

Head delivery in second stage caesarean section: preliminary analysis of PLUS trial

Dr Ahmed Hamdy¹, Dr Mohamed Anan¹, Dr Mohamed Fahmy¹, Dr Amr Shehata¹, Mostafa Abouzeid², Gena Ellassall ³, Esraa Sayed ³, Ahmad Radwan³, Nashwa Eltaweel⁴, Sherif Shazly⁵

¹ Obstetrics and Gynaecology Department, Aswan University, Aswan, Egypt. ² Obstetrics and Gynaecology Department, Assiut University, Assiut, Egypt. ³ Faculty of Medicine, Assiut, Egypt. ⁴ Department of Obstetrics and Gynaecology, University hospitals of Coventry and Warwickshire, Coventry, United Kingdom. ⁵ Leeds Teaching Hospitals, Leeds, United Kingdom – Middle-East Obstetrics and gynecology graduate education (MOGGE) foundation

Abstract

Objective: to compare clinical outcomes of “conventional head push method” to “abdominal disimpaction with lower uterine segment support” for foetal head delivery during second stage caesarean section.

Design: This is a randomized single-blinded clinical trial. Women were assigned to either conventional push method or abdominal disimpaction with lower uterine segment support, where delivery of the head is aided by application of multiple Allies forceps over the lower edge of uterine incision, followed by gentle upward traction by the assistant to prevent extension of uterine incision due to direct pressure by the delivering hand.

Method: Women who underwent, second stage caesarean section at Aswan University birth centre, were considered for the study since January 2021. Women aged between 18-40 years, with singleton term living cephalic foetus, were eligible, and were offered to participate in the study. An informed consent was signed by women who agree to participate in the study. Participants were randomized to either group A (lower uterine segment support) or group B (push method) in a 1:1 ratio. Incidence of uterine incision extensions presents our primary outcome. Secondary outcomes include incidence of bladder injury, vaginal injury, postpartum haemorrhage, estimated blood loss, surgical time, and neonatal outcomes. This is an interim analysis of a total anticipated sample size of 80 patients (ClinicalTrials.gov Identifier: NCT02934516).

Results: Forty women were included in the study (16 vs. 24 for group A and group B, respectively). Women in group A had lower incidence of all extensions (37.5 % vs. 79.1%, P 0.008). Of those, incidences of lateral extensions (18.8% vs. 70.8%, P 0.001) and down extensions (18.8% vs. 50%, P 0.046) were significantly reduced. Uterine artery injury was also less common in group A patients (6.3% vs. 45.8%, P 0.007

Conclusions: Preliminary results of PLUS trial support a clinical role of lower uterine segment support during delivery of impacted foetal head in reducing risk of uterine extensions, blood loss, and surgical time in second stage caesarean sections

Introduction

Obstructed labour refers to failure of labour progress in spite of good uterine contractions and is attributed to mismatch between the size of the presenting part of the foetus and the mother's pelvis. Approximately 8% of maternal deaths worldwide are attributed to obstructed labour and subsequent puerperal infection, uterine rupture, and postpartum haemorrhage. In these situations, Caesarean section could minimize maternal and neonatal morbidity. However, Caesarean section is challenging when the head is deeply impacted and is associated with high risk of maternal injuries and perinatal injuries. The most common complication is extension of uterine incision which could involve the vagina, bladder, ureters and broad ligament. Neonates are also at risk of skull fractures, cephalhematoma, and subgaleal hematoma mainly due to manipulations. Currently, the most popular approaches for foetal head delivery are the push and pull methods. Although push method seems to be more convenient and does not necessitate extensive experience, it is more significantly associated with extension than the pull method. Although pull method seems to be safer, it is more difficult to perform and usually warrants an aggressive uterine incision to deliver the foetus. In 2013, investigators published a case series on abdominal disimpaction with lower uterine segment support which basically allows obstetricians to deliver the foetal head through a transverse uterine incision with minimal risk of extensions and neonatal complications. In this study, investigators aim to validate this approach in comparison to the classic push method.

