Review Article

Instrumental vaginal deliveries: A review

Jacob A Unuigbe, Godwill E Agbon-Ojeme, Robinson A Erhatiemwomon, Kenneth Toby Maduako

Department of Obstetrics and Gynecology, College of Health Sciences, Igbinedion University, Okada, Benin City, Nigeria

ABSTRACT

In contemporary obstetric practice, safety with caesarean section in developed countries has witnessed its increased application in deliveries and the decreasing use of instrumental deliveries. This trend follows the relative hazards complicating instrumental vaginal deliveries and increasing litigations arising thereof. In developing countries however, caesarean sections are not so readily available to parturients and are relatively unsafe, especially with mothers presenting late in health facilities with complicated (commonly obstructed) labors, not infrequently with fetal death. In these circumstances, instrumental vaginal deliveries serve as suitable options. It is with this background that this review considers the role of instrumental vaginal delivery and gives a critical account of current techniques of operative procedures. Important issues, including case choice, documentation, application and use, avoidance of complications, and the need for medical staff training, are included. To this end, nondestructive instrumental (vacuum and forceps), "corrective" instrumental (symphysiotomy), and destructive instrumental assisted vaginal deliveries are considered and carefully analyzed.

Key words: Corrective instrumental delivery; destructive instrumental delivery; instrumental delivery; instrumental vaginal delivery; medical personnel training; nondestructive.

Introduction

Globally, about 10%–20% of women are assisted in their deliveries.[1,2] The majority are caesarean sections with operative vaginal deliveries on the decline.[3-5] By 1920, more than 50% of all assisted vaginal deliveries were conducted by forceps. The subsequent three decades witnessed a decline in deliveries with forceps while caesarean section and vacuum deliveries were relatively on the increase.[6,7] The availability of various modalities of antepartum, intrapartum, and postpartum perinatal monitoring together with the developments in the fields of anesthesia, antibiotics, blood transfusion, surgical aids, and techniques have made caesarean section a very safe operation. These are good reasons, together with the issue of increasing litigations when the outcome of vaginal delivery is poor and unexpected, for the acceptance of caesarean section and the drastic fall in instrumental vaginal deliveries in developed countries.

In developing countries (Nigeria inclusive), prolonged neglected obstructed labor and difficult deliveries contribute a significant proportion of the extremely high maternal and perinatal mortality rates. Most health institutions neither have trained personnel nor adequate facilities to carry out caesarean section. And because of the hazards inherent in the conduct of abdominal surgery in these circumstances, women and their families are averse to caesarean sections. Many are less hostile toward other forms of assisted vaginal births that are not complicated by abdominal scars and untold morbidity. When in the mid-20th century, secondary level and tertiary health institutions evolved in many sub-Saharan African countries, and obstetric units needed to adapt to

Address for correspondence: Prof. Jacob A Unuigbe, Department of Obstetrics and Gynecology, College of Health Sciences, Igbinedion University, Okada, PMB 0006, Benin City, Nigeria.
E-mail: junuigbe@yahoo.com

Access this article online	
Website: www.tjogonline.com	Quick Response Code
DOI: 10.4103/TJOG.TJOG_49_18	

How to cite this article: Unuigbe JA, Agbon-Ojeme GE, Erhatiemwomon RA, Maduako KT. Instrumental vaginal deliveries: A review. Trop J Obstet Gynaecol 2018;35:99-107.

these peculiar needs of parturient women. Then, prowess in obstetric practice was judged by versatility in management of complicated obstructed labor and sequelae, notably by destructive instrumental vaginal deliveries.

While these procedures are considered obsolete by current obstetric practice standards, the need to retain some form of these assisted instrumental vaginal delivery practice is justified with the peculiar constraints inherent in the option for assisted abdominal deliveries. There is therefore a need for emphasis on training medical personnel and provision of equipment for assisted instrumental vaginal procedures rather than declaring them "obsolete." These instruments come in useful for *nondestructive*, *corrective*, and *destructive* assisted vaginal deliveries.

Nondestructive Instrumental Delivery

Vacuum extraction

History

Modern obstetric vacuum extraction (VE) originated from "cupping," a therapeutic technique that predates Hippocrates.[8] Applications of cupping to assist in deliveries were introduced in the 18th century by James Young Simpson, an Edinburgh professor of obstetrics who performed a successful vacuum delivery in 1849. This device (his "air tractor") was constructed of a metal syringe that was probably derived from a breast pump attached to a soft rubber cup. Since then, a number of vacuum delivery devices have been invented and successfully used by various clinicians.

Modifications of current devices are usually by the addition of incorporated hand pumps, pressure release valves or gauges, and other changes. Modern extractors are constructed of varying materials, including polyethylene, silastic, plastic, and stainless steel (Malmstrom, Medi Safe International, West Parmanand Colony, New Delhi). Several features found in all VE designs consist of mushroom-shaped vacuum cups of varying composition and depth, cup including a fixed internal vacuum grid or guard, and combined vacuum pump/handle or a vacuum port to permit a vacuum hose attachment, handle, wire, or chain for traction [Figure 1].

