

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20163997>

Original Research Article

Instrumental vaginal deliveries at tertiary centre

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Received: 17 October 2016

Revised: 23 October 2016

Accepted: 25 October 2016

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ABSTRACT

Background: Operative vaginal delivery has been maligned since the days of W. J. Little with the word “Forceps” becoming synonymous with the “Birth Injury” and “Cerebral palsy”. Instrumental vaginal deliveries in that era were the end result of a long, obstructed labour performed for maternal benefits and to avoid destructive procedures to the fetus. The aims and objectives of the study were to find out the incidence of instrumental vaginal delivery at our tertiary institute and to know the indications of the procedure and to study the impacts of the same on maternal and fetal outcomes.

Methods: This was an observational prospective cohort study on Instrumental Vaginal Deliveries (IVD) carried out between Jan 2015 to Dec 2015 at a tertiary hospital in Sion, Mumbai. All the patients who had an instrumental vaginal delivery were studied in terms of maternal age, parity, indications for the same, maternal and fetal outcomes, APGAR scoring, NICU admissions and complications in both.

Results: The incidence of Instrumental vaginal delivery was 2.8% of all deliveries, most of the patients between 20-30yrs (88%) and maximum primigravida (57.19%). In 70.56 % patients it was indicated because of prolonged second stage of labour. 2 patients required blood transfusion, other complications being cervical tear (36 cases) and extension of episiotomy (27 cases). 82 newborn babies had birth asphyxia for which NICU admission was required.

Conclusions: It is evident from our study that Instrumental Vaginal Delivery is an important emergency obstetrics procedure in our obstetrics day to day care. It is very important to make Instrumental Vaginal Delivery procedure available and accessible everywhere especially in low resource country like India where the need is high and caesarean section as alternative is not always available. It should be made available for such patient with abnormal prolonged labour and complication should be identified and managed at the earliest.

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

INTRODUCTION

A vaginal delivery accomplished with the help of instruments that can be either Forceps or Vacuum is termed as instrumental vaginal delivery or Operative vaginal delivery or assisted vaginal delivery.¹

The incidence varies from country to country and even in the same country from one obstetrician to other. In the RCOG Consultant Conference, the instrumental vaginal

delivery rate of 10.5 % was reported with a range of 4-20%. The consensus at the conference was to aim to lower the rate to an average of 8.5% (range 5-15%).²

The incidence of instrumental vaginal delivery in the United States is 4.5% and that in United Kingdom is between 10%-15%.³

Previously worldwide studies were carried out to compare the neonatal and maternal complications

between forceps and vacuum deliveries. Cochrane Systemic Review of nine Randomised Controlled Trials (RCT) showed that vacuum extractor is no more likely to be associated with APGAR score at 5 min as compared to forceps and some studies have shown maternal complications higher with forceps application.⁴⁻⁶

According to the WHO and UN Agencies, Assisted vaginal delivery is one of the six critical functions of basic EMERGENCY Care.⁷ So it's very important to realise the fact that instrumental vaginal delivery procedures should be made available and accessible everywhere especially in low resource countries like India where the need is high and caesarean section as alternative is not always available.^{5,8,9} In response to the growing number of caesarean deliveries and the morbidities associated with the increasing number of caesarean deliveries the ACOG and the Society for Maternal Fetal Medicine recently conducted a workshop in Feb 2012 at Dallas, Texas, US to address the concept of preventing the primary caesarean delivery.¹⁰

METHODS

A total of 299 cases were included in the Prospective Observational study carried out from Jan 2015 – Dec 2015.

The indications of instrumental vaginal delivery were broadly based on 4 common indications (summarised in the following Table 8).

After the case selection, written valid and informed consent was obtained, and obstetrics examination performed to confirm fulfilment of criteria for the same.

In our setting, Forceps deliveries were performed by application of the short curved/ Straight Outlet forceps (e.g. Wrigley s Forceps/ Simpsons Forceps).

Vacuum deliveries were performed by application of Silastic cups.

In all the selected cases, immediately after the delivery of the baby, a compulsory per Speculum examination and 3 sponge holders were used at the labour table to look for cervical lacerations, vaginal laceration, Perineal tear, episiotomy extensions or Periurethral tear; intra venous drip of oxytocin were given in all and prostaglandins were administered prophylactically to prevent PPH. All the cases were given intravenous broad spectrum antibiotics for three days. These patients were discharged on day 4.

