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Research Article

Disengagement of the deeply engaged fetal head during caesarean section in advanced labor: patwardhan versus push extraction

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ABSTRACT

Background: To compare the maternal and neonatal morbidities between the “Patwardhan” technique and the “Push” method for extraction of the foetus in second stage caesarean sections.

Methods: Retrospective cohort study was done at PESIMSR, Kuppam, AP from MAY 2012 to APRIL 2015. Women with single fetus at term in anterior vertex position, with the head deeply impacted in pelvis and needing cesarean delivery were included in the study. Group 1 consists of all cases in which extraction of fetus was done by Patwardhan technique and Group 2, in whom extraction of fetus was done by push method and extracted as vertex. Objective of the study was to assess selective complications like extension of the incision, injury to the surrounding structures, excessive bleeding, need for blood transfusion and the fetal outcome between the two groups.

Results: Out of 98 cases reviewed, 46 belonged to group A (Patwardhan) and 52 belonged to group B (push). Patients in the push group had statistically significant higher rates of maternal morbidity in terms of uterine extension and other related complications. However; there were no differences in neonatal outcomes in both the groups.

Conclusions: While complications are inherent in both methods, Patwardhan method of delivery of the fetus for second stage labour has been shown to confer considerable advantage in prevention of maternal morbidity over the push method in our institution. Our findings support the fact that the Patwardhan method could be a useful maneuver in intraoperative disengagement of fetal head, when encountered at second stage CS and it is our opinion that the Patwardhan manoeuvre can be practiced selectively as a primary technique.

Keywords: Second stage caesarean section, Deeply engaged fetal head, Patwardhan technique, Push method

INTRODUCTION

The desire of every woman in Labor and her obstetrician is to have a normal vaginal birth. During this due course, unanticipated cephalopelvic disproportion at times may end up in deeply impacted head with features of obstructed labor and there is no way other than to deliver these babies by abdominal route. According to studies approximately up to 25% of emergency caesarean sections performed are second stage caesarean sections.^{1,2} The number of second stage caesareans encountered in developing countries is much higher especially in rural

population due to neglected obstetric care, poor utilization of available health services, traditional beliefs and practices like preference of home delivery from traditional birth attendants, poor transport facilities, late referrals from primary health care centres where over-enthusiastic attempts are made to deliver vaginally in suboptimal condition and also lack of training and confidence to present generation obstetricians to perform instrumental delivery.³

Caesarean sections done at full cervical dilatation with impacted fetal heads are not only technically difficult, but

are also associated with an increased incidence of maternal and fetal morbidities. Methods employed for disimpacting the fetal head from the pelvis at caesarean section may perhaps contribute to varying complications. Potential problems include difficulty in delivery of the fetal head, extension of the uterine wound, uterine artery laceration, broad ligament hematoma and a higher risk of postpartum haemorrhage requiring blood transfusion. Fetal complications include injuries, poor APGAR scores and admission to the neonatal ICU unit.⁴⁻⁷

Second stage caesareans are always done in emergency and there are a number of widely accepted techniques that obstetrician perform when faced with this potentially difficult task. The method chosen may depend upon the skill and experience with a particular method. There is insufficient evidence available to support the use of anyone method.

Extraction of the impacted fetal head may be done by

1. Push method i.e., pushing through the vagina.^{8,9}
2. Pull method, i.e., a reverse breech technique.¹⁰
3. Patwardhan technique i.e. shoulders first technique.¹¹
4. Using simple device- Fetal Disimpacting System.²
5. Extraction of fetal head with Murless head extractor/ C-snorkel.¹²

Available evidence from Meta analysis has shown that reverse breech method to have least maternal complication.¹³ However, the necessity to intentionally modify the low transverse uterine incision to an inverted T-shape incision in an attempt to reach for the fetal leg seems to be the main disadvantage. Extension of incision to upper segment as in inverted T-shape uterine incision is known to have a higher risk for uterine rupture in subsequent pregnancies and is a relative contraindication for TOLAC in subsequent delivery.¹⁴

The Fetal Disimpacting System² consists of a silicone balloon that can be inserted through the vagina to rest under the fetal head. It can then be inflated with saline in an attempt to elevate the fetal head. A pilot study of 30 women in advanced Labor reported elevation of 3 cm, as demonstrated by ultrasound. The C-snorkel¹² is an anatomically curved tube with multiple ventilation ports. It can be inserted between the vaginal wall and fetal head, and aeration through the ports can alleviate the vacuum between them, aiming to lessen the force required to disimpact the fetal head. Although described in literature, the existence of these innovative devices is not known in many parts of the world and there has been no randomized studies conducted to prove the claimed theoretical benefits. Hence these have not received any attention word wide.