The vacuum extractor (ventouse) is available as manual or electrical equipment [Figures 2 and 3] and remains popular because of its ease of use, safety, and effectiveness in achieving satisfactory intrapartum care, thus preventing perinatal and maternal complications.

The most recent vacuum extractor, called the Kiwi Vacuum Device [Figure 4], is equipped with an omnicup. Its flexible stem and low-profile cup enable placement to correct the flexion point in the baby's head, no matter the fetal head position. It has the ability to correct malpositions of the fetal head easily. It is the latest adaptation of the Malmström equipment that can be operated by other healthcare staff other than the specialist obstetrician. It has the potential for use at primary healthcare service level in remote country side because its use requires minimal staff training.

Figure 1: Silastic (flexible) vacuum extractor

Figure 2: Manual vacuum device

Figure 3: Electric device

Epidemiology

The ideal vacuum delivery rate is unknown; however, it

Figure 4: Kiwi vacuum device

has been reported to be higher in developed countries. Rates of about 10%–15% and 4.5% are quoted from the United Kingdom[9] and the United States,[10] respectively. Much lower rates are reported from sub-Saharan Africa.[11] Institutional studies conducted in Nigeria show VE rates of 1.6% (Ilorin), 1.7% (Maiduguri), 1.5% (Zaria), and 3.5% (Benin City).[12] Similar studies from Abakaliki[13] showed a total of 764 (3.6%) VEs out of 20,997 total deliveries. Only four (0.1%) forceps deliveries were performed in the series. Disparity in the rates may be due to the differences in labor management procedures and obstetricians' experience.

Prerequisite for vacuum extraction

The safe use of vacuum extractor requires strict adherence to guidelines and prerequisites for the operation, good case selection and judgment, adequate skill and experience, mastery of the equipment, limitation of oneself to simpler procedures,[14-16] and obtaining informed consent, especially in the face of imminent danger to the fetus, mother, or both. The following conditions must be met: ruptured membranes; empty bladder, full cervical dilation; an engaged fetal head; exclusion of cephalopelvic disproportion; and confirmation of the station and position of the presenting fetal head.[17] Another prerequisite is the need for analgesia/anesthesia (pudendal block, epidural, spinal, saddle block).

Indications

There are maternal and fetal indications. *Prophylactic* maternal indications to cut short second stage of labor where mother cannot, or should not, bear the stress entailed in the second stage of labor, for example, hypertension, eclampsia, severe anemia, cardiac, and neuromuscular diseases resulting in lack of voluntary expulsive efforts. Obstetric conditions such as a previous caesarean section may call for elective vacuum delivery. *Prolonged second stage* is a common indication for ventouse delivery. In general, second stages of more than 2 h without and 3 h with epidural anesthesia, respectively, were the acceptable measures for nulliparous women. One hour less in each category was the limit for multipara. These time intervals are to be considered in conjunction with prevailing maternal obstetric and medical challenges, as well as fetal condition, in the second stage of labor.

With *fetal distress*, particularly in second stage of labor where there are no contraindications to vaginal delivery, vacuum delivery becomes the most expedient route of delivery, as it may be faster and reduce probable perinatal morbidity or mortality. Such instances usually involve a rapidly progressing labor when the maternal pelvis is adequate, the infant is normally presenting, the parturient is willing and able to assist, and an experienced obstetrician is present.

Contraindications to VE are the following: lack of birth attendant's experience with the use of the instrument, the inability to achieve a correct application of the instrument, inappropriate or wrong indications, uncertainty concerning fetal position and station, suspicion of cephalopelvic disproportion, fetal malpresentation (e.g., breech, face, brow), fetal coagulopathies, and with preterm delivery (notably with gestation less than 34 weeks).

Procedure

Having certified the needed prerequisite for VE, application of the instrument requires a ghost or phantom application. This is a mandatory step. In ghosting, the surgeon holds the vacuum cup in front of the perineum in the same angle and position expected once the extractor has correctly been applied to the fetal head. The cup is lubricated with sterile lubricant. If a soft cup is used, it may be partially collapsed by the operator's hand and introduced through the labia. Rigid cups are turned sideways, the labia are gently spread, and the device is slipped into the vagina and then positioned against the fetal head. Once the application is established and cup confirmed to be properly fixed to the fetal head with the mid-sagittal over the pivot point and no maternal tissue intervening between the cup and the fetal head, full vacuum is applied at a pressure of 550–600 mmHg and traction follows, parallel to uterine contractions.

The direction of pull on the traction handles changes as the fetal head traverses the pelvic curve. Traction efforts are timed to coincide with uterine contractions. As each contraction wanes, the tension on the extractor handle is relaxed. Attempting traction without the assistance of maternal bearing down efforts and/or a uterine contraction is inappropriate. These techniques simply predispose to failure and risk a fetal scalp injury from a pop-off. Continuous

vacuum throughout the procedure and intermittent vacuum with the vacuum released between contractions have been studied in a randomized trial. No differences exist between groups with regard to the speed of delivery, rates of instrument failure, or maternal or fetal outcomes.

