VACUUM EXTRACTION AND FORCEPS DELIVERIES; COMPARISON OF MATERNAL AND NEONATAL MORBIDITY

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ABSTRACT... Objective: To compare the maternal and neonatal morbidity between vacuum extraction versus forceps vaginal delivery. **Study design:** Quasi-experimental study. **Period:** January 2009 to December 2010. Setting: Department of Obstetrics and Gynecology CMC, SMBBMU Larkana. **Methodology:** All patients delivered by forceps or vacuum with singleton pregnancy were included, the patient with multiple gestation, breech presentation and gestational age less than 34 weeks were excluded. Data collected in pre-set Proforma include type of instrument used, indication of instrumental delivery, maternal and neonatal complications of procedure. Data was analyzed; frequency and percentage will be calculated for maternal age, gestational age, and degree of perineal and cervical tears. .chi-square test was applied to compare the degree of neonatal and maternal complications. P-value less than 0.05 taken as significant. **Results:** Total 9, 5600 deliveries were conducted, among them assisted vaginal deliveries were169 making the frequency of 2.66%, among which 96 have forceps and 64 were ventouse vaginal deliveries. Majority of women were primigravida. In infants of less than 37 weeks of gestation the use of forceps was significantly more common, delay in second stage of labor was the most common indication for vacuum extraction while fetal distress was more common reason for forceps delivery. Severe birth canal injuries (third and fourth degree perineal tears) and procedure related blood loss of more than 500 ml was significantly more common in forceps delivery group. Cephalhaematoma, neonatal jaundice and severe caput succedanum at discharge were more seen in vacuum deliveries, but facial injuries were more common after forceps delivery. Intracranial hemorrhage was identified in two infants born by vacuum extraction and none in forceps group. Two infants delivered by vacuum extraction expired, one due to respiratory distress and other due to intracranial hemorrhage, and one of the infants delivered by forceps expired due to meconium aspiration syndrome (MAS). **Conclusions:** Each instrument has its own merits and demerits .Maternal and neonatal outcome depends on indications of instruments, patient selection and skill of operator. We conclude that forceps delivery is more associated with maternal genital tract trauma and vacuum delivery is associated with more neonatal complications. So it is the choice of obstetrician to select the proper instruments . We also suggest that obstetricians learn these skills not on patients but in a skill laboratory using models.

Key words: Neonatal morbidity, maternal morbidity, vacuum delivery, forceps vaginal delivery, assisted vaginal deliveries' .Instrumental vaginal deliveries

INTRODUCTION

Assisted vaginal delivery is defined as delivery of a baby vaginally using an instrument for assistance[1]. Vacuum and forceps are two options when an instrument is needed to facilitate vaginal birth. The choice between two options is usually been based on training and traditions[2]. Forceps are recognized as a primary instruments in English speaking countries where reversal is true in euorapian countries, although most British obstraticians still prefers forceps for instrumental vaginal delivery[2]. Vacuum extraction has also recently gained in popularity because of new designs of cups presumably with reduced risk of injury to infant[3]. The incidence of assisted vaginal delivery in united states is currently estimated at around 5%[4]. One local study in Pakistan showed that frequency of instrumental vaginal deliveries is 3.8%[1].

The overall rate of operative vaginal delivery has been declining the proportion of operative vaginal deliveries conducted by vacuum assisted birth has been increasing and is more than four times the rate of forceps assisted births[5]. Forceps accounts for 0.8% of vaginal birth and vacuum 3.7%[6]. In recent years the success rate of operative vaginal deliveries has been quite high (99%) this likely reflects appropriate choice of obstetrician for intervention[7]. So it is important that obstetric care providers are aware of the maternal and neonatal risk associated with such deleveries. Meta-analysis of randomized trial comparing maternal and infant outcomes between vacuum and forceps delivery have

found vacuum extraction causes less maternal trauma[2]. Instrumental vaginal delivery trials comparing forceps with vacuum extractor are not new, these trial have documented that the vacuum offers lower rate of maternal trauma such as genital tract laceration and episiotomy extension, but higher rate of cephal-haematoma and scalp trauma than forceps[3].There is little doubt ,however that right equipment in right hand can achieve impressive and safe result[4].

