
ANALYSIS OF VENTOUSE DELIVERIES AT TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Background:-Instrumental deliveries are conducted to assist or expediate the delivery of the baby in second stage of labour. Ventouse deliveries are on rise due to its preference over obstetric forceps. Relative safety and requirement of less technical skill could be the two main reasons for its preference over forceps.

Material and Methods:-It was a retrospective analysis of 52 ventouse deliveries conducted from October 2010 to March 2012 at Pravara rural Hospital .Information about the ventouse deliveries was obtained from labour room register and individual indoor case file. Analysis of data was done to find out the incidence and maternal and fetal outcome in ventouse deliveries.

Results:-The incidence of ventouse deliveries was 0.73%.Common indications of ventouse application were maternal exhaustion, previous caesarean section, fetal distress and eclampsia. Six percent cases had ventouse related complications. One case had third degree perineal tear and one baby had cephal hematoma and intracranial hemorrhage. Failure of ventouse, requiring caesarean section was observed in 4% of cases. Apgar score of babies delivered by ventouse, performed for prolonged second stage was lower, than when it was performed for prophylactic indication. Overall neonatal outcome was satisfactory. Duration of hospital stay was not affected by ventouse delivery.

Conclusion:-Careful selection of cases and adequate training of postgraduate students during residency under direct supervision of senior experienced obstetrician can reduce the rate of failed ventouse and related complications.Ventouse remains a good alternative to obstetric forceps in situation like proloned second stage and those situations which demand shortening of second stage of labour.

Keywords: Ventouse delivery, Instrumental delivery, Perineal tear, Still births, Birth trauma

1. Introduction:

Instrumental or assisted vaginal birth is commonly used to expedite birth, for the benefit of either mother , baby or both.¹ It is sometimes associated with significant complications .Instrumental or 'assisted' vaginal birth is a frequently and widely practiced obstetric intervention, accounting for 11% of births in the UK². There are widespread procedural variations in assisted vaginal birth that depend on many factors. Operator choice is foremost among these, and this in itself is governed by the clinical scenario, local practice, geographical location, and occasionally consumer preference. The clinical

indications for an assisted birth take into account maternal and fetal wellbeing. Maternal indications include exhaustion following prolonged labour, failure to progress in the second stage of labour, and medical conditions such as pre-eclampsia, placental abruption, or acquired or congenital heart disease. Fetal indications are fetal distress in the second stage of labour due either to the maternal condition or occurring independently of it. Other factors which must be taken into account are the station and position of the presenting part, moulding of the fetal head, comfort, morale and co-operation of the mother, as well as experience of the operator and the availability of

the necessary equipments¹. Last few decades have witnessed rise in the number of ventouse deliveries among instrumental deliveries.^{3,4,5} Present study was aimed at critically analyzing the ventouse deliveries in regards to its incidence, indications and maternal and neonatal outcome at tertiary care teaching hospital.

2. Material and Methods:-

2.1.-Material -Retrospective analysis of all ventouse deliveries conducted at Pravara Rural hospital from 1st October 2010 to 31st March 2012 was done. Pravara Rural hospital is the only tertiary hospital located in Ahmednagar district of Maharashtra, where all obstetric complicated cases are referred from nearby townships and villages. Cases are referred by government, primary health centers, rural hospitals, general practitioners allopathic and ayurvedic both, and gynaecologists. The hospital is well equipped with 24 hrs availability of gynaecologist, anaesthesiologist, paediatricians, NICU, blood bank and operation theatre facilities.

2.1.1 Inclusion Criteria-

a) All cases who have undergone ventouse delivery either for prophylactic reason or for therapeutic reason.

2.1.2 Exclusion Criteria-

a) Cases of failed ventouse requiring other operative intervention like forceps or caesarean section.

