



A STUDY OF FETOMATERNAL OUTCOME OF INSTRUMENTAL VAGINAL DELIVERIES AT A RURAL TERTIARY CARE HOSPITAL IN MANDYA DISTRICT KARNATAKA

Obstetrics & Gynaecology

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ABSTRACT

Introduction: Giving birth can be a long and painful process and is not always a perfect one. Instrumental vaginal delivery is an art and provides a temporal advantage over cesarean delivery.¹ It is also an alternative procedure for delivery in emergency obstetrics. Instrumental vaginal delivery is an integral part of Obstetrics care world wide. The present study was carried out to evaluate the maternal and neonatal outcome in operative/assisted vaginal delivery.

Method: We performed a retrospective observational study of women with singleton term pregnancies who underwent operative vaginal delivery at Adichunchanagiri Institute of Medical Sciences. The study was conducted between August 2019 to August 2020 for the duration of 1 year and the data was accrued from patient database retrospectively and was entered in Microsoft Excel (Version 16.4) for Windows.

Results: During the study period, 95 patients underwent Instrumental Vaginal Delivery, of which 74 were vacuum assisted and 21 were forceps delivery. The most common indication for Operative vaginal delivery was failure of maternal efforts followed by prolong 2nd stage of labour in vacuum group and severe pre-eclampsia in forceps group. Vacuum was used more often than forceps for most of the deliveries. Maternal complication like 1st and 2nd degree perineal tear were seen more often with the use of forceps. Instrument marks and bruising were found in the neonates delivered by forceps and a greater incidence of cephalohematomas and caput in the neonates delivered with vacuum.

Conclusion: A successful instrumental vaginal delivery can be achieved with lesser maternal and neonatal morbidity with timely assessment of labour and skilled operator. The overall rate of perinatal and maternal morbidity and mortality vary by indication and operative instrument. Women who underwent forceps-assisted delivery had greater rates of maternal complications than those who underwent vacuum-assisted delivery.

KEYWORDS

Instrumental deliveries; Vacuum; Forceps; Neonatal and Maternal outcomes

INTRODUCTION

Operative vaginal delivery is a procedure where the mother is assisted in the delivery of the fetal head by the use of forceps or vacuum.² The concept of operative vaginal delivery dates back to 1500 BC. The invention of the precursor to modern forceps is awarded to Peter Chamberlin in approximately 1600 this has been modified over years at this time we have 700 different types of forceps. James Yonge in 1705 was the 1st to describe vacuum extractor and it was popularized in the Europe by Malmstrom in 1954.³ The frequency of operative vaginal deliveries is estimated to be 10% of all vaginal deliveries.⁴ The percentage of vacuum deliveries has been increasing and forceps deliveries has been decreasing mostly because of concern about the maternal and neonatal effects as well as fewer clinician who are trained in using instruments. Professional liability has also had an impact.³ In the 2006 American college of Obstetrician and Gynecologist (ACOG) Survey on Profession Liability, 37.1% of obstetrician reported increasing rate of cesarean section due to fear of litigation. Operative vaginal delivery is an art and when the instrument is used appropriately, the procedure is simple and there is no injury to mother and fetus. The indication of instrumental delivery are often complex and usually interdependent for example fetal malposition leading to prolong labour and maternal exhaustion or fetal distress.

This study was designed to estimate the immediate maternal and neonatal effects of forceps and vacuum assisted vaginal deliveries.

OBJECTIVE

To evaluate the fetal and maternal morbidity and mortality associated with the use of vacuum extraction and forceps application.

METHODOLOGY

It was a retrospective study, conducted at Adichunchanagiri institute of medical sciences between August 2019 and August 2020 for the duration of 1 year. We performed a record review of all forceps and vacuum-assisted deliveries that occurred between the study period at our hospital. Maternal demographics recorded included age, parity, and gestational age. Delivery characteristics recorded included indication for the use of an instrument. Maternal outcome variables of interest were perineal tear, lacerations sustained and need for blood transfusion. Neonatal outcomes of interest were birth weight, Apgar

scores, neonatal intensive care unit (NICU) admissions, cephalohematomas, instrument marks and bruising and caput formation. For all vacuum assisted group, the soft rubber cup of 6 cm in diameter was used and Wrigley's forceps were used for forceps assisted group.