During traction, the accoucheur places the non-dominant hand within the vagina with the thumb on the extractor cup and one or more fingers on the fetal scalp. He follows the descent of the head and can determine the changing angle for traction while gauging the relative position of the cup edge to the scalp. This helps detect cup separation. If the operator is uncertain that descent has occurred after traction effort, a maximum of two additional tractions may be attempted.[18]

Complications

Complications that may arise following vacuum delivery may be classified as fetal or maternal complications.

Fetal complications: Fetal injuries that commonly occur are subgaleal and subaponeurotic hemorrhage, scalp bruising, and lacerations. Clinically diagnosed scalp injuries occur largely because of the physics of VE. As the vacuum force is applied, the extractor draws the fetal scalp into the body of the cup. This produces the characteristic mound of scalp tissue and edema, the *chignon*, which may be identified after an extraction. Traction also tensions the scalp against its attachments to the fetal skull, drawing it in the direction of the cup. These effects predispose to bleeding within the substance of the scalp.

The two major types of scalp injury are the common, but clinically unimportant, cephalhematoma and the relatively rare but potentially life-threatening subgaleal hemorrhage. Scalp bruising or lacerations and retinal hemorrhages are additional, usually insignificant fetal risks of extraction procedures.

Maternal complications: Maternal injuries that do commonly occur are lacerations, stress incontinence which may be urinary or fecal. Perineal lacerations are common complications of all operative vaginal deliveries. Many tears are associated with episiotomy. Women who sustained vaginal lacerations in a previous delivery are at a significantly greater risk for a repeat laceration in subsequent deliveries. Women at greatest risk are those who experienced a laceration in the first delivery followed by another delivery combining both an instrumental delivery and an episiotomy. Delivery technique, skill, large babies, and poor application of instrument are important factors in perineal injury.[17,19]

Forceps delivery

Historical overview

When the obstetric forceps was invented by the Chamberlain family, as noted by Aimakhu *et al*,[20] it lacked a pelvic curve which prohibited its use in the upper part of the pelvis. Several modifications have been made over centuries, notably by Andre Levret in 1747 when he introduced the pelvic curve. Stephan Tarnier, a French Obstetrician, in 1877, added a traction system that gained worldwide popularity before introduction of caesarean section. Hundreds of forceps designs surfaced in the 19th century.[21] Over the past century, following the acceptance of caesarean section and its improved safety and introduction of the vacuum extractor, the conduct of forceps delivery has declined.[22]

Forceps delivery is the active application of the forceps to the fetal head with the aim of achieving fast and safe delivery of the baby. The forceps is a paired metal instrument with each half or leaf comprising the blade, shank, lock, and the handle. Studies conducted on operative vaginal deliveries in developing countries are institution-based, and coordinated approaches to the practice are lacking. In several institutional studies in Nigeria, the incidence of forceps deliveries was 1.57% (16 per 1000 births) at the UCH Ibadan;[23] between 0.11% and 0.46% at the Ilorin Teaching Hospital;[24] and from ABUTH, Zaria, 55.7% of 262 (3.6%) operative vaginal deliveries out of a total of 7,327 deliveries were by forceps deliveries.[25]

These dismally low forceps delivery rates are reinforced by the fear of neonatal injuries and subsequent litigations. Issues of litigation and practice guidelines relate to widespread concerns over the training of obstetricians. Training in the use of forceps has been further reduced with awareness that the sequential use of instruments (failed vacuum extraction followed by forceps) is inappropriate and associated with increased morbidity.[26]

A representative survey of obstetricians practicing in Nigeria on their inclination and preference in the conduct of assisted vaginal deliveries showed that delivery by forceps was 68.8%, destructive delivery 60.1%, VE 84.8%, symphysiotomy 41.7%, external cephalic version 68.0%, and vaginal breech delivery 85.5%.[26] Respondents shied away from vaginal operative deliveries for the following reasons: procedures were considered obsolete (32.6%), fear of litigation (32.7%), and lack of skills (16.6%).

Types of forceps

Typically, the forceps has two halves or leaves consisting each of the blade, shank, lock, and the handle [Figure 4]. The two leaves usually, but not always, cross at the midline called the articulation. This articulation is where either the locking mechanism (in majority of cases) or the sliding mechanism (for few cases) is situated. The articulation connects the handle of the forceps to the blade. Forceps with

a fixed lock mechanism are used for deliveries where little or no rotation is required, when the fetal head is in line with mother's pelvis. Forceps with a sliding lock mechanism is used for deliveries requiring fetal head rotation [Figure 5].[22]

All forceps are typed on the basis of modifications to these four basic parts of the forceps, namely, (1) classic forceps, with the usual cephalic and pelvic curves, with the English lock with the Simpsons forceps as prototype; (2) special forceps are those designed to solve specific problems, and the prototypes are the Pipers, Kielland [Figure 6], and Barton forceps.

