

Instrumental delivery

Ahmed Ramy

***Consultant and Lecturer of ob/gyn, sohag faculty
of medicine, sohag, Egypt***

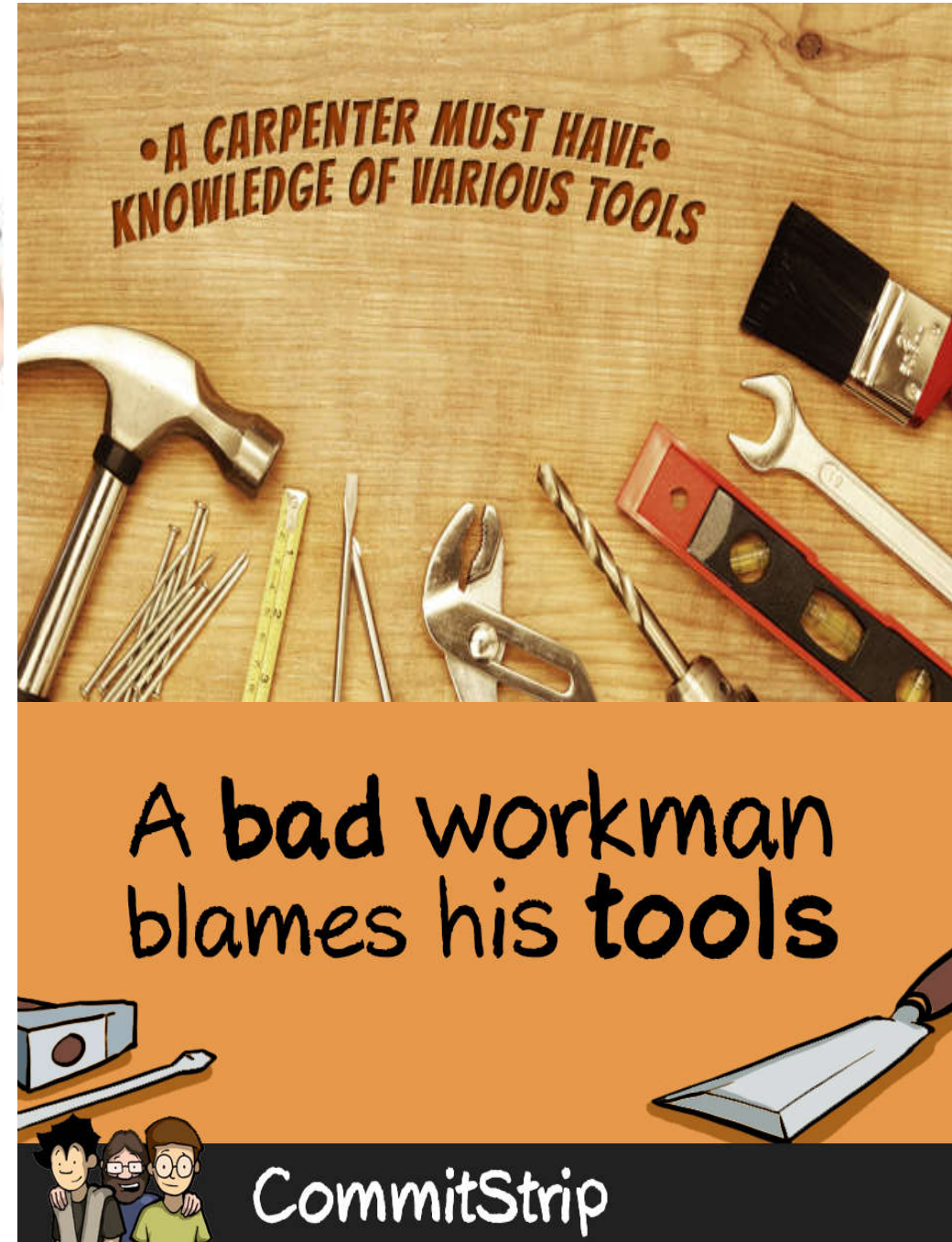
***fellow of Gynecology and Obstetrics,
Graduate School of Medicine, Kyoto University,
Japan***

***54 Shogoin Kawahara-cho, Sakyo-ku, Kyoto 606-
8507,
TEL [81]-75-751-3269 FAX [81]-75-761-3967.***



introduction

- It has been said that "a good carpenter knows his tools."
- Similarly, skilled surgeons must know the applications and limitations of the instruments they regularly use.
- Surgical instruments are, in many ways, simply extensions of the human hand.
- There is inevitably a "feel" for different instruments designed to accomplish the same purpose.