Data was analysed on Descriptive analysis of all the explanatory and outcomes parameter was done using mean and standard deviation for quantitative variables, frequency and proportions for categorical variables. Chi-square test was used to compare the different indication, Apgar score at 1 and 5 minutes, maternal and fetal complication between different modes of delivery. The level of significance was set at $p < 0.05$.

RESULTS

Out of 500 deliveries conducted from August 2019 to 2020 total instrumental delivery was 95 out of which 74 (77.9%) were vacuum assisted and 21 (22.1%) were forceps assisted deliveries.

Table 1: Age distribution

Age group (years)	Number	Percentage (%)
18 to 20 years	19	20.0%
21 to 25 years	38	40.0%
26 to 30 years	30	31.6%
>30 years	8	8.4%

Table 1 shows age wise distribution of the patient. Out of 95 cases 38 (40.0%) was in the age group of 21 to 25 years. 30 (31.6%) was 26 to 30 years. 19 (20.0%) cases was in the age group of 18 to 20 years and 8 cases (8.4%) belong to >30 years.

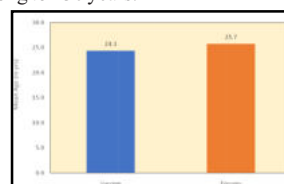


Figure 1: Mean age of patients (in years) between two modes of delivery

The figure 1 shows the mean age in different modes, for vacuum it was 24.3 and for forceps it was 25.7.

Table 2: Distribution according to parity

Parity	Vacuum (n=74)	Forceps (n=21)
Primigravida	53 (71.6%)	17 (81.0%)
Multigravida	21 (28.4%)	4 (19.0%)

Table 2 shows the parity distribution between the two groups, in vacuum group (n=74) total number of primigravida was 53 (71.6%) and multigravida was 21(28.4%). In case of forceps total number of primigravida was 17(81.0%) and only 4 (19.0%) multi gravida.

Table 3: Gestational age

Variables	Category	Vacuum (n=74)		Forceps (n=21)		p-value
		Mean	SD	Mean	SD	
Gestational age	33-35 weeks	1	1.4%	2	9.5%	0.04* ^b
	36-38 weeks	23	31.1%	10	47.6%	
	39-41 weeks	50	67.6%	9	42.9%	

Table 3 shows the gestational age distribution. All operative vaginal deliveries were beyond 33 weeks or more of gestation, maximum vacuum deliveries were done with gestational age 39 to 41 weeks, whereas maximum forceps deliveries were at 36 to 38 weeks followed by 39 to 41 weeks of gestation.

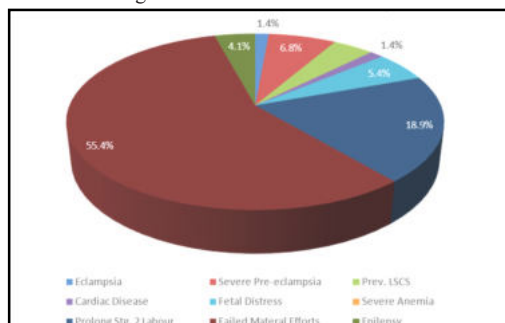


Figure 2: Indications for vacuum mode of delivery

The figure 2 shows the common indication for the vacuum group. Most common indication for vacuum group was failed maternal efforts (n=41) followed by prolong 2nd stage of labour (n=14).

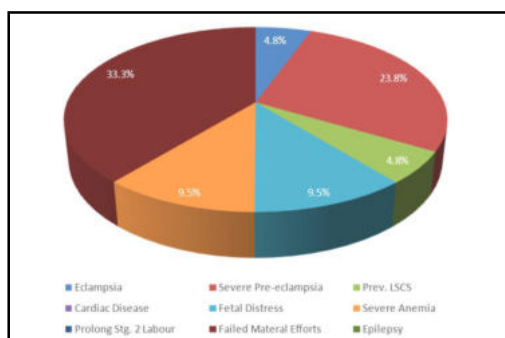


Figure 3: Indications for forceps mode of delivery

The figure 3 shows the indication for forceps application. Most common indication was failed maternal efforts (n=7), next being severe Pre-eclampsia (n=5).

