International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Rana V et al. Int J Reprod Contracept Obstet Gynecol. 2024 Sep;13(9):2371-2374
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20242484

Original Research Article

Retrospective study of maternal and perinatal outcomes of instrumental vaginal deliveries in a tertiary care hospital

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Received: 03 July 2024
Revised: 11 August 2024
Accepted: 12 August 2024

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ABSTRACT

Background: An instrumental delivery includes vacuum assisted delivery and obstetric forceps delivery, which is used to cut short the second stage of labour. In modern obstetric practice, there is increased rate of cesarean section worldwide. In India, incidence of operative vaginal deliveries (OVDs) varies between 2.5-5%. A successful instrumental delivery decreases the possibility of cesarean section and its morbidity and its implications for future pregnancy.
Methods: A retrospective study was conducted in our tertiary care hospital, in department of Obstetrics and Gynecology from May 2022 to April 2024. All pregnant females with full term singleton pregnancy with cephalic presentation were included in this study. In this study, we studied indications, requirement of type of OVDs, maternal and perinatal outcomes.
Results: In our study, incidence of instrumental deliveries was 4.25%. Use of instrumental delivery was more common in primigravida and most common indication was prolonged second stage of labour. Most common maternal morbidity was extension of episiotomy and fetal morbidity was birth asphyxia. 6 babies needed NICU admission. Few babies had low APGAR score at 1 and 5 minutes.
Conclusions: Instrumental delivery has found to be safe and it is the best option to cesarean delivery.

Keywords: Forceps delivery, Instrumental delivery, Operative vaginal delivery, Vacuum delivery

INTRODUCTION

The incidence of OVDs varies from country to country. In the UK hospitals, the incidence is between 6 to 12%.[1] Instrumental delivery includes either vacuum assisted delivery or forceps delivery, Rates of cesarean section has risen worldwide in recent years. OVDs contributes in decreasing cesarean section rates and its related morbidities.[2] The commonest indications of OVDs are delayed second stage of labour, maternal exhaustion, fetal distress, intrapartum hemorrhage, maternal cardio-pulmonary or vascular conditions, etc.[3] Incompletely dilated cervix, unengaged head, cephalopelvic disproportion and fetal coagulation disorders are contraindications of instrumental deliveries. Operator's skill and experience is very important in outcome of instrumental delivery. There are some risk factors associated with failure of OVDs e.g. station '0' or above, previous cesarean section, nulliparous women, position of head other than occipitoanterior.[4] Cesarean section is an alternative to failed OVDs. A successful instrumental delivery avoids cesarean section, concomitant uterine scar and its implications on future pregnancy.[5] There is increased risk of fetomaternal complications in OVDs as compared to normal vaginal deliveries. Maternal complications are cervical, vaginal or perineal tears, episiotomy extension, traumatic postpartum hemorrhage and rupture of uterus or bladder. Fetal complications include cephalhematoma, intracranial hemorrhage, low APGAR score, brachial plexus injury, facial nerve injury,

sub conjunctival hemorrhage and shoulder dystocia.[6,7] Various studies show that vacuum deliveries are considered safe as compared to forceps deliveries. The goal of instrumental delivery is to assist the spontaneous vaginal delivery, with minimal maternal and perinatal morbidity.[8] This study was undertaken to evaluate the fetomaternal outcomes in vacuum and forceps delivery at tertiary care hospital.

METHODS

This retrospective study was conducted in Department of Obstetrics and Gynecology, Dr. M. K. Shah Medical College and Research Centre, Ahmedabad, Gujarat, a tertiary care hospital from May 2022 to April 2024. In present study, 52 patients had instrumental delivery, out of which 44 patients had vacuum delivery and 8 patients had obstetric forceps delivery. Information of OVDs was obtained from Labour room register and indoor case files. From these data analysis was done to find out fetal and maternal outcomes in instrumental deliveries.

Inclusion criteria

Patients with full term singleton pregnancies with cephalic presentation were included in this study.

Exclusion criteria

Exclusion criteria for this study was preterm pregnancy, other than cephalic presentation, multiple pregnancy, cephalopelvic disproportion.

Statistical analysis

All data was collected, tabulated and analyzed using Microsoft Office Excel.

RESULTS

Out of 1224 vaginal deliveries, the number of instrumental deliveries was 52 (4.25%). Out of 52, 44 (84.6%) were vacuum deliveries and 8 (15.4%) were forceps deliveries. Of these patients, 39 (75%) women were aged between 21-28 years and 13 (25%) women were between 29-35 years. 42 (80%) patients were primigravida and 10 (20%) were multigravida. In 35 deliveries baby weight was between 2.5-3.0 kg and in 17 deliveries baby weight was between 3.0-3.5 kg. Most of the babies were born with good APGAR score at 1 and 5 minutes. In 5 babies there was low APGAR score at 1 and in 7 babies at 5 minutes (Table 1). Prolonged second stage of the labour (57.7%) was the most common indication of OVDs followed by maternal exhaustion (13.5%) (Table 2). Perineal tears were observed in 2 (3.9%) patients, extension of episiotomy in 3 (5.8%) patients, cervical/vaginal tear in 2 (3.9%), traumatic PPH and retention of urine in 1 (1.9%) patient (Table 3). No cephalhematoma was noted, instrumental bruising was seen in 2 babies, birth asphyxia seen in 4 patients and NICU admission needed in 6 babies (Table 4).