Push method is the oldest method known and has been practiced since ages. However this method is associated with certain difficulties and complications like 1) even

with push from below, the operating surgeon finds it difficult to manoeuvre his hand below the deeply engaged fetal head, which may be further complicated by the presence of moulding and caput on the fetal head.^{15,16} 2) Contamination of the operative field by the assistants pushing hand.¹⁷ 3) Undue force exerted from below to deliver the head, Leads to extension of uterine incision^{4,5,7}. 4) the fetal body part encountered at incision is often the shoulders, thus the distance which the operating hand has to traverse before he can reach below the fetal head is more and causes significant delay in extraction¹⁸ and also 5) the fetal spine acts as a splint in the uterus which is already contracted upon the fetus and flexion of the fetal neck in order to lift it up to the uterine incision may not be possible easily.¹⁸

By contrast, Patwardhan method involves extraction of shoulders first with an incision made high in the overstretched lower segment followed by extraction of trunk and breech successively aided by fundal pressure. Reports on the associated fetal and maternal morbidity associated with this procedure are inconsistent in English literature.

So, the aim of this study was to compare the Patwardhan technique with conventional "Push" method in terms of selected maternal and neonatal morbidities.

METHODS

We conducted a retrospective cohort study during a period of 3 years, from MAY 2012 to APRIL 2015 at the PES Institute of medical science and research Institute, Kuppam, Andhra Pradesh, India.

Women with single fetus at term in anterior vertex position, with the head deeply impacted in pelvis and needing caesarean delivery were included in the study. The exclusion criteria were: (a) intrauterine fetal death (b) congenital fetal anomaly (c) multiple pregnancy (d) preterm caesarean (e) previous caesarean section.

The decision for the performance of the Patwardhan extraction or to go on with push approach was taken in the operating theatre by the operating surgeon; Group 1 (study group) consists of all cases in which extraction of fetus was done by Patwardhan technique and Group 2(control) in whom extraction of fetus was done by push method and extracted as vertex. Selective complications like extension of the incision, injury to the surrounding structures, excessive bleeding, need for blood transfusion and the fetal outcome were observed and compared.

Patwardhan Technique^{11,24}

- 1 In case of occipito-transverse or occipito-anterior positions with the head deeply impacted in the pelvis, incision is made in the lower uterine segment, at the level of the anterior shoulder, which is delivered out.

- 2 With gentle traction on this shoulder, the posterior shoulder is also delivered out.
- 3 Next, the surgeon hooks the fingers through both the axillae and with gentle traction, aided by fundal pressure applied by assistant, the body of the foetus is brought out of the uterus.
- 4 Now the baby's head which is the only part of the foetus which is still inside the uterus is gently lifted out of the pelvis.

Push method ^{8,9,24}

After opening the uterus, the patient is positioned in the supine position with the knees flexed and the lower legs abducted by two assistants. One of the assistants under sterile condition introduces his gloved finger into the vagina and then pushes the head up disimpacting it. The surgeon then introduces his hand into the uterus between the fetal head and the uterine wall, manoeuvring his hand downwards to get beneath the fetal head as the assistant disimpacts the fetal head from below. The patient's legs are then returned to normal position. The Surgeon then delivers the fetal head and the rest of the fetus as it is performed in routine caesarean section.

Statistical analysis

The data were processed using the Statistical Package for Social Sciences version 13.0 (SPSS). Mean and standard deviation were used for describing data. Student t test and Fisher's test were used appropriately for calculation of p value and a p<0.05 was considered statistically significant.

