ORIGINAL ARTICLE

Feto-Maternal Outcome in Operative Vaginal Delivery

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ABSTRACT

Objective: To compare the fetomaternal outcome in vacuum assisted vaginal delivery and forceps assisted vaginal delivery.

Study design: Quasi-experimental study.

Subjects & methodology: This study was conducted at the Department of Obstetrics and Gynaecology, Services Hospital, Lahore during six months (from January 2011 to June 2011), Sixty patients requiring operative vaginal delivery. They were further allocated to either group by using a random number table. Age ranged from 20 to 40 years and Gestational age 37 or more completed weeks. Per abdominal and per vaginal examination was carried out.

Results: Mean age of the patients in vacuum extraction group was 28.53±4.86 year and in forceps delivery group was 28.73±5.29. Laceration developed in 13 patients (43.3%) and 22 patients (73.3%) in group-A and B, respectively. Extension of episiotomy took place in 2 patients (6.7%) from group-A and 10 patients (33.3%) from group-B. Vulvovaginal haematoma was found in 1 patient (3.3%) in group-B only. Immediate bladder and urethral injuries developed 1 patient (3.3%) in group-B only. Perineal tears (3rd and 4th degree) were present in patient (3.3%) in group-B only. Failure of instrument happened in 2 patients (6.7%) from group-B.

Conclusion: Results of the present study indicate that both modes of instrumental vaginal delivery are safe with respect to maternal morbidity and neonatal trauma.

Keywords: Forceps delivery, Vacuum assisted delivery, Fetomaternal outcome

INTRODUCTION

Pregnancy as a physiological activity not always terminate as normal vaginal delivery; in some cases it may required some assistance to avoid risks both to mother and to fetus. In 10-20% of complicated vaginal deliveries operative vaginal procedures including forceps and vacuum devices are used to assist the mother in delivering the fetus. In operative vaginal delivery either instrument is applied to the fetal head and then the operator uses traction to extract the fetus, during the contraction while the mother is pushing[1,2].

Major indications for operative vaginal delivery includes maternal distress, maternal exhaustion, prolong 2nd stage of labour, maternal cardiopulmonary or vascular conditions, intrapartum hemorrhage, fetal distress, malpositioning of fetal head and cord prolapsed[2].

Skill and experience of operator is very important in outcome of operative vaginal delivery, multiple pull results in increased maternal and neonatal trauma.[3] There are various risk factors associated with failure of operative vaginal delivery including application of instrument at or above 0 station, nulliparous women, previous caesarean section, position other than occipitoanterior[4]. In case of instrumental failure caesarean is alternative[5].

Both forceps and vacuum assisted vaginal deliveries may result in fetomaternal complications. Commonly seen morbidities with forceps are lacerations (uterine, cervical and vaginal), hematomas, 3rd and fourth degree perineal tears, bladder and urethral injuries, postpartum urinary retention, postpartum hemorrhage and neonatal facial injuries.[6-8] Vacuum deliveries are usually associated with extension of episiotomy, low APGAR score at birth, molding, cephalohematoma, subgaleal hematoma, intracranial hemorrhage), shoulder dystocia and postpartum hemorrhage[7-10].

There are different views regarding which instrument can provide us with better fetomaternal outcome. According to a view there is no significant difference seen in the outcome of both instruments[11] but on the other hand it is also seen that vacuum extraction is safe alternative to forceps delivery[10] and vacuum should be instrument of 1st choice in assisted vaginal delivery[12].

MATERIAL AND METHODS

This study was conducted at the Department of Obstetrics and Gynaecology, Services Hospital, Lahore during six months (from 17-07-2007 to 16-01-2008), sixty patients requiring operative vaginal delivery. They were further allocated to either group by using a random number table. Age ranged from

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20 to 40 years and Gestational age 37 or more completed weeks. Patients included with singleton pregnancy, Gestational age 37 or more completed weeks, patients having indication for operative vaginal delivery (fetal distress, prolong 2nd stage of labour, maternal cardiopulmonary conditions, preeclampsia, maternal exhaustion, patients fulfilling pre-requisite for operative vaginal delivery (fully dilated cervix, station below 0, ruptured membranes and empty bladder). While patients with non-cephalic presentations (breech, face and brow), expected fetal bleeding disorders, Cephalopelvic disproportion and Position of head other than occipitoanterior. Patients were allocated to either group (vacuum assisted vaginal delivery or forceps assisted vaginal delivery) by using a random number table. An informed consent was taken for assigning them to a particular procedure after mentioning the benefits and risks associated with the procedure and using their data for my research. They were assured regarding confidentiality and expertise. For each patient detailed history was taken including demographic information (name, age, address, parity) present pregnancy (LMP, EDD, DOP and any other problem during pregnancy), present labour and obstetrical history was asked.