2.2-Methodology-As per the protocol of the department, all normal deliveries are conducted by residents or post graduate students. Complicated delivery cases are conducted by consultants. Operative deliveries are conducted by senior doctors or by post graduate students, under direct supervision of senior doctors. Silastic or metal cups are being used for ventouse delivery as per the preference of the attending obstetrician. All deliveries were attended by post graduate students from paediatrics. Neonatal intensive care unit is present in close vicinity of the labour room complex. Genuineness of the need for ventouse delivery is ascertained by senior obstetricians. Wide right mediolateral episiotomy is routinely given before ventouse application. Post delivery cervical and vaginal exploration to rule out traumas has been a routine protocol of the unit. Prophylactic antibiotics in the form of Cap. Ampicillin or combination of Ampicillin

and Cloxacillin is given to all cases undergone ventouse delivery. Episiotomy wound is daily observed for evidence of any infection or other complications like hematoma, cutting through of skin sutures etc. Women are asked to keep the perineum clean and dry during immediate post natal period following ventouse delivery. Women are kept in hospital for at least four days after ventouse delivery. All newborn babies are resuscitated and managed by resident doctors in paediatrics and complicated cases by consultant in neonatology. All babies are kept with mothers as rooming in policy. In order to avoid unnecessary delay, all postgraduate students have been instructed to inform the consultant on call, when second stage gets prolonged for more than 45 minutes.

3. Results:

During the study period of eighteen months, there were 7245 deliveries, of which 5690 (78.53%) were normal vaginal deliveries, 1495 (20.63%) were caesarean sections and 60 (0.85%) were instrumental deliveries. Among instrumental deliveries, 52 (86.66%) were ventouse deliveries and 8 (13.34%) were forceps deliveries. (**Table.1**) In the present study, ventouse deliveries were carried out, when station of head was either at +1 or +2. In seventy percent cases, ventouse was applied by junior consultant and thirty percent by resident doctor under supervision of consultant. Approximately 65% cases were primigravidas and remaining were multigravidas. With increasing parity, the incidence of ventouse delivery decreased. (**Table.2**) In fifty percent cases each, ventouse was applied for prophylactic indications and therapeutic indications. Previous caesarean section and maternal exhaustion were the commonest indications for ventouse application. (**Table.3**) Eight percent cases had either perineal or cervico vaginal tears that required suturing. There was one case of third degree perineal tear. Two cases required blood transfusion for atonic postpartum hemorrhage following ventouse delivery. Two cases had episiotomy wound related complication in the form of wound dehiscence requiring resuturing. (**Table.4**) Ten babies (19.23%) had morbidity in the form of birth asphyxia, meconium aspiration or birth trauma. There were two neonatal deaths and one fresh stillbirth. (**Table.5**)

Table.1 Information regarding mode of delivery during study period

Sr.No	MODE OF DELIVERY	NO.OF CASES	PERCENTAGE
1	NORMAL VAGINAL	5690	78.53
2	CAESAREAN SECTION	1495	20.63
3	VENTOUSE DELIVERY	52	00.71
4	FORCEPS DELIVERY	08	00.14

Table.2 Paritywise distribution of ventouse deliveries

	GRAVIDA	NO OF CASES (n=52)	PERCENTAGE
1.	G-1	33	63.46
2.	G-2	16	30.76
3.	G-3	02	03.84
4.	G-4 & ABOVE	01	01.92

Table.3 Indications for ventouse delivery

SERIAL NO.	INDICATION	NO.OF CASES (n=52)	PERCENTAGE
1.	PREVIOUS CAESAREAN SECTION	11	21.15
2.	HEART DISEASE	04	7.69
3.	SEVERE HYPERTENSION	08	15.38
4.	SEVERE ANAEMIA	02	03.84
5.	MATERNAL EXHAUSTION\ POOR MATERNAL BEARING DOWN	13	25.00
6	RIGID PERINEUM	06	11.53
7	FOETAL DISTRESS	05	09.61
8	SECOND OF THE TWINS	03	05.76

Table.4 Maternal morbidity in ventouse delivery

Sr.No	MATERNAL MORBIDITY	NO.OF CASES (N=52)	PERCENTAGE
1	EXTENSION OF EPISIOTOMY	02	3.84
2	VAGINAL\CERVICAL LACERATION	02	3.84
3	POSTPARTUM HEMORRHAGE	01	1.92
4	NEED FOR BLOOD TRANSFUSION	01	1.92
5	EPISIOTOMY WOUND COMPLICATIONS	02	3.84

