

ORIGINAL ARTICLE

A comparative study of feto-maternal outcome between forceps and ventouse delivery at tertiary care hospital in West Bengal

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Received: 17 Sep, 2023

Accepted: 18 Oct, 2023

ABSTRACT

Background: Instrumental delivery is an art that is fading and may disappear in the near future as more and more obstetricians are resorting to caesarean sections. Instrumental vaginal deliveries comprise the use of vacuum assisted devices and /or forceps to assist in delivering a fetus, offering the alternative to accomplish vaginal delivery in properly selected cases thereby reducing maternal morbidity in terms of blood loss and increase hospital stay which is a consequence of cesarean sections. The objective of the present study is to compare the feto-maternal outcome between forceps and ventouse delivery at tertiary care hospital in West Bengal. **Methods:** The present hospital based prospective comparative study was conducted in the Dept of Gynae and Obstetrics, College of Medicine & Sagar Dutta Hospital, Kamarhati, Kolkata, West Bengal, India between January 2023 to August 2023. A minimum of 150 patients were taken up for study. 75 women delivered by outlet forceps delivery and 75 women by vacuum delivery. Cases which require instrumental vaginal delivery and fulfilling the inclusion criteria for forceps or vacuum were taken up for the study, after taking informed consent. Maternal outcomes including episiotomy wound and extension, perineal tear, post-partum hemorrhage, hospital stay was analyzed and compared. Statistical data were analysed by using Microsoft Excel and SPSS V.20 software. **Results:** The mean age of women in our study was 27±3.16 yrs in ventouse and 18±4.68 yrs in forceps group. In present study 57.33% of ventouse deliveries and 69.33% forceps deliveries were carried out in primigravida. Mean birth weight in our study was 2.68±0.38 kg Most common indication was Fetal bradycardia 27 (36%) in ventouse delivery and Meconium stained liquor (MSL) 22 (29.3%) in forceps delivery and 21 (28%) in ventouse delivery. The maternal morbidity was significantly less in ventouse group as compared to forceps group (p<0.05). Episiotomy extension was 30.67% in forceps delivery and 18.67% in ventouse delivery. The risk of neonatal morbidity was similar between infants delivered by ventouse or forceps. Cephalhematoma was present in 20% in forceps delivery and 14.67% in ventouse delivery. **Conclusion:** With the expertise and appropriate decision on the indication and meticulous handling of the instrument whether outlet forceps or vacuum, especially in a tertiary care centre, the maternal outcome is equally good with both the instruments.

Keywords – Instrumental delivery, Forceps, Vacuum extraction, Maternal morbidity, Perinatal outcomes

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Introduction

Instrumental delivery is an art that is fading and may disappear in the near future as more and more obstetricians are resorting to caesarean sections. In the advent of modern medicine along with the

advancement of surgery as an option and simultaneous breakthroughs achieved in the field of anesthesia the science and art of operative deliveries will become a thing of the past and will be reminisced as an anecdote in the history of medicine. The ultimate aim of antenatal care is achieving optimal health of the

mother and the neonate at the end and hence the need to reassert the importance of operative vaginal deliveries.

Vacuum extraction and forceps are the two options when an instrument is needed to facilitate a vaginal birth. The choice between these two options has usually been based on tradition and training.¹ In North America, forceps has been used more frequently than vacuum extraction whereas reverse is true in Europe and Asia.²⁻⁴ Vacuum extraction has recently gained in popularity because of new designs of vacuum cups with reduced risk of injury to the neonate.⁵ James Young Simpson was the first to use traction to deliver a baby in 1849. It was later modified by Malmstrom in 1953. The obstetric forceps had its history from the time of Chamberlain family in the seventeenth century.

