Breech Presentation

A breech presentation occurs when the fetal pelvis or lower extremities engage in the maternal pelvic inlet.

Three types of breech are distinguished, according to fetal **attitude**

- In **frank breech,** the thighs are flexed on the abdomen and both legs are extended at the knee
- In **complete breech,** both thighs are flexed on the abdomen and both legs are flexed at the knee
- In **footling breech,** one (single footling breech) or both (double footling breech) legs are extended below the level of the buttocks.

In **singleton** breech presentations in which the infant weighs less than 2500 g,

- 40% are frank breech
- 10% complete breech, and
- 50% footling breech.

With birth weights of more than 2500 g,

- 65% are frank breech,
- 10% complete breech, and
- 25% footling breech.

Fetal **position** in breech presentation is determined by using the sacrum as the fetal point of reference to the maternal pelvis. This is true for frank, complete, and footling breeches

Eight possible positions are recognized:

- Sacrum anterior (sa),
- Sacrum posterior (sp),
- Left sacrum transverse (lst),
- Right sacrum transverse (rst),
- Left sacrum anterior (lsa),
- Left sacrum posterior (lsp),
- Right sacrum anterior (rsa), and
- Right sacrum posterior (rsp).

The **station** of the breech presenting part is the location of the fetal sacrum with regard to the maternal ischial spines.

Causes & mechanisms

mechanisms

- A relative decrease in intrauterine volume as gestational age and fetal weight increase
- Spontaneous version to cephalic presentation is prevented as term approaches or if
- Labor and delivery occur prematurely before the cephalic version has taken place.

causes

- Oligohydramnios,
- Uterine anomalies such as bicornuate or septate uterus,
- Pelvic tumors obstructing the birth canal,
- **Multiple gestation**: multiple fetuses may prevent each other from turning. In twin gestation, the incidence of breech for the first twin is 25% and for the second twin nearly 50%. The percentage is increased with additional fetuses.
- Fetal congenital malformation: congenital malformations of the fetus commonly associated with breech presentation include

- Congenital hip dislocation,
- Hydrocephalus,
- Anencephalus,
- Familial dysautonomia,
- Spina bifida,
- Meningomyelocele, and
- Chromosomal trisomies 18 and 21 (down's syndrome). Chromosomal, neuromuscular, and skeletal malformations that affect the form, function, and movement of the fetus may prevent turning

Once a fetus assumes frank breech presentation, it may not be able to revert to cephalic presentation, because the lower extremities essentially act as a splint for the body. Advanced multiparity, contracted maternal pelvis, placenta previa, and hydramnios are no longer considered causative factors in breech presentation.

Diagnosis

A. Palpation and ballottement: performance of leopold's maneuvers and ballottement of the uterus may confirm breech presentation. The softer, more ill-defined breech may be felt in the lower uterine segment above the pelvic inlet. Diagnostic error is common, however, if palpation and ballottement alone are used to determine presentation.

B. Pelvic examination: during vaginal examination, the round, firm, smooth head in cephalic presentation can easily be distinguished from the soft, irregular breech presentation if the presenting part is dipping into the maternal pelvis. However, if no presenting part is palpable, further studies are necessary.

C. Ultrasound: ultrasonographic scanning by an experienced examiner will document fetal presentation, attitude, and size; multiple gestation; location of the placenta; and amniotic fluid volume. Ultrasound will also reveal skeletal and soft tissue malformations of the fetus. Ultrasonographic measurements of the biparietal diameter, abdominal circumference, and femur length will provide a good estimate of weight and gestational age.

D. X-ray studies: x-ray studies will differentiate breech and cephalic presentations and also the

type of breech by locating the position of the lower extremities. X-ray will also reveal multiple gestation and skeletal defects. Fetal attitude may be seen, but fetal size cannot readily be determined by x-ray.

Because of the risks of radiation exposure to the fetus with this technique, ultrasonography is now often used instead to determine fetal presentation or malformations.