Table 5 Neonatal morbidity and perinatal mortality

Sr.No	MORBIDITY/MORTALITY	NO.OF CASES(N=52)	PERCENTAGE
1	BIRTH ASPHYXIA	04	7.69
2	BIRTH TRAUMA	02	3.84
3	MECONIUM ASPIRATION	04	7.69
4	NICU ADMISSIONS	10	19.23
5	STILLBIRTHS	01	1.92
6	NEONATAL DEATHS	02	3.84

4. Discussion:-

Historically, the obstetric forceps, which preceded the development of the ventouse by many decades, was the primary instrument used. However, more recently this has been superseded by the ventouse in some countries³. In the United Kingdom there has been an increasing use of vacuum compared to forceps^{4,5}. Where the clinician has access to more than one type of instrument, their choice is determined by the clinical scenario in terms of examination findings and, where maternal or fetal compromise is anticipated, the speed with which delivery must be performed. In the present study, incidence of ventouse delivery was almost five times more than forceps delivery. This change in the trend goes hand in hand with the observations of above mentioned studies^{3,4,5}. Ventouse application is preferred over forceps as it requires less technical skill and cause less complications. Improvisation in the equipments used for ventouse, has also been the reason for its preference over forceps. Main indications for ventouse delivery are fairly common in most of studies. To cut short the second stage of labour in cases of previous caesarean section, for the fear of scar dehiscence during vaginal birth in properly selected cases and cases of severe pre eclampsia and eclampsia or heart diseases. Ventouse is applied when the head is on perineum or at +1 station. It did reduce the need for maternal bearing down and curtailed the duration of second stage of labour. The most common complications of assisted vaginal birth for the mother involve perineal trauma. Life-threatening complications are very rare.⁶ Perineal trauma is associated with both the use of instruments to assist birth and the use of episiotomy. There is a growing perception that episiotomy may be needed less often for the ventouse than for forceps and that episiotomy rates can be reduced by using the ventouse in preference to forceps. For outlet or low vacuum extractions, episiotomy is indicated only as for unassisted vaginal births. For skilled operators, episiotomy may be reduced, but additional pulls and stronger traction force may be required to deliver a baby through an intact perineum, particularly if the mother is having her first baby⁷. Rates of third degree perineal tears (when the tear extends into the anal sphincter) are greater with forceps deliveries than with ventouse. For the ten year period, 1991-2000, in Scotland, rates of third degree tears were: ⁶ Spontaneous

vertex deliveries 5.4/1000, ⁶ Forceps deliveries 16.1/1000, ⁶ Ventouse deliveries 9.9/1000⁸. Fortunately, most of the complications are fairly superficial and of short duration. For example, marks on the baby's face are common with forceps, there may be a 'chignon', with a metal or rigid cupped ventouse and the baby may have scalp lacerations or bruising with either instrument. Fortunately, most soft tissue injuries last only a short time and are of no long term consequence. Mode of delivery and birth injury data for over 580,000 live-born, first-born singletons with birth weights of 2500 to 4000g have been collected. Babies whose birth was assisted by forceps or ventouse had a significantly higher rate of intracranial haemorrhage, brachial plexus injuries, convulsions, central nervous system depression and the need for mechanical ventilation, compared with those born spontaneously⁹. However, there were no significant differences in the rates of the more severe neonatal injuries, when comparing babies born by caesarean during labour (0.25 per 1000), those assisted by ventouse (0.15 per 1000) or forceps (0.26 per 1000). Subgaleal haematoma, which is quoted as occurring in 1-4% of babies born with vacuum extraction⁷, is the most important life-threatening complication of this mode of delivery¹⁰. When subgaleal haematoma occurs, blood from damaged blood vessels can accumulate in a large space from the ridges above the baby's eyes to the nape of the neck and laterally from ear to ear. The blood loss may be large and may result in haemorrhagic shock and death. It can spread quietly and unnoticed over the first hours or days after birth. Early recognition and treatment are essential¹¹. Subgaleal haematoma can occur when the delivery has not been particularly difficult and traction not prolonged or excessive¹². Cephalhaematoma, another less serious complication (discussed in part I), occurs more commonly with the ventouse, but also with forceps. In the trials included in the Cochrane review comparing the two instruments, it occurred in 9.8% of ventouse assisted births and 4.1% of forceps¹⁴. The incidence of cephalhaematoma reported in trials comparing different vacuum cups was 4.8% for soft and 7.0% for rigid cups, not a statistically significant difference¹⁴. No specific treatment is required for the haematoma, which will resolve spontaneously. The likelihood of

