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Comparison between Forceps, Single Blade Forceps and Manual Extraction of Fetal Head in Elective Caesarean Section: A Randomized Control Trial-Forceps Delivery in Cesarean Section

Abdelrahim Mohamed Abdelrahim
Faculty of Medicine, Cairo University Class of 2016 Resident of Obstetrics and Gynecology Embaba general hospital, abdelrahimmohamed254@gmail.com

Ibrahim Abdelhamid Abousekein
Faculty of Medicine for Boys-Cairo, Al-Azhar University

Hosam Eldin Mohamad Alazazy
Lecturer of Obstetrics & Gynecology Faculty of Medicine for Boys-Cairo, Al-Azhar University

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ORIGINAL ARTICLE

Comparison Between Forceps, Single Blade Forceps and Manual Extraction of Fetal Head in Elective Caesarean Section: A Randomized Control Trial-forceps Delivery in Cesarean Section

Abdelrahim Mohamed Abdelrahim [a,*], Ibrahim Abdelhamid Abousekein [b], Hosam Eldin Mohamad Alazazy [b]

[a] Cairo University Class of 2016, Obstetrics and Gynecology, Embaba General Hospital, Egypt
[b] Obstetrics & Gynecology, Faculty of Medicine for Boys-Cairo, Al-Azhar University, Egypt

Abstract

Background: **Caesarean section is the maximum common and globally significant obstetric procedure, and this rate has been rising gradually. The birth of the foetal head can be accomplished through manual delivery or instrumental delivery, among other techniques.**

Aim of the work: **To investigate the effects of three different methods of delivering the foetal head—manual delivery, forceps delivery with either a single or double blade, during an elective caesarean section—on patient perceptions of pain and pain scores, unintended extension of the uterine incision, uterine vessel injury, and neonatal outcomes.**

Patients and methods: **This study was a comparative study that was conducted at Sayed Galal University Hospital, El Hussein University Hospital and Embaba General Hospital on 600 women undergoing elective Cesarean section from July 2021 to June 2022. The study group divided into three equal groups (200 women/ group): Group I: delivered head by manual extraction Group II: one blade forceps was used for head extraction Group III: we used duple blades forceps for head extraction.**

Results: **No important variance between groups according to demographic data, and according to uterine wound extension, uterine vessels injury, fetal head injury and APGAR score at 1 & 5 min but statistically significant variances exist. between groups according to expectations of pain and pain during fundal pressure.**

Conclusion: **Regarding patient anticipation of pain and pain score, unexpected delay of the uterine incision, harm to the uterine vasculature, and neonatal outcomes, forceps is superior to manual delivery of the baby head during elective caesarean section and has fewer complications.**

Keywords: Cesarean section, Forceps delivery, Fundal pressure, Manual extraction, Pain

1. Introduction

When vaginal delivery through the birth canal is either impractical or risky, a caesarean section (the surgical delivery of a neonate through the mother's abdominal and uterine walls) may be the only viable option.[1]

Caesarean delivery is the most frequent and significant obstetric operation worldwide, and this rate has been steadily rising.[2]

Over the past few decades, there has been a sharp rise in the number of caesarean deliveries worldwide, which now surpasses 55% of all deliveries in many nations.[3]

Cesarean deliveries account for 32% of all deliveries in the United States, making them one of the most popular operations.[4]

The most recent figures indicate that caesarean sections account for 52% of all deliveries in Egypt. After a caesarean section, it is possible to experience anesthesia problems, infections, hemorrhaging, damage to adjacent organs, peripartum hysterectomy, and other short- and long-term effects. To lessen these postoperative problems,

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* Corresponding author. Professor of Obstetrics and Gynecology, Faculty of Medicine, Alazhar University, Cairo, Egypt.
E-mail address: ibrahim.sekkean1@gmail.com (A.M. Abdelrahim).

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numerous adjustments were made to the surgical techniques.[5]

The delivery of the foetal head during an elective caesarean delivery has been described using a variety of techniques. Delivery through basic manual labour is most frequently used. The patient frequently feels uncomfortable or even painful during the fundal pressure used by the surgeon and the helper to deliver an unengaged foetal vertex via a thick lower uterine section.[1]

In some cases, particularly when the head is high floating and the lower segment is poorly formed, difficulty is experienced during the delivery of the head. In such circumstances, manual delivery employing fundal pressure, lateral vertical incision (Jincision), inverted T incision, or use of ventouse and forceps are some of the delivery techniques that may be performed. A safe and efficient alternative to manual delivery using fundal pressure is the use of forceps during a Caesarean operation to deliver a floating head.[6]

Accordingly, the present was conducted to compare three different methods of delivering the foetal head during an elective caesarean section (forceps-assisted using either a single or double blade versus manual delivery) in terms of patient expectation of pain and pain scores, unintended extension of the uterine incision, uterine vessel injury and neonatal results.