Modern obstetric practice has witnessed an increased caesarean rate worldwide. Assisted vaginal delivery, with the use of forceps and vacuum extraction, offers the option to accomplish safe delivery for the mother and clinician. It avoids caesarean section and its associated morbidity and implications for future pregnancy. Forceps and vacuum have been compared in many studies.⁶⁻⁹ Review of the literature suggests different maternal and neonatal outcomes and complications rates between the two methods. Both are associated with increased risk of maternal and neonatal injury when compared to normal spontaneous vaginal deliveries. Poor maternal and neonatal outcome has also been reported after the sequential use of vacuum and forceps for assisted vaginal delivery.¹⁰ Furthermore, it has been repeatedly shown that maternal injury is less frequent and less extensive with the use of vacuum.

With this background the present study has been carried out to evaluate the fetomaternal outcome between forceps and ventouse delivery at tertiary care hospital in West Bengal.

Materials and Methods

Present hospital based prospective comparative study was conducted in the Dept of Gynae and

Obstetrics,

Results

College of Medicine & Sagar Dutta Hospital, Kamarhati, Kolkata, West Bengal, India between January 2023 to August 2023.

Seventy five (75) consecutive cases of vacuum assisted delivery and seventy five (75) consecutive cases of forceps assisted delivery were scrutinized for demographic data, various indications for instrumental delivery, parity, gestational age, maternal morbidity and neonatal outcomes. Exclusion criteria from both the groups were cases of multiple pregnancy, preterm (<34 wks of gestation) and breech presentation (for forceps in after coming head).

The instruments used for vacuum extraction were sialistic 40mm and 60 mm cups. The negative pressure applied was upto 0.6 kg/cm². Forceps deliveries were performed using short curved outlet Wrigley's forceps.

Maternal morbidity was analyzed in terms of perineal, vaginal and cervical lacerations, episiotomy extensions, urinary and fecal incontinence and traumatic post partum hemorrhage. Neonatal complications in both groups included low apgar score at birth, unexplained convulsions, jaundice, facial and scalp injuries, cephalhaematoma, birth asphyxia, neonatal sepsis and NICU admissions.

Method of Data Analysis Plan : They all are compared in both groups. Condition of mother and neonate at the time of discharge was noted. χ^2 (Chi Square) test was used to analyze the data and p value

<0.05 was considered as statistically significant

Ethical considerations- Study was initiated after obtaining the informed consents from the participants and ethical clearance from the institutional ethical committee.

Table 1: Maternal and Neonatal characteristics.

| Characteristics | | Ventouse (n=75) | | Forceps (n=75) | | P value |
|-------------------------|------------------|-----------------|-------|----------------|-------|---------|
| | | No. | % | No. | %. | |
| Maternal age | Years; (Mean±SD) | 27±3.16 | | 18±4.68 | | NS |
| Parity n (%) | Primiparous | 43 | 57.33 | 52 | 69.33 | NS |
| | Multiparous | 32 | 42.67 | 23 | 30.67 | NS |
| Gestational age (weeks) | <37 | 03 | 4 | 03 | 4 | NS |
| | 37-40 | 60 | 80 | 53 | 70.67 | NS |
| | >40 | 12 | 16 | 14 | 18.67 | NS |
| Birth weight (gm) | LBW | 24 | 32 | 21 | 28 | NS |
| | Normal | 51 | 68 | 54 | 72 | |
| Apgar score (at 1 min) | 0-3 | - | - | 04 | 5.33 | - |
| | 4-6 | 14 | 18.67 | 22 | 29.33 | NS |
| | 7-10 | 52 | 69.33 | 44 | 58.67 | NS |

| | | | | | | |
|-----------------------|------|----|----|----|-------|----|
| Apgar score (at 5min) | 0-3 | - | - | 04 | 5.33 | NS |
| | 4-6 | 9 | 12 | 14 | 18.67 | NS |
| | 7-10 | 57 | 76 | 54 | 72 | NS |

