Comparison of maternal and neonatal outcome between vacuum extraction and forceps deliveries

Nag U, Burra KC, Kodali M

ABSTRACT

Background: Instrumental deliveries are associated with maternal and neonatal morbidity. The choice of the instrument decides the morbidity rate.
Aim: To compare the maternal and neonatal outcome of ventouse and forceps deliveries.
Method: Retrospective study of 100 consecutive ventouse and 100 forceps deliveries was done and maternal and neonatal injuries compared.
Result: 75% of forceps and 57% of ventouse deliveries were carried out in primigravida. Fetal distress was the indication in 36% of ventouse, 55 % of forceps deliveries. Prolonged 2nd stage of labor was an indication in 17% of forceps and 14% of ventouse. Success rate of ventouse was 96%. Extension of an episiotomy was done more often in ventouse than forceps, while 3rd degree perineal tear occurred more with forceps deliveries. Babies who had ventouse deliveries have lower Apgar score at one minute than forceps.
Conclusion: When there is an indication for instrumental vaginal delivery, ventouse should be preferred over forceps, as it causes much less maternal morbidity in terms of third and fourth degree perineal tears, while most of the neonatal morbidities are insignificant in comparison with both instruments.

Keywords: instrumental delivery, forceps, vacuum, perinatal outcomes

INTRODUCTION

In certain conditions normal delivery cannot be allowed for various reasons, assisted vaginal delivery is the method of choice. Vaginal delivery being assisted by instruments can either be of vacuum extraction or forceps, a choice based on obstetrician's competence and training.[1] James Young Simson was the first to use traction to deliver a baby. It was later modified by Malmstrom in 1953. The obstetric forceps had its history from the time of Chaberlain family in the seventh century.

Forceps delivery has generally been used more frequently in North America, whereas the reverse is true in Europe.[2] Vacuum extraction has recently gained in popularity because of new designs of vacuum cups, thereby minimizing injury to infants.[4] However, a meta-analyses of randomized trials comparing maternal and infant outcomes between vacuum extraction and forceps deliveries have found that vacuum extraction causes less maternal trauma.[3]

This study has been carried out to evaluate the maternal and neonatal morbidity, failure and complications associated with these two methods and to decide which is safer and more effective.

MATERIAL AND METHODS

One year retrospective study was carried out in in a tertiary care institution during Jan- Dec 2011. One hundred consecutive cases of forceps delivery and ventouse extraction each were included in this study. Cases were scrutinised for demographic data, gestational age, birth weight and indication for instrumental delivery. Exclusion criteria from both the groups were cases of multiple pregnancy, preterm (< 34 wks of gestation) and breech presentation. Institutional ethical committee approval was taken.

The instruments used for vacuum extraction were silastic 40mm and 60mm cups. The negative pressure applied was up to 0.6kg/cm.[2] The forceps used was Wrigley's outlet forceps. During the procedure, number of times the vacuum cup was applied, the total number of pulls, number of times of detachment of the vacuum cup, application of vacuum cup to delivery time and any other

difficulty in carrying out the procedure were noted.

Neonatal outcomes of interest were birth weight, Apgar score, NICU admission, cephalhematoma and scalp injuries. Maternal outcomes of interest were genital tract injuries (vaginal wall tear, cervical tear, vulvo-vaginal hematoma and 3rd and 4th degree perineal tears), postpartum hemorrhage and puerperal complications.

For the purpose of analyses the cases were divided into two groups . G1 the ventouse group and G2 the forceps group. Data was entered and analysed using Microsoft Excel and the results were expressed as proportions. Chi square test was applied to find out the significance of association and p value <0.05 was considered as statistically significant.

RESULTS

The mean age of the subjects was between 21-22 yrs. 75% of forceps deliveries and 57% of ventouse deliveries were carried out in primigravida. Fetal distress was the indication in 36 % of ventouse deliveries as compared to 55 % of forceps deliveries. (Table-1) Prolonged 2nd stage of labor was encountered in 17% of forceps and 14 % of ventouse deliveries. Poor maternal efforts were found in 37% of ventouse and 22% in the forceps group. Maternal distress was observed in 3% of ventouse and 12% of forceps group. Perineal tears were observed in 2% in ventouse and 6% in the forceps group. However, third degree perineal tear was seen in 1% of the forceps group. (Table-2) No significant difference was found in the blood loss in both the groups. 87% - 93% of instrumental deliveries were between 37 - 40 wks of gestation. Only 8 cases were beyond 40wks of gestation. Facial palsy was seen in 3% of forceps group, cephalhaematoma was seen in 1% of each group, subconjunctival haemorhage was seen in 1% of each group.(Table-3) Attempted ventouse delivery was successful in 96% as compared to 95% in forceps. Extension of an episiotomy was more likely to occur with ventouse than forceps delivery. Attempted ventouse delivered babies have lower Apgar score at one minute than attempted forceps. No newborn required admission to neonatal intensive care unit.

Table 1: Indications for Instrumental deliveres.

Variables	G I Ventouse (N=100)	G2Forceps (N=100)	Chi Sq	P
Prolonged 2nd stage	14	17		
Prophylactic	10	5		
Fetal distress	36	55	0.22	NS
Maternal distress	3	12		
Poor maternal efforts	37	22		

Table 2: Distribution of cases according to maternal trauma.