The rationale of this study was to compare the maternal and neonatal complications in vacuum versus forceps vaginal deliveries.

MATERIAL AND METHODS

This was a quasi experimental study carried out at the department of obstetrics and gynecology CMC, SMBBMU Larkana from January 2009 to Dec 2010. All cases delivered by forceps or vacuum extraction of singleton pregnancy were included. The patient with multiple gestations, breech presentation and gestational age of less than 34 weeks were excluded from the study. The data collected on study specific Proforma included age, parity, duration of gestation, infant birth weight, APGAR score, position of the fetus, indication of instrumental delivery, type of instrument used (Metal cup were used in Vacuum extraction and Outlet forceps in forceps delivery). Maternal morbidity was analyzed in terms of perineal, vaginal, cervical tears and blood loss during procedure, which was estimated by the weight differences in pads or towels before and after instrumental delivery. Neonatal morbidity was analyzed using parameters like scalp , and facial injuries, convulsions, intracranial hemorrhage, jaundice, Erb's palsy, APGAR score, and perinatal mortality assessed.

All the neonates were examined and assessed clinically by the pediatrician immediately after delivery and followed for a period of at least 48 hours. Neonatal cerebral hemorrhage was diagnosed clinically and radio logically by Ultrasound and CT scanning. The results were analyzed and compared between two groups, using SPSS version 10.

Means ±SD were calculated for maternal and gestational age, frequency and percentages for variables like perineal, cervical, vaginal tears, neonatal complications. Chi square test was applied to compare the proportions of degree of maternal and neonatal morbidity between Vacuum and Forceps Vaginal deliveries groups, and P-value of less than 0.05 was taken as statistically insignificant.

RESULTS

In the period under review a total of 9,5600 deliveries were conducted, among them instrumental vaginal deliveries were 169 making the frequency of 2.66%, among which 96 have forceps, 64 were ventose vaginal deliveries.

Table I shows the parity and Gestational age of patients delivered by assisted vaginal deliveries. Most of these patients were primigravida. Infants born before 37 weeks of gestation were delivered mostly by the forceps with a p value of 0.001. Prolonged second stage of labor was the most common indication for vacuum extraction while non-reassuring fetal trace (fetal distress) was more common reasons for forceps delivery table II. Severe birth canal injuries, third and fourth degree tears, lower birth canal injuries were commonly seen in in forceps delivery group. Similarly procedure related blood loss of more than 500 ml was significantly more common in forceps delivery group as shown in table III.

Cephalhaematoma, neonatal jaundice, and severe caput succedanum at discharge was seen more in vacuum vaginal delivery further clarified in table IV, but facial injuries were more common after forceps delivery. Intracranial hemorrhage was identified in two infants born by vacuum extraction and none in forceps group. Two infants delivered by vacuum extraction expired, one due to respiratory distress and other due to intracranial hemorrhage, and one of the infants delivered by forceps expired due to meconium aspiration syndrome.

DISCUSSION

The incidence of operative vaginal delivery overall is 10% of all vaginal deliveries. It varies widely[8].The frequency of instrumental delivery in our unit is 2.66%. Each instrument has certain advantage over others, Birth trauma is significantly more likely to occur with ventouse than forceps delivery[9], but failure is more likely with

Table-I. Gestational age and parity

Gestational age	Vacuum delivery (N=64)		Forceps delivery (N=96)	
	No. of patients	%age	No. of patients	%age
37 weeks	04	6.25%	10	10.4%
37-40 weeks	45	70.3%	70	72.9%
40 weeks	15	23.43%	16	16.6%
Total	64	100	96	100
Parity				
Primigravida	45	70.3	60	32.5
1-5	10	15.6	14	14.5
5	09	14.0	22	22.9
Total	64	100	96	100

