

The Feto-Maternal Outcome in Instrumental Assisted Vaginal Delivery in Parapokar Maternity and Woman Hospital—A Retrospective Study

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Abstract

Aim: To determine maternal and neonatal morbidities associated with instrumental vaginal delivery. **Methods:** This retrospective study consisted of 233 women undergoing instrumental vaginal deliveries from April 2020 to March 2021 at Paropakar Maternity and Women Hospital, a tertiary care hospital in Kathmandu, Nepal. Neonatal and maternal complications were analyzed. **Results:** Of 233 women, 102 (43.7%) and 131 (56.2%) had vacuum and forceps deliveries, respectively. The use of instruments was more frequent in infants with higher birth weight and gestational age. There were no significant differences in Apgar scores between the two groups. Two main indications of instrumental deliveries were fetal distress and prolonged second stage labor. Forceps, compared with vacuum, more often caused 3rd/4th perineal tears, tear extending to fornices, and postpartum hemorrhage. Neonatal outcomes were similar in both types of instrumental deliveries. **Conclusion:** Instrumental vaginal delivery caused maternal morbidity and procedure/judgment training for it is essential.

Keywords

Instrumental Delivery, Forceps, Vacuum Extraction, Maternal Morbidity, Perinatal Outcomes

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1. Introduction

Operative vaginal deliveries (OVD) refers to obstetrics forceps and /or vacuum assisted delivery to accelerate the second stage of labor and facilitate to decrease primary cesarean section rate [1]. Modern obstetric practice has witnessed an increase in the cesarean rate worldwide. A successful assisted vaginal delivery avoids cesarean section, its attendant uterine scar, and its indications in future pregnancy [2] [3].

About 10% - 20% of all deliveries may need some form of intervention and 6% - 12% of these interventions are by instrumental vaginal deliveries [4]. The choice between these two devices depends on the level of clinical expertise, clinical circumstances, obstetrician choice, and availability of specific instruments [5].

Instrumental-assisted deliveries are performed for the indication of maternal or fetal-related conditions and any event that threatens the mother or fetal life [6].

An operative vaginal delivery should only be considered when the likelihood of success is high because failure to deliver is associated with significant maternal and neonatal morbidity. Common indications are prolonged second stage of labor, maternal and fetal distress to shortened second stage of labor in maternal disorders such as cardiac disease, pulmonary edema, and neuromuscular conditions [5] [7].

There is an increased risk of maternal and fetal complications compared to spontaneous vaginal delivery. Maternal complications include cervical, vaginal, and perineal tears, an extension of an episiotomy, postpartum hemorrhage, and rupture of the uterus or even the bladder whereas fetal complications include intracranial damage, cephalhematoma, brachial plexus injury, convulsions, subconjunctival injury [8].

Thus, this study was done to evaluate the fetal and maternal morbidity following instrumental assisted vaginal delivery in a tertiary center for one year.

2. Methods

This is a retrospective observational study carried out in the department of obstetrics and gynecology of Paropakar Maternity and Women's Hospital for one year from 16th April 2020 to 15th March 2021. Two hundred and thirty-three cases of forceps and vacuum delivery were included in this study. Institutional Review Committee approval was taken.

Indications for instrumental delivery were fetal distress, the prolonged second stage of labor, and poor maternal efforts, to cut short the second stage of labor. Cases were scrutinized for maternal and fetal demographic data and indication for application. All women with a singleton pregnancy from 34 weeks of gestation to term pregnancy having undergone vacuum or forceps delivery were included. Similarly, pregnant women who had multiple pregnancies, cephalopelvic disproportion, preterm (<34 weeks of gestation), placenta previa, and presentation other than cephalic were excluded.

Maternal morbidity was analyzed in terms of perineal tear and cervical tear, episiotomy extensions, and postpartum hemorrhage. Neonatal complications included respiratory distress, perinatal asphyxia, cephalohematoma, convulsion, instrumental marks, and bruising, meconium aspiration syndrome, and NICU admission. Data was entered and analyzed using SPSS 20 and Chi-square test was applied to find out the p-value and a p-value < 0.005 was considered statistically significant.

