section if estimated fetal weight (EFW) >5000 g in non-diabetic patients or EFW >4500 g in diabetic women. In patients with pregestational or gestational diabetes treated with insulin, consider induction of labour at term based on metabolic control and EFW.

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- If there is a previous history of shoulder dystocia, the route of delivery should be agreed with the pregnant woman, given the high risk of recurrence (up to 25%). In the case of previous shoulder dystocia requiring second line manoeuvres, neonatal sequelae, or maternal complications, counselling on the way of delivery should be given by the maternal-fetal specialist.

At admission, patients with risk factors for shoulder dystocia should be identified by screening for:

- Body Mass Index (BMI)
- Gestational weight gain
- Gestational diabetes.
- EFW. Before induction of labour, in patients at risk (e.g. obese, diabetic, history of macrosomia or shoulder dystocia, etc.), ultrasound scan for checking EFW should be considered if a recent ultrasound is not available (<15 days). Ultrasound has a margin of error of 10% and a sensitivity for macrosomia of 60%.
- History of previous caesarean section
- History of shoulder dystocia
- History of macrosomia

5. MANAGEMENT

The management of shoulder dystocia consists of the systematic application of a series of manoeuvres aimed at facilitating the release of the impacted shoulder.

The aim of the manoeuvres is to assure the safe delivery of the fetus before hypoxaemia-related injuries (secondary to umbilical cord compression and inability to breathe in) and to avoid or minimize peripheral neurological damage as well as trauma to maternal tissue.

Considering that a well-oxygenated neonate has a pH UA of 7.28 on average at birth and that this falls at a rate of 0.04 units/minute of asphyxia, the maximum time to resolution should be 5 minutes.

Upon diagnostic suspicion, the management protocol should be activated. The situation should be explained to the patient and help should be sought from the delivery room team (midwife, gynaecologist, paediatrician, anaesthesiologist).

5.1 INITIAL GENERAL MEASURES:

- Identify the problem and record time of onset.
 - Ask for help (additional midwife, senior maternal-fetal medicine specialist, neonatologist, anaesthesiologist).
 - Give instructions to the team and patient in a clear and calm manner.
 - The patient must not push.
 - Fundal pressure manoeuvres are contraindicated.
 - Stop perfusion of oxytocin.
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- Avoid excessive traction or rotation of the fetal head or neck.
 - Position the patient on the stretcher lying down, without pillows on the back, and at the lower limit of the stretcher.
 - Discharge bladder by catheterisation (if required).
 - Record start time and time between manoeuvres.
 - A manoeuvre should be abandoned if it is not effective after one minute of application.

5.2 FIRST LINE MANOEUVRES:

These are external manoeuvres on the patient that modify the position of the pelvis and the foetus.

- **McRoberts Manoeuvre:** The woman should be lying down, and the pillows should be removed from under her back. With an assistant on each side, the woman's legs should be hyperflexed over the abdomen. If the woman is in the lithotomy position, it will be necessary to remove her legs from the supports. Routine traction (the same degree of traction applied during normal delivery) in an axial direction should be applied to the fetal head to assess whether the shoulders have been released.
- This manoeuvre produces the anterior movement of the pubic symphysis and the flattening of the sacrum, increasing the anteroposterior diameter of the pelvis.
- It is a simple, safe, and extremely effective manoeuvre, up to 90% of instances of dystocia are resolved by this manoeuvre.
- Complications: separation of the pubic symphysis, sacroiliac dislocation, and transient neuropathy of the lateral femoral cutaneous nerve.