The Kielland forceps[22] have no angle between the shanks and the blades and have a sliding lock. The pelvic curve of the blade is identical to all other forceps. The sliding mechanism at the articulation can be helpful in asynclitic births, when the fetal head is tilted to one side and one parietal bone overrides the other.[27] Wrigley's forceps [Figure 7] are used for low or outlet deliveries when the maximal diameter is about 2.5 cm above the vulva.[28] Pipers forceps have a perineal curve to allow application to the after-coming head in breech delivery. Simpson's forceps have elongated cephalic curve to adapt to the sufficiently molded fetal head. They are the most commonly used forceps.

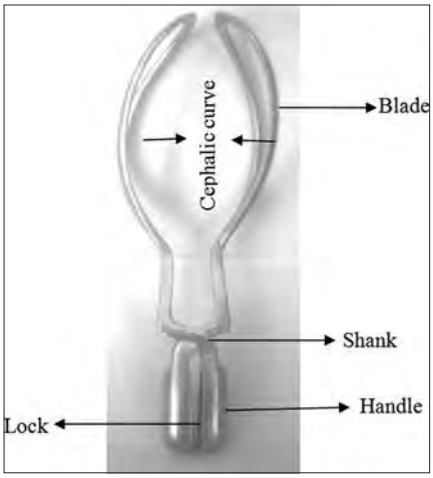

Figure 5: Parts of forceps

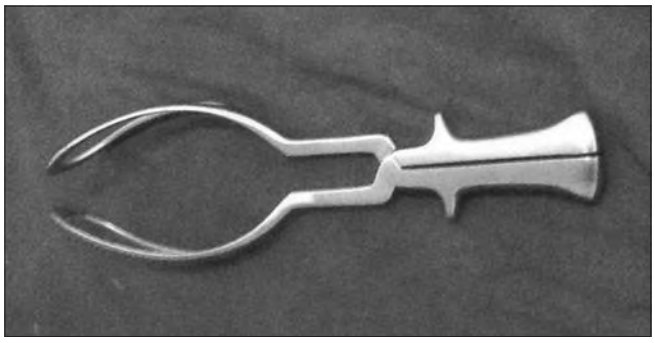

Figure 7: Traction (Wrigley's) forceps

Functions of the forceps in assisted vaginal delivery

The primary functions of the forceps are traction and rotation. Traction is the pulling of the fetal head with the forceps in place with uterine contractions either for assistance in the terminal phase of labor or to deal with arrest with a favorable fetal cephalic diameter presenting.

The conduct of forceps *traction* delivery entails passing the index and middle fingers of the right hand over the cross bars of the handle from above and applying traction in place with contraction peaks in line with the birth canal axis without bracing the leg against the delivery table and without using other muscles except that of the flexed forearm. *Rotation* forceps delivery entails rectification of unfavorable presentation and position of fetal head, after excluding disproportions, to normal occipito-anterior position before traction. Other functions of the forceps are protective when used to guide the head of premature baby and aid fetal head compression in destructive procedures. These last two functions are however obsolete.

Figure 6: Rotational (Kielland's) forceps

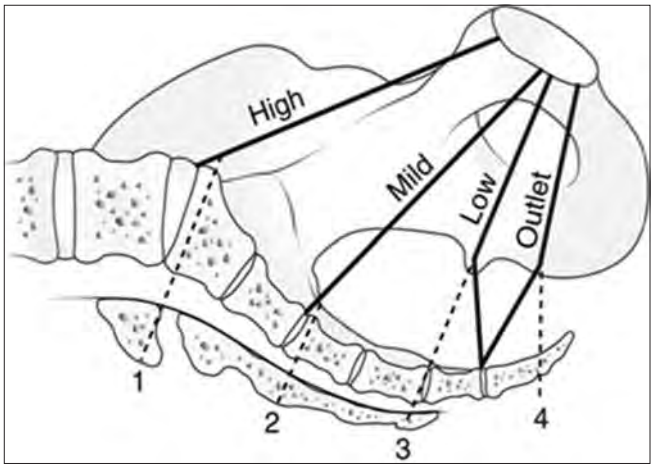

Figure 8: The obstetric planes of the pelvis and forceps classifications

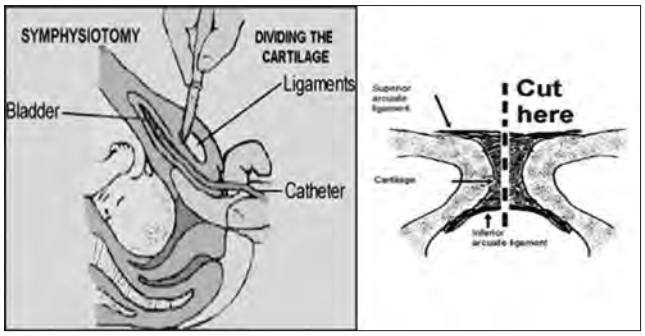

Figure 9: Symphysiotomy – anatomical description

Classifications

There are several classifications of forceps delivery.[22,27,29,30] The modified ACOG classification [Figure 8] summarized below has gained wide acceptance.