3. Result

The mean age of women in our study was 25.21 ± 4.73 years in the ventouse and forceps group. In our study, 43.8% of ventouse deliveries and 56.2% of forceps deliveries were carried out. The mean birth weight in our study was 3.07 ± 0.44 kg. Our study also showed that the use of instruments was 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 groups (**Table 1, Table 2**).

Fetal distress was most common indication for instrument application in second stage of labor accounting 32.4% in ventouse and 30.5% in forceps but it is not statistically significant. Other indications were prolonged second stage of labor which was seen in 21.6% of ventouse and 27.5% of forceps deliveries. Poor maternal efforts were found in 9.2% of forceps and 17.6% of ventouse delivery. Maternal distress was observed in 13.7% of ventouse and 14.5% of forceps delivery. We observed that forceps were the instrument of choice in many cases.

Table 1. Maternal and Neonatal characteristics.

		Ventouse (n = 102)	Forceps (n = 131)	P value
Parity	Primigravida	73 (71.6%)	104 (79.4%)	NS
	Multigravida	29 (28.4%)	27 (20.6%)	
Gestation age	<37weeks	1 (1%)	9 (6.9%)	NS
	37 - 40 weeks	43 (42.2%)	56 (42.7%)	
	>40weeks	58 (56.9%)	66 (50.4%)	
Birth weight (GM)	<2000	0	3 (2.3%)	NS
	2001 - 2500	4 (3.9%)	9 (6.9%)	
	2501 - 3000	26 (25.4%)	40 (30.5%)	
	3001 - 3500	52 (51%)	62 (47.3%)	
	3501 - 4000	20 (19.6%)	17 (13%)	
AS at 1 min	0 - 3	10 (9.8%)	5 (3.8%)	NS
	4 - 6	84 (82.4%)	110 (84%)	
	7 - 10	8 (7.8%)	16 (12.2%)	
AS at 5 min	0 - 3	2 (2%)	2 (1.5%)	NS
	4 - 6	7 (6.9%)	9 (6.9%)	
	7 - 10	93 (91.2%)	120 (91.6%)	

Table 2. Indications for application of ventouse AND/OR forceps.

Indication	Ventouse	Forceps	p-value
Fetal distress	33 (32.4%)	40 (30.5%)	NS
Maternal distress	14 (13.7%)	19 (14.5%)	
Prolonged 2nd stage of labor	22 (21.6%)	36 (27.5%)	
Poor maternal effort	18 (17.6%)	12 (9.2%)	
Previous CS	5 (4.9%)	6 (4.6%)	
Eclampsia	2 (2%)	3 (2.3%)	
Severe PE	5 (4.9%)	6 (4.6%)	
Preterm	0	6 (4.6%)	
Anemia	3 (2.9%)	3 (2.3%)	

The maternal morbidity was less in the vacuum group as compared to the forceps group. We have given episiotomy in all patients (100%) before forceps and ventouse application. **Table 3** shows that maternal morbidity such as a cervical tear, periurethral tear, vaginal wall tear, perineal tears, and PPH were observed more frequently after forceps application.

The risk of neonatal morbidity was similar between infants delivered by vacuum or forceps (**Table 4**). Cephalhematoma in neonates was significantly more common with vacuum, but instrumental marks and bruising were more common with the forceps group. NICU admissions were more (10.8%) with ventouse as compared to forceps (4.6%), and perinatal mortality in the forceps group was due to preterm and perinatal asphyxia.