- **Suprapubic pressure (Mazzanti/Rubin manoeuvre):** Requires the collaboration of an assistant who will apply strong suprapubic pressure with the palm of the hand or wrist in a lateral and caudal direction on the anterior shoulder of the foetus to release it from the pubic symphysis so that it enters the pelvis. It produces adduction of the shoulders, reducing the biacromial diameter; the anterior shoulder rotates towards the oblique pelvic diameter, facilitating its detachment.
- It is important to locate the dorsum of the foetus to know in which direction the pressure should be applied (opposite side of the mouth).
- There is no clear difference in efficacy between applying continuous pressure or intermittent pressure.
- On its own, it is a manoeuvre that can resolve 42 to 80% of instances of dystocias.

Suprapubic pressure and the McRoberts manoeuvre can be combined to improve the success rate.

It is appropriate for them to be applied a second time by different operators if they fail initially.



5.3 SECOND LINE MANOEUVRES:

If anterior shoulder release is not achieved with the McRoberts manoeuvre and suprapubic pressure, second line manoeuvres should then be performed:

- These consist of internal fetal manipulation, and therefore are considered invasive.
- It is necessary to ensure adequate analgesia in patients under locoregional anaesthesia to facilitate the performance of the manoeuvres.
- There are no randomised studies comparing the effectiveness of the different second line manoeuvres. Their application will depend on the clinical experience of each operator.
- It is appropriate for them to be applied a second time by different operators if they fail initially.
- The performance of an episiotomy does not resolve the obstruction of shoulder dystocia, but its performance or extension may be necessary to facilitate internal vaginal manoeuvres (internal rotation of the shoulders or detachment of the posterior shoulder).
- **Woods' corkscrew manoeuvre:** This consists of inserting 2 fingers into the back of the anterior shoulder and 2 fingers into the front of the posterior shoulder, applying force to the scapula or clavicle, rotating concomitantly with suprapubic pressure (to keep the anterior shoulder in abduction). The aim of this manoeuvre is to place the shoulders in a more oblique diameter or to rotate the posterior shoulder 180° to convert it into an anterior one and thus achieve disimpaction of the anterior shoulder.
- If this does not work, the same manoeuvre is performed in reverse (reverse Woods' manoeuvre: Rubin's manoeuvre).

- **Manoeuvre for detachment of the posterior shoulder (Barnum's/Jacquemier's manoeuvre):** This consists of inserting the hand into the vagina (preferably at the level of the sacral excavation), locating the posterior shoulder, flexing the arm from the wrist, and obtaining the hand. The arm is then carefully slid over the foetal thorax. Removal of the arm decreases the biacromial diameter by 2-3 cm and is followed by rotation of the shoulder girdle to an oblique diameter, releasing the anterior shoulder.
- Suprapubic pressure should not be applied during the manoeuvre and requires adequate anaesthesia.
- If release does not occur, the anterior shoulder can be rotated anterior to posterior and try to perform again this manoeuvre.
- Complications: Humerus fracture (2 - 12%).



- **Digital posterior axilla sling traction:** This consists of slightly flexing the fetal head towards the anterior shoulder and positioning the middle fingers in the fetal axillarycavus and pulling the fetal axilla downwards (respecting the curvature of the birth canal) and then proceeding to deliver the posterior arm.
- A variant of the manoeuvre would be posterior axilla sling traction using an aspiration probe, instead of the fingers, but this may result in transient brachial plexus injury in 60% of cases, so will only be performed in those cases where all first and second line manoeuvres fail.
- Complications: Risk of fracture but not permanent brachial plexus injury.
- **Gaskin manoeuvre:** This consists of changing the woman's position so that she is supported on her hands and knees to deliver the posterior shoulder, which is now in the anterior position. In this position, the force of gravity acts on the foetus; on the other hand, in the crawling position there is a modification of the pelvic diameters with respect to the decubitus position, and both phenomena can be useful for releasing the shoulders, especially if the posterior shoulder is impacted in front of the sacral promontory.
- It should be considered as a first option for second line manoeuvres in patients without locoregional anaesthesia.
- Alternative: Runner's position (similar to the previous manoeuvre but supported on one foot and the knee).