Table 4: Comparison of different maternal complications between two modes of delivery using Chi-square test

Maternal Complications	Vacuum		Forceps		χ ² value	p-value
	N	%	N	%		
1 st perineal Tear	1	1.4%	2	9.5%	3.682	0.04*
2 nd perineal Tear	1	1.4%	2	9.5%	3.682	0.04*
3 rd perineal Tear	1	1.4%	1	4.8%	0.923	0.34
Vaginal Laceration	0	0.0%	2	9.5%	7.199	0.007*
Postpartum Hemorrhage	4	5.4%	1	4.8%	0.014	0.91
Episiotomy Extension	2	2.7%	2	9.5%	1.887	0.17
Blood Transfusion	0	0.0%	3	14.3%	10.916	0.001*

Table 4 shows maternal morbidity associated with use of instruments. The p-value for 1st degree perineal tear was <0.04 making it statistically significant. The p-value for 2nd degree perineal tear was <0.04 making it statistically significant. The p-value for vaginal laceration was <0.007 leading it to be significant. The p-value for blood transfusion was also found to be significant. (<0.001) 1st and 2nd degree laceration was more commonly seen with forceps group as compared to vacuum group, blood transfusion was seen mainly with forceps group and episiotomy extension was seen equally in both the groups. There was no mortality seen in both the groups.

Table 5: Comparison of different foetal complications between two modes of delivery using Chi-square test

Foetal Complications	Vacuum		Forceps		χ ² value	p-value
	N	%	N	%		
Caput	10	13.5%	1	4.8%	1.224	0.27
Cephal Hematoma	11	14.9%	2	9.5%	0.395	0.53
Jaundice	3	4.1%	2	9.5%	0.982	0.32
Brachial Plexus Injury	0	0.0%	2	9.5%	7.199	0.007*
Respiratory Distress Syndrome	16	21.6%	4	19.0%	0.065	0.80
Neonatal death	1	1.4%	0	0.0%	0.287	0.59
Intraventricular Hemorrhage	1	1.4%	0	0.0%	0.287	0.59

Table 5 shows different morbidity and mortality associated with both the groups. Complications like cephalohematoma and respiratory distress was seen more with vacuum group, whereas brachial plexus injury was seen only with forceps p-value of 0.007 making it significant. There was 1.4% neonatal mortality seen with vacuum group cause of death identified was due to prolonged 2nd stage of labour and perinatal asphyxia.

Duration of hospital stay

There was no difference found in NICU admission for both the groups, comparing hospital stay it was found to be more with neonates delivered with forceps.

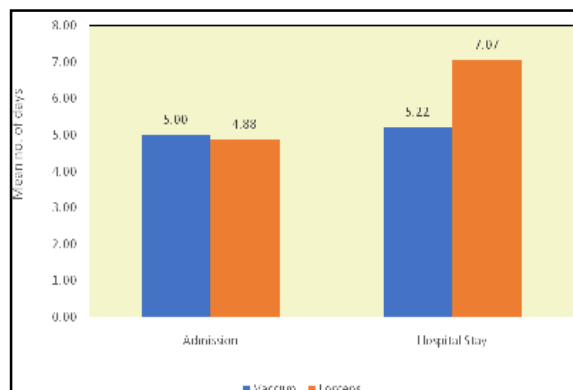


Figure 4: Mean admission duration and hospital stay (in days) between two modes of delivery Birth weight and APGAR scores were similar in both the groups.

DISCUSSION

This study was designed to estimate the immediate maternal and neonatal effects of instrumental vaginal deliveries in a rural tertiary care hospital. In our study it we found lower rates of maternal morbidity among women with vacuum deliveries as compared with women undergoing forceps assisted vaginal deliveries, maternal complication like perineal tear, vaginal laceration was seen more commonly with forceps assisted vaginal deliveries as compared to vacuum assisted group, which was similar to the study conducted by Kitaw Demissie et al.⁶ we also found that women undergoing forceps delivery had infant with lower rates of cephalohematomas which was consistent with the study by Aaron B Caughey et al.⁷ The most common indication for the use of instrumental vaginal delivery in our study was found to be failed maternal efforts followed by prolonged 2nd stage followed by severe pre eclampsia in both the group. In the study conducted by Jennifer H Johnson et al⁵ it was found that use of forceps was more often than vacuum for prolonged stage of labour, however in our study vacuum was the preferred instrumentation. In retrospective review, Gardella et al⁸, found that sequential use of vacuum and forceps was associated with increased rate facial nerve injury, depressed 5 - minute Apgar Score whereas in our study sequential use of vacuum and

