

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 USA, most primary cesarean deliveries are done for dystocia in labor. In these deliveries, the fetal head is engaged, and the lower uterine segment is thinned by the strong contractions of labor. Suppose the fetal head is not deeply engaged in the pelvis. In that case, a transverse lower uterine segment incision is performed, and the fetal head is lifted to the incision level and then delivered easily or with the aid of the fundal pressure of the assistant [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].

Many methods have been used to deliver the fetal head during cesarean delivery. The most common is simple manual extraction. The patient perceives the fundal pressure exerted by the assistant to deliver the head as a painful and uncomfortable event [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. All women gave their informed consent, after which full history was taken, general and abdominal examination, and obstetric ultrasonography was performed to assess gestational age, fetal weight, amniotic fluid, and placental site and to rule out congenital fetal malformation.

Sample size justification

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

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 steps were done in the usual fashion. After regional anesthesia and antisepsis of the abdominal wall, Pfannenstiel skin incision with the opening of the subcutaneous incision, then the opening of the rectus sheath in the usual way; the peritoneum is opened by blunt scissors, then sharp downward dissection of the bladder downward. The lower uterine segment incision was performed by scalpel in the traditional C shape incision, then cutting of fetal membranes to reach the fetal head.

Group 1; 45 women that we used Wrigley forceps for head delivery: Once membranes are ruptured, the surgeon felt the transverse position of the head with his hands. The posterior blade of the forceps was applied first; the surgeon placed one hand under the head at the side of the head behind the posterior ear and put the curved blade between the surgeon's fingers, moving the fetal head. The anterior blade was then applied to the correct position in front of the anterior ear. Extraction was then applied along the longitudinal axis of the patient to deliver the fetus, then delivery of the placenta and membranes in the usual way—closure of the uterus by a one-layer locked sawing machine. Any uterine extension, injury of uterine vessels, or additional hemostatic sutures was recorded. Closure of

the parietal peritoneum and then closure of the abdomen in layers and leaving drains if needed.

Group 2; 45 patients with manual head delivery:

The surgeon's nondominant hand was placed into the lower uterine segment, and his fingers hooked the fetal head. Traction of the head is used to elevate the fetal head upwards to deliver the head through the uterine incision with the assistance of fundal pressure. The rest of the procedure continues as above.

The patient was asked to feel the pain they felt when the baby was being delivered, especially when using fundal pressure. A standard (10 cm) VAS score was used to measure pain [5], in which (0) cm corresponded to 'no pain' and (10) cm corresponded to the worst pain.

Statistical analysis

Recorded data were analyzed using the statistical package for social sciences, version 20 (SPSS Inc., Chicago, Illinois, USA). The comparison between two groups regarding quantitative data with parametric distribution was made using an independent t-test. A Chi-square (x2) test of significance was used to compare proportions between qualitative parameters. The confidence interval was 95%, and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following (p<0.05, Significant, and p<0.001 highly significant).

RESULTS

As shown in **Tab. 1**. No statistically significant difference was found between the 2 groups as regards demographic criteria. As shown in **Tab. 2**. there was a high statistically significant difference in pain scores in the double blade forceps group compared to other groups (P=0.001).

There were no statistically significant differences between the studied groups regarding unintended uterine extensions, uterine vessel injury, or the need for additional stitches. Regarding neonatal outcome, birth weight

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 ± 2.90	27.93 ± 3.23	0.853
GA, wks, mean (SD)	39.09 ± 0.55	39.12 ± 0.57	0.8
BMI, kg/m ² , mean (SD)	29.96 ± 1.58	29.66 ± 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 ± 2.14	6.12 ± 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 ± 0.32	3.52 ± 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

and APGAR scores at 1 minute and 5 minutes were not different between the studied groups.

DISCUSSION

The present study found no significant differences between the two groups regarding participants' age, gestational age, BMI, and parity. Pain felt during the baby's delivery was significantly less in the first group, in which delivery was done by applying Wrigley forceps.

The wide use of regional anesthesia in performing CS permits the patient to be aware of all steps in CS. Our results show that the patients are annoyed by the pain they experience during fundal pressure.

Some studies have been concerned with the application of fundal pressure in CS. Kurtay et al. studied the Effect of Fundal Pressure on Maternal intraocular Pressure in CS; they concluded that fundal pressure might significantly increase intraocular pressure [6].

Another study by Kim and Ryu investigated the effect of fundal pressure at Caesarean section on the maternal hemodynamics of 20 women. They studied brachial arterial blood pressure, heart rate, and cardiac output during the exertion of fundal pressure. They found that applying fundal pressure produced significant hemodynamic effects, such as decreased heart rate, cardiac output, and blood pressure. They did not observe any clinical effect on mothers and babies [7].

There was no statistically significant difference between the 2 groups regarding unintended uterine expansion, uterine vessel injury, or the need for additional stitches. This reflects that neither technique has an advantage over the other one, especially when surgeons are well-trained with different methods of head delivery. Also, there was no difference regarding the neonatal outcome and APGAR scores. This reflects that using the forceps is safe in the head delivery in CS.

In a study by Abdel Hamid AS and Abou Louz AS, a prospective single-blinded randomized controlled trial was conducted among 150 women with repeat elective CS. Women were randomly allocated into 3 groups (each 50 women).

Forceps group: Forceps were used without applying fundal pressure. In another group, a single blade of forceps was used, plus fundal pressure.

Manual group: Manual extraction was used, assisted by fundal pressure. The study's outcomes were pain expectation score, pain score during head delivery, uterine extension, injury of uterine vessels, and need 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 3 groups regarding pain expectation, uterine extension, uterine vessel injury, and need for hemostatic stitches ($P > 0.05$) [3].

The main limitation of this study is an inadequate number of patients, as Arab women's Islamic culture limits their participation in clinical trials. Also, lack of randomization in this study because there are no RCT units in these hospitals, the private patients refused the idea, and the hospital ethical committee was not encouraging the idea stating that we are not a governmental hospital.

For clinical practice, junior obstetricians should be trained to extract the fetal head by forceps in CS. Also, the surgeons should be instructed to avoid fundal pressure, especially if the patient is awake and feeling pain.

Further research is needed with a larger number of participants to study blood loss using forceps in CS.

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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