4.4. THIRD LINE MANOEUVRES

These are manoeuvres of last resort with a higher rate of maternal-fetal morbidity and mortality (up to 25% of sequelae).

Before proceeding to the application of third line manoeuvres, the situation must be reassessed and the first and second line manoeuvres must have been repeated by different operators.

- **Clavicular fracture:** Consists of anterior outward traction of the clavicle.

Complications: Vascular or pulmonary lesions.

- **Zavanelli manoeuvre:** This consists of repositioning the foetal head within the pelvis and proceeding to emergency caesarean section.
 - o Prepare the operating room for emergency caesarean section.
 - o Administer nitroglycerin 400 mcg sublingual spray or 200 mcg iv.
 - o Rotate fetal head to occipitoanterior (reverse restitution).
 - o Flex the head and insert, as flexed as possible, with the palm of the operator's hand. The other hand presses on the maternal perineum.
 - o Bladder catheterisation and performing the caesarean section

- **Abdominal rescue:** Consists of performing an emergency caesarean section and a low transverse hysterotomy to perform abdominal manoeuvres to help disimpact the shoulder and assist vaginal delivery.

- **Symphysiotomy:** This involves making an incision over the pubic cartilage until the pubic bones are separated. The urethra must first be retracted laterally with the index, and middle fingers and requires local anaesthesia.

Complications: Urethral, bladder and/or vaginal laceration, urinary incontinence, vesico-vaginal fistula, chronic pelvic pain, and bone instability.

6. COMPLICATIONS

6.1. Neonatal: 5% of neonatal injuries.

Brachial plexus injury and clavicular fracture are the most common complications.

Transient brachial plexus injury	3.0 to 16.8%
Clavicular fracture	1.7 to 9.5%
Humeral fracture	0.1 to 4.2%
Permanent brachial plexus injury	0.5 to 1.6%
Hypoxic-ischaemic encephalopathy	0.3%
Demise	0 to 0.35%

6.2. Maternal:

Haemorrhage	11%
Third- or fourth-degree perineal lacerations	3.8%

7. DOCUMENTATION

In case of shoulder dystocia, it must be properly recorded in the medical history of the patient, specifying the following aspects:

- If delivery is instrumented, note the indication, foetal statics, position of the head, instrument used and delivery time.
- Record when and how the diagnosis of shoulder dystocia was made.
- Record all manoeuvres performed after diagnosis, as well as the time taken to perform each manoeuvre.
- Explanation to the mother/partner about the diagnosis, the manoeuvres performed, and possible sequelae.
- Immediate neonatal assessment.



HELPER

FOR SHOULDER DYSTOCIA



RISK FACTORS: EVERY DELIVERY COULD BE ON RISK

ANTEPARTUM

History of shoulder dystocia
Diabetes Mellitus or Gestational Diabetes
Large for gestational age fetus (>97th centile)
Prolonged pregnancy
Maternal obesity (BMI>30)
Excessive weight gain (>20 Kg)
Pelvic abnormality

INTRAPARTUM

Abnormal progression of labour
Instrumented delivery
Prolonged second stage of labour
Use of oxytocin
Hurried labour and delivery

H

HELP

Call for help

E

EVALUATE EPISIOTOMY

Evaluate for Episiotomy

L

LEGS

Mc Roberts manoeuvre

P

SUPAPUBIC PRESSURE

External pressure on the shoulder

E

ENTER MANOEUVRES

Rubin II - Woods manoeuvre

R

REMOVE POSTERIOR ARM

Removing the posterior arm

R

ROLL THE PATIENT

Gaskin manoeuvre
Roll the patient to her knees and hands



THIRD LEVEL MANOEUVRE

- Clavicular fracture
- Zavanelli Maneuver (repositioning the foetal head within the pelvis and proceeding to emergency caesarean section)
- Abdominal rescue (perform abdominal manoeuvres to help disimpact the shoulder and assist vaginal delivery)

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