Management

A. Antepartum Management

Following confirmation of breech presentation, the mother must be closely followed to see if spontaneous version to cephalic presentation occurs. If breech presentation **persists beyond 36 weeks, external cephalic version** should be considered (see below). The mother should be informed of the presentation and of management options.

X-ray pelvimetry should be done to rule out women with a borderline or contracted pelvis. Accurate pelvic examination may also be obtained by computed tomographic techniques or by MRI. Attempts at vaginal delivery with an inadequate pelvis are associated with a high rate of difficult delivery and significant trauma to mother and fetus. Difficult vaginal delivery may still occur in women with adequate pelvic measurements.

B. Management during Labor

1. Examination-Patients with singleton breech presentations are admitted to the hospital as soon as labor begins or spontaneous rupture of membranes occurs because of the possibility of umbilical cord complications. Upon admission, a repeat ultrasonographic or x-ray study is obtained to confirm the type of breech presentation and to ascertain whether the head is deflexed. The fetus is again scrutinized for lethal congenital malformations such as anencephalus, which would preclude cesarean delivery for fetal indications. A thorough history is taken, and a physical examination is performed to evaluate completely the status of mother and fetus. Based on these findings, a decision must be made regarding the route of delivery (see below).

2. Electronic fetal monitoring-Electronic monitoring of fetal heart rate and uterine contractions should continue throughout labor. Whenever possible, the fetal ECG electrode should be carefully attached to the breech presenting part, with care taken to avoid injury to the fetal anus, perineum, and genitalia. The transcervical catheter for direct recording of intrauterine pressure should be used to determine accurately the frequency, strength, and duration of uterine contractions. Fetal distress or dysfunctional labor often requires cesarean section rather than vaginal delivery for optimal fetal outcome.

3. Oxytocin-The use of oxytocin in the management of dysfunctional breech labor is controversial. Although some obstetricians condemn its use, others employ oxytocin with benefit and without complications. Oxytocin should be administered only if uterine contractions are insufficient to sustain normal progress in labor. A continuous intravenous infusion of a very dilute solution should always be used to prevent hyperstimulation or tetany of the uterus.

Continuous electronic monitoring of the fetal heart rate and uterine contractions should be employed whenever oxytocin is administered.

C. Delivery

The decision regarding route of delivery must be made carefully on an individual basis. Criteria for vaginal or cesarean delivery are outlined in the table below

Cesarean delivery has now become much more common in breech presentation, with significantly lower rates of perinatal morbidity and mortality. Complications of traumatic vaginal delivery are avoided (eg, umbilical cord prolapse, difficult delivery of aftercoming head, nuchal arms)

However, not all breech presentations require cesarean delivery. Many can be safely delivered vaginally without significant risk of injury or death. Risks to the mother with cesarean section (anesthesia, blood loss, infection) must be weighed against risks to the fetus with vaginal delivery (asphyxia, trauma). Decisions must be made with the utmost care to prevent unnecessary cesarean section or inadvertent vaginal delivery. Only obstetricians skilled in breech techniques should attempt any breech delivery, whether vaginal or cesarean.

Obstetricians have long believed that primigravid women have longer labors, more difficult breech extractions, and higher perinatal mortality rates than

multiparas. As a result, multiparous women with previously proved adequate

pelves were allowed a trial of labor and vaginal delivery, whereas primigravid patients were more often delivered by cesarean section. However, data regarding vaginal delivery in multiparous versus primigravid women demonstrate no benefit in perinatal outcome. Rates of difficult breech extraction, birth trauma, and perinatal death are not influenced by maternal parity. With any type of delivery, the fetus must be handled with great care.

1. Cesarean delivery-The type of incision chosen is extremely important. If the lower uterine segment is well developed (generally the case in women at term who have experienced labor), or if the presenting part is not well down in the uterus, a longer transverse "lower segment" incision is adequate for easy delivery. In premature gestations, the lower uterine segment may be quite narrow, and a low vertical incision is almost always required for atraumatic delivery.

