

A prospective comparative study between Wrigley forceps and manual extraction of fetal head in elective cesarean section

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SUMMARY

AUTHORS' CONTRIBUTION: (A) Study Design · (B) Data Collection · (C) Statistical Analysis · (D) Data Interpretation · (E) Manuscript Preparation · (F) Literature Search · (G) No Fund Collection

Background: Delivery of fetal head by forceps has many advantages; small uterine and skin incision and no need of fundal pressure exerted on abdomen resulting in patient dissatisfaction.

Objective: To compare the extraction of the fetal head either manually or by Wrigley forceps.

Methods: A prospective cross section comparative study on 90 pregnant women were classified into two groups in 2 different hospitals; 45 women in each group.

Forceps group: Done in the first hospital where Wrigley forceps were used for deliver the fetal head.

Manual group: Done in the second hospital by performing the usual way of head extraction. The outcome of the study was; Expected Pain score, pain score felt with the delivery of the head, uterine extension, injury of uterine vessels, and use of extra stitches.

Results: There was a statistically significant difference between the 2 groups regarding pain score ($P < 0.05$). No statistically significant differences were found between the 2 groups regarding the expectation of pain, unintended uterine extension, injury of the uterine vessel, and need of additional hemostatic stitches.

Conclusion: Wrigley forceps is less painful to the patient during the delivery of the fetal head in cesarean section (CS).

Keywords: Head extraction; Wrigley forceps; Manual extraction; Pain

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INTRODUCTION

Cesarean delivery is one of the most common operative procedures, and the rate of cesarean deliveries has continuously increased [1]. In the United States, most initial cesarean deliveries occur due to labor dystocia. During these deliveries, the baby's head is nestled in the pelvis, and the lower part of the uterus is thinned as a result of strong labor contractions. If the baby's head isn't deeply nestled in the pelvis, a horizontal incision is made in the lower part of the uterus. The baby's head is then raised to the level of the incision and can be easily delivered, possibly with the help of the assistant's fundal pressure [2].

Regional anesthesia is now the most convenient way for patients and surgeons. The patients are conscious and alert during the operation and feel the in during assistant fundal pressure [3].

The fetal head during cesarean delivery has been delivered using various techniques. The most frequently used method is manual extraction. The patient experiences discomfort and pain when the assistant applies fundal pressure to deliver the head [4].

The study aimed to compare 2 methods for extraction of the fetal head (Wrigley Forceps vs. manual extraction) at the time of cesarean section as regards the patient's perception of pain and pain scores, an extension of the uterine incision, injury of uterine vessels injury and need of hemostatic sutures.

METHODS

This prospective comparative trial was conducted at 2 private hospitals in Saudi Arabia. One hospital consultant used Wrigley forceps to deliver the head in group 1, and another hospital consultant used manual extraction of the fetal head (group 2). The ethical committee of both hospitals approved the study, and properly informed consent was undertaken from the patient. The inclusion criteria included patients aged between 18 and 40 years, with any elective CS but with one condition of regional anesthesia. Women with preterm pregnancy, multiple pregnancies, fetal mal-presentation, and congenital fetal malformation were excluded.

All women were informed about the targets of the study. The informed consent of all women was obtained before conducting a complete history, general and abdominal examination, and obstetric ultrasonography to evaluate gestational age, fetal weight, amniotic fluid, and placental site, and to exclude congenital fetal malformations.

Sample size justification

The study included all women fulfilling the inclusion and exclusion criteria who were admitted to the 2 private hospitals between January 2020 and June 2020.

The pain was assessed by a standard 10 cm VAS score [5], in which (0) cm corresponded to 'no pain' and the last digit (10) cm corresponded to 'the worst pain ever'.

The surgical procedure followed the standard protocol. Regional anesthesia and sterilization of the abdominal wall were carried out before making a Pfannenstiel skin incision. The subcutaneous incision was opened, followed by the usual opening of the rectus sheath. The peritoneum was then opened using blunt scissors, and the bladder was dissected downward with a sharp incision. A traditional C- shaped incision was made in the lower uterine segment using a scalpel, followed by cutting the fetal membranes to reach the fetal head. In Group 1, Wrigley forceps were used to deliver the heads of 45 women. After the membranes were ruptured, the surgeon identified the transverse position of the head by hand. The posterior blade of the forceps was applied first. Placing one hand under the head at the side behind the posterior ear, the surgeon used the curved blade between the fingers to move the fetal head. The anterior blade was then applied in front of the anterior ear. Extraction was then performed along the patient's longitudinal axis to deliver the fetus, followed by the delivery of the placenta and membranes in the usual manner. The uterus was closed using a one-layer locked sewing machine. Any uterine extension, injury to uterine vessels, or additional hemostatic sutures was documented. Closure of the parietal peritoneum and then closure of the abdomen in layers and leaving drains if needed.

Group 2 consisted of 45 patients who underwent manual head delivery. During the procedure, the surgeon's non- dominant hand was inserted into the lower uterine segment, and the fingers were used to grasp the fetal head. Traction was applied to the head to lift it upwards and deliver it through the uterine incision, with fundal pressure providing additional assistance. The remaining steps of the procedure were carried out as previously described. Patients were instructed to assess the pain experienced during the delivery, particularly when fundal pressure was applied. Pain was measured using a standard (10 cm) Visual Analog Scale (VAS) [5], where (0) cm represented 'no pain' and (10) cm represented the most severe pain.

Statistical analysis

The data recorded was analyzed using the statistical package for social sciences, version 20 (SPSS Inc., Chicago, Illinois, USA). An independent t-test was employed to compare two groups on quantitative data with parametric distribution. A Chi-square (χ^2) test of significance was utilized to compare proportions between qualitative parameters. The confidence interval was 95%, and the accepted margin of error was 5%. Therefore, a p-value was deemed significant based on the following criteria ($p < 0.05$ for Significance and $p < 0.001$ for high significance).

