Contracted Pelvis

Definition

Anatomical definition: It is a pelvis in which one or more of its diameters is reduced below the normal by one or more centimeters.

Obstetric definition: It is a pelvis in which one or more of its diameters is reduced so that it interferes with the normal mechanism of labour.

Factors influencing the size and shape of the pelvis

• Developmental factor: hereditary or congenital.

• Racial factor.

• Nutritional factor: malnutrition results in small pelvis.

• Sexual factor: as excessive androgen may produce android pelvis.

• Metabolic factor: as rickets and osteomalacia.

• Trauma, diseases or tumours of the bony pelvis, legs or spines.

Etiology of Contracted Pelvis

Causes in the pelvis

• Developmental (congenital):

o Small gynaecoid pelvis (generally contracted pelvis).

o Small android pelvis.

o Small anthropoid pelvis.

o Small platypelloid pelvis (simple flat pelvis).

o Naegele’s pelvis: absence of one sacral ala.

o Robert’s pelvis: absence of both sacral alae.

o High assimilation pelvis: The sacrum is composed of 6 vertebrae.

o Low assimilation pelvis: The sacrum is composed of 4 vertebrae.

o Split pelvis: splitted symphysis pubis.

• Metabolic:

o Rickets.

o Osteomalacia (triradiate pelvic brim).

• Traumatic: as fractures.

• Neoplastic: as osteoma.

Causes in the spine

• Lumbar kyphosis.

• Lumbar scoliosis.

• Spondylolisthesis: The 5th lumbar vertebra with the above vertebral column is pushed forward while the promontory is pushed backwards and the tip of the sacrum is pushed forwards leading to outlet contraction.

Causes in the lower limbs

• Dislocation of one or both femurs.

• Atrophy of one or both lower limbs.

N.B. oblique or asymmetric pelvis: one oblique diameter is obviously shorter than the other. This can be found in:

• Naegele’s pelvis.

• Scoliotic pelvis.

• Diseases, fracture or tumours affecting one side.

Diagnosis of Contracted Pelvis

History

• Rickets: is expected if there is a history of delayed walking and dentition.

• Trauma or diseases: of the pelvis, spines or lower limbs.

• Bad obstetric history: e.g. prolonged labour ended by;

o difficult forceps,

o caesarean section or

o still birth.

Examination

• General examination:

o Gait: abnormal gait suggesting abnormalities in the pelvis, spines or lower limbs.

o Stature: women with less than 150 cm height usually have contracted pelvis.

o Spines and lower limbs: may have a disease or lesion.

o Manifestations of rickets as:

 square head,

 rosary beads in the costal ridges.

 pigeon chest,

 Harrison’s sulcus and bow legs.

o Dystocia dystrophia syndrome: the woman is

 short,

 stocky,

 subfertile,

 has android pelvis and

 masculine hair distribution,

 with history of delayed menarche.

o This woman is more exposed to occipito-posterior position and dystocia.

• Abdominal examination:

o Nonengagement of the head: in the last 3-4 weeks in primigravida.

o Pendulous abdomen: in a primigravida.

o Malpresentations: are more common.

Pelvimetry

It is assessment of the pelvic diameters and capacity done at 38-39 weeks. It includes:

• Clinical pelvimetry:

o Internal pelvimetry for:

 inlet,

 cavity, and

 outlet.

o External pelvimetry for:

 inlet and

 outlet.

• Imaging pelvimetry:

o X-ray.

o Computerised tomography (CT).

o Magnetic resonance imaging (MRI) .

N.B. CT and MRI are recent and accurate but expensive and not always available so they are not in common use.

Internal pelvimetry (is done through vaginal examination)

• The inlet:

o Palpation of the forepelvis (pelvic brim):

 The index and middle fingers are moved along the pelvic brim. Note whether it is round or angulated, causing the fingers to dip into a V-shaped depression behind the symphysis.

o Diagonal conjugate:

 Try to palpate the sacral promontory to measure the diagonal conjugate. Normally, it is 12.5 cm and cannot be reached. If it is felt the pelvis is considered contracted and the true conjugate can be calculated by subtracting 1.5 cm from the diagonal conjugate .This assessment is not done if the head is engaged.

• The cavity:

o Height, thickness and inclination of the symphysis.

o Shape and inclination of the sacrum.

o Side walls:

 To determine whether it is straight, convergent or divergent starting from the pelvic brim down to the base of ischial spines in the direction of the base of the ischial tuberosity. Then relation between the index and middle finger of the base of ischial spines and the thumb of the other hand on the ischial tuberosity is detected. If the thumb is medial the side wall is convergent and if lateral it is divergent.

o Ischial spines:

 Whether it is blunt (difficult to identify at all), prominent (easily felt but not large) or very prominent (large and encroaching on the mid-plane).

