

Comparison of Maternal and Fetal Outcome in Instrumental Deliveries in a Tertiary Care Center - A Retrospective Study

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Abstract: Background: Instrumental deliveries are associated with maternal and neonatal morbidity. The choice of instrument decides the morbidity rate. Objective: To compare maternal and neonatal outcomes of vacuum and forceps application in instrumental vaginal delivery. Material& Methods: A retrospective hospital based study was carried out in the Department of Obstetrics & gynecology of Yenepoya Medical College; a tertiary health care referral centre in Mangalore, Karnataka over a period of one years from December 2015 to December 2016. Results: Out of the 100 patients subjected to this study, majority of the patients were multigravidas belonging to the age group 27- 28 years. Maternal morbidity in terms of periurethral tear, second and third degree perineal tear were significantly more in forceps group. However neonatal outcomes were found to be similar in both types of instrumental deliveries. Conclusion: The conclusion from this study Ventouse should be preferred over forceps whenever there is an indication for instrumental delivery (except in fetal distress) as it is associated with less maternal trauma and most of the neonatal morbidities were insignificant in comparison with both instruments.

Keywords: vacuum, forceps, instrumental delivery, maternal morbidity, perinatal outcome

1. Introduction

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. 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. 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 seventh century.

The rate of normal vaginal deliveries varies between 75-90%. Among them rate of operative vaginal delivery is 11.2%. The commonly used instruments for operative vaginal delivery are forceps and vacuum extraction. Operative vaginal deliveries are accomplished by applying direct traction on the fetal skull with forceps, or by applying traction to the fetal scalp by means of a vacuum extraction.

Assisted vaginal delivery offers the option of an operative procedure to safely and quickly remove the fetus, mother and obstetrician from a difficult or even hazardous situation. When spontaneous vaginal delivery does not occur within a reasonable time, a successful operative vaginal delivery trial avoid caesarean section with its attendant uterine scar and implications for a future pregnancy and avoids potential birth asphyxia from prolonged fetal and cord compression.

2. Material & Methods

A retrospective hospital based study was carried out in the Department of Obstetrics & gynecology of Yenepoya Medical College; a tertiary health care referral centre in

Mangalore, Karnataka over a period of 1 year from December 2015 to December 2016.

Inclusion criteria for the study group;

- 1) Singleton pregnancy
- 2) Term pregnancy
- 3) Full dilatation of cervix
- 4) Cephalic presentation

Exclusion Criteria

- 1) Cephalopelvic disproportion
- 2) Vesico vaginal fistula, Recto vaginal fistula and Manchester repair
- 3) Previous uterine surgery e.g. caesarean section, myomectomy
- 4) Multiple pregnancy, breech presentation.

Fifty (50) consecutive cases of vacuum assisted delivery and fifty (50) consecutive cases of forceps assisted delivery were scrutinized for demographic data, various indications for instrumental delivery, parity, gestational age, maternal morbidity and neonatal outcomes.

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. They all are compared in both groups.

3. Results

139 pregnancies which met all the parameters in the inclusion criteria were taken into consideration in this study. Age * Group and Neonatal Characteristics

		Character	VENTOUSE (50)	FORCEPS (50)
Mean Age	Count	Years	27-28	28-29
Parity	Count	PRIMI	15	10
		MULTI	35	40
Gestational Age	Count	<37	10	5
		37-40	35	38
		>40	5	7
Birth Weight	Count	2.5-30KG	15	4
		3.0-3.5KG	25	26
		3.5-40KG	10	12
		>4.0KG	10	8
APGAR Score at 1 Min	Count	0-3	1	4
		6-Apr	12	15
		10-Jul	37	31
APGAR Score at 5 Minutes	Count	0-3	-	1
		6-Apr	6	10
		10-Jul	44	39

Table 2: Indication for Application of Forceps

INDICATION	VENTOUSE(50)	FORCEPS(50)
Prolonged second stage	15(30%)	10(20%)
Poor maternal effort	10(20%)	12(24%)
Fetal distress	10(20%)	15(30%)
Heart disease	3(6%)	2(4%)
Severe anemia	3(6%)	4(8%)
Pre eclampsia	3(6%)	3(6%)
Eclampsia	2(4%)	1(2%)
Maternal distress	2(4%)	2(4%)
Failure to descent	2(4%)	1(2%)

Table 3: Cervical dilatation at the time of application of forceps

Cervical Dilatation	No.of Cases (50)	Successful (38)	Unsuccessful (12)
10	30	25	5
9	15	12	3
8	5	1	4