2. Vaginal delivery-Obstetricians who contemplate performing a vaginal breech delivery should be experienced in the maneuver and should be assisted by 3 physicians: (1) an experienced obstetrician who will assist with delivery; (2) an anesthesiologist, to ensure that the patient is comfortable and cooperative during labor and delivery; and (3) a pediatrician capable of providing total resuscitation of the newborn, should it be required.

a. Anesthesia-The type of anesthesia required depends on the type of breech delivery. Multiparous women undergoing spontaneous breech delivery may require only analgesia for pain relief during labor and a pudendal anesthetic during delivery. A continuous "segmental" epidural anesthetic may also be administered during labor or during partial breech extraction, including application of Piper forceps to the aftercoming head.

In emergency circumstances when total breech extraction is performed in lieu of cesarean section, complete relaxation of the perineum and uterus is essential for a successful outcome. This is accomplished by immediate induction of inhalation anesthesia using halothane. This technique may also be used in partial breech extraction, when complete perineal relaxation is necessary for

optimal delivery of the aftercoming head.

b. Spontaneous vaginal delivery-During spontaneous delivery, delivery occurs without assistance, and no obstetric maneuvers are applied to the body. The fetus negotiates the maternal pelvis as outlined below, while the operator simply supports the body as it delivers.

The transverse (bitrochanteric) diameter of the fetal pelvis is wider than the anteroposterior diameter is deep. During labor, the breech usually engages the pelvis in the sacrum anterior position. As the fetus descends into the pelvis, it continues in the sacrum anterior position or rotates slightly to a left or right sacrum anterior position, until the buttocks reach the levator ani muscles of the maternal pelvis. At this point, internal rotation occurs, whereby the anterior hip rotates beneath the pubic symphysis, resulting in a sacrum transverse position. The bitrochanteric diameter of the fetal pelvis is now in an anteroposterior position within the maternal pelvis.

The anterior hip then descends below the pubic symphysis, and the buttocks begin to distend the perineum. As this occurs, the shoulders enter the pelvic inlet with the bisacromial diameter in the transverse position. As descent occurs, the bisacromial diameter rotates to an oblique or anteroposterior diameter, until the anterior shoulder rests beneath the pubic symphysis. Delivery of the anterior shoulder occurs as it slips beneath the pubic symphysis. Upward flexion of the body allows for easy delivery of the posterior shoulder over the perineum.

As the shoulders descend, the head engages the pelvic inlet in a transverse or oblique position. Rotation of the head to the occiput anterior position occurs as it enters the midpelvis. The occiput then slips beneath the pubic symphysis, and the remainder of the head is delivered by flexion as the chin, mouth, nose, and forehead slip over the maternal perineum.

As delivery of the breech occurs, increasingly larger diameters (bitrochanteric, bisacromial, biparietal) of the body enter the pelvis, whereas in cephalic presentation, the largest diameter (biparietal diameter) enters the pelvis first.

Particularly in preterm labors, the head is considerably larger than the body and provides a better "dilating wedge" as it passes through the cervix and into the pelvis. The breech is a much poorer "dilating wedge." The smaller bitrochanteric and bisacromial diameters may descend into the pelvis through a partially dilated cervix, but the larger biparietal diameter may be trapped. Delivery in these cases is described below.

c. Partial breech extraction-Partial breech extraction (assisted breech extraction) is employed when the operator discerns that spontaneous delivery will not occur or that expeditious delivery is indicated for fetal or maternal reasons. The body is allowed to deliver spontaneously up to the level of the umbilicus. The operator then assists in delivery of the shoulders, arms, and head.

The body is supported by an assistant while the operator rotates the spine as necessary until it rests directly under the pubic symphysis.

The operator applies gentle downward pressure on the body until both scapulas are visible.

The body is then rotated until the right shoulder is beneath the pubic symphysis. Reaching up with the right hand, the operator locates the right humerus and applies gentle downward pressure until the right arm is delivered.