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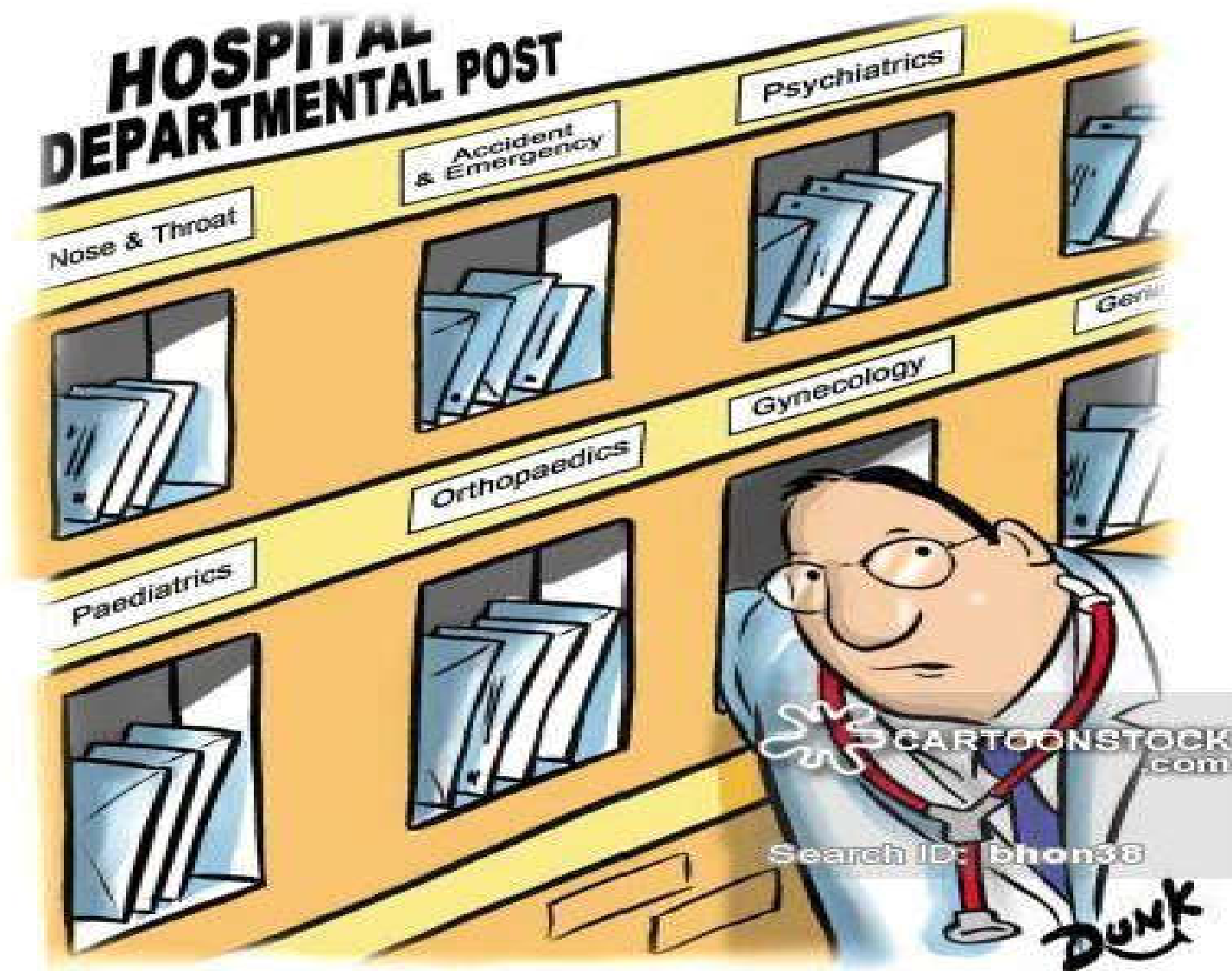
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DUNK



Instrumental delivery = Operative vaginal delivery

- through use of : **Forceps.**
- **vacuum extraction.**

introduction

- There is increasing cesarean section rate worldwide which makes the need for instrumental delivery necessary to effect delivery of live and dead fetuses.
- The use of instruments in the facilitation of birth is an age-old process.
- from as early as 1500BC there exist reports of successful deliveries of live infants in obstructed labours.