Table 1: Maternal and neonatal characteristics.

		Number	Percentage
Age	21-28 years	39	75
	29-35 years	13	25
Parity	Primigravida	42	80
	Multigravida	10	20
Birth weight	2.5-3.0 kg	35	67.3
	3.0-3.5 kg	17	32.7
APGAR at 1 min	6-9	47	90.3
	2-5	5	9.7
APGAR at 5 min	6-9	45	86.5
	2-5	7	13.5

Table 2: Indications of OVDs.

Indication	Number	Percentage
Prolonged second stage	30	57.7
Maternal exhaustion	12	23
Fetal distress	7	13.5
Poor maternal effort	3	5.8

Table 3: Maternal morbidity in OVDs.

Maternal morbidity	Number	Percentage
Perineal tear	2	3.9
Extension of episiotomy	3	5.8
Vaginal/cervical laceration	2	3.9
Traumatic PPH	1	1.9
Retention of urine	1	1.9

Table 4: Neonatal morbidity/mortality.

Variable	Number	Percentage
Cephalhematoma	0	0
Instrumental bruising	2	3.8
Birth asphyxia	4	7.7
NICU admission	6	11.5
Nerve injury	0	0
Neonatal death	0	0

DISCUSSION

About 10-20% deliveries need some type of intervention in all the deliveries worldwide. About 6-12% deliveries are OVDs. Operative vaginal delivery is used to cut short the second stage of labour. In the past, development of vacuum was preceded by the obstetric forceps by many decades, but in recent years this has been superseded by the vacuum in some countries. When spontaneous birth fails even after full cervical dilatation, the obstetrician has to decide whether to perform an assisted delivery or cesarean section. Despite the OVDs are an emergency intervention, the use of it in developing countries has progressively declined due to neonatal and maternal morbidity and need of skillful obstetrician. Our study was done to determine the neonatal and maternal outcome and complications related to OVDs. Instrumental delivery is the important

tool in modern obstetric era. It helps in avoiding the cesarean section and its associated morbidity. In our study, rate of instrumental delivery was 4.25%. In study conducted by Jabeen. the rate of instrumental deliveries was 4.7%.[9] In our study, 75% of the patients were between the age group of 21-28 years. Mean age of women was 25.21±4.72 years in study of Gupta S.[6] 80% of the patients were Primigravida in this study. Joshi R. agrees to this finding.[10] 67% women had babies weighing between 2.5-3.0 kg. In study by Gupta S, mean birth weight was 3.12±0.38 kg. OVDs may be indicated for maternal exhaustion or fetal conditions like non - reassuring fetal heart rate, to prevent hypoxic injury to brain or fetal death. Arrest of labour may be another indication. In this study, prolonged second stage of labour (57.7%) was the most common indication of instrumental delivery. Maternal exhaustion (23%) being the second most common indication. Study by Manorama shows the similar finding.[11] Various maternal conditions like cardiac diseases or cerebral aneurysm, where bearing down effort is not encouraged, is another indication of OVDs. Extension of episiotomy, perineal tear and cervical/vaginal tear were more common after instrumental delivery in this study. In study by Khadija, it is shown that perineal tears or cervical/vaginal lacerations were more common with forceps as compared to ventouse.[12] In our study 5 babies had low APGAR score at one minutes and 7 babies at 5 minutes. Other studies showed no significant difference in APGAR scores at 5 minutes between vacuum and forceps. In this study 6 babies needed NICU admissions for various reasons. Birth asphyxia was most common neonatal morbidity. No cephalhematoma was noted in this study. A study conducted by Johnson and Manon showed increased rate of cephalhematoma and retinal hemorrhage.[13] No neonatal death was reported in our study. OVDs mainly depend on operator's skill of application of instrument and case selection rather than type of instrument. RCOG guidelines states that consecutive use of forceps and vacuum should be avoided and should not be done by inexperienced obstetricians.[14] As this study was retrospective study, long term maternal and fetal morbidities were beyond the scope of our study. The reported maternal morbidities may not have been only a result of the delivery procedure, but rather could have been caused by additional maternal comorbidities and fetal factors. Our study does not address this question because the maternal complications in spontaneous deliveries or cesarean sections have not been assessed. Furthermore, bias about a few maternal morbidities may have resulted from the deliveries being conducted by different obstetricians with varying levels of experience.

CONCLUSION

Instrumental delivery by experienced obstetrician is associated with good obstetric outcomes with minimal risk. Ventouse application is associated with significantly less maternal trauma than with the forceps. The safety of OVDs is dependent mainly on operator's skills and right case selection. Forceps delivery requires more skill. Knowledge about the possible maternal and neonatal outcomes shown by our study may help to avert the complications or at least help in preparedness for management of potential complications.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Rana V, Patel A, Patel V, Bhati B. Retrospective study of maternal and perinatal outcomes of instrumental vaginal deliveries in a tertiary care hospital. Int J Reprod Contracept Obstet Gynecol 2024;13:2371-4.