Variables	G I (N=100)	G2(N=100)
Episiotomy	15	100
3rd degree perineal teat	Nil	1
Pernealhaematoma	Nil	1
Postpartum Haemorrhage	Nil	1
Cervical/Vaginal tear	2	6

Table 3: Neonatal morbidity in forceps and vaccum delivery groups

Variables	G1 (N=100)	G2 (N=110)
Facial palsy	0	3
Facial and brachial palsy	Nil	1
Cephalhaematome	1	1
Lacerations of scalp	5	2
Subconjunctival haemorrhage	1	1

DISCUSSION

In our study 75% cases were primigravida in the forceps group compared to 57 % in the ventouse group, a finding similar to the reported rates in an earlier study.[7] For vacuum assisted delivery, common indications were poor maternal efforts followed by fetal distress and prolonged 2nd stage. However, different studies report fetal distress as te commonest indications for vacuum assisted deliveries.[5,8] Episiotomy was not done routinely in the ventouse group(15%), especially in 2nd gravidas, but it was given in all the patients undergoing forceps delivery. Likewise, another study also supported our findings.[9] Few studies have reported a higher incidence of maternal trauma with forceps delivery compared to vaccume extraction.[10,11,12] Correspondingly, we found that, second degree perineal tears, cervical tear, vulval haematoma and post partum haemorrhages are more often associated with forceps deliveries.

Our study also reported lesser neonatal trauma with ventouse when compared to forceps deliveries. Other studies have reported higher incidence of neonatal trauma with forceps deliveries.[2,3,4,9,13,14] In our study cephalhaematoma was observed equally in both ventouse and forceps group. It occurs more frequently with vacuum extraction than with forceps. Apart from causing neonatal jaundice, it is rarely of any clinical significance[2,3] In vacuum assisted deliveries, 5% of babies had Apgar score less than 5 at 1 minute, 2% in the forceps group. According to earlier reported studies, the rate of neonates with less Apgar scores was significantly higher after forceps compared with vacuum delivery.[9,10] Incidence of neonatal jaundice is higher in the Ventouse group than the forceps group.[8] In our study the incidence of neonatal jaundice was found to be 30%. Only 5 had pathological levels of bilirubin which needed phototherapy. None required exchange transfusion.

Our study reported a failure rate of 4% in the ventouse group and 5% in forceps deliveries similar to other studies.[9] Failure was most fequently associated with unsuspected cephalopelvic disproportion followed by occipito posterior presentations and macrosomia.

CONCLUSION

When there is an indication for instrumental vaginal delivery, ventouse should be preferred over forceps, as it causes much less maternal morbidity and insignificant neonatal morbidities. Proper use of vacuum extractor, appropriate negative pressure, and preventing cervical or vaginal tissues from entering the cup will further help in minimizing both maternal as well as neonatal morbidity.

AUTHOR NOTE

Usha Nag, Associate Professor, Contact no-+919346259045, Email:drushanag@gmail.com **(Corresponding author);**

Department of Obstetrics and Gynaecology

Kalyan C Burra, Assistant Professor, Community Medicine

Madhavi Kodali, Assistant Professor, Psychiatry

Dr. Pinnamaneni Siddhartha Institute of Medical Sciences & Research Foundation, Vijayawada AP

REFERENCES

1. Editorial. Vacuum versus forceps. *Lancet.* 1984 Jan 21;1(8369):144.
2. Lomas J, Enkin M. Variations in operative delivery rates. In: Chalmers I, Enkin M, Keirse MJNC, eds. Effective care in pregnancy and childbirth. Vol. II. Oxford, England: Oxford University Press, 1991:1182–95.
3. Johanson RB. Vacuum extraction vs. forceps delivery. Oxford, England: The Cochrane Library: pregnancy and childbirth database, 2000, Disk Issue I.
4. Johanson RB, Rice C, Doyle M, et al. A randomised prospective study comparing the new vacuum extractor policy with forceps delivery. *Br J Obstet Gynaecol*. 1993;100(6):524-30.
5. Giri A, Vaidya A. Maternal and fetal outcome of vacuum assisted delivery. *Postgraduate Medical Journal of National Academy of Medical Sciences.* 2008;8(1):48-56.
6. Prapas N, Kalogiannidis I, Masoura S, et al. Operative vaginal delivery in singleton term pregnancies: short-term maternal and neonatal outcomes. *Hippokratia*. 2009 Jan;13(1):41-5.
7. Akhtar S. Comparison of maternal and infant outcome between vacuum extraction and forceps deliveries. *Pakistan Armed Force Medical Journal*. 2006;2(1):25-31.
8. Mesleh RA, AL-Sawadi HM, Kurdi AM. Comparison of maternal and infant outcomes between vacuum extraction and forceps deliveries. *Saudi Medical Journal.* 2002;23(7):811-3.
9. Achanna S, Monga D. Outcome of forceps delivery versus vacuum extraction—a review of 200 cases. *Singapore Med J*. 1994 Dec;35(6):605-8.
10. Caeter J. The vacuum extractor. In: Studd J (Editor). Progress in Obstetrics and Gynaeocology. London: Churchill-Livingstone.1990;8:107-26.
11. Johnson JH, Figueroa R, Garry D, Elimian A, Maulik D. Immediate maternal and neonatal effects of forceps and vacuum-assisted deliveries. *Obstet Gynecol*. 2004;103(3):513-8.
12. Gachiri JR, Rogo KO. Foetal and maternal outcome of vacuum extraction. *East Afr Med J.* 1991;68(7):539-46.
13. Baker PN. The place of Midforceps deliveries in modern obstetric practice. *Current Obst and Gynae.* 1995;5:225-9.
14. Baskett TF, Fanning CA, Young DC. A prospective observational study of 1000 vacuum assisted deliveries with the OmniCup device. *J Obstet Gynaecol Can.* 2008;30(7):573-80.