Non-operative interventions which reduce instrumental delivery rates

- Various techniques have been implemented to help lower the rates of assisted delivery. These include:
 - 1:1 care in labour
 - active management of the second stage with syntocinon
 - upright birth posture/mobilization
 - fetal blood sampling rather than expediting delivery when fetal heart rate abnormalities occur.

- Other interventions, such as an epidural anaesthesia, have been observed to be associated with an increased risk of instrumental vaginal delivery.

Prerequisites for instrumental delivery

- - Cephalic presentation (piper forceps is used for breech)
- - Head is engaged 0- 2
- - Fully dilated bladder
- - Maternal pelvis adequacy
- - Ruptured membranes
- - Empty bladder
- - Episiotomy
- - Anesthesia

Indications for assisted vaginal delivery

Fetal:

- Mal-positions of the fetal head (occipito-lateral and occipito-posterior). Such positions occur more frequently in the presence of regional anaesthesia — alterations in the tone of the pelvic floor may impede spontaneous rotation to the optimal occipito-anterior position.
- Fetal ‘distress’ is a commonly cited indication for instrumental intervention; however, *‘presumed fetal compromise’* is a more comprehensive term unless a fetal blood sample has been obtained showing hypoxia and acidosis in which case *‘fetal hypoxia’* should be used.

- Elective instrumental intervention for infants of reduced weight. In infants weighing <1.5 Kg, delivery with forceps does not confer advantage over spontaneous delivery and may increase the incidence of intracranial haemorrhage. Ventouse carries the same risks, but in addition should be avoided in infants of $<34^{+6}$ weeks of gestation.
- Vaginal breech delivery. Forceps can be applied to the after coming head to control the delivery of the vertex, a situation where the ventouse is contra-indicated.

Maternal:

- The commonest maternal indications are those of maternal distress, exhaustion, or prolongation of the second stage of labour (>2 hours in a primigravida (3 hours if an epidural is *in situ*), or >1 hour in a multipara (2 hours if an epidural is *in situ*)).
- Medically significant conditions such as: aortic valve disease with significant outflow obstruction; myasthenia gravis; significant APH due to placental abruption or vasa praevia; severe hypertensive disease; and previous caesarean section (to minimize the risk of scar rupture) are less common.

Contraindications to an instrumental vaginal delivery

Absolute

- The vertex is $\geq 1/5$ th palpable abdominally
- The position (occipito-anterior/posterior or lateral) of the fetal head is unknown
- Before full dilatation of the cervix (although a possible exception occurs with a ventouse delivery of a second twin)
- When the operator is inexperienced in instrumental vaginal delivery

The ventouse should not be used:

- In gestations of less than 34⁺⁶ weeks because of the increased risk of intracranial haemorrhage in the fetus
- With the fetus presenting by the face
- If there is a significant degree of caput that may either preclude correct placement of the cup or, more sinisterly, indicate a substantial degree of cephalopelvic disproportion

Relative contraindications (for forceps or ventouse):

- Fetal bleeding disorders (e.g. alloimmune thrombocytopenia) or a predisposition to fractures (e.g. osteogenesis imperfecta) are relative contraindications, however, the comparative risks of a difficult second stage caesarean section must also be considered.
- There is minimal risk of fetal haemorrhage if the vacuum extractor is employed following fetal blood sampling or application of a scalp electrode

Types of forceps

- 1. Short curved Wrigley's obstetric forceps.
- 2. Long curved Simpson's obstetric forceps
- 3. Long straight Kielland's obstetric forceps.



Long curved Simpson's obstetric forceps



Short curved Wrigley's obstetric forceps



Long straight Kielland's obstetric forceps

Types of forceps deliveries:

- I- **High forceps:** This means forceps applied to a high head (non-engaged head).
 - It is not done any more.
- II- **Mid-forceps:** The fetal head is engaged but the biparietal diameter is still above the ischial spine level.
 - The lowest bony part of the head is felt below the ischial spines.
- III- **Low forceps (outlet forceps)** The biggest transverse diameter (biparietal) has passed the ischial spine level.
 - The lowest bony part of the head has already reached the perineum and is visible either during or between contractions.