1. **Outlet forceps delivery**: This is when the forceps is applied with the maximum fetal biparietal diameter having passed the pelvic floor and the sagittal suture is in the anteroposterior position and fetal scalp is visible at the introitus (#4 in Figure 8)
2. **Low-cavity forceps delivery**: This is the use of the forceps to effect delivery when the fetal biparietal diameter has reached the pelvic floor and not higher than station 0 + 3. This may involve both rotation and traction if the saggital suture is oblique (#3 in Figure 8)
3. **Mid-cavity delivery**: The forceps is used to effect delivery with the fetal biparietal diameter between stations 0 − 0 and 0 + 2. The head is engaged (#2 in Figure 8)
4. **High-cavity forceps delivery**: This is the use of forceps when the fetal head is not engaged. This is dangerous and constitutes an absolute contraindication to forceps delivery (#1 in Figure 8). This type of forceps delivery is not recommended in modern obstetrics. Efforts are consented in outlet and low-cavity forceps to limit injury to the fetus and the mother.

Other classifications[31,32] have evolved with forceps use: *prophylactic forceps delivery*, the use of forceps to prevent injuries to the fetal head and maternal pelvic floor and to reduce maternal stress, usually an outlet delivery; *trial of forceps delivery*, tentative use of the forceps with traction, which is abandoned with the slightest resistance noticeable; *failed forceps delivery* which occurs when there is abandonment of an attempt to achieve successful forceps delivery after meeting the prerequisite criteria for forceps delivery. Caesarean section is usually the next option.

Indications for forceps delivery

The obstetrician should be familiar with all the standard instruments and must settle for the appropriate forceps for use, rotation, traction, or delivery of the after-coming head in breech delivery. The indications for forceps delivery include the following:

Maternal indications: Delay in the second stage due to uterine inertia, failure of progress of labor for more than 20–30 min, with the head on the perineum, maternal distress, pre-eclampsia, heart diseases, and neurological disorders where voluntary efforts are contraindicated or impossible; *fetal indications*: fetal distress in second stage when prospect of vaginal delivery is safe, abnormal heart rate pattern, cord prolapse in second stage, and after-coming head of a breech delivery.

The criteria for forceps delivery

The criteria that must be fulfilled before forceps delivery include the following: assured experience of the obstetrician; the cervix must be fully dilated; the head must be engaged with the position ascertained; the membranes must be ruptured; gross cephalopelvic disproportion must be ruled out; the bladder must be emptied; and the rectum may be emptied.[33] Forceps must be conducted with appropriate analgesia.

Complications

The complications of the forceps can be summarized as follows: *maternal* – increased risk of perineal, vaginal and cervical lacerations, and uterine rupture, with consequent postpartum hemorrhage, pelvic organ prolapse, and incontinence; increased postnatal recovery time and pains; urinary bladder and rectal incontinence in early puerperium.[31] *Fetal* complications following forceps delivery are inconsistent and include trauma (cuts and bruises) to the head and face; facial nerve injury; rarely, clavicular fracture; intracranial hemorrhage; improper twisting of the neck; and cerebral palsy.

Advantage of the forceps delivery

Advantages of forceps include avoidance of caesarean section; general applicability whenever it is cephalic presentation; reduction in delivery time; and shorter hospital stay. The main advantages of the forceps over caesarean section are absence of major obstetric hemorrhage, more likelihood of subsequent spontaneous vaginal delivery, and shorter hospital stay. Compared to vacuum delivery, the main advantages are more expedient delivery in face of fetal distress.

Corrective Instrumental Delivery

Symphysiotomy

Symphysiotomy [Figure 9] is a surgical procedure in which the cartilage of the pubic symphysis is divided to widen the pelvis allowing delivery of the fetus when there is a mechanical problem.[34] It is also known as pelviotomy or synchondrotomy.[35] This allows the two halves of the

pelvis to separate 2–2.5 cm increasing the transverse pelvic diameter by 0.6–0.8 cm. Some authors[36-38] have advocated symphysiotomy as an alternative to caesarean section especially in the developing countries when there is mild to moderate cephalopelvic disproportion or to prevent the entrapment of the after-coming head.[39] Some studies in a rural setting showed a high maternal mortality (0.5%–5%) following caesarean section by inexperienced medical personnel, and a 0.3%–6.8% incidence of uterine scar rupture in future pregnancy.[40]

Symphysiotomy was first described in 1597 by Severing Pineau.[41] Its use was popularized by the Irish Roman Catholic Community to forestall the possible limitation of family size by the use of caesarean section. There are reports of its practice in some African countries by traditional healers.