The body is rotated until the left shoulder is beneath the pubic symphysis, and the left arm is delivered in like fashion. Rotating the spine again to a position below the pubic symphysis, the operator begins to deliver the head. As the body is lifted gently upward and as fundal pressure is applied from above to keep the head in a flexed position, the head may be delivered spontaneously over the perineum.

The operator may elect to manually assist in delivery of the head by performing the **Mauriceau-Smellie-Veit maneuver.**

In this procedure, the index and middle fingers of one of the operator's hands are applied over the maxilla as the body rests on the palm and forearm of the operator.

Two fingers of the operator's other hand are applied on either side of the neck with gentle downward traction. At the same time, the body is elevated toward the pubic symphysis, allowing for controlled delivery of the mouth, nose, and brow over the perineum.

During partial breech extraction, the anterior shoulder may be difficult to deliver if it is impacted behind the pubic symphysis. In this event, the body is gently lifted upward toward the pubic symphysis, and the operator inserts one hand along the hollow of the maternal pelvis and identifies the posterior humerus of the fetus. By gentle downward traction on the humerus, the posterior arm can be easily delivered, thus allowing for easier delivery of the anterior shoulder and arm.

d. Total breech extraction-In total breech extraction, the entire body is manually delivered. This procedure is employed only occasionally when fetal distress is encountered and an expeditious delivery is indicated. Total breech extraction has been virtually replaced by cesarean delivery in modern obstetrics.

For complete or footling presentation, total breech extraction is accomplished by initially grasping both feet and applying gentle downward pressure until the buttocks are delivered. A generous midline or mediolateral episiotomy is then performed.

The operator gently grasps the fetal pelvis, with both thumbs placed directly on either side of the sacrum. The spine is rotated, if necessary, until it rests under the pubic symphysis. Gentle, firm downward pressure is applied to the body until both scapulas are visible. The shoulders, arms, and head are delivered as in partial breech extraction.

If the fetus is in frank breech presentation, the index finger of the right hand must initially be placed into the anterior groin of the fetus and gentle downward pressure applied. As the fetus descends further into the birth canal, the left index finger is inserted into the posterior groin, and additional gentle downward traction is applied, until the buttocks are delivered through the vaginal introitus. The fetus is gently rotated until the spine rests directly under the pubic symphysis.

To deliver the extended legs from the birth canal, the operator places the index finger in the popliteal fossa of one leg and applies pressure upward and outward, causing the knee to flex. As the knee flexes, the foot is often seen or easily palpated. The lower leg is grasped firmly and gently delivered, and the opposite leg is then delivered. The rest of the body is extracted as previously described for footling presentation.

Occasionally during partial breech extraction and more often during total breech extraction,

excessive downward traction on the body to effect delivery of the scapulas results in a single or double **nuchal arm.** Because the body descends too rapidly through the birth canal, one or both arms are extended upward from their normal flexed position against the chest and become lodged behind the neck.

A single or bilateral nuchal arm is suspected when delivery of the shoulder is difficult to accomplish. To dislodge an impacted nuchal arm, the operator rotates the body in a half circle to bring the elbow toward the face. The humerus can then be readily identified by palpation and delivered as previously described. For bilateral nuchal arms, the fetus is rotated counterclockwise to deliver the right arm and often clockwise to dislodge and deliver the left arm. If rotation does not dislodge a nuchal arm, the operator must insert a finger into the maternal pelvis, identify the fetal humerus, and possibly extract the arm.

Fractures of the humerus or clavicle may result.

e. Delivery of the aftercoming head-Following delivery of the shoulders and arms, the body is rotated as necessary until the spine rests beneath the pubic symphysis and the head is in the occiput anterior position. At this point, the aftercoming head may be delivered spontaneously or by the Mauriceau-Smellie-Veit maneuver.

(1) Piper forceps-Piper forceps may be used electively or when the Mauriceau-Smellie-Veit maneuver fails to deliver the aftercoming head in an expeditious manner. Use of Piper forceps has improved the neonatal outcome in infants with birth weights of 1000-3000 g.