Material and methods

A randomized clinical trial has been conducted in Aswan University birth centre since January 2021. Women who attend labour ward for delivery have been initially counselled to participate in the study. Eligible women are women aged between 18-40 years, with singleton term living cephalic foetus. Of those who agree to participate in the study, women have been randomized at the time of decision of a second stage caesarean section, if indicated. A 1:1 randomization is computer-generated, and an oblique envelope is drawn after the decision of caesarean delivery is made. Women were randomized to one of 2 arms: Participants will be randomly assigned to one of two groups:

- Group A: Abdominal disimpaction with lower uterine segment support will be performed during CS. Abdominal disimpaction with lower uterine segment support is conducted by incising the uterus transversely at or slightly below the retraction ring. The incision is extended carefully in both directions just like in traditional caesarean section, then the edge of the lower uterine segment is grasped by 4-5 Allies forceps, 1-2 cm apart to pull the lower segment up gently by the assistance, while the surgeon delivers the head. The aim of this step is to retract the lower segment away from the delivering hand to reduce the incidence of incisional extensions
- Group B: Classic push method will be performed to disimpact foetal head at the time of caesarean delivery. In the push method, after opening into the uterus, the patient's knees were flexed, and her legs abducted. An assistant then introduced their hand into the patient's vagina and exerted pressure to dislodge the foetal head and elevate it toward the surgeon's hand. The surgeon then delivered the foetus via routine caesarean section.

The primary outcome of the study was the incidence of uterine incision extensions. Secondary outcomes include incidence of bladder injury, vaginal injury, postpartum haemorrhage, estimated blood loss, surgical time, and neonatal outcomes. Given that abdominal disimpaction with lower uterine segment support is a novel technique, we assume that this technique would reduce the risk of extensions from push method to a rate comparable to the pull method without actually performing the pull method which is more inconvenient for many obstetricians and usually warrants T or J shaped extension of the incision. The best evidence comes from a recent meta-analysis published in 2016, which estimated the difference in primary outcome (incision extension) as 36%. To achieve a power of 0.9, and alpha of 0.05, 33 participants in each arm are required. STATA ® software, version 13 was used for calculation. This is an interim analysis of a total anticipated sample size of 80 women at 50% of target cohort (40 women).