 The ischial spines can be located by following the sacrospinous ligament to its lateral end.

o Interspinous diameter:

 By using the 2 examining fingers, if both spines can be touched simultaneously, the interspinous diameter is £ 9.5 cm i.e. inadequate for an average-sized baby.

o Sacrosciatic notch:

 If the sacrospinous ligament is two and half fingers, the sacrosciatic notch is considered adequate.

• The outlet:

o Subpubic angle:

 Normally, it admits 2 fingers.

o Bituberous diameter:

 Normally, it admits the closed fist of the hand (4 knuckle).

o Mobility of the coccyx.

 by pressing firmly on it while an external hand on it can determine its mobility.

o Anteroposterior diameter of the outlet:

 from the tip of the sacrum to the inferior edge of the symphysis.

FINDINGS INDICATING ADEQUATE PELVIS:

Data Finding

Forepelvis (pelvic brim)

Diagonal conjugate

Symphysis

Sacrum

Side walls

Ischial spines

Interspinous diameter

Sacrosciatic notch

Subpubic angle

Bituberous diameter

Coccyx

Anterposterior diameter of outlet Round.

≥11.5 cm.

Average thickness, parallel to sacrum.

Hollow, average inclination.

Straight.

Blunt.

≥10.0 cm.

2.5 -3 finger - breadths.

2finger - breadths.

4 knuckles >8.0 cm).

Mobile.

≥11.0 cm.

External pelvimetry

It is of little value as it measures diameters of the false pelvis.

Thom’s, Jarcho’s or crossing pelvimeter can be used for external pelvimetry.

• Interspinous diameter (25cm): between the anterior superior iliac spines.

• Intercrestal diameter (28 cm): between the most far points on the outer borders of the iliac crests.

• External conjugate (20 cm).

• Bituberous diameter: can be measured by pelvimeter.

In rickets, the interspinous equals or even exceeds the intercrestal diameter.

Radiological pelvimetry

It is indicated mainly in borderline pelvic contraction.

• Lateral view: The patient stands with the X-ray tube on one side and the film cassette on the opposite side.

o It is the most important view as it shows the anteroposterior diameters of the pelvis, angle of inclination of the brim, width of sacrosciatic notch, curvature of the sacrum and cephalo-pelvic relationship.

• Inlet view: The patient sits on the film cassette and leans backwards so that the plane of the pelvic brim becomes parallel to the film.

• Outlet view: The patient sits on the film cassette and leans forwards.

N.B. The measurements can be identified by using a graduated scale or Thom’s perforated grid, in which the perforations are 1cm apart, while taking the X-ray film.The picture of the scale or grid on the X-ray film allows the measurement.

Cephalometry

• Ultrasonography: is the safe accurate and easy method and can detect:

o The biparietal diameter (BPD).

o The occipito-frontal diameter.

o The circumference of the head.

• Radiology (X-ray): is difficult to interpret.

Cephalopelvic disproportion tests

These are done to detect contracted inlet if the head is not engaged in the last 3-4 weeks in a primigravida.

• (1) Pinard’s method:

o The patient evacuates her bladder and rectum.

o The patient is placed in semi-sitting position to bring the fetal axis perpendicular to the brim.

o The left hand pushes the head downwards and backwards into the pelvis while the fingers of the right hand are put on the symphysis to detect disproportion.

• (2) Muller - Kerr’s method:

o It is more valuable in detection of the degree of disproportion.

o The patient evacuates her bladder and rectum.

o The patient is placed in the dorsal position.

o The left hand pushes the head into the pelvis and vaginal examination is done by the right hand while its thumb is placed over the symphysis to detect disproportion.

Degrees of Disproportion

• Minor disproportion:

o The anterior surface of the head is in line with the posterior surface of the symphysis. During labour the head is engaged due to moulding and vaginal delivery can be achieved.

• Moderate disproportion (1st degree disproportion):

o The anterior surface of the head is in line with the anterior surface of the symphysis. Vaginal delivery may or may not occur.

• Marked disproportion (2nd degree disproportion):

o The head overrides the anterior surface of the symphysis. Vaginal delivery cannot occur.

Degrees of Contracted Pelvis

• Minor degree: The true conjugate is 9-10 cm. It corresponds to minor disproportion.

• Moderate degree: The true conjugate is 8-9 cm. It corresponds to moderate disproportion.

• Severe degree: The true conjugate is 6-8 cm. It corresponds to marked disproportion.

• Extreme degree: The true conjugate is less than 6 cm. Vaginal delivery is impossible even after craniotomy as the bimastoid diameter (7.5 cm) is not crushed.

Mechanism of Labour in Contracted Pelvis

The Flat Rachitic Pelvis

Characters:

• Inlet: reduced antero-posterior diameter.

• The pelvic inclination: is exaggerated due to increased lumbar lordosis.

• The sacrum has the following characters:

o - The promontory is pushed forwards so the tip is pushed backwards.

o - Diminished or obliterated concavity.

o - Bent at the middle may be present.