Per abdominal (fundal height, lie, presentation, fetal heart rate, palpable contraction duration intensity interval) and per vaginal (cervical dilatation, station, position of head, membranes and color of liquor) examination was carried out. Maternal outcome (lacerations, extension of episiotomy, vulvovaginal hematoma, immediate bladder and urethral injuries, third and fourth degree perineal tears, failure of instrument, postpartum hemorrhage and maternal satisfaction) and fetal outcome (Apgar score, nursery admission, shoulder dystocia, facial trauma, skull trauma and cephalohematoma) was noted. All that information was recorded through a proforma attached herewith.

The two groups were compared for outcome variables. The comparison was made by using Chi Square test, as the variables mainly were qualitative in nature. P value less than or equal to 0.05 was taken as significant.

RESULTS

Mean age of the patients was 28.53±4.86 and 28.73±5.29 in group-A and B, respectively. Regarding maternal indications for assisted vaginal deliveries, exhaustion in 14 patients (46.7%) and 10 patients (33.4%) in group-A and B, respectively. 7 patients (23.3%) developed failure to push in group-B only. Fetal indications showed meconium drainage in 10 patients (33.3%) and 6 patients (20.0%) in group-A and B, respectively. Fetal heart rate abnormalities occurred in 6 patients (20%) in group-A and 7 (23.3%) in group-B (Table-2).

Table1: Age distribution

Age (Year)	Group-A (Vacuum extraction) n = 30		Group-B (Forceps delivery) n = 30	
	Number	%	Number	%
< 20	01	03.3	01	03.3
20-30	19	63.4	18	60.0
31-40	10	33.3	11	36.7
Total	30	100.0	30	100.0
Mean±SD	28.53±4.86		28.73±5.29	

Table-2: Indications for assisted vaginal deliveries

Indications	Group-A (Vacuum extraction) n = 30		Group-B (Forceps delivery) n = 30	
	No.	%	No.	%
Maternal				
Exhaustion	14	46.7	10	33.4
Failure to push	-	-	7	23.3
Fetal				
Meconium drainage	10	33.3	06	20.0
Fetal heart rate abnormalities	06	20.0	07	23.3
Total	30	100	30	100

Table 3: Maternal outcome.

Maternal outcome	Group-A (Vacuum extraction) n = 30		Group-B (Forceps delivery) n = 30		P value
	No.	%	No.	%	
Laceration	13	43.3	22	73.3	0.018
Extension of episiotomy	02	06.7	10	33.3	0.009
Vulvovaginal haematoma	-	-	01	03.3	0.313
Bladder and urethral injuries	-	-	01	03.3	0.313
Perineal tears	-	-	01	03.3	0.313
Failure of instrument	-	-	02	06.7	0.150
Maternal satisfaction	28	93.3	21	70.0	0.019

Laceration developed in 13 patients (43.3%) and 22 patients (73.3%) in group-A and B, respectively. Extension of episiotomy took place in 2 patients (6.7%) from group-A and 10 patients (33.3%) from group-B. Vulvovaginal haematoma was found in 1 patient (3.3%) in group-B only. Immediate bladder and urethral injuries developed 1 patient (3.3%) in group-B only. Perineal tears (3rd and 4th degree) were present in patient (3.3%) in group-B only. Failure of instrument happened in 2 patients (6.7%) from group-B. In vacuum extraction group 28 patients (93.3%) and in group-B 21 patients (70%) were satisfied (Table 3).

Table-4: Fetal outcome.

Fetal outcome	Group-A (Vacuum extraction) n = 30		Group-B (Forceps delivery) n = 30		P value
	No.	%	No.	%	
Admission to nursery	06	20.0	05	16.7	0.738
Shoulder dystocia	-	-	01	03.3	0.313
Facial trauma	-	-	01	03.3	0.313
Cephalo-haematoma	01	03.3	-	-	0.313

DISCUSSION

When spontaneous delivery fails to occur after complete cervical dilatation, the obstetrician must decide whether to perform an assisted vaginal delivery or a primary caesarean section. A study by Towner et al [38] states that successful vaginal delivery with the use of either vacuum extraction or forceps appears to carry no excess risk of neonatal intracranial haemorrhage, as compared to caesarean section during labour[13].

Operative vaginal delivery is used to shorten the second stage of labour. It may be indicated for maternal exhaustion or fetal conditions including non-reassuring fetal status to prevent hypoxic brain damage or fetal death[14]. Inadequate progress of labour (arrest of labour progress with documented uterine activity) represents another indication. Maternal exhaustion was the most common indication in my study and accounted for 46.6% in the vacuum whereas for 33% in the forceps group, that was similarly described by others[15,16].