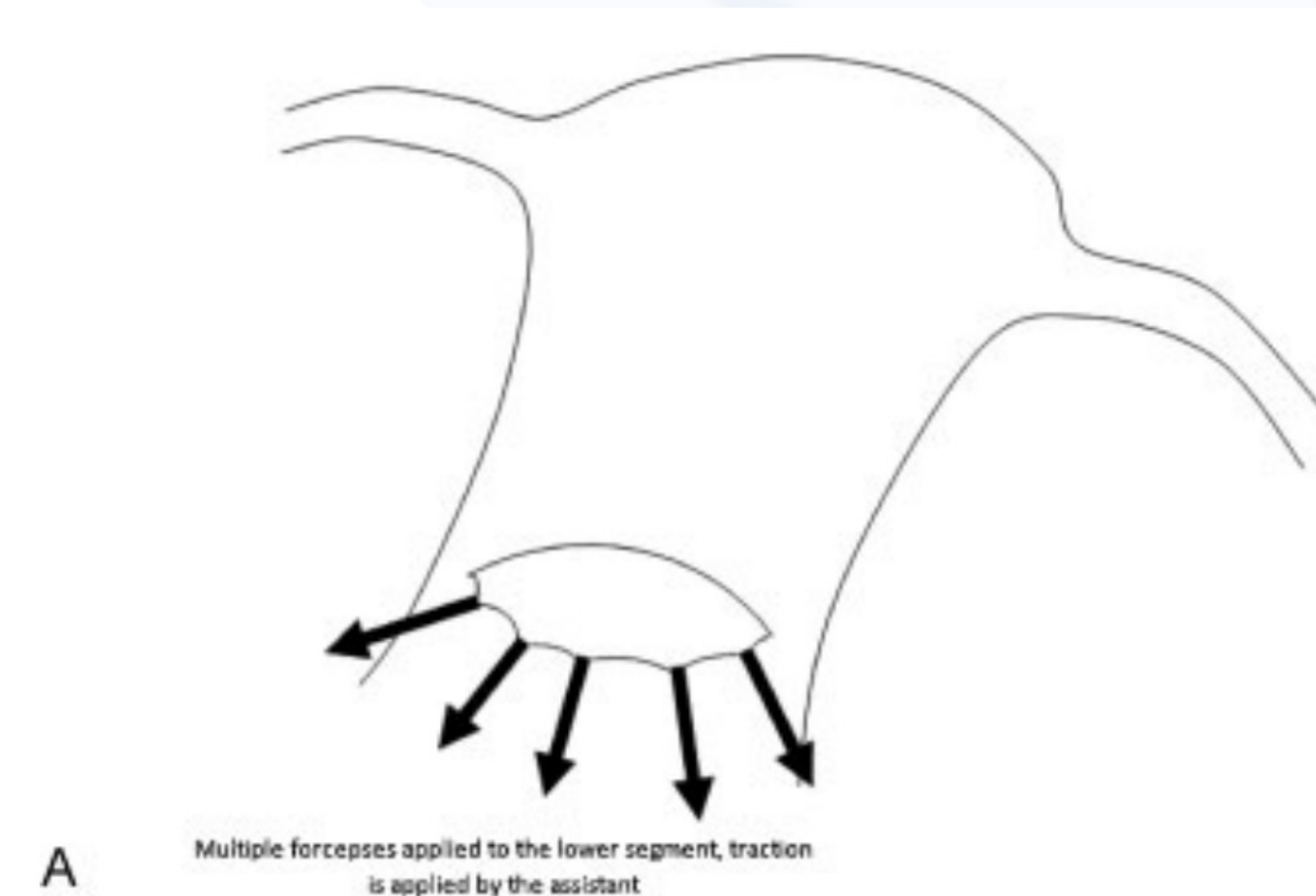
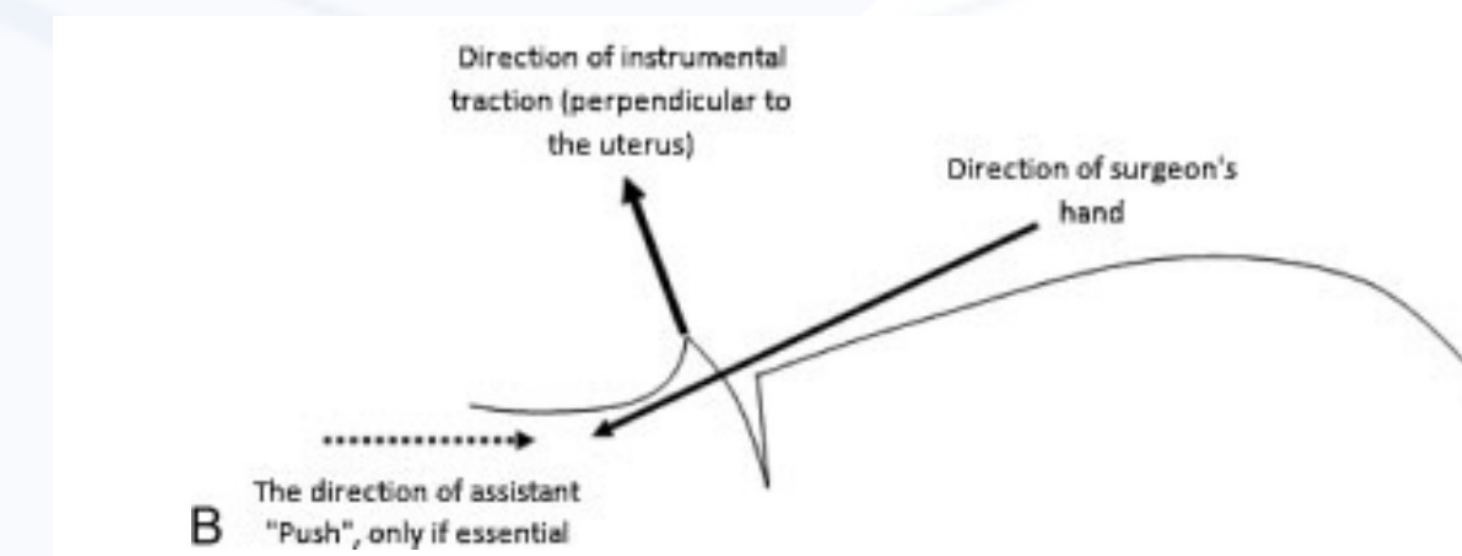