Parts of forceps:

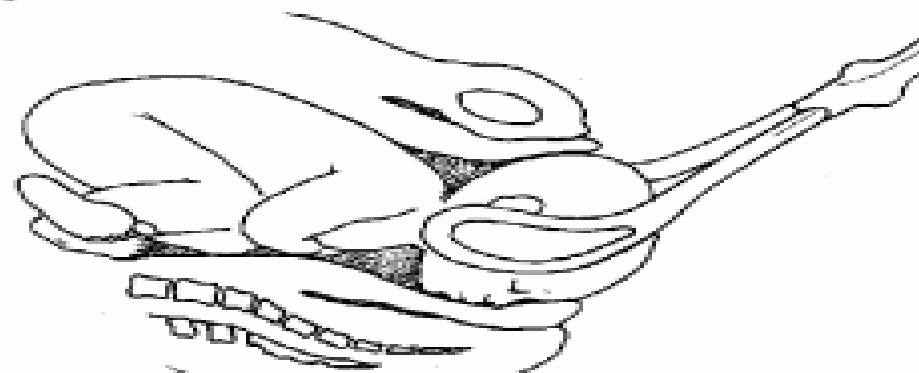
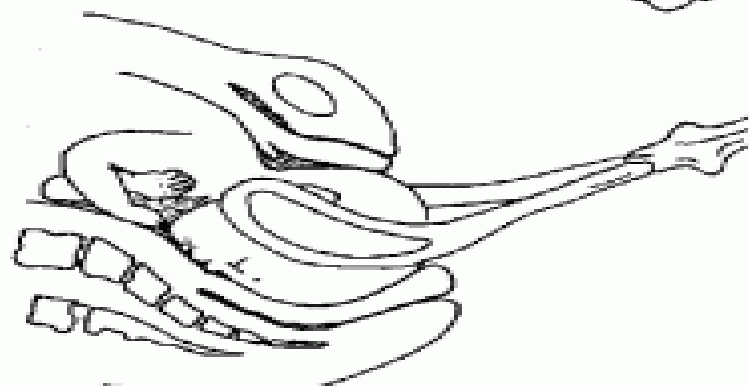
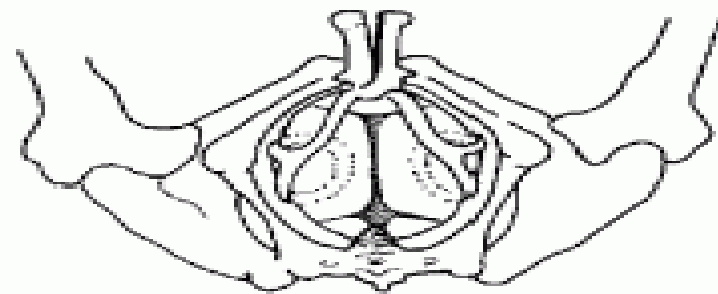
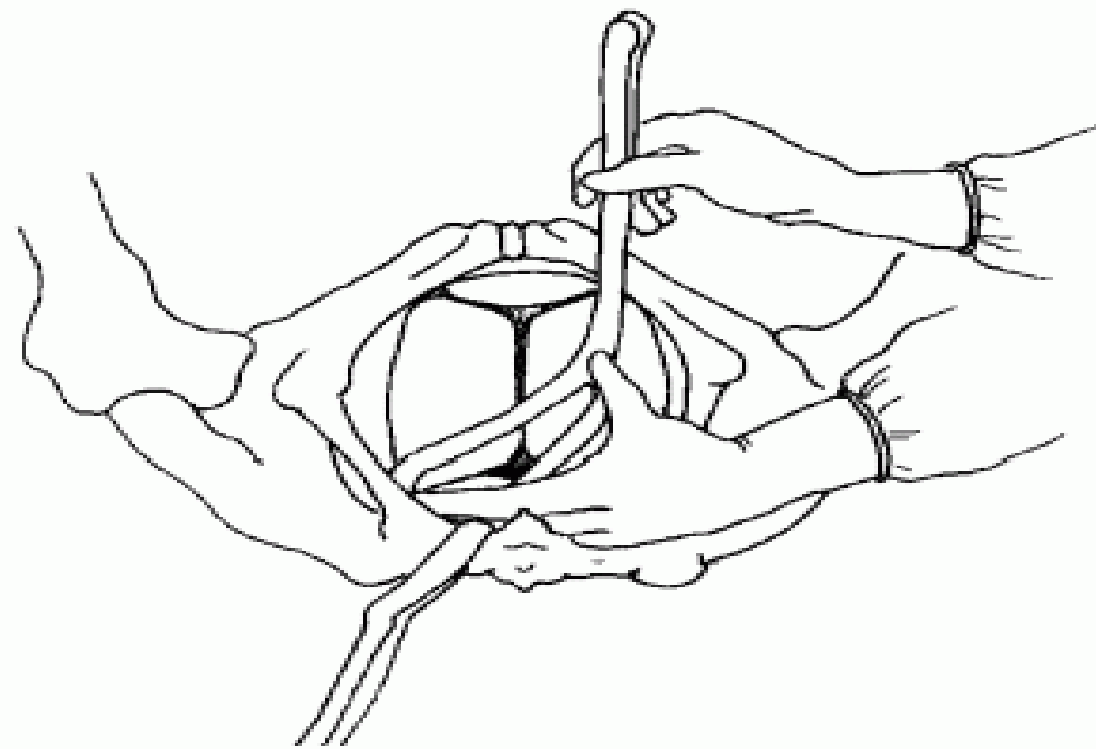
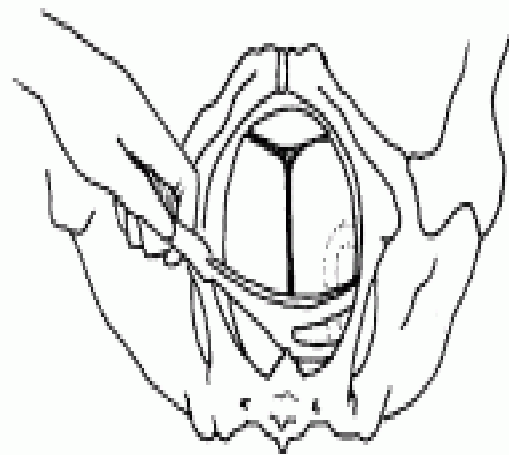
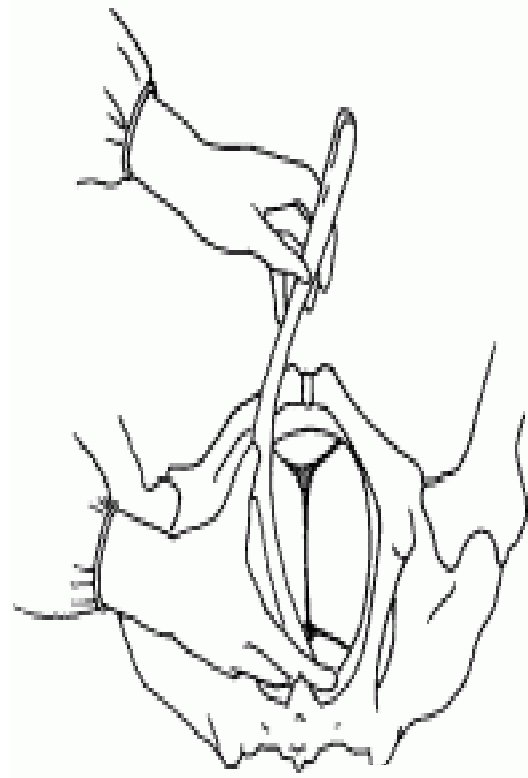
- It consists of 2 branches, right and left. Each branch is made of:
 - 1. **A blade:** cephalic curve, pelvic curve, and a fenestrum.
 - The cephalic curve: medial curved aspect of each blade.
 - The pelvic curve: This curve confirms with the curve of the birth canal.
 - The fenestrum makes the forceps lighter in weight, offers a firm grip over the head and avoids slipping and it minimizes injury of the head.
 - 2. **A shank:** between the blade and the handles.