4. Discussion

This study was performed to estimate neonatal and maternal morbidity associated with instrumental-assisted vaginal delivery. Instrumental deliveries are an important tool to avoid a cesarean section and its associated morbidity and implications for future pregnancy. The frequency of instrumental vaginal delivery varies from one country to another or even in the same country. The worldwide incidence of instrumental delivery is 2% - 15% [9], since the incidence of instrumental deliveries in our institution was 1.77%, which is comparable to other developing countries of Africa [10]. However, the incidence is lesser than 2.3%, 4.2%, and 13.8% noticed by E Nkwabong *et al.* [8], Lamba A *et al.* [11] and Chaudhari P *et al.* [3], respectively. Despite instrumental deliveries listed as emergency operative care, the trend has progressively declined. The lower incidence is likely due to the fear of its use concerning neonate and maternal complications, the declining skills of providers in conducting instrumental deliveries, and the increasing rate of cesarean section.

In our study, the majority of the instrumental deliveries in both groups were primigravida and fetal distress was the commonest indication for instrumental delivery followed by the prolonged second stage of labor, poor maternal effort,

Table 3. Maternal morbidity in instrumental deliveries.

Maternal complication	Ventouse	Forceps	p-value
Episiotomy extension	6 (5.9%)	9 (6.9%)	NS
Vaginal wall tear	2 (2%)	3 (2.3%)	
Paraurethral tear	2 (2%)	1 (0.8%)	
Extension to fornices	0	4 (3.1%)	
Cervical tear	2 (2%)	2 (1.5%)	
3rd and 4 th -degree perineal tear	3 (2.9%)	9 (6.9%)	
PPH	7 (6.9%)	15 (11.5%)	

Table 4. Neonatal morbidity and mortality.

Fetal complication	Ventouse	Forceps	p-value
Cephalhematoma	3 (2.9%)	0	0.005
Instrumental marks and bruising	2 (2%)	8 (6.1%)	
NICU admission	11 (10.8%)	6 (4.6%)	
Neonatal hyperbilirubinemia requiring phototherapy	2 (2%)	2 (1.5%)	
Convulsion	3 (2.9%)	0	
Perinatal mortality	0	3 (2.3%)	
Syndromic baby	0	1 (0.8%)	

and maternal distress. A similar finding was noticed in the study done by Zenebe *et al.* [12] where fetal distress (56.2%), prolonged SSOL (24.0%), and to cut-short second stage of labor (19.4%) was found.

Table 3 shows that maternal morbidity was significantly less in the ventouse group as compared to the forceps group, which is following the results of the Cochrane Database [13].

In a randomized controlled trial, Eason E showed that a decrease of 4.9 in adjusted relative risk of anal sphincter injury was noted when a vacuum was used to forceps [14]. Our study also reported only 2.9% of patients in the vacuum group had anal sphincter injury as compared to the forceps group with 6.9% of patients having anal sphincter injury.

Regarding neonatal outcomes, in our study the risk of neonatal morbidity was similar between infants delivered by vacuum or forceps (**Table 4**). There were 3 cases of cephalhematoma which is far less than 9.4% and 5.2% reported in a systematic review for vacuum deliveries and forceps deliveries respectively [15]. NICU admissions was required in 15.6% of neonate in our study which is little less than that reported in Belgium cohort study where 24.4% neonates required NICU admission [16]. There was 3 case of perinatal mortality which probably was due to extreme preterm labor and fetal distress due to thick meconium stained liquor in second stage of labor respectively. The APGAR score of all the babies at 1 and 5 min were more than or equal to 6 and 7 respectively although

the most common indication for instrumental delivery was fetal distress, hence timely recognition of fetal distress and judicious intervention in 2nd stage of labor by operative vaginal delivery leads to favorable neonatal outcome.

But these complications may not be truly attributed to the procedure as asphyxia may be the outcome of the event of labor that indicated the intervention than the operative vaginal delivery itself. So it depends mainly on the operator's skill of application of instrument and case selection rather than a type of instrument.

5. Conclusion

Our study showed that ventouse application is associated with less maternal trauma than with forceps. Regarding neonatal outcomes, there was no difference in both types of instrumental deliveries. The most important factor to determine the safety of the instrument is the operator rather than the instrument. To reduce unwanted and raised cesarean section rate operative vaginal delivery need to be encouraged.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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