RESULTS

During the 3 years of the study period, we had a total of 6192 deliveries. Among these deliveries, 4086 (65.89%) were vaginal and 2106 (34.01%) were CS. Of these CS, 114(5.41%) were done in second stage. Of which, 98(4.65%) patient fulfilled both inclusion and exclusion criteria. Out of 98 cases, 46 belonged to group A (Patwardhan) and 52 belonged to group B (push).

Table 1: Basic Parameters.

Gestational age	Group A (Patwardhan) N=46	Group B (push) N=52	P value
Mean gestational age	272±06 38.85±0.85	274±07 39.14±1.0	0.129
Mean fetal weight at birth(Kg)	3050±230	3080±260	0.54
Meconium stained liquor	18(39.13)	22(42.30)	0.8377

The data are presented as mean ± SD or n (%), * significant.

There were no statistically significant differences between the 2 groups in the mean gestational age, mean fetal weight and incidence of meconium stained liquor.

Table 2: Fetal morbidity.

	Group A(Patwardhan) N=46	Group B(push) N=52	P value
APGAR at 1min			
≤7	27(58.69)	35(67.30)	0.4076
>7	19(41.30)	17(32.69)	0.4076
APGAR at 5min			
≤7	5(10.86)	7(13.46)	0.7652
>7	41(89.13)	45(86.53)	0.7652
Need For NICU Care	9(19.56)	11(21.15)	1.0000
Still Births	1(2.17)	2(3.84)	1.0000
Fetal Injuries	2(2.17)	0(0)	0.4967

The data are presented as mean ± SD or n (%), * significant.

Table 3: Maternal morbidity.

	Group A(Patwardhan) N=46	Group B(push) N=52	P value
Extension Of Uterine Incision	4(8.69)	18(34.61)	0.0031*
Uterine Artery Laceration	2(4.34)	12(23.07)	0.0092*
Broad ligament hematoma	0	2	0.4967
Bladder Injury	0	2	0.4967
Traumatic PPH	2(4.34)	13(25)	0.0049*
Atonic PPH	2	5	0.4423
Blood Transfusion Needed	8	20	0.0259*
Need For Hysterectomy	0	2	0.4967
Mean Fall In Hb%	1.22±0.44	1.86±0.72	0.0001*

The data are presented as mean ± SD or n (%), * significant.

Neonatal profiles of both the groups were assessed. The mean birth weights of the babies in both the groups were comparable. The APGAR scores of the babies at 1min and 5 min were also compared and they were not statistically significant. Need for NICU care was not found to be statistically significant when both the groups were compared. There was 1 case of still birth in Patwardhan extracted and 2 in push method extracted

groups. Fetal injuries (humerus fracture) were noted in 2 cases of Patwardhan, whereas none occurred in push method. However, still birth and fetal injuries were not statistically significant.

Our study showed an increased incidence of uterine incision extension in push method (34%) compared to Patwardhan (8%) and was statistically significant. The incidence of uterine artery laceration (23% v/s 4.34%) and Traumatic PPH (25% v/s 4.3%) were also statistically significant. There were 2 cases each of broad ligament hematoma and incidental cystostomy noted in push method, but none occurred in Patwardhan method. Although this was not statistically significant, these findings were a direct consequence of uterine incision extension. 2 cases extracted by push method required hysterectomy; in one case extension into cervix was missed at primary closure and surgical reexploration followed by hysterectomy was needed to achieve hemostasis and in another case lacerations extended downwards causing colporhexis, which was beyond surgical repair and required hysterectomy. Mean fall in Hb%, which is an indirect marker of intraoperative blood loss was more in push method and was significant. Blood transfusion requirement, either intra operatively or postoperatively was more in push method. However the occurrence of atonic PPH was not significant in both groups.

DISCUSSION

The incidence of CS performed at full dilatation was 5.41% in our study and was comparable to global rates of 4%¹⁹ to 5%.²⁰ Obstetric confounding parameters like gestational age, birth weight and the incidence of meconium stained liquor (MSL) were comparable in both the study group. Occurrence of more complication in any study group was unrelated to birth weight and MSL.