serious injury to the baby is increased when forceps or ventouse is followed by a failed operation with the alternative instrument^{15,9}. In a cohort study to assess maternal and neonatal morbidity following operative delivery in second stage, the use of multiple instruments was associated with increased neonatal trauma¹⁶. In the same study, more than three pulls at attempted instrumental delivery was associated with increased serious trauma in the baby for completed and failed deliveries. An excessive number of pulls and multiple instrument use both occurred more frequently when care was being provided by less experienced doctors¹⁶. Caesarean section is relatively easy to perform. Assisted vaginal birth has the potential to be the most complex and difficult of all obstetric procedures¹⁷, yet in expert hands an assisted vaginal birth can also be safe for the baby and avoid long term consequences for the mother, some of which are inherent in caesarean section. On the one hand, caesarean sections performed in the second stage of labour are not infrequently traumatic and are associated with significant morbidity and mortality¹⁸. And a successful, assisted vaginal birth may increase the likelihood of an uncomplicated normal birth in a subsequent pregnancy^{19,20}. Operative birth has been associated with considerable maternal morbidity, including depression, guilt, regret, loss of esteem, prolonged pain, discomfort infection, grief reactions, feeling of violation and dissatisfaction with care. Women were significantly more likely to report at least one health problem at 0-13 days, eight weeks and two to 18 months after an assisted vaginal birth than after a normal or a caesarean birth. Painful perineum, constipation, piles and stitches breaking down were particularly common²¹. In comparison with forceps, women who birthed with the assistance of the ventouse reported less pain but had more worries about their babies²². However, there is a place of assisted vaginal birth in appropriate circumstances; with a skilled practitioner carrying out the procedure.⁶ Vacuum extraction may be associated with lower rates of perineal trauma but leads to fetal chignon and cephalhematoma. From a maternal viewpoint assisted vaginal birth, especially when associated with severe perineal trauma, may result in a negative psychological effect. On the other hand, some women may view assisted vaginal birth as preferable to caesarean section. Continuous maternal support in labour

decreases the likelihood of an assisted birth as well as increasing maternal satisfaction with the birth experience²³. Current educational methodology promotes the use of skills and drills scenarios employing mannequins and models to teach clinical skills. For example, most postgraduate deaneries in the United Kingdom require evidence of such training as this forms part of the trainees' core log-book of clinical skills. Thus, methods to achieve, evaluate and maintain competency in assisted vaginal delivery need to be addressed. A high rate of inappropriate placement of the vacuum cup has been cited as a reason for re-addressing training needs²⁴. Improved safety for mother and baby has been reported following formal postgraduate education and training on assisted birth²⁵.

5. Conclusion:-

Careful selection of cases and adequate training of postgraduate students during residency under direct supervision of senior experienced obstetrician can reduce the rate of failed ventouse and related complications. Ventouse remains a good alternative to obstetric forceps in situation like prolonged second stage and those situations which demand shortening of second stage of labour like maternal hypertensive diseases and rheumatic heart diseases.

References:-

1. Mahony F, Hofmeyr GJ, Menon V. Choice of instruments in assisted vaginal delivery. *Cochrane database of Systematic Reviews* 2010, Issue 11, Art.No.: CD005455. DOI: 10.1002/1465-1858.CD005455.pub2.
2. Department of health Statistical bulletin. *Maternity Statistics England 2003-2004*. London; HMSO, 2004
3. Bofill JA, Parry KG, Roberts WF, Martin RW, Morrison JC, Rust OA. Forceps and vacuum delivery: A survey of north American residency programs. *Obstetrics and Gynecology* 1996; 88(4 Pt 1): 622-5
4. O Connell SW, Lindow M. Trends in obstetric care in United Kingdom. *Journal of Obstetrics and Gynaecology*. 2000; 20: 592-3
5. Patel RR, Murphy DJ. Forceps delivery in modern obstetrics practice. *BMJ* 2004; 328: 1302-5
6. Lewis G, Drife J. Why do mothers die? 1997-99: The fifth report of the

