

Comparison of push and pull methods of delivery for deeply engaged fetal head during cesarean section for prolong second stage of labor in preventing extension of uterine incision

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Objective: To compare effectiveness of push and pull methods of delivery used to extract the impacted fetal head during cesarean delivery for prolong second stage of labor in terms of preventing uterine incision extension.

Methodology: This randomized controlled trial was done in obstetrics & gynecology department of Benazir Bhutto Hospital (BBH), Rawalpindi from December 2018 to June 2019. A total of 86 consecutive patients of prolonged second stage of labor with deeply impacted fetal head were included in the study. Patients were allocated in two groups; pull method (Group A) and push method (Group B). All patients underwent cesarean section. A deeply impacted fetal head was delivered either by pull

method or push method. Extension of uterine incision or tear/laceration more than 2cm in lower uterine segment was assessed subjectively by surgeon as presence or absence of tear from normal uterine incision.

Results: The study had 86 patients with mean age of 28.32 ± 3.6 years. The 'push' method was associated with extension of the uterine incision (19 [79.0%] vs. 5 [21.0%]) ($p = 0.001$) compared to 'pull' method.

Conclusion: Pull technique had considerably lower risk of extension of the uterine incision as compared to push technique.

Keywords: Cesarean section, second stage labor, uterine, incision.

INTRODUCTION

Cesarean section (CS) is a common obstetrical surgical procedure accounting for 32% of all births in USA in 2015.¹ Morbidity and Mortality is more with CS than vaginal births and there is increased risk of subsequent uterine rupture, placenta accreta, hemorrhage, hysterectomy, and maternal death.² CS has increased dramatically over the years.³ Among primary cesarean deliveries, 45.6% were performed in primigravida with full term singleton pregnancy with cephalic presentation.³ In primiparous women, multiple gestations, increasing maternal age, obesity, maternal request, and obstetrician's fear of litigation increase CS.⁴ The frequency of second stage caesarean section is on the rise, accounts for 16.1% in Pakistan, 2015 and 17.3% in USA as there is decline in instrumental delivery, reluctance of patients towards it.^{3,5} The second stage of labor is said to be prolonged if baby is not delivered after 2 hours of full dilation of the cervix in primigravida and 1 hour in multigravida. According to American College of Obstetricians and Gynecologists, 10% to 14% of primigravida and 3.5% of multigravida women have prolonged second stage of labor.⁶ Cesarean sections during the second stage with deeply impacted fetal head can be technically challenging, a

nightmare for obstetrician and associated with maternal morbidity like increased risk of major hemorrhage, endometritis, bladder injury, uterine tears leading to broad ligament hematoma and fetal morbidity like poor APGAR score, hypoxia, direct trauma to fetus.⁷ Consultant obstetrician must be present as swift action and skills are required to reduce adverse events.⁸ Surgeon may utilize two different techniques either reverse breech extraction or abdomino-vaginal technique to disengage the deeply impacted fetal head.⁹ There is limited data available regarding both delivery methods in our population. In our study, we compared both methods of delivery used at second stage CS for deeply impacted fetal head.

METHODOLOGY

This randomized controlled trial was carried out in Obstetrics & Gynecology Department of Benazir Bhutto Hospital, Rawalpindi from December 2018 to June 2019. The study was approved by institutional research forum of Rawalpindi Medical University and an informed written consent was taken from all women. A total of 86 patients (sample size calculated by using WHO sample size calculator whereas level of significance was 5%, anticipated population proportion

(pull group) 50% and anticipated population proportion (push group) 17.2% with 95% CI¹⁰ women with singleton pregnancy with prolonged second stage of labor, gestational age ≥ 37 weeks (assessed on LMP), parity status 1-5, BMI ≤ 30 kg/m² and age 18 to 40 years were included in the study. Patients with multiple pregnancy, non-cephalic presentation and previous uterine scar were excluded from the study. Each group had 43 Patients were randomly allocated to group A (Pull method) and group B (Push method) by non-probability consecutive sampling, 43 in each group. Randomization sequence was computer-generated and allocation was sealed in opaque envelopes.

The following procedure was done for evaluation of the patients; in push method, fetal head was pushed upward from vagina by assistant and baby delivered as cephalic by surgeon. It is described as abdomino-vaginal delivery in which patient legs were abducted by using a modified lithotomy position and a cupped hand gently pushed up fetal head through vagina and delivered through the uterine incision. In pull method, also known as reverse breech extraction, the obstetrician introduced a hand through the uterine incision towards the upper segment

to grasp both feet as baby is in cephalic position and gently delivers the fetus up as breech.

Extension of uterine incision was assessed subjectively by surgeon as presence or absence of inadvertent extension of uterine incision beyond 1-2cm from normal lower segment uterine incision or tear/laceration more than 2cm in lower uterine segment. Demographic details like medical and obstetrical data were recorded.