• The outlet has the following characters:

o Increased antero-posterior diameter.

o Increased bituberous diameter.

• The interspinous equal the intercrestal diameter.

Mechanism of labour:

• Engagement: with the sagittal suture in the transverse diameter.

• Asynclitism with anterior parietal bone presentation so that the shorter subparietal supraparietal diameter (9cm) is passed instead of the biparietal (9.5cm) in the narrow true conjugate.

• Lateral displacement of the head so that the bitemporal diameter is passed through the narrow true conjugate .

• Deflexion of the head as the descent of the occiput is resisted by the lateral pelvic wall .

• Correction of the asynclitism and deflexion with further descent of the head.

• Rotation of the occiput 2/8 circle anteriorly and the head is delivered easily due to wide outlet.

Simple Flat Pelvis

Characters:

• Reduced antero-posterior diameters of the inlet, cavity and outlet.

• No rachitic manifestations.

Mechanism of labour:

The process passes as flat rachitic pelvis till the mid cavity where internal rotation and further descent cannot occur due to persistence of flattening of the pelvis and contracted outlet. So deep transverse arrest is common and vaginal delivery is obstructed.

Contracted Outlet (Funnel Pelvis)

Characters:

• The pelvic capacity is diminished from the inlet to the outlet.

• Subpubic angle is acute.

• Convergent side walls.

• Bituberous diameter is 8 cm or less.

Causes:

• Android pelvis.

• Anthropoid pelvis.

• Osteomalacia.

• High assimilation pelvis.

• Spondylolisthesis.

• Oblique pelvis.

• 20% of generally contracted pelvis.

Mechanism of labour:

• Normal descent and engagement as the pelvic inlet is normal.

• Extreme flexion and moulding of the head at the level of the jutting ischial spines.

• Because of the narrow subpubic angle, the head is pushed backwards with more liability to perineal tears.

• In case of occipito-posterior, the funnel pelvis interferes with long anterior rotation so persistent occipito-posterior and deep transverse arrest are common. The face to pubis position is more favourable as it brings the short bitemporal diameter in the narrow subpubic angle.

Management:

It depends on Thom’s dictum:

• If the sum of bituberous + posterior sagittal is >15 cm and bituberous diameter is >8cm: vaginal delivery is allowed with episiotomy and low forceps.

• If the Thom’s dictum is <15 cm or the bituberous diameter is <8cm: caesarean section is performed.

• Symphysiotomy: may be done in distant areas with no facilities for C.S. and the foetus is living.

Management of Contracted Pelvis

It depends mainly on the degree of disproportion.

• Minor disproportion (minor degree of contracted pelvis): vaginal delivery.

• Moderate disproportion (moderate degree of contracted pelvis): trial labour, if failed ® caesarean section.

• Marked disproportion (severe or extreme degree of contracted pelvis): caesarean section.

Trial of Labour

It is a clinical test for the factors that cannot be determined before start of labour as:

• Efficiency of uterine contractions.

• Moulding of the head.

• Yielding of the pelvis and soft tissues.

Procedure:

• Trial is carried out in a hospital where facilities for C.S is available.

• Adequate analgesia.

• Nothing by mouth.

• Avoid premature rupture of membranes by:

o rest in bed,

o avoid high enema,

o minimise vaginal examinations.

• The patient is left for 2 hours in the 2nd stage with good uterine contractions under close supervision to the mother and foetus.

Suitable cases for trial of labour:

• Young primigravida of good health.

• Moderate disproportion.

• Vertex presentation.

• No outlet contractions.

• Average sized baby.

Termination of trial of labour:

• Vaginal delivery:

o either spontaneously or by forceps if the head is engaged.

• Caesarean section if:

o failed trial of labour i.e. the head did not engage or

o complications occur during trial as fetal distress or prolapsed pulsating cord before full cervical dilatation.

Indications of caesarean section in contracted pelvis

• Moderate disproportion if trial of labour is contraindicated or failed.

• Marked disproportion.

• Extreme disproportion whether the foetus is living or dead.

• Contracted outlet.

• Contracted pelvis with other indications as;

o elderly primigravida,

o malpresentations, or

o placenta praevia.

Complications of Contracted Pelvis

• Maternal:

o During pregnancy:

 Incarcerated retroverted gravid uterus.

 Malpresentations.

 Pendulous abdomen.

 Nonengagement.

 Pyelonephritis especially in high assimilation pelvis due to more compression of the ureter.

o During labour:

 Inertia, slow cervical dilatation and prolonged labour.

 Premature rupture of membranes and cord prolapse.

 Obstructed labour and rupture uterus.

 Necrotic genito-urinary fistula.

 Injury to pelvic joints or nerves from difficult forceps delivery.

 Postpartum haemorrhage.

• Fetal:

o Intracranial haemorrhage.

o Asphyxia.

o Fracture skull.

o Nerve injuries.

o Intra-amniotic infection.