Table-II. Indications of vacuum and forceps delivery

	Vacuum delivery (N=64)		Forceps delivery (N=96)	
	No. of patients	%age	No. of patients	%age
Prolong second stage of labor	26	40.6	20	20.8
Fetal distress	18	28.12	52	54.16
Shortened second stage	08	12.5	06	8.33
Deep transverse arrest	01	1.56	03	3.12
OP	03	4.68	06	6.25
Maternal exhaustion	08	12.5	07	7.29
Total	64	100	96	100

ventouse than forceps, presumably because it is not possible to pull with as much force as when using Forceps, and there is comparatively less pain and less requirement of analgesia with ventouse at delivery and

Table-III. Maternal morbidity

	Vacuum delivery (N=64)		Forceps delivery (N=96)	
	No. of patients	%age	No. of patients	%age
Perineum				
Intact	12	18.75	14	14.5
Episiotomy	34	53.12	46	47.9
First and second degree tear	08	12.7	12	12.5
Third and forth degree tear	-	-	04	4.16
Vagina				
Sidewall and periurethral tear	03	4.68	05	5.20
Extension to fornices	-	-	02	2.0
Cervical tear	02	3.12	04	2.0
PPH 500 ml	05	7.81	09	9.37
Total	64	100	96	100

24 hours later[10]. Serious maternal perineal or vaginal trauma is more likely with use of forceps[11].

In our study it was noticed that birth trauma, and blood loss is more with forceps than vacuum delivery 4.16% that is comparable with study conducted by alia aslam[1]. Episiotomy was used much more after performing forceps delivery 46 patients compared with vacuum group. When properly applied, forceps add to the volume passing through the introitus whereas vacuum cup adds no extra volume. This may properly explain the tendency for more lacerations and episiotomies in the forceps group. In our study the indications for procedures were different, fetal distress a more common indication for forceps delivery 54.16% .The delay in second stage was the commonest indication for vacuum extraction 12.5% this is comparable with study conducted in Oman[3]. The over all duration of compression on a fetal head is less marked for forceps then for the normal delivery, with

Table-IV. Neonatal morbidity

	Vacuum delivery (N=64)		Forceps delivery (N=96)	
	No. of patients	%age	No. of patients	%age
Scalp and facial injuries	05	7.8	12	12.5
Bruising and abrasions	-	-	02	02
ICH	02	3.12	-	-
Retinal hemorrhage	-	-	-	-
Subconjuctival hemorrhage	01	1.56	-	-
Erb's palsy	-	-	-	-
Facial nerve palsy	-	-	-	-
Cephal hematoma	03	4.6	01	01
Jaundice	10	15.6	04	4.16
Severe caput at discharge	05	7.8	01	01
Perinatal death	02	3.12	01	01
None	36	56.25	75	78.2
Total	64	100	96	100

vacuum extraction, Over all traction is significantly greater than that associated with forceps , for these reasons we used forceps much more frequently then vacuum extraction in the deliveries of premature babies. In current study cephalhematoma was found in 4.6% among vacuum group and1.0%in forceps group. Jaundice has been found in 15.6%in vacuum as compared to forceps 4.16% that is comparable with study conducted by Johnsons et al [12]. In Florida, a study reported 20%babies delivered by vacuum extraction had raised bilirubin compared to 10% of forceps delivered group[13]. when a ring of extrinsic pressure is applied to the fetal scalp, either from the dilating cervix, pelvic soft tissue or vacuum cup, interstitial fluid and micro haemorrhage accumulate to form the caput Prolonged second stage of labor and larger vacuum procedure apparently allowed time for accumulation of more interstitial scalp fluid which in turn leaves the tissue more vulnerable to abrasion ,laceration and cephal hematoma formation .Forceps delivery was more associated with facial and scalp injuries.

CONCLUSIONS

Each instrument has its own merits and demerits .Maternal and neonatal outcome depends on indications of instruments, patient selection and skill of operator. We conclude that forceps delivery is more associated with maternal genital tract trauma and vacuum delivery is associated with more neonatal complications. So it is the choice of obstetrician to select the proper instrument. We also suggest that obstetricians learn these skills not on patients but in a skill laboratory using models.

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