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Research Article

FETO-MATERNAL OUTCOME IN INSTRUMENTAL VAGINAL DELIVERIES OVER 3YEAR PERFORMED AT SMGS HOSPITAL, JAMMU: A RETROSPECTIVE DATA ANALYSIS.

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ABSTRACT

Background Instrumental vaginal delivery (IVD), performed using forceps or vacuum extractors, is an essential obstetric intervention aimed at reducing maternal and neonatal morbidity and avoiding unnecessary cesarean sections. Despite its clinical importance, declining use due to fear of complications has raised concern. This study was undertaken to evaluate the incidence, indications, and feto-maternal outcomes of IVDs over three years at a tertiary care hospital. **Methods:** This retrospective study was conducted at SMGS Hospital, Jammu, analyzing all antenatal women who underwent instrumental vaginal deliveries between July 2020 and June 2023. Patient records, delivery registers, and NICU data were reviewed. Maternal and neonatal characteristics, indications, and complications were compared between vacuum-assisted and forceps deliveries. Statistical analysis was performed using SPSS version 25, with chi-square and t-tests applied; $p < 0.05$ was considered significant. **Results:** Among 31,360 vaginal deliveries, 58 (1.8/1000) were instrumental. Of these, 41 (70.7%) were vacuum-assisted and 17 (29.3%) were forceps deliveries. The mean maternal age was 28.5 ± 4.9 years, with 67.2% being nullipara. The most common indications were delayed second stage (27.6%) and fetal distress (25.8%). Maternal complications included cervical and vaginal lacerations (15.5%), extension of episiotomy, traumatic postpartum hemorrhage, and vulval hematoma, the latter being significantly more with forceps. Neonatal complications, including facial abrasions, scalp injuries (12.1%), and cephalhematoma (10.3%), were also more frequent with forceps. **Conclusion:** IVDs were infrequent but largely safe when performed by skilled obstetricians, with favorable maternal and neonatal outcomes in most cases. Vacuum was preferred over forceps due to lower complication rates. Training and skill enhancement in operative vaginal deliveries are essential to minimize unnecessary cesarean sections while ensuring maternal and neonatal safety.

Keywords: Instrumental vaginal delivery, Operative vaginal delivery, Obstetrical forceps, Vacuum delivery.

INTRODUCTION

Instrumental vaginal delivery (IVD) refers to the delivery of baby vaginally using either obstetrical forceps or vacuum-assisted extractors. The term operative vaginal delivery (OVD) and instrumental vaginal delivery can be used interchangeably. It is a vital component of basic emergency obstetric care as defined by World Health Organization.

Instrument-assisted deliveries are performed for the indication of maternal or fetal-related conditions and any event that threatens the mother or fetal life; 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[(1)].

There has been a rise in cesarean section (CS) rate in the modern times which raises concern. Instrumental deliveries decrease these primary CS done in second stage of labor. The prevalence of neonatal complications in instrumental delivery is higher than that observed with spontaneous vaginal delivery, neonates born by forceps and vacuum delivery have an approximately fourfold and threefold higher birth trauma rate, respectively[(2)]. IVDs are associated with a higher incidence of episiotomy, pelvic floor tearing, levator ani avulsion and obstetric anal sphincter injury (OASI) than spontaneous vaginal birth and serious rare complications in neonates, such as subgaleal haemorrhage, intracranial haemorrhage, skull fracture and spinal cord injury, can result in perinatal death [(3)]. These complications can be diminished when IVDs are carried out by a skilled obstetrician. It offers the option to accomplish safe delivery, thereby reducing the morbidity and impact on future pregnancies from Cesarean section.

Moreover, structured and specific training provided to medical officers for emergency obstetric care in rural India has been reported as highly beneficial, particularly for skills in undertaking IVD where the capacity to perform safe caesarean sections was limited [(4)].

This study was done to evaluate the fetal and maternal outcome, determine the incidence of instrumental vaginal deliveries, analyze various indications of instrumental vaginal deliveries and resulting fetal and maternal morbidities in antenatal patients who undergo instrumental vaginal deliveries over 3 years at SMGS Hospital Jammu.

MATERIALS AND METHODS

This was a retrospective study of antenatal cases who underwent instrumental vaginal delivery in the Department of obstetrics and gynecology, SMGS Hospital, Jammu over a period of 3 years (from 1 July 2020 to 30 June 2023) after obtaining ethical clearance from institutional ethical committee.

Patients records were reviewed for study purpose. Source of data was files from Medical Records Department section, maternal mortality registers, OT registers, delivery registers, NICU registers and census papers.