Uterine laceration and its related complications increase morbid and also has a long-term implication on the patient's future obstetric careers as it is a contraindication for allowing subsequent vaginal delivery. The incidence of extension of incision in second stage caesarean sections seen in push method extraction was found to be about 15% to 50% in various studies¹³. In our study, incidence of extension was 34.61% in push method and 8.69% in Patwardhan method. Results of our study were similar to those of a study done by Khosla et al. (24% v/s 0%),²¹ Partha Mukhopadhyay et al (64% v/s 6%)²² and Pradip Kumar Saha et al (22% v/s 0%).²³ In our study, The incidence of incision extension was approximately 4 times more common in push method than Patwardhan method and approximately one in three cases extracted by push method had extension. Uterine incision extension related complications like uterine artery laceration, broad ligament hematoma, bladder injury, traumatic PPH, need for hysterectomy and blood transfusion were all more in push group than in Patwardhan group.

The possible explanations for increased incidence of uterine incision extension in push method are 1) Iatrogenic trauma caused by the operating surgeon in manoeuvre his hand between the already stretched, congested lower segment and the impacted head. 2) Push from below, if applied posterior to the flexion point can lead to iatrogenic extension of head in utero, with either face/ brow presentation. 3) Undue force exerted by the operating surgeon in order to lift the deeply impacted head out of pelvis up to a highly placed uterine incision. 4) The tonic contracted uterus on the fetal spine acts as a splint, there by resisting both flexion at atlanto-occipital joint and upward lifting of presenting part. These compel the operating surgeon as well as the assistant pushing from below to apply excessive force, thereby further increasing the chances of uterine extension. By contrast, in Patwardhan method the extraction is partially reverse with shoulder first followed by trunk and breech successively, and head virtually pops out at last. The operating surgeon neither inserts his hand into the cavity nor does he apply any undue force. Hence the chances of maternal injury are lessened by this method.

Birth asphyxia and still birth rates were almost similar in two groups, indicating that, the technique of delivery was not responsible for these. The results of our study were similar to other studies done by Mukhopadhyay et al^{1, 22} and Pradip Kumar Saha et al.²³

As per the authors experience, the most difficult step in Patwardhan method was reaching the posterior shoulder and delivery of trunk out of uterine incision. This manoeuvre requires hyper extension of arm and flexion of spine, which may leads to injury. Transient asymmetrical Moro's reflex with spontaneous recovery was a common finding noted in Patwardhan group, which was probably due to Neuropraxia. Unfortunately there were 2 cases of humerus fracture noted in Patwardhan group. Although these findings were not statistically significant, careful handling and gentle approach could have reduced this complication

The Drawbacks of Patwardhan method is that, this method cannot be used or rather becomes difficult 1) when the fetal spine is posterior as in direct occipito posterior, in such cases extraction by reverse breech method seems to be ideal. 2) If fetal part other than shoulder is encountered at incision, extraction by Patwardhan method becomes difficult. This often happen when the uterine incision is taken too low and in such cases fetal part encountered is either neck or lower part of face, in such cases extraction has to be completed by other methods.

Our study, in addition to being a retrospective study, has other limitations; Although the decision to employ the Patwardhan or the Push manoeuvre was undertaken in second stage section by an experienced obstetrician, this was performed intraoperative – a major variant that could determine the outcome. The decision was probably based

on clinical grounds, taking into account the degree of fetal head impaction into the pelvis and the expertise of the surgeon.

Although various studies showed an increased risk of infectious morbidity like post operative wound infection and endometritis with push method, this was not studied as the confounding factors incriminated in infection like preoperative presence of genital infection, number of digital pelvic examination, prolonged rupture of membrane, antibiotic prophylaxis and duration of labour could not be controlled in study and control groups.

CONCLUSIONS

While complications are inherent in both methods, Patwardhan method of delivery of the fetus for second stage labour has been shown to confer considerable advantage in prevention of maternal morbidity over the push method in our institution. Our findings support the fact that the Patwardhan method could be a useful maneuver in intraoperative disengagement of fetal head, when encountered at second stage CS and it is our opinion that the Patwardhan manoeuvre can be practiced selectively as a primary technique.

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