Parts of forceps

- **3. A handle:** The handles cross to the opposite side of the blade so that the left handle is held by the left hand and is put at the left side of the birth canal and the right handle is held by the right hand and is put at the right side of the birth canal.
- The branches are joined by a lock located at the junction between the shank and The handles
- The left blade is inserted first followed by the right blade, because the lock will only locks if the right branch was placed on top of the left branch.
- Direction of pull: Downwards, forwards

Types of forceps Application:

- (A) Cephalic application:
 - One blade on either side of the head along the mento-vertical diameter.
 - The safety margin that is permissible extends from the zygoma anteriorly to the mastoid process posteriorly.
- (B) Pelvic application
 - The hand is applied inside the birth canal under the blade to prevent maternal tissue injury.
 - The left blade is inserted first followed by the right blade.
 - A safety margin within the pelvis extends from the sacroiliac joint to the iliopectineal eminence.



Action of the forceps:

- 1. Traction on the head (the main action).
- 2. Rotation of the head.
- 3. Compression of the head (this should be minimal to avoid intracranial hemorrhage).
- 4. Stimulation of uterine action.
- 5. Dilatation of the vulva.
- 6. One blade can be utilized to dislodge the head out of a lower segment cesarean section incision.

Indications of forceps delivery:

- **1. Maternal**
- (A) Threatened dangers to the mother (prophylactic forceps):
 - - Toxemia of pregnancy (pre-eclampsia and eclampsia).
 - - Previous cesarean section
 - - Weakness in the abdominal wall (hernias and a history of a recent abdominal operation).
 - - Associated disease, e.g. Diabetes, heart disease, lung disease, chronic nephritis, hypertension, etc.
- (B) Rigid pelvic floor and perineum
- (C) Uterine inertia
- (D) Maternal distress

2. Fetal indications

- (A) Threatened dangers to the fetus (prophylactic forceps), as in the case of
 - prolapse of a pulsating umbilical cord
 - (B) Abnormal presentations and positions: occipitoposterior, deep transverse
 - arrest, face presentation, after-coming head.
 - (C) Large sized fetal head
 - (D) Fetal distress
-
- 3. Prolonged second stage of labor
 - (A) Over 1-2 hours in multiparae or 2-3 hours in primigravidae, depending on the uterine activity.

Complications:

- (A) Fetal complications
- 1. Asphyxia (intracranial injury, aspiration, cord compression and anesthesia)
- 2. Fracture of the skull bones
- 3. Intracranial hemorrhage
- 4. Nerve lesions: Bell's palsy, Brachial plexus injury.
- 5. Lacerations and contusions of the scalp and cephalhematoma which might
- get infected and forms an abscess.

B) Maternal complications

- (1. Risks of anesthesia.
- 2. Traumatic lesions of the lower uterine segment, cervix, vagina and perineum.
- 3. Sepsis
- 4. Obstetric shock
- 5. Bone injuries: Separation of the symphysis.
- Dislocation of the sacro-iliac joint; this may be followed by a waddling gait, and severe low backache.
- Fracture of the coccyx or its dislocation from the lower end of the sacrum.
- 6. Post-partum hemorrhage (traumatic, or atonic if delivery is completed in the absence of labor pains).
- 7. Vesico-vaginal fistula and stress incontinence. The former results either from direct trauma to a full bladder during application or extraction, or from ischemic effects of prolonged compression in protracted labor.

The Vacuum Extractor or Ventouse



Metal cup ventouse



Plastic cup ventouse

Indications of ventouse delivery

- All the indications of forceps delivery except the face and after coming head. The ventouse is not helpful when a rapid delivery is aimed e.g. In fetal distress.
- To increase flexion in deflexed heads & to help forward rotation of the occiput in occipito posterior & deep transverse arrest.
- To assist completion of cervical dilatation; the cervix should be at least $\frac{3}{4}$ dilated or more.
- It can be used to control bleeding by traction on the head in placenta previa.

Indications of ventouse

- In cord prolapse it serves to prevent recurrence after its successful replacement
- It can be utilized to remove the head out of a lower uterine segment cesarean section
- It May be of help to correct inertia in the first stage by pulling the head to be well applied to the lower uterine segment & cervix.