RESULTS

As indicated in Table 1, there were no statistically significant differences between the two groups in terms of demographic criteria. As demonstrated in Table 2, a highly statistically significant disparity in pain scores was observed in the double-blade forceps group compared to the other groups ($P = 0.001$). The studied groups did not show any statistically significant variances in terms of unintended uterine extensions, uterine vessel injury, or the necessity for extra stitches. Regarding neonatal outcome, birth weight and APGAR scores at 1 minute and 5 minutes were not different between the studied groups.

Tab. 1. Comparison of demographic data between different groups.

Variables	Forceps (n=45)	Manual (n=45)	p-value
Maternal age, years, mean (SD)	28.05 \pm 2.90	27.93 \pm 3.23	0.853
GA, wks, mean (SD)	39.09 \pm 0.55	39.12 \pm 0.57	0.8
BMI, kg/m ² , mean (SD)	29.96 \pm 1.58	29.66 \pm 1.77	0.396
^Independent t-test; p-value >0.05 is insignificant			

Tab. 2. Comparison of outcome variables data between different groups.

Variables	Forceps (n=45)	Manual (n=45)	p-value	Sig
Pain during fundal pressure, mean (SD)	4.59 \pm 2.14	6.12 \pm 1.53	^ 0.001	HS
Uterine extension	Negative 42 (93.3%)	39 (86.7%)	#0.482	NS
	Positive 3 (6.7%)	6 (13.3%)		
Uterine vessels injury	Negative 43 (95.6%)	40 (88.9%)	#0.431	NS
	Positive 2 (4.4%)	5 (11.1%)		
Additional stitches needed	Negative 38 (84.4%)	32 (71.1%)	#0.151	NS
	Positive 7 (15.6%)	14 (31.1%)		
Birth Weight	3.50 \pm 0.32	3.52 \pm 0.26	^ 0.746	NS
APGAR at 1 min <7,	6 (13.3%)	5 (11.1%)	#0.751	NS
APGAR at 5 min <7,	1 (2.2%)	1 (2.2%)	#1.000	NS
^Independent t-test; #Chi square test; NS: Non significant; HS: Highly significant				

DISCUSSION

Participants' age, gestational age, BMI, and parity did not show significant differences between the two groups in the current study findings. The first group, where delivery was performed using Wrigley forceps, experienced significantly less pain during the baby's delivery than the other group.

Regional anesthesia is commonly used for cesarean sections, allowing the patient to remain conscious throughout the procedure. Our findings indicate that patients find the pain from fundal pressure bothersome.

Some research has focused on the use of fundal pressure during cesarean sections. Kurtay et al. conducted a study on the Impact of Fundal Pressure on Maternal Intraocular Pressure during cesarean sections and determined that fundal pressure could potentially lead to a significant rise in intraocular pressure [6].

Kim and Ryu conducted another study that examined how fundal pressure during Caesarean section affects the maternal hemodynamics of 20 women. They monitored the women's brachial arterial blood pressure, heart rate, and cardiac output while fundal pressure was applied. The study revealed that the application of fundal pressure led to significant hemodynamic effects, including reduced heart rate, cardiac output, and blood pressure. However, they did not observe any adverse clinical effects on the mothers and babies. [7].

There was not a statistically significant difference between the two groups in terms of unintended expansion of the uterus, injury to uterine blood vessels, or the necessity for extra stitches. This indicates that neither method holds an advantage over the other, particularly when surgeons are proficient in various techniques for delivering the baby's head. Additionally, there was no contrast in terms of the newborn's overall condition and APGAR scores. This suggests that using forceps for head delivery during a cesarean section is safe.

Abdel Hamid AS and Abou Louz AS conducted a randomized controlled trial involving 150 women who underwent repeat elective CS. These women were divided into three groups of 50 each. The first group used forceps without applying fundal pressure. The second group used forceps with a single blade and fundal pressure. In the third group fundal pressure assisted in the use of manual extraction. The study evaluated pain expectation score, pain score during head delivery, uterine extension, injury of uterine vessels, and requirement for hemostatic sutures. The results showed a high statistically significant difference in pain score during delivery in the forceps group ($P < 0.005$). No differences were found among the three groups

regarding pain expectation, uterine extension, uterine vessel injury, and need for hemostatic stitches ($P > 0.05$) [3].

One of the primary limitations of this research is the insufficient number of participants, as the Islamic culture of Arab women restricts their involvement in clinical trials. Furthermore, the absence of randomization in this study is due to the lack of RCT units in these hospitals, opposition from private patients, and a lack of support from the hospital's ethical committee, which stated that as a non-governmental hospital, they were not in favor of the idea.

In clinical practice, junior obstetricians should receive training in using forceps to assist in extracting the fetal head during a cesarean section. Surgeons should be educated to refrain from applying fundal pressure, particularly when the patient is conscious and experiencing discomfort.

Additional research with a larger participant pool is necessary to examine blood loss when using forceps during cesarean sections.

CONCLUSION

Compared with fundal pressure exerted with manual extraction of the fetal head, the use of Wrigley forceps resulted in significantly less pain during the delivery of the head.

ETHICS APPROVAL

Study approved by Ethical Committee of 2 private hospitals

CONSENT FOR PUBLICATION

Non applicable

AVAILABILITY AND DATA MATERIAL

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

COMPETING INTEREST

The authors report there are no competing interests to declare

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AUTHORS' CONTRIBUTION

All authors jointly contributed to conception and design of the study.

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