Prerequisites for use of Piper forceps in delivery of the aftercoming head include a completely dilated cervix and engagement of the head in the pelvis. Preferably, the head should be in the direct occiput anterior position for best application of the forceps, but the left or right occiput anterior position is acceptable. Piper forceps application should not be attempted in the occiput transverse positions, because significant fetal or maternal injury may result. Although some obstetricians use the Piper forceps in the direct occiput posterior positions, better perinatal results are obtained if the body is rotated to an occiput anterior position. An obstetric assistant supports the fetal body as the operator gently inserts the Piper forceps into the birth canal.

As the assistant elevates the body slightly, the operator places each forceps blade alongside the head. After proper placement of both blades has been verified, the forceps are locked in position, and traction is gently applied to deliver the chin, mouth, nose, and brow over the perineum. A generous midline episiotomy is often indicated to allow for easier application of the forceps and delivery of the aftercoming head.

(2) Modified Prague maneuver-If, after delivery of the body, the spine remains in the posterior position and attempts at rotation are unsuccessful, extraction of the head in a persistent occiput posterior position may be achieved by the modified Prague maneuver. One hand of the operator supports the shoulders from below while the other hand gently elevates the body upward toward the maternal abdomen. This flexes the head within the birth canal and results in delivery of the occiput over the perineum.

(3) Delivery of entrapped head in premature breech presentation-In premature breech presentations, the incompletely dilated cervix may allow delivery of the smaller body, but the relatively larger aftercoming head may be entrapped. Prompt delivery is mandatory because

severe asphyxia leading to death may rapidly ensue. Gentle downward traction on the shoulders combined with fundal pressure applied by an assistant may effect delivery. If this fails, the anesthesiologist should administer deep inhalation anesthesia (halothane may be useful) to obtain complete relaxation of the lower uterine segment and pelvic floor. Gentle downward traction on the shoulders will then often successfully deliver the aftercoming head.

If delivery is still not accomplished, a **hysterostomatomy (Duhrssen's incision)** must be considered to preserve fetal life. Incisions are made in the posterior cervix at 6 o'clock to loosen the entrapped head. Occasionally, additional incisions are necessary at 2 and 10 o'clock. Hysterostomatomy invariably releases the head, but the maternal consequences may be severe because incisions may extend upward into the lower uterine segment, causing severe hemorrhage.

Hysterostomatomy should be performed rarely today (if at all). Viable premature breech gestations should usually be delivered by cesarean section. Previable gestations delivered vaginally may become entrapped, but the maternal risks of Duhrssen's incisions or cesarean section performed to release the entrapment outweigh any potential benefit to the immature fetus. Continued labor and gentle downward pressure will release the aftercoming head but generally not without fetal death from asphyxia.

Complications of Breech Delivery

A. Birth Anoxia: Umbilical cord compression and prolapse may be associated with breech delivery, particularly in complete (5%) and footling (15%) presentations. This is due to the inability of the presenting part to fill the maternal pelvis, either due to prematurity or poor application of the presenting part to the cervix, so that the umbilical cord is allowed to prolapse below the level of the breech. Frank breech presentation (thighs flexed against the abdomen) offers a contoured presenting part, which accommodates better to the maternal pelvis and is usually well applied to the cervix.

The incidence of cord prolapse in frank breech is only 0.5% (the same as for cephalic presentations).

Compression of the prolapsed cord may occur during uterine contractions causing moderate to severe variable decelerations in the fetal heart rate. Fetal anoxia or death may occur.

Continuous electronic monitoring is mandatory during labor in these cases to detect ominous decelerations. If they occur, immediate cesarean delivery must be performed.

B. Birth Injury: The incidence of birth trauma during vaginal breech delivery is 6.7%, 13 times that of cephalic presentations (0.51 per 1000 deliveries). Only high forceps and internal version and extraction procedures have higher rates of birth injury than vaginal breech deliveries. The types of perinatal injuries reported in breech delivery include tears in the tentorium cerebellum, cephalohematomas, disruption of the spinal cord, brachial palsy, fracture of long bones, and rupture of the sternocleidomastoid muscles.