The mean age of women in our study was 27 ± 3.16 yrs in ventouse and 18 ± 4.68 yrs in forceps group. In present study 57.33% of ventouse deliveries and 69.33% forceps deliveries were carried out in primigravida. Mean birth weight in our study was 2.68 ± 0.38 kg. We observed that birth weight >2.5

kg was significantly more common in forceps group i.e 54 (72%). Present study also showed that the use of instruments were more frequent in infants with higher birth weight and gestational age. We found no significant difference in apgar scores at 1 & 5 minutes, between the two study groups. (Table 1)

Table 2: Indications for application.

| Indications | Ventouse(n=75) | | forceps(n=75) | |
|--|----------------|---------------|---------------|---------------|
| | No. | % | No. | %. |
| Fetal bradycardia | 27 | 36.00 | 4 | 5.33 |
| Fetal distress | 0 | 0.00 | 20 | 26.67 |
| Maternal distress | 1 | 1.33 | 4 | 5.33 |
| Meconium stained liquor (MSL) | 21 | 28.00 | 22 | 29.33 |
| MSL & Fetal bradycardia | 7 | 9.33 | 7 | 9.33 |
| MSL & Fetal distress | 2 | 2.67 | 5 | 6.67 |
| Placental Location | 2 | 2.67 | 1 | 1.33 |
| Placental Location (PL) in 2nd stg | 1 | 1.33 | 0 | 0.00 |
| Placental Location & Fetal bradycardia | 1 | 1.33 | 0 | 0.00 |
| Placental Location in 2nd stg | 9 | 12.00 | 5 | 6.67 |
| Prolonged labour | 4 | 5.33 | 7 | 9.33 |
| Total | 75 | 100.00 | 75 | 100.00 |

P value <0.05 (Significant)

Most common indication was Fetal bradycardia 27 (36%) in ventouse delivery and Meconium stained liquor (MSL) 22 (29.3%) in forceps delivery and 21 (28%) in ventouse delivery. Other indications were Fetal distress 20 (26.67%) in forceps delivery, Placental Location in 2nd stg 12% in ventouse and 6.67% in forceps delivery. MSL & Fetal bradycardia was present in 9.33% in ventouse and forceps delivery each. The result was statistically significant $p<0.05$. (Table 2)

Table 3: Maternal morbidity in instrumental deliveries.

| Morbidity | Ventouse(n=75) | | Forceps(n=75) | | P value |
|--------------------------|----------------|-------|---------------|-------|---------|
| | No. | % | No. | % | |
| Episiotomy | 1 | 1.33 | 2 | 2.67 | <0.05 |
| Episiotomy extension | 14 | 18.67 | 23 | 30.67 | NS |
| Perineal tear | 7 | 9.33 | 13 | 17.33 | NS |
| Cervical tear | 14 | 18.67 | 19 | 25.33 | NS |
| Post-partum hemorrhage | 14 | 18.67 | 13 | 17.33 | NS |
| Blood transfusion needed | 4 | 5.33 | 7 | 9.33 | <0.05 |
| Length of hospital stay | 60 hrs | | 105 hrs | | NS |

The maternal morbidity was significantly less in ventouse group as compared to forceps group ($p<0.05$). Episiotomy extension was 30.67% in forceps delivery and 18.67% in ventouse delivery. Cervical tear was present in 25.33% in forceps delivery and 18.67% in ventouse delivery. (Table 3)

Table 4: Neonatal morbidity and mortality.

| Variables | Ventouse(n=75) | | Forceps(n=75) | | P value |
|------------------------|----------------|-------|---------------|-------|---------|
| | No. | % | No. | % | |
| Cephalhematoma | 11 | 14.67 | 15 | 20.00 | NS |
| Facial palsy | 0 | 0.00 | 1 | 1.33 | <0.05 |
| Convulsion | 3 | 4.00 | 3 | 4.00 | <0.05 |
| NICU / SNCU admissions | 9 | 12.00 | 20 | 26.67 | NS |
| Feeding difficulty | 4 | 5.33 | 2 | 2.67 | NS |
| Perinatal mortality | 0 | 0.00 | 0 | 0.00 | NS |