Maternal conditions, where bearing down effort is not encouraged, such as cardiac failure and cerebral aneurysms are also indications for instrumental delivery[14].

However, the decision to perform forceps or vacuum is not always straight forward. Absolute and relative contraindications for its use do exist. Malpresentation, incompletely dilated cervix, unengaged fetal head, cephalopelvic disproportion and fetal clotting disorder are some of the absolute contraindications.[14]

The incidence of operative vaginal delivery overall is 10% of all vaginal deliveries although it varies widely[17]. Each instrument has certain advantages over other. There is less pain and fewer requirements for analgesia with ventouse at delivery and 24 hours later[18]. It is comparable to my study where 93.3% cases with vacuum delivery were satisfied with the instrument used. It was due to less pain during and after the delivery with vacuum extraction. Another possible explanation of the increased worldwide rate of vacuum against forceps is the less maternal injury and newborn's morbidity after the introduction of less traumatic soft vacuum extractor when compared to the rigid cups.[19]

In my study, vacuum extraction resulted in vaginal laceration in 43.3% cases and in forceps group 73.3% had vaginal laceration. The results are comparable to a study which states that serious maternal perineal or vaginal trauma is more likely with the use of forceps[20]. In my study, cervical and vaginal tears were seen in 10% with vacuum extraction versus 36.7% with forceps delivery. Perineal damage, such as second and third degree lacerations has been shown to occur more often with the use of forceps in some studies[6,21].

Another study by Islam et al has shown increased third degree perineal tears with forceps delivery, regarding maternal complications[20].

The rate of periurethral injuries and vulvovaginal hematomas that was shown from any study was similar in both ways of operative vaginal delivery, although a trend of vulvovaginal hematomas and periurethral injuries was observed after forceps application (one case of each complication in forceps group). My results are comparable with Johnson et al, showed insignificant different of perineal haematoma between the two methods, while the periurethral injuries were more common after forceps delivery[16].

The percentage of failure after forceps application was reported approximately 7%, while it is almost double, 12% after vacuum-assisted vaginal delivery [81]. In my study, the results for failure of forceps delivery were 6.6% which are comparable but there was no case of vacuum failure[21].

In the present study, neonatal intensive care unit (N-ICU) admissions were slightly higher (10% versus 8.3%) after vacuum application. My results are comparable where others documented no difference with respect to neonatal intensive care unit (N-ICU) admission between the two methods[16].

In my study, the Apgar score at 1 minute was less than 5 in 26.6% neonates delivered by vacuum and in 13.3% neonates delivered by forceps delivery. The results are comparable with a study by Islam et al, showing Apgar score less than 6 at 1 minute in 30% and 20% neonates delivered by using vacuum and forceps, respectively[20].

No significant difference was found in Apgar score at 5 minute in forceps and vacuum deliveries. This is comparable to a local study conducted at Nishtar Hospital, Multan in which there was no marked difference in Apgar score at 1 and 5 minute between forceps and vacuum deliveries[11]. Similarly, Cochrane systematic review of nine randomized controlled studies showed that vacuum extractor is no more likely to be associated with low 5 minute Apgar score as compared to forceps[18,22]. Another local study conducted at Holy Family Hospital, Rawalpindi showed no significant difference in the Apgar score among two groups and that improved afterwards[16]. Bofill et al, showed no differences in the

Apgar scores values at 5 minutes, independently of the instrument used[15].

Vacuum is rapidly replacing forceps as the predominant instrument, but each has advantages and disadvantages, including increased risk of maternal trauma with forceps and increased risk of neonatal cephalohematoma with vacuum[23].

According to the results of my study, and in accordance with other investigators[24], the mode of instrumental delivery does not seem to have an important impact on the rate of cephalohematomas, shoulder dystocia and facial trauma. This is because of mainly outlet uses of instrumental delivery in cases of maternal fatigue or exhaustion and the recourse to caesarean section in case of mid cavity arrest. Significantly higher rates of cephalohematomas have been reported after vacuum application.[15], whereas Johnson et al[16] found that the overall neonatal trauma as well as clavicle fracture and nerve injury did not differ between the two modes of assisted vaginal delivery.

Regarding neonatal complications, in my study in forceps group only one neonate had shoulder dystocia and one neonate suffered facial trauma. In vacuum group only one had cephalohematoma. This is comparable to another study which concluded that neonates delivered with vacuum have more chances of cephalohematoma**[16].**

CONCLUSION

Results of the present study indicate that both modes of instrumental vaginal delivery are safe with respect to maternal morbidity and neonatal trauma. However, forceps application increases the risk of maternal injury and neonatal compromise consequently necessitating their admission in the N-ICU. Where indicated, vacuum should be the instrument of first choice for assisted vaginal delivery.

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