Vaginal breech delivery is also the main cause of injuries to the fetal adrenal glands, liver, anus, genitalia, spine, hip joint, sciatic nerve, and musculature of the arms, legs, and back.

Factors contributing to difficult vaginal breech delivery include a partially ilated cervix, unilateral or

bilateral nuchal arms, and deflexion of the head.The type of procedure used may also affect the neonatal outcome.

1. Partially dilated cervix-Delivery of a breech fetus may progress even though the cervix is only partially dilated, since the bitrochanteric and bisacromial diameters are smaller than the biparietal diameter. This is true especially in prematurity. The hips and shoulders may negotiate the cervix, but the aftercoming head becomes entrapped, resulting in difficult delivery and birth injury.

2. Nuchal arms-Nuchal arms hinder delivery of the aftercoming head, causing delay in delivery and an increased incidence of birth asphyxia. Fractures of the humerus and trauma to the musculature of the shoulders and arms may occur as the operator attempts to free the nuchal arm and deliver the head.

3. Deflexion of the head-Hyperextension of the head is defined as deflexion or extension of the head posteriorly beyond the longitudinal axis of the fetus (5% of all breech deliveries). Causes of hyperextension include neck cysts, spasm of the neck musculature, and uterine anomalies, but over 75% have no known cause. Although deflexion may be documented by ultrasonographic or x-ray

studies weeks before delivery, there is little apparent risk to the fetus until vaginal delivery is attempted. At that time, deflexion causes impaction of the occipital portion of the head behind the pubic symphysis, which may lead to fractures of the cervical vertebrae, lacerations of the spinal cord, epidural and medullary hemorrhages, and perinatal death. If head deflexion is diagnosed prior to delivery, cesarean section should be performed to avert injury.

Cesarean section cannot prevent injuries such as minor meningeal hemorrhage or dislocation of the cervical vertebrae; these may develop in utero secondary to long-standing head deflexion.

4. Type of delivery-More complex delivery procedures have a higher rate of birth trauma. While few infants are injured during spontaneous breech births, as many as 6% are injured during partial breech extraction and 20% during total breech extraction. Injuries associated with total breech extraction are usually extensive and severe, and this procedure should never be attempted unless fetal survival is in jeopardy and cesarean section cannot be immediately performed.

An additional important factor in breech injury and perinatal outcome is the experience of the operator. Inexperience may lead to hasty performance of obstetric maneuvers. Delay in delivery may result in birth asphyxia due to umbilical cord compression, but haste in the management of breech delivery results in application of excessive pressure on the fetal body, causing soft tissue damage and fracture of long bones. Too-rapid extraction of the body from the birth canal causes the arms to extend above the head, resulting in unilateral or bilateral nuchal arms and difficult delivery of the aftercoming head.

All breech deliveries should be carried out slowly and methodically by experienced obstetricians who execute the maneuvers with gentleness and skill--not speed.

Prognosis

The incidence of cesarean section for breech delivery has been steadily increasing, from approximately 30% in 1970 to 75% in 1990.

Rates of perinatal death have not decreased to those associated with cephalic presentations, mainly because many breech fetuses are very premature or have lethal congenital malformations. Cesarean section for the immature or malformed fetus does not improve chances for perinatal survival; vaginal delivery should be performed in these cases.

The route of delivery for term breech infants does not seem to affect neonatal mortality rates. For infants with birth weights of 2000-3500 g, neonatal mortality rates approach zero regardless of the route of delivery. However, the impact of cesarean section on perinatal outcome is clearly seen in singleton breech presentations with extremes in birth weight. The premature breech fetus (25-34 weeks with birth weight of 700-2000 g) and large term breech fetus (birth weight > 3500 g) have significantly better neonatal outcomes when delivered by cesarean section. For a tiny premature fetus, cesarean delivery avoids umbilical cord prolapse, entrapment of the aftercoming head by a partially dilated cervix, and birth trauma. For a large fetus, cesarean section avoids prolonged labor and difficult, traumatic breech extraction.