Figure. Abdominal disimpaction with lower uterine segment support – Illustration of the technique
(A) Frontal view
(B) Side view



Results

This analysis includes 40 women (16 randomized to group A and 24 to group B). All deliveries were done by trainees equivalent to ST3-5 in the UK system. The new technique (group A) was associated with lower incidence of total extensions (lateral and downward extension) (37.5 % vs. 79.1%, P 0.008). Specifically, incidence of lateral extensions was lower in Group A compared to group B (18.8% vs. 70.8%, respectively, P 0.001). Downward extensions were reported in 18.8% of women in group A and 50% of women in group B (P 0.046). Similarly, uterine artery injury occurred less frequently in group A (6.3% vs. 45.8% in group B, P 0.007). No bladder or vaginal injuries were reported in both arms. The incidence of postpartum haemorrhage was comparable in both arms. However, mean estimated blood loss was statistically lower in group A (603.1±15.1 vs. 670.8±17.0 ml, P 0.008). Although surgical duration was statistically shorter in in group A (50.6 ± 1.1 vs. 56.3 ± 1.3 minutes respectively, P 0.004), the clinical difference was less evident since it was limited to 6 minutes on average. Differences in 1-minute and 5-minute APGAR scores were not significant.

	Group A (n = 16)	Group B (n = 24)	P value
Age in years	26.2 ± 1.1	27.5 ± 0.7	0.3
Parity	1.7 ± 0.4	1.6 ± 0.3	0.9
BMI (kg/m²)	27.5 ± 1.7	27.2 ± 2.4	0.7
Gestational age in weeks	38.3 ± 1.4	38.8 ± 1.1	0.2
Lateral extensions	18.8%	70.8%	0.001
Downward extensions	18.8%	50%	0.046
Uterine artery injury	6.3%	45.8%	0.007
Postpartum haemorrhage	12.5%	20.8%	0.5

Conclusion

Preliminary results of the PLUS trial shows significant benefit of abdominal disimpaction with lower uterine segment support in reducing the risk of incision extension and uterine artery injury during second stage caesarean section

References

- Manning JB, Tolcher MC, Chandrachan E, Rose CH. Delivery of an Impacted Fetal Head During Cesarean: A Literature Review and Proposed Management Algorithm. Obstetrical & Gynecological Survey. 2015 Nov 1;70(11):719-24.
- Dolea C, AbouZahr C. Global burden of obstructed labour in the year 2000. World Health Organization (WHO). Geneva, Switzerland. 2003 Jul;1:17.
- Jeve YB, Navti OB, Konje JC. Comparison of techniques used to deliver a deeply impacted fetal head at full dilation: a systematic review and meta-analysis. BJOG: An International Journal of Obstetrics & Gynaecology. 2016 Feb 1;123(3):337-45.
- Menticoglou S. Delivering the Impacted Head at Caesarean Section. Journal of Obstetrics and Gynaecology Canada. 2016 Mar 1;38(3):234.
- Shazly SA, Elsayed AH, Badran SM, Abdel Badee AY, Ali MK. Abdominal disimpaction with lower uterine segment support as a novel technique to minimize fetal and maternal morbidities during cesarean section for obstructed labor: a case series. Am J Perinatol 2013;30:695–8.
- Dolea C, AbouZahr C. Global burden of obstructed labour in the year 2000. World Health Organization (WHO), Geneva, Switzerland. 2003 Jul;1:17.