Technique

There are two ways – *Open*: through an incision which is large enough for the surgeon to visualize and feel exactly what he does and *closed*: through an incision which is only just large enough to admit the blade of a scalpel. However, this procedure is based on Seedat–Crichton method[42] in the sense that complete division of the symphysis is done instead of partial. This is to prevent forceful abduction that could occur in partial divisions that could damage the sacro-iliac joints resulting in permanent pelvic instability and pain.

Indications are mild or moderate cephalopelvic disproportion especially in failed vacuum extradition; obstructed labor with a live fetus with the head deeply jammed into the mother's pelvis that might be difficult to extract during caesarean section; prolonged second stage, if the criteria for symphysiotomy are met; and delivery of arrested after-coming head of breech when VE is unlikely to succeed.

Contraindications include severe cephalopelvic disproportion; malpresentations, except after-coming head of a breech presentation; a dead fetus; a previous caesarean section; abnormalities of the mother legs or spine; severe obesity is a relative contraindication; fetal macrosomia; and if the cervix is not fully diluted.

Complications

Maternal mortality following symphysiotomy is very rare. Maternal complications encountered are vesico-vaginal fistula, osteitis pubis/retropubic abscess, walking disability, and stress incontinence.

Destructive Obstetric Operations

These are surgical procedures designed at reducing the size of the head, shoulder girdle, or trunk of the dead fetus to allow its vaginal delivery.[43] This practice has been virtually abandoned in contemporary obstetric practice in favor of caesarean section, because of its improved safety. These skills are still very relevant in developing countries that are still saddled with high incidence of prolonged obstructed labor due to fetal cephalopelvic disproportion, complicated malpresentations, and abnormal lie that can be relieved by these procedures.[44,45]

In a 15-year retrospective hospital study from Eastern Nigeria, 2,947 cases of obstructed labor were recorded.[46] Although 67 of these cases required destructive vaginal delivery, only 11 (16.4%) were performed. In a 25-year retrospective study from India, out of 85,952 deliveries, 25,474 (29.63%) were by caesarean section, 8,826 (10.26%) by operative vaginal deliveries consisting of 230 (0.26%) destructive vaginal deliveries – 202 (87.89%) craniotomies, 13 (5.7%) decapitations, and 8 (3.6%) embryotomies.[47] A 10-year review of destructive operations at the University College Hospital, Ibadan, Nigeria, revealed an incidence of 0.48%.[48] Figures reported from Lagos University Teaching Hospital and Zaria, are 0.2%–0.3% and 1.4%, respectively.[44,49]

The *indications* for destructive deliveries almost invariably revolve around neglected and prolonged obstructed labor, the type of which is rarely experienced in urban settings these days. Nevertheless, they still occur in the vast rural tropical and subtropical African country side. When such hapless women present in hospital, they require very careful considerations. Before embarking on destructive procedures, it must be confirmed that the fetus is dead. Exceptional cases include severely malformed and compromised fetuses.

Specific indications are hydrocephalus, retained after-coming head of a dead fetus, cephalopelvic disproportion with a dead fetus, impacted malpresentation with dead fetus as mento-posterior and brow presentations, and fetal anencephaly associated with large shoulder girdle.

Generally, the major procedures are as follows:

1. Craniotomy
2. Decapitation
3. Cleidotomy
4. Evisceration
5. Spondylotomy.

Broadly, indications for destructive operations are encapsulated in the following conditions. Hydrocephalus with a dead fetus, malpresentation as mento-posterior or a brow presentation, transverse lie with hand prolapsed, mild cases of cephalopelvic disproportion with a dead fetus, retained after-coming head of a dead fetus, and

some cases of shoulder dystocia with dead fetus whereby cleidotomy could be offered. Suffice it to state that under the following conditions, destructive vaginal deliveries are strictly *contraindicated*: live fetus except for anencephalic fetus as earlier indicated, severely contracted pelvis, partially dilated cervix, ruptured uterus, presence of an obstructing pelvic tumor, cancer of the cervix, patients disapproval, and lack of requisite experience for the procedure.

Craniotomy simply means perforation of the fetal cranium to let out the content of the brain is the comment of the destructive operation performed per vaginam. Further crushing of the cranium known as *cranioclasm* could be required to achieve this purpose. Crushing of the cranium with the base of the skull is known as *cephalotripsy* which is sometimes done when simple craniotomy to release the brain matter does not decompress the brain enough for vaginal delivery.

The crucial point in this procedure is for the attending obstetrician to be very conversant with various sites of perforation, depending on the type of presentation because it is key to achieving a successful outcome. For vertex presentation, the site of perforation is the anterior fontanelle or the parietal bone. For the after-coming head, the following sites are applicable, through the roof of the month, the foramen magnum, the occipital bone behind the mastoid, and through the spinal bifida if present by a stiff catheter passed up to the spinal canal. In cases of face and brow presentations, the sites are through the orbit and frontal bone, respectively.

Other destructive procedures

Cleidotomy: It is a procedure embarked upon to break both clavicles to reduce the biacromial diameter to facilitate delivery of the dead fetus in shoulder dystocia when the other maneuvers have failed.