Newborn outcome in terms of APGAR scoring at 1 min and 5 min, convulsions, instrumental injuries or complications (Cephalhematomas, Caput succedaneum, NICU admissions, Jaundice, neonatal sepsis) was noted.

RESULTS

During the study period there were total of 10,756 deliveries in our institution out of which 299 cases of instrumental vaginal delivery including 296 cases were of Forceps assisted and 3 cases of Vacuum assisted delivery.

Table 1: Incidence of instrumental vaginal delivery (IVD).

Total number of deliveries (Jan 2015 to Dec 2015)	Total number of instrumental Vaginal delivery	Incidence (Forceps + Vacuum)
10756	299	2.77%

Table 2 shows maternal age of the patient. The highest cases of forceps assisted delivery were from the age group of 20 to 25 years. And the lowest were from age group of above 30 years.

Table 2: Maternal age.

Maternal age	Forceps	Vacuum	Total	%
<20yr	19	00	19	6.35
20yr-25yr	158	01	159	53.17
25yr-30yr	102	02	104	34.78
>30yr	17	00	17	5.68
Total	296	03	299	

Table 3: Parity.

Parity	Forceps	Vacuum	Total	%
Primigravida	169	2	171	57.19
Gravida 2	73	00	73	24.41
Gravida 3	49	01	50	16.38
>Gravida 3	05	00	05	1.67
Total	296	03	299	

There were 70.56% of indications of labour in prolonged second stage. In maternal heart disease this indication was 14.38%.

Table 4: Indications for applications.

Indications	Forceps	Vacuum	Total	%
Prolonged second stage of labour	208	03	211	70.56
Maternal heart disease	43	00	43	14.38
Gestational diabetes	05	00	05	1.67
Postdatism	07	00	07	2.34
Fetal distress	33	00	33	11.03
Total	296	03	299	

Table 5: Maternal complications/morbidities.

Complications	Forceps	Vacuum	Total	%
Cervical tear	36	0	36	12.04
Extension of episiotomy	27	00	27	9.03
Atonic PPH	12	00	12	4.01
Excessive blood loss requiring blood transfusion	02	00	02	0.66
Maternal mortality	00	00	-	-
Ruptured uterus	00	00	-	-
Broad ligament injuries	00	00	-	-
Traumatic PPH	02	00	-	-
Total	77	00	77	

Table 6: Neonatal morbidity and mortality.

Morbidity	Forceps	Vacuum	Total	%
Apgar score >6 at 1min	208	03	211	70.56
Apgar score <6 at 1min	82	00	82	27.42
Fresh Still birth	06	00	06	2.00
Total	296	03	299	

Table 7: Newborn complications.

Complications	Forceps	Vacuum	Total	%
Cephalhematomas	0	1	01	0.33
Other Injuries	1	0	01	0.33
Neonatal Jaundice	19	1	20	6.68
Neonatal sepsis	0	0	00	-
Neonatal convulsions	2	0	02	0.66
NICU admissions	82	0	82	27.42
Total	105	1	106	

DISCUSSION

Incidence of instrumental vaginal delivery (IVD)

During the study period there were total of 10,756 deliveries in our institution out of which 299 cases of instrumental vaginal delivery including 296 cases were of Forceps assisted and 3 cases of Vacuum assisted delivery.

In our study at our institute the incidence of Instrumental vaginal delivery is 2.77%.

It ranges between 10 and 15% in the UK and 4.5% in the United States.²

It is also very much lower than 8.5% recommended by RCOG and also lower than developed countries.³

However IVDs are underused in low resource settings.³

In the study carried out by Nigeria by Aliyu LD et al observed incidence of instrumental vaginal delivery 0.69%.¹¹

In low resource the rates of IVD are low, ranging from 1% or less in Niamey (Niger), Ougadaougou (Burkina Faso) and Bamako (Mali) to 3% in Nouakchott (Mauritania).¹²

Maternal age

The above table shows the majority of women were young between 20 to 25 yrs making 53.17% followed by 25 to 30 yrs making 34.78%.

In the study carried out in United States similar results were observed.¹³

In the study carried out by Nigeria by Aliyu LD et al also observed women upto 25yr of age forming 62 % of cases.¹¹

Parity

57.19% cases were primigravida followed by second gravida with 24.41% cases.