Statistical Analysis: The data were analyzed using SPSS version 22. Chi-square (χ^2) test was used to compare outcome between two groups. Effect modifier like age of female, gestational age, BMI and parity status was controlled by stratification. Post stratification chi-square (χ^2) test was applied.

RESULTS

Total 86 patients (43 in each group) were evaluated for deeply engaged fetal head during caesarean section. Mean age in group A was 28.40 ± 3.22 and mean age in group B was 28.21 ± 3.85 . Five patients in pull and 19 in push method has extension of uterine incision (Table 1). Gestational age was ≥ 37 weeks with mean gestational

Table 1: Comparison of extension of uterine incision between groups (N = 86).

		Pull (n = 43)		Push (n = 43)		p-value
		Number	%	Number	%	
Extension of uterine incision	Present	05	11.63	19	44.19	0.001
	Absent	38	88.37	24	55.81	

Table 2: Stratification of extension of uterine incision with respect to age, gestational age, parity status and BMI (N = 86).

Age (Years)	Pull Method		Push Method		p-value
	Extension of Uterine Incision		Extension of Uterine Incision		
	Present	Absent	Present	Absent	
18 – 30	02	31	13	16	0.0001
31 – 40	03	07	06	08	0.521
GA (weeks)					
37 – 39	04	30	14	17	0.003
40 – 41	01	08	05	07	0.125
Parity Status					
1 – 2	05	33	17	21	0.002
3 – 5	00	05	02	03	0.114
BMI (kg/m ²)					
≤ 25	04	30	14	17	0.003
26 – 29	01	08	05	07	0.125

Table 3: Comparison maternal and fetal morbidity between groups.

Outcome	Pull (n = 43)	Push (n = 43)	p-value
	No. of Patients	No. of Patients	
Operation time (min)	36.54 ± 8.56	46.37 ± 7.44	0.0001
Estimated blood loss (ml)	438 ± 72.4	515 ± 97.2	0.0001
Bladder injury	0	0	-
Wound complication	1 (2.3%)	2 (4.7%)	0.544
Postpartum fever	3 (7.0%)	5 (11.6%)	0.132
Apgar score	9.08 ± 0.76	9.24 ± 0.78	0.889
NICU admission	1	0	-
Fetal Injury	1	0	-

age of 38.32 ± 1.54 weeks. The mean gestational age in pull group was 38.21 ± 2.00 weeks and in push group was 38.65 ± 1.04 week. Mean parity status was 2.55 ± 0.84 and mean BMI was 23.08 ± 3.66 kg/m² (Table 2). Maternal and fetal morbidity are shown in Table 3.

DISCUSSION

Over a time period of 6 months, total deliveries Benazir Bhutto hospital were 5,422. Out of these, emergency lower segment cesarean section (Em-LSCS) were 2,169. Total 86 pregnant women with prolonged second stage of labor underwent Em-LSCS. So, the incidence of prolonged second stage of labor was 3.9%. The incidence of second stage CS was reported as 5% according to the largest survey conducted at a tertiary care hospital in London.¹¹ In 2015, a study from Ayub Medical hospital reported that 16.1% of CS were performed for obstructive labor/failure to progress irrespective of stage of labor.⁵ Another study conducted over a period of five years reported a incidence of 2.21% of CS performed at full dilatation.¹²

In our study, no statistically significant results were documented between age, gestational age and parity status of patients of two groups. In our study population, 53.5% were primigravida and 46.5% multigravida. There was no difference in parity status because most of patients in our study were referred cases due to obstructed labor and prolonged second stage. So our management plan was Em-LSCS irrespective of parity status. However, a study reported that incidence of 2nd stage CS was more seen in primigravida (74%) than in multigravida (26%).¹² Causes of increase primary CS rate were associated with due to mild to moderate cephalopelvic disproportion, rigid perineum, lack of experience of previous labor in primigravida women. A study documented that second stage CS was associated with two fold increased risk of intraoperative

trauma like extension of uterine incision or tears in lower uterine segment.¹³ Extension of uterine incision is reported in the range of 10% to 27% during second stage CS.^{13,14} Nigeria conducted the largest study applying the 'pull' versus 'push' method of delivery for women with obstructed labor and found that 'push' method was associated with extension of the uterine incision (30% versus 11%, $p < 0.05$) compared to the 'pull' method.¹⁵ Subgroup analysis showed correlation of parity status with extension of uterine incision among study population between two study groups. Our results showed that primigravida has less chances of extension using pull method as compared to multigravida i.e. [2 (14.0% vs. 3 (30.0%)).

CONCLUSION

Pull technique (reverse breech extraction) has considerably lower risk of extension of the uterine incision as compared to push technique (abdomino-vaginal approach) for delivery of a deeply engaged fetal head during second-stage caesarean section. It is necessary to develop knowledge, expertise and skills among training residents to use various methods of delivery of engaged fetal head.

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Conflict of Interest: None declared.

Rec. Date: Mar13, 2020 Revision Rec. Date: Jul 30, 2021 Accept Date: October 14, 2021.

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