All these cases were scrutinized for demographic data, various indications for instrumental delivery, parity and gestational age. The data was collected to calculate the incidence, indications of instrumental vaginal deliveries and feto-maternal outcomes in terms of perineal laceration, episiotomy extension, postpartum hemorrhage, apgar score and neonatal injuries were compared between vacuum assisted and forceps delivery.

Inclusion criteria

- All antenatal women who underwent instrumental vaginal deliveries in the pre decided time frame.

Exclusion criteria

- All patients who were not willing for instrumental vaginal deliveries or patients who did not fulfill the prerequisites for instrumental vaginal deliveries.

STATISTICAL ANALYSIS

The data so collected was analyzed using SPSS software version 25. Categorical and continuous data was compared using chi square and paired t test respectively. $P < 0.05$ was considered statistically significant.

RESULTS

During the period under review there were 31360 vaginal deliveries in the hospital, out of which 58 deliveries were carried out with instrumental assistance. The incidence of IVDs being 1.8 per 1000 deliveries. 41 (70.7%) patients had vacuum assisted ventouse delivery, rest 17 (29.3%) underwent forceps application.

The mean age of study subjects was 28.5 +- 4.9 years, with most women (31%) being in 26-30 years age group. There were 39 out of 58 women (67.24%) which were nullipara who had previously not given birth. 14 out of 58 women had delivered before term (24.1%) though maximum patients requiring instrumental assistance were at term gestation (43 out of 58, 74.1%). The maternal characteristics are present in Table 1.

Table 1: Maternal characteristics

	Number (N=58)	Percentage (%)
Age group		
<20	4	6.90
21-25	15	25.86
26-30	18	31.03
31-35	17	29.31
>35	4	6.90
Mean +- SD	28.5+-4.9	
Parity		
Nullipara	39	67.24
1-2	9	15.52
>2	10	17.24
Mean +- SD	0.8+-1.4	
Gestational age		
<37	14	24.14
37-42	43	74.14
>42	1	1.72
Mean +- SD	37 week 4 days +- 2 weeks 1 day	

Most common indication for instrumental delivery was delay in second stage of labor seen in 16 out of 58 women (27.5%), followed by fetal distress in 15 out of 58 women (25.8%). The difference in various indications for vacuum and forceps delivery was statistically significant for delay in second stage, Vaginal birth after cesarean (VBAC) and cord prolapse (Table 2).

Table 2: Indications for instrumental vaginal delivery

Indication	Vacuum (n=41)	% of total	Forceps (n=17)	% of total	p value

Delayed second stage	10	17.24	6	10.34	0.007*
Fetal distress	11	18.96	4	6.89	0.78
Abruption	2	3.44	0	0.00	0.09
Preeclampsia/eclampsia	8	13.79	3	5.17	0.71
VBAC	10	17.24	2	3.44	0.005*
Cord prolapse	0	0.00	2	3.44	0.002*

Maternal complications seen were cervical (9 out of 58) and vaginal lacerations (9 out of 58) in maximum patients. Extension of MLE, traumatic PPH and vulval hematoma were significantly more with the use of Forceps (Table 3).

Table 3: Maternal complications

Maternal complications	Vacuum (n=41)	% of total	Forceps (n=17)	% of total	p value
Cervical lacerations	7	12.06	2	3.44	0.09
Vaginal lacerations	6	10.34	3	5.17	0.46
Extension of MLE	2	3.44	4	6.89	<0.01*
Traumatic PPH requiring blood	4	6.89	3	5.17	0.009*
Vulval hematoma	-		2	3.44	0.002*
Colporrhexis	-		1	1.72	0.10

There was no significant difference in neonatal outcomes in term of birth weight, apgar score at 1 min and 5 min. There were 2 still births, one each in vacuum and forceps birth. 12.06% neonates suffered scalp injuries and facial marks. 10.03% had cephalhemoatoma. These complications were significantly more with forceps use (Table 4).

Table 4: Neonatal characteristics

Neonatal characteristics	Vacuum (n=41)	% of total	Forceps (n=17)	% of total	p value
Birth Weight					
<2	0	0.00	1	1.72	
2.1-2.5	4	6.89	1	1.72	
2.6-3.0	15	25.86	4	6.89	
3.1-3.5	19	32.75	7	12.06	
>3.5	3	5.17	4	6.89	0.19
A/S at 1 min					
<3	4	6.89	2	3.44	
4-6	7	12.06	3	5.17	
7-10	30	51.72	12	20.68	0.72
A/S at 5 min					
<3	2	3.44	1	1.72	
4-6	2	3.44	2	3.44	
7-10	37	63.79	14	24.13	0.34
Neonatal outcome					
Still birth	1	1.72	1	1.72	
Live birth	40	68.96	16	27.58	0.87