forceps were not attempted. In our study even though we found most common complication associated with vacuum was atonic postpartum haemorrhage, the cause could be attributed to multiparity, big baby weighing > 4 kg, unbooked cases and not due to vacuum application particularly. The need for blood transfusion was more in the forceps group and incidence of minor injuries was also seen more in forceps group. There was no maternal mortality seen in our study, where as there was one neonatal death seen in vacuum group due to perinatal asphyxia. There was no difference in 1- and 5 min Apgar scores, mean neonatal intensive care unit or incidence of jaundice, there was no incidence of retinal haemorrhage or subgaleal haemorrhage. In many parts of the country, vacuum use has surpassed forceps use and there is decreasing trend in instrumental delivery mainly because of inadequate training of residents and also due to fear of Professional liability. The limitation of our study was related to its retrospective nature and lack of randomization and inability to account for operator skills.

CONCLUSION

The aim of instrumental vaginal deliveries is to mimic spontaneous vaginal birth, expediting delivery with a minimum of maternal and perinatal morbidity. The important aspect of the decision regarding which instrument to use should be taken after weighing the risks versus benefit and this comes only when residents are adequately exposed to both types of assisted instrumental deliveries thus improving the confidence in conducting both the types of instrumental deliveries. Thereby modality of choice shall only depend on the justified indication and patient requirement as per the clinical situation and not solely on the skill of obstetrician. Hence it is essential that provider continue to be trained in the use of forceps as well as vacuum. If instrument is used appropriately by well trained and skilled obstetrician it can reduce perinatal and maternal morbidity, also reduce the overall rate of caesarean section. Nevertheless the operator should choose the instrument most appropriate to clinical circumstances and their level of skill.

REFERENCES

1. Muraca GM, Sabr Y, Lisonkova S, Skoll A, Brant R, Cundiff GW, et al. Perinatal and maternal morbidity and mortality after attempted operative vaginal delivery at midpelvic station. *Canadian medical association journal* 2017;189:E64-72.
2. Ali UA, Norwitz ER. Vacuum-assisted vaginal delivery. *Gynecology and Reproductive Sciences*. 2009;2(1):5-17.
3. Demissie K, Rhoads GG, Smulian JC, Balasubramanian BA, Gandhi K, Joseph KS, et al. Operative vaginal delivery and neonatal and infant adverse outcomes: population based retrospective analysis. *Br Med J*. 2004 Jul 3;329(7456):24-9.
4. Arulkumaran S, Arjun G, Penna LK. Operative vaginal delivery. The management of labour. 3rd edition. Universities Press; 2001. pp171-87.
5. Johnson JH, Figueroa R, Garry D, Elimian A, Maulik D. Immediate maternal and neonatal effects of forceps and vacuum-assisted deliveries. *The American College of Obstetricians and Gynecologists*. 2004 Mar;103:3.
6. Shrestha BK, Shrestha S, Thapa B. Vacuum Assisted Vaginal Delivery in Singleton Term Pregnancies: Short Term Maternal and Neonatal Outcome in a Tertiary Hospital of Nepal Journal of Lumbini Medical College. 2016;4(2):104-7.
7. Caughey AB, Sandberg PL, Zlatnik MG, Thiet MP, Parer JT, Laros RK, Jr. Forceps compared with vacuum: rates of neonatal and maternal morbidity. *Obstet Gynecol*. 2005;106(5):908-12.
8. Gardella C, Taylor M, Benedetti T, Hitti J, Crischlow C. The effects of sequential use of vacuum and forceps for assisted vaginal delivery on neonatal and maternal outcomes. *Am J Obstet Gynecol*. 2001 Oct;185(4):896-902.
9. Geotzinger KR, Macones GA. Operative vaginal delivery: Current trends in obstetrics. *Women's Health*. 2008;4(3):281-90.
10. Naz H, Sarosh M, Praveen S, Sultana A. Fetomaternal morbidity associated with vacuum versus forceps delivery. *Pak J Surg*. 2012;28(2):126-9.