Evisceration: This is an incision either on the abdomen or the thorax to evacuate its visceral contents thereby reducing its size for easy delivery per vaginam. This procedure is done in cases of fetal ascitis or tumor of the abdomen or the thorax.

Spondylotomy: A condition in which the vertebra column is divided by embryotomy scissors in to two halves. It is sometimes indicated for impacted transverse lie when the neck is inaccessible or done in addition to evisceration when the fetus is large or presence of pelvic deformity.

Complications of destructive vaginal delivery

Maternal mortality associated with destructive operations is very rare. The following maternal complications can occur: puerperal sepsis, postpartum hemorrhage, vaginal/cervical lacerations, perineal tear, ruptured uterus, bladder laceration, vesico-vaginal fistulae, recto-vaginal fistulae, endotoxic shock, and puerperal psychosis.

Postoperative care

An intravenous drip should be in place for at least 24 h; the patient should be covered with prophylactic antibiotics and have continuous urinary bladder drainage with an indwelling catheter for at least 10 days.

Conclusion

In contemporary obstetric practice, instrumental vaginal deliveries, including vacuum and forceps deliveries, symphysiotomy, and destructive obstetric vaginal operations, have severely diminished as a result of improvement in the safety of caesarean section coupled with the need to avoid litigations. However, there is still some relevance of these practices in low-resource settings for reasons earlier enunciated. Consequently, there is urgent need to re-educate obstetricians and improve proficiency in these vaginal procedures to reduce the burden on rural women and, by extension, reduce maternal morbidity and mortality associated with complicated obstructed labor.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Hillier CEM, Johanson RB. Worldwide survey of assisted vaginal delivery. Int J Gynecol Obstet, November 1994;47:109-14.
2. Notzon FC. International differences in the use of obstetric interventions. J Am Med Assoc 1990;263:3286-91.
3. Bofill JA, Rust OA, Perry KG, Roberts WE, Martin RW, Morrison JC. Forceps and vacuum delivery: A survey of North American residency programs. Obstet Gynecol 1996;88:622-5.
4. Zahniser SC, Kendrick JS, Franks AL, Saftlas AF. Trends in obstetric operative procedures, 1980 to 1987. Am J Public Health 1992;82:1340-4.
5. Bowes WA, Katz VL. Operative vaginal delivery: Forceps and vacuum extractor. Curr Probl Obstet Gynecol Fertil 1994;17:81-112.
6. Thompson JP. Forceps deliveries. Clin Perinatol 1995;22:953-72.
7. Bergsjo P, Schmidt E, Pusch D. Differences in the reported frequencies of some obstetrical interventions in Europe. Br J Obstet Gynaecol 1983;90:628-32.
8. O'Grady JP. Instrumental delivery: A critique of current practice. In Nichols D, editor. Gynecologic, Obstetric, and Related Surgery. Mosby; 2000. p. 1081-105.
9. Royal College of Obstetricians and Gynaecologists. Operative Vaginal Delivery. Guideline No. 26; 2005.
10. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Kirmeyer S, *et al*. Births: Final data for 2006. Natl Vital Stat Rep 2009;57:1-102.