Neonatal complications					
Facial marks/abrasion	1	1.72	6	10.34	<0.01*
Scalp injuries	4	6.89	3	5.17	0.008*
Cephalhematoma	5	8.62	1	1.72	0.036*
Neonatal convulsions	4	6.89	2	3.44	0.32

DISCUSSION

Instrumental vaginal deliveries constituted 1.8 out of 1000 vaginal deliveries carried at SMGS hospital in the given time period. 70.7 % of which were vacuum deliveries and 29.3% were forceps assisted delivery. Sonawane AA *et al.*, in their study found the incidence of IVDs to be 1.39%, 73.3% were vacuum and 26.66% were forceps delivery [5]. Incidence rate of 9.9 per 1000 deliveries was reported by Jumbo CTH *et al.*, with vacuum delivery in 67% and forceps delivery in 33% of the subjects [6]. Though the use of instruments is proportionally similar, the decrease incidence is likely because of progressive decline in instrumental deliveries and resorting to cesarean section due to fear of neonatal and maternal injuries.

The mean maternal age was 28.5 +- 4.9 years, with most women (31%) being in 26-30 year age group. Sewunet H *et al.*, in their study had a mean age of 27 ± 5.833 years with nearly one-third (32.9%) participants found in the age group of 25 to 29 years [7]. In the research carried out by Shimalis C *et al.*, the majority of the respondents 169 (59.9%) were in the age group of 25–34years and mean age of the respondents was 26.3±5 years [8].

There were 39 out of 58 ie. 67.24% women in the study which were nullipara who had previously not given birth. 73% women were nullipara in study by Bhanu BT *et al.*, likewise maximum participants were nillipara (62.5%) in the study carried out by Sonawane AA *et al.*, [9,5]. In the present study, the maximum patients requiring instrumental assistance were at term gestation (43 out of 58, 74.1%), in study by Biru S *et al.*, and the patients at term was 92.7% [10].

The most common indications of use of instruments were delayed second stage accounting for 16/58 ie. 27.58% of total instrumental deliveries (24.39% of vacuum and 35.29% of forceps), followed by fetal distress in 15/58 ie 25.86% of total (26.83% of vacuum and 23.53% of forceps), VBAC, preeclampsia/ eclampsia and cord prolapse in the same order.

Maharajan A *et al.*, noted the most common indication as fetal distress (32.4% of vacuum and 30.5% of forceps) followed by prolonged second stage (21.6% of vacuum and 27.5% of forceps) [1]. Al Riyami N *et al.*, found out the most common indication to be fetal bradycardia in 40% of the patients followed by non-reassuring CTG in 22.3% [2].

In our study the common maternal complications found with were cervical lacerations (12.6% with vacuum, 3.44% with forceps), vaginal lacerations (10.34% with vacuum, 5.17% with forceps) and traumatic pph (6.89% with vacuum, 5.17% with forceps). One patient experienced colporrhexis and two patients developed vulval hematoma with forceps use. Sonawane AA *et al.*, noted similar findings with vacuum use, most of the complications were cervical lacerations (29 of 195) and vaginal lacerations (19 of 195) and with forceps use the most common complication was traumatic pph (13 out of 71) [5]. In study by Shameel F *et al.*, the maternal complications due to forces applications causing cervical tear and lacerations accounted for 12.04% followed by cases with episiotomy extension in 9.03 % cases [11].

Apgar score at 1 min was <3 in 6 out of 58 neonates (10.34%), 4-6 in 10 out of 58 neonates (17.24%) and 7-10 in 42 out of 58 neonates (72.41%). Shimalis C *et al.*, found out A/S at 1 min of <3, 4-6 & 7-10 in 5.3%, 40.3% & 54.3% of neonates respectively [8]. Likewise, in our study, Apgar score at 5 min was <3 in 3 out of 58 neonates (5.17%), 4-6 in 4 out of 58 neonates (6.89%) and 7-10 in 51 out of 58 neonates (87.93%). Shimalis C *et al.*, found out A/S at 5 min

of <3, 4-6 & 7-10 in 4.6%, 10.3% & 85.1% of neonates respectively[8]. We had 12.06% neonates suffered scalp injuries and facial marks in our study, Sonawane AA *et al.*, noted 8% neonates having these injuries with forcep use[5].

The perinatal mortality in our study was 3.44%, Maharjan A *et al.*, had a perinatal mortality of 2.3% in their study [1].

CONCLUSION

It is concluded that, the majority of the cases in our study had no complication and maternofetal outcomes were mostly favorable. Operative vaginal delivery, a key element of obstetric care is a safe alternative to cesarean section when performed by skilled obstetrician. However, risk and benefits of vacuum and forceps have to be individualized. Strengthening of training programs for obstetricians will enhance their expertise for operative vaginal delivery and further reduce cesarean section rates.

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