In the study carried out by Nigeria by Aliyu LD et al also observed primigravida forming 52% and second gravid 18% cases.¹¹

In a study by Prapas N et al on Instrumental vaginal delivery also observed primigravida forming 84.75 % and multigravida 15% cases.¹⁴

Indications for applications

We found the most indication for instrument application was the Prolonged second stage of labour (70.56%) followed by maternal heart disease (14.38%). Fetal distress accounted for 11% cases.

In a study by Singh Abha and Rathore reported the indication as fetal distress in 20.83 % and prolonged second stage in 16% cases.¹⁵

In a study by Prapas N et al on Instrumental vaginal delivery observed most common indication as Prolonged second stage of labour in 69.73 % followed by Fetal distress accounting for 26.47%.¹⁴

An Operative vaginal delivery should only be performed if there is an appropriate indication.

The American College of Obstetrics and Gynecologists (ACOG) has published guidelines on the use of Operative vaginal delivery aid (both Forceps and vacuum) which

included a list of accepted indications for such procedures.¹⁶ They are summarised in the Table 8 below:

Table 8: ACOG indication for the assisted vaginal delivery.

Indication	Definition / Detail
Prolonged second stage of labour	Defined as In Nulliparous as lack of progress of labour for 3 hrs with regional anesthesia or 2 hrs without anesthesia.
	In multiparous as lack of progress of labour for 2 hrs with regional anesthesia or 1 hrs without anesthesia.
Non Reassuring fetal testing	Suspicion of immediate or potential fetal compromise is an indication for the operative vaginal delivery
Elective shortening of second stage of labour	In maternal cardiovascular / neurological disorders
Maternal exhaustion	Largely subjective and not well defined

Maternal complication / morbidities

In the our study 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.

Atonic post partum hemorrhage noted in 4% cases.

However 2 patients had excessive blood loss due to traumatic with cervical laceration which was managed by prostaglandins with suturing and intravenous oxytocin drip. Blood transfusion given in them.

In study by Singh Abha and Rathore the incidence of episiotomy extension was 26.66%.¹⁵

In the review of over 50000 vaginal deliveries at the University of Miami, the rate of 3rd/4th perineal lacerations were significantly higher in forceps (20%) and Vacuum (10%) as compared to the Spontaneous vaginal delivery.¹⁷

In study by Bradley et al the rate of severe vaginal lacerations was approximately 32% and that by Handa VL at al showed incidence of vaginal laceration to be between 20-50%.^{18,19}

Similar results were also seen in the study by Sultan AH, Kamm MA, Hudson CN Bartram CI.⁶

Neonatal morbidity and mortality

We have observed that 70.56% of the newborn with good APGAR score >6 at 1min.

However there were 2% cases of Fresh still birth noted.

Evidence evaluating neonatal morbidity after instrumental vaginal delivery is inconsistent.²⁰

A Cochrane Database systematic review of 10 trials comparing vacuum extraction with forceps delivery found no significant differences in Apgar scores at one and five minutes and few serious injuries in neonates, although the vacuum extractor was associated with an increase in cephalohaematoma and retinal haemorrhage.²¹

Murphy DJ et al in a recent prospective study found that neonatal trauma and fetal acidosis were more common after failed instrumental vaginal delivery than after immediate caesarean section.²²

Newborn Complications

82 newborn babies required NICU admission due to birth asphyxia. 20 babies had neonatal Jaundice.

Humerus fracture was noted in one baby following forceps applied for shoulder dystocia. Humerus fracture was managed with the help of orthopaedic surgeons.

In a study by Prapas N et al on Instrumental vaginal delivery showed 14.43 % newborn required NICU admission.¹⁴

In our study 2 newborns had convulsions (0.66%) and 1 newborn has cephalhematoma (0.33%).

CONCLUSION

In the present study and after studying various recent literatures it can be concluded that the decision to proceed with an operative vaginal delivery when a spontaneous vaginal delivery is not possible must be based upon maternal and fetal risks.

However risk and benefits of both the modes of deliveries (forceps and vacuum) must be individualised in each scenario and operative vaginal deliveries should only be performed if considered a safe alternative.

So it's very important to reinvent the training and use of Operative vaginal delivery so as to optimise this art which is underutilised today. When it is performed by skilled provider it is an ideal alternative to the Ceserean delivery in the chosen patients.

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: Shameel F, Bava A, Nandanwar YS. Instrumental vaginal deliveries at tertiary centre. *Int J Reprod Contracept Obstet Gynecol* 2016;5:4146-50.