11. Bailey PE. The disappearing art of instrumental delivery: Time to reverse the trend. Int J Gynaecol Obstet 2005;91:89-96.
12. Mairiga AG, Kyari O, Audu BA. Instrumental vaginal deliveries at the University of Maiduguri Teaching Hospital, Nigeria. Trop J Obstet Gynaecol 2005;22:42-5.
13. Onoh RC, Ezeonu PO, Chijioke O, Onoh TP, Saidu AK, Ezeou CT. Disappearing art of forceps delivery and the trend of instrumental vaginal deliveries at Abakaliki, Nigeria. Afr J Med Hlth Sci 2014;13:99-104.
14. Chukudebelu WO. Instrumental delivery. In: Agboola A, editor. Textbook of Obstetrics and Gynaecology for Medical Students. Lagos University Services Educational Publishers Ltd; 1998. p. 232-9.
15. Odoi AT, Opare-Addo HS. Operative vaginal delivery, forceps delivery and vacuum extraction. In: Kwawukume EY, Emuveyan EE, editors. Comprehensive Obstetrics in the Tropics. 1st ed. Dansoman (Ghana): Dansoman, Asante and Hittscher Printing Press Ltd; 2002. p. 340-51.
16. Chukudebelu WO. The vacuum extractor Nigerian experience. Trop J Obset Gynaecol 1980;1:63-5.
17. Peleg D, Kennedy CM, Merrill D. Risk of repetition of a severe perineal laceration. Obstet Gynecol 1999;93:1021-4.
18. Vacca A. Vacuum-assisted delivery. Best practice. Res Clin Obstet Gynaecol 2002;16:17-30.
19. Baume S, Cheret A, Creveuil C, Vardon D, Herlicoviez M, Dreyfus M. Complications of vacuum extractor deliveries. J Gynecol Obstet Biol Reprod (Paris) 2004;33:304-11.
20. Aimakhu CO, Olayemi O, Enabor OO, Oluyemi FA, Aimakhu VE (Late). Forceps delivery at the University College Hospital, Ibadan, Nigeria. West Afr J Med 2003;22:222-4.
21. Anate M. Instrumental (operative) vaginal deliveries: Vacuum extraction compared with forceps delivery at Ilorin University Teaching Hospital, Nigeria. West Afr J Med 1991;10:127-36.
22. Adaji SE, Shittu SO, Sule ST. Operative vaginal deliveries in Zaria, Nigeria. Ann Afr Med 2009;89:95-9.
23. Anozie BO, Osaheni LL, Onu FA, Onoh RC, Ogah EO, Eze JN, *et al*. Declining rate of operative vaginal deliveries in Nigeria. Open J Obstet Gynecol 2018;8:10.
24. Moore, W. Keeping mum. Br Med J 2007;334.
25. Robson, S. Forceps delivery: Science wears its art on its sleeve. O and G Magazine 2009;11:19-20.
26. Towner D, Castro MA, Eby-Wilkens E, Gilbert WM. Effect of mode of delivery in nulliparous women on neonatal intracranial injury. N Engl J Med 1999;341:1709-14.
27. Lindow SW, Hayashi R. Assisted vaginal delivery. In: James DK, Steer PJ, Weiner CP, Gonik B, editors. High Risk Pregnancy, Management Options, chapter 72. 4th ed. St Louis, MO: Elsevier Saunders; 2011, p. 1245-59.
28. Revah A, Ezra Y, Farine D, Ritchie K. Failed trial of vacuum or forceps – Maternal and fetal outcome. Am J Obstet Gynecol 1997;176:200-4.
29. Chamberlain G, Steer P. ABC of labour care: Operative delivery. Br Med J 1999;318:1260-4.
30. ACOG Practice Bulletin No. 154. Operative vaginal delivery. Committee on Practice Bulletins – Obstetrics. Obstet Gynecol 2015;126:e56-65.
31. Johanson RB. Instrumental Vaginal Delivery. London: Royal College of Obstetricians and Gynaecologists; 2000.
32. Johanson RB, Menon V. Vacuum extraction versus forceps for assisted vaginal delivery. Cochrane Database Syst Rev 2000;(2):CD000224.
33. Vacca A. The trouble with vacuum extraction. Curr Obstetr Gynaecol 1999;9:41-5.
34. Lawson JB. Obstructed labour. In: Lawson JB, Stewart DB, editors. Obstetrics and Gynaecology in the Tropics and Developing Countries, chapter 11. London: Edward Arnold Ltd.; 1967. p. 189-93.
35. Drife, J. The start of life: A history of obstetrics. Postgrad Med J 2002;78:311-5.
36. The American Heritage Stedman's Medical Dictionary Retrieved; March 22, 2012, from Dictionary.com.
37. Zarate E. Subcutaneous Partial Symphysiotomy. Buenos Aires: TICA; 1992.
38. Menticoglon SM. Symphysiotomy for the trapped after-coming parts of the breech. A review of literature and a plea for its use. Aust NZ Obst Gynaecol 1990;30:1-9.
39. Roosmalen JV. Symphysiotomy as an alternative to caesarean section. Int Gynaecol Obstet 1987;25:451-8.
40. Roosmalen JV. Maternal health care in the South Western Highland of Tanzania. PhD Thesis, Leiden, 1988.
41. Dumont M. La Longue et Laborieuse naissance de la symphyseotomie on de Severin Pineau a Jean-Rene Sigant J. Gynecol Obstet Biol Reprod 1989;18:11-21.
42. Seedat EK, Crichton D. Symphysiotomy technique, indications and limitations. Lancet 1962;1:554-9.
43. El Mowafi DM. Obstetric Simplified. Geneva; Foundation for Medical Education and Research; 2017.
44. Harrison KA. Approaches to reducing maternal and perinatal mortality in Africa. In: Philport RH, editor. Maternity Services in the Developing World. What the Community Needs. London: RCOG; 1980. p. 52-69.
45. Monjok E, Okokon IB, Opiah MM, Ingwu JA, Ekabua JE, Essien EJ. Obstructed labour in resource poor settings: The need for revival of symphysiotomy in Nigeria. Afr J Reprod Health 2012;16:94-101.
46. Ezugwu FO, Anya SE, Onah HE, Okaro JM. Are destructive operations still relevant in developing countries? Trop J Obstet Gynecol 2002;19:90-2.
47. Sikka P, Choppa S. Destructive operations – A vanishing art in modern obstetrics: 25 year experience at a tertiary care center in India. Arch Gynecol Obstet 2011;283:929-33.
48. Otolorin EO, Adelusi B. Destructive operations in difficult labour. Trop J Obstet Gynaecol 1981;2:73-9.
49. Giwa-Osagie OF, Azzan BB. Destructive operations. In: Studd J, editor. Progress in Obstetrics and Gynaecology. Edinburgh: Churchill Livingstone; 1987. p. 211-21.