Contraindication of ventouse

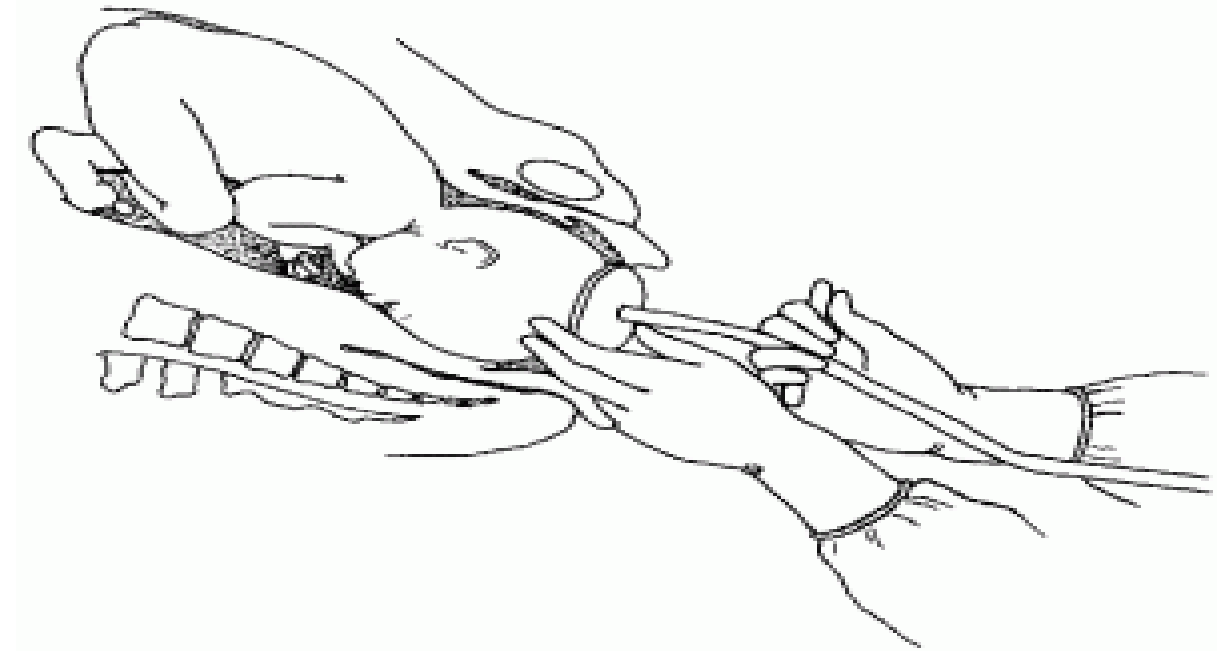
- Face, breech, & transverse presentation of the after coming head.
- Premature babies.
- Moderate or severe cephalo-pelvic disproportion.
- Fetal & maternal distress necessitating a rapid delivery.

Advantage of ventouse over the forceps:

- To the Mother
 - Less risk of anesthesia, sepsis & trauma
 - Helps cervical dilatation & +ve uterine contractions
 - It doesn't occupy space adjacent to the fetal head → less trauma and smaller episiotomy.
 - Can be applied if the cervix is not fully dilated.
- To the Fetus
 - Corrects malattitudes of the fetal head
 - Helps rotation of the head

Method of ventouse application

- Use the largest possible cup.
- Pressure is gradually reduced (in about 8 min.) to reach a max. Vacuum of 0.8 kg/cm² (600 mmHg).
- Allows the formation of a caput inside the cup to fill it.
- It shouldn't be used for longer than 40 min (scalp necrosis & alopecia).



Complications of ventouse delivery

- Risk of cervical incompetence.
- Vaginal laceration from entrapment of vaginal mucosa between the suction cup and fetal head.
- Fetal skull injuries: cephalohematoma, intracranial hemorrhage & cerebral irritation, subaponeurotic hemorrhage and scalp lacerations, necrosis & alopecia.
- Longer delivery time.

conclusions

- Considering all aspects, operative delivery has still got a place in modern obstetric practice and should be considered in certain cases.
- If performed judiciously by proper selection of cases and careful & timely application, operative delivery can be useful in reducing not only unnecessary caesarean sections but also fetal & maternal complications due to prolonged labor.
- Vacuum and forceps delivery can be associated with significant complications, both maternal and fetal.
- Complications/dangers of operative delivery: - are mostly due to faulty technique rather than the instrument.
- RCOG audit standard says that “vacuum is the first choice of instrument for instrumental vaginal delivery”.

Thank you



Sohag University
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