- Confidential Enquiries into Maternal Deaths in the United Kingdom. London: RCOG Press; 2001. Available from: <http://www.cemdrpt.org.uk/reports/cemdrpt.pdf>
7. Vacca A. Vacuum-assisted delivery. *Best Pract. Res. Clin. Obstet. Gynaecol.* 2002; 16(1): 17-30.
 8. Information and Statistics Division. Operative vaginal deliveries. Available from: http://www.isdscotland.org/isd/info3.jsp?pContentID=2152&p_applic=CCC&p_serv
 9. Towner D, Castro MA, Eby-Wilkens E, et al. Effect of mode of delivery in nulliparous women on neonatal intracranial injury. *New England Journal of Medicine.* 1999; 341(23): 1709-14.
 10. Milkovasky P, Watson WJ, Obstetric vacuum extraction: State of the art in the new millennium. *Obstet. Gynecol. Surv.* 2001; 56(11): 736-51.
 11. Rennie J. Caesarean section: the impact on neonatal health. Paper presented at The Rising Caesarean Section Rate – A Public Health Issue. Report of a national conference organised by the National Childbirth Trust, the Royal College of Midwives and the Royal College of Obstetricians and Gynaecologists; held in London on 23 November 1999. London: Profile Publications Ltd.; 2000.
 12. Indusekhar R, Oláh KS. Serious fetal intracranial haemorrhage associated with the vacuum extractor. *BJOG* 2003; 110(4): 436-8.
 13. Johanson RB, Heycock E, Carter J, et al. Maternal and child health after assisted vaginal delivery: five-year follow up of a randomised controlled study comparing forceps and ventouse. *BJOG.* 1999; 106(6): 544-9.
 14. Johanson RB, Menon BK. Vacuum extraction versus forceps for assisted vaginal delivery (Cochrane Review). In: *The Cochrane Library*, Issue 3, 2003. Available from: <http://www.nelh.nhs.uk/cochrane.asp>
 15. O'Grady JP, Pope CS, Patel SS. Vacuum extraction in modern obstetric practice: a review and critique. *Current Opinion in Obstetrics and Gynaecology* 2000; 12(6): 475-80.
 16. Murphy DJ, Liebling RE, Patel R, et al. Cohort study of operative delivery in the second stage of labour and standard of obstetric care. *BJOG* 2003; 110(6): 610-5.
 17. Vacca A. Choice and instrumental delivery [Correspondence]. *BJOG* 2003; 103 (12): 1269.
 18. Hayman R. Instrumental vaginal delivery. *Current Obstetrics and Gynaecology* 2002; 12(2): 73-80.
 19. Murphy DJ, Liebling RE, Verity L, et al. Early maternal and neonatal morbidity associated with operative delivery in second stage of labour: a cohort study. *Lancet* 2001; 358(9289): 1203-7.
 20. Bahl R, Strachan B, Murphy D J, Outcome of subsequent pregnancies three years after previous operative delivery in the second stage of labour: cohort study. *BMJ* 2004; doi:10.1136/bmj.37942.546076.44. (Published 14 January 2004)
 21. Glazener CM, Abdalla M, Stroud P, et al. Postnatal maternal morbidity: extent, causes, prevention and treatment. *BJOG* 1995; 102(4): 282-7.
 22. Garcia J, Anderson J, Vacca A, et al. Views of women and their medical and midwifery attendants about instrumental delivery using vacuum extraction and forceps. *Journal of Psychosomatic Obstetrics and Gynaecology* 1985; 4(1): 1-9.
 23. Hodnett Ed, Gates S, Hofmeyr GJ, Sakala C. Continuous support to the women during childbirth. *cochrane database systematic review* 2003, Issue 3, (DOI; 10.1002/14651858.CD003766)
 24. Sau A, Sau M, Ahmed H, Brown R. Vacuum extraction: Is there any need to improve the current training in the UK? *Acta Obstetrica et Gynecologica Scandinavica* 2004; 83: 466-7
 25. Cheong YC, Abdullahi H, Lashen H, Fairlie FM. Can formal education and training improve the outcome of instrumental delivery? *European journal of Obstetrics and Gynecology and reproductive biology* 2004; 113: 139-44.