Table 4: Maternal Morbidity In Instrumental Deliveries

Morbidity	VENTOUSE(50)	FORCEPS(50)
Episiotomy	45(90%)	50(100%)
Episiotomy extension	6(12%)	7(14%)
Vaginal wall tear	2(4%)	2(4%)
Periurthral tear	2(4%)	2(4%)
Extension to fornices	-	-
Cervical tear	2(4%)	3(6%)
1 st and 2 nd degree tear	4(8%)	4(8%)
3 rd and 4 th degree tear	-	2(4%)
Postpartum hemorrhage	2(4%)	3(6%)
Length of hospital stay	48 hours	72 hours
Blood transfusion	2(4%)	3(6%)

Table 5: Neonatal Morbidity and Mortality

Variable	VENTOUSE (50)	FORCEPS (50)
Cephalhematoma	5(10%)	6(12%)
Instrumental markers and bruising	4(8%)	6(12%)
Subconjunctival hemorrhage	-	1(2%)
Branchial plexuses injury	-	1(2%)
Convulsions	1(2%)	2(4%)
Neonatal hyperbilirubinemia and use of phototherapy	10(20%)	10(20%)
Feeding difficulties	3(6%)	4(8%)
Irritability	1(2%)	1(2%)
Neonatal ICU admission	10(20%)	10(20%)
Perinatal mortality	-	1(2%)
normal	16(32%)	8(16%)

4. Results

The mean age of subject was between 27-28yrs. 80% of forceps deliveries and 70% of ventouse deliveries were carried out in Multigravida (Table 1). Fetal distress 30% was more in the forceps deliveries. Poor maternal efforts were found in 24% in forceps group and 20% in ventouse group. (Table 2) Prolonged 2nd stage of labour was encountered in 20% of forceps and 30% of ventouse group. Prophylactic indications were observed in 8% in forceps and in 6% in the ventouse group. No significant difference in first and second degree perineal tears whereas third and fourth degree Perineal tears were observed in 4% in forceps than in the ventouse group. (Table 3) 6% blood loss was found in forceps and 4% blood loss was found in ventouse group. 76% of instrumental deliveries were between 37-40 weeks of gestation. Only 7 cases were beyond 40 weeks of gestation in forceps group and 5 patients was in ventouse group. Face marks with abrasions was seen in 6 cases of forceps and 4 cases in ventouse group whereas six cases of cephalhematoma seen in forceps group no significant difference is seen in neonatal jaundice in both the groups. (Table 4) Attempted ventouse delivery was successful in 38 cases. Perineal and cervical tears are more common in forceps compared to ventouse delivery. Attempted forceps delivered babies have lower Apgar score at one minute than attempted forceps. No significant difference seen for admission required to neonatal intensive care unit.

5. Discussion

In our study 80% of forceps delivery and 70% of ventouse deliveries were carried out in multigravida. For vacuum delivery, common indications were prolonged second stage of labour (30%), followed by poor maternal efforts (20%) and fetal distress (20%). For forceps delivery main indication was by fetal distress (30%) followed by poor maternal efforts. Our study results showed that forceps are the instrument of choice in cases of fetal distress. However, different studies reported fetal distress as the commonest indication for vacuum delivery.

Episiotomy was not done routinely in the ventouse group, especially in multigravida, but it was given in all cases of forceps deliveries but in our study 90% ventouse group patients was given episiotomy. Study done by Achanna S et al also supported this association. We found that episiotomy

extensions were more common with forceps deliveries in our study. Maternal morbidity was significantly less in ventouse group as compared to forceps group, which is in accordance with the results of Cochrane Database. It showed that vacuum extractor was associated with a lower caesarean section rate, a lower use of regional and general anesthesia, with apparently less pain at delivery, significantly less pain after 24 hr and significantly less likely to cause serious maternal injury than forceps. It seemed that vacuum extractor could, do no harm to mother or newborn.

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 vacuum was used over forceps.

Our study also reported 4% patients in forceps group had anal sphincter injury.

Our study showed the failure rate of 24% with forceps. Vacca A et al also reported the similar percentage of failure after forceps application.

Failure of vacuum and the sequential use of forceps to complete deliveries increase the maternal and neonatal morbidity. Neonatal morbidity differs substantially among various published reports. 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. In the present study, low Apgar Score at 1 & 5 min, NICU admissions and duration of stay in NICU were significantly higher after forceps application. Cephalhematoma was seen more common after forceps application. Apart from causing neonatal jaundice, it is rarely of any significance. Instrumental marks and bruising were seen more commonly after forceps application. Both the fore mentioned complication, were dependent mainly on operator's skill of instrument application and case selection rather than type of instrument.

6. Conclusion

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.

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