The risk of neonatal morbidity was similar between infants delivered by ventouse or forceps. Cephalhematoma was present in 20% in forceps delivery and 14.67% in ventouse delivery. NICU / SNCU admissions was required for 26.67% neonates of forceps delivery and 12% in ventouse delivery. (Table 4)

Discussion

The incidence of instrumental vaginal delivery in our institution in last five years was 14.8% of total births. It is still within the worldwide incidence of 2%-15%.^{11,12}

The variation in incidence in various health institutions and the decline in practice in recent times could be attributed to variation in practice protocols, litigation, non-availability of functional equipments and the declining skills of providers in conducting instrumentaldeliveries.^{13,14}

In present study mean age of women in our study was 27±3.16 yrs in ventouse and 18±4.68 yrs in forceps group. In present study 57.33% of ventouse deliveries and 69.33% forceps deliveries were carried out in primigravida which is in accordance with prior study done by Akhtar S.¹⁵ Mean birth weight in our study was 2.68±0.38 kg. We observed that birth weight >2.5 kg was significantly more common in forceps group i.e 54 (72%). Present study also showed that the use of instruments were more frequent in infants with higher birth weight and gestational age. We found no significant difference in apgar scores at 1 & 5 minutes, between the two study groups.

In the past, forceps deliveries were highly favored over vacuum extraction in North America. According to official statistics from the 1980s, the vacuum/forceps ratio in Canada and United States were both 0.03, whereas in European countries, the ratio varied from 1.06 in Norway to 13.0 in Finland.¹⁶ Currently there is tendency to rely on vacuum extraction which may be because of recent evidence of decreased maternal trauma with vacuum extraction compared to forceps deliveries in randomized trials and by a substantial improvement in the technique of vacuum extraction, especially in the material used for vacuum cups.¹⁷

In our study Most common indication was Fetal bradycardia 27 (36%) in ventouse delivery and Meconium stained liquor (MSL) 22 (29.3%) in forceps delivery and 21 (28%) in ventouse delivery. Other indications were Fetal distress 20 (26.67%) in forceps delivery, Placental Location in 2nd stg 12% in ventouse and 6.67% in forceps delivery. MSL & Fetal bradycardia was present in 9.33% in ventouse and forceps delivery each. The result was statistically significant $p < 0.05$. However, different studies reported fetal distress as the commonest indication for

vacuum delivery.^{15,18,19}

In present study maternal morbidity was significantly less in ventouse group as compared to forceps group ($p < 0.05$). Episiotomy extension was 30.67% in forceps delivery and 18.67% in ventouse delivery. Cervical tear was present in 25.33% in forceps delivery and 18.67% in ventouse delivery.

In our study risk of neonatal morbidity was similar between infants delivered by ventouse or forceps. Cephalhematoma was present in 20% in forceps delivery and 14.67% in ventouse delivery. NICU / SNCU admissions was required for 26.67% neonates of forceps delivery and 12% in ventouse delivery.

Neonatal morbidity differ substantially among various published reports.²⁰⁻²³ Some authors highlight the risk of vacuum, but vacuum is generally considered as a safe alternative to forceps or with comparable outcomes concerning the neonatal morbidity

Conclusions

Instrumental vaginal delivery by experienced health care provider is associated with good obstetric outcomes with minimal risk. Our study concluded that ventouse application is associated with significantly less maternal trauma than with forceps. Neonatal outcomes were similar in both types of instrumental deliveries. The safety of the instrument is dependent mainly on operator's skills and right judgment regarding case selection. Improved training of residents in instrumental delivery may help to reduce the unwarranted and raised caesarean section rates.

Acknowledgements: Authors would like to acknowledge the patients who participated in this research study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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