The goal of this research is to compare the possessions of three different techniques for delivering the foetal head during elective caesarean sections on patient perceptions of pain and pain total score, unintended offshoot of the uterine incision, damage to uterine vessels, and neonatal outcomes. These techniques include manual delivery and forceps delivery using single or the double blades.

2. Patients and methods

This study is a comparative study that was conducted at Sayed Galal University Hospital, El Hussein University Hospital and Embaba General Hospital on 600 women undergoing elective Cesarean section who met the inclusion criteria and exclusion criteria.

This study followed the ethical committee rules of Obstetrics & Gynecology, Al-Azhar University. For all pregnant women in this study, explanation of the study procedures was done, and informed consent was obtained.

3. Methods

600 pregnant women were included in the study and underwent evaluation, which included a thorough history taking, physical examination, and an ultrasound. With accordance to inclusion and exclusion criteria, the study group was chosen.

The patients were randomized into three groups: Group 1 (Manual extraction group) n = 200: pregnant women that delivered head by manual extraction. Group 2 (Single forceps group) $n = 200$: pregnant women who delivered head by single blade forceps. Group 3 (double forceps group) $n = 200$: pregnant women who delivered head by double blade forceps.

Prior to the surgery, all enrolled women were asked to indicate how much pain they anticipated based on their prior CS experiences and the discomfort they encountered during fundal pressure.

All deliveries were noted for unwanted uterine extension, uterine vascular injury, birth weight, foetal head injury, and Apgar scores at 1 and 5 min.

3.1. Statistical methods

Data was investigated using the statistical program for social sciences, version 23.0. (SPSS Inc., Chicago, Illinois, USA). Mean, standard deviation, and ranges were reported for the quantitative data. Numbers and percentages were also used to display qualitative variables. Data were checked for normality using the Shapiro-Wilk Test and Kolmogorov-Smirnov tests.

4. Results

This table shows no statistically difference between the groups according to maternal age and weight, gestational age and parity.

According to the expectation of pain, there was a statistical significant distinction between the two groups with a P value of 0.05. The Manual Extraction Group had the greatest value (5.832.63), followed by the Double Blade Forceps Group (4.581.24), and the Single Blade Forceps Group (4.041.41) had the lowest value.

Additionally, there was a significant statistical difference (p 0.05) between the groups in terms of fundal pain. The Manual Extraction Group had the greatest value (6.581.79), followed by the Double Blade Forceps Group (5.331.27), while the Single Blade Forceps Group (4.791.56) had the lowest value.

This table shows that There is a higher frequency of uterine vessels injury in manual extraction group was (13%), followed by double-blade forceps group was (10%), while the lowest frequency was found in Single Blade Forceps Group (8%), but insignificant difference between groups with (P value > 0.05 NS).

Additionally, the manual extraction group had a higher occurrence of uterine wound extension (14.5%), followed by the double-blade forceps group (11%), while the single-blade forceps group had the lowest frequency (9%), even though there was no difference between the groups that was statistically significant (*P* value > 0.05 NS).

Also, there was a higher frequency of fetal head injury in Single Blade Forceps Group (3.5%), followed by double blade forceps group was (2%), while the lowest frequency was found in manual extraction group was (0.5%), but insignificant difference between groups with (*P*-value >0.05 NS).

This table shows no statistically significant changes between groups according to birth weight and APGAR score at 1 and 5 min.

5. Discussion

In this study, we compared three different methods for delivering the foetal head during an elective caesarean section in terms of the patient's perception of discomfort and pain scores, unexpected extension of the uterine incision, harm to the uterine veins, and neonatal outcomes.

The mother age in the three groups from 20 to 36 years, a age of (group I: 26.543.96, group II: 26.643.23, group III: 27.043.63), according to demographic data (Table 1). While, the mean age was reported to be (27.38 3.17 in the manual group, 27.38 3.17 in the single blade group, and 27.5 2.84 in the double blade group) according to study by Wahab and Aboulouz.[2]

As regards parity, the majority of instances in our study were P2 (34.0% in the manual group and double blade group, whereas 35% in the single blade group). **Wahab and Aboulouz**[2] observed that the majority of cases were P1 (48.0%) in all three groups, hence this is contraindicated by them.

The mean GA in our study ranged from 38 to 40 weeks with a mean (38.22 ± 0.44 in manual group, 38.17 ± 0.26 in single blade group and 38.18 ± 0.39 in double blade group). This was consistent with the findings of **Swan *et al.*,**[7] who stated that the mean gestational age was 38.840.50 in the forceps extraction group and 39.040.51 in the manual extraction group.

The mean maternal weight for the participants in the current study was (71.087.04 for manual, 69.645.26 for single, and 70.186.45 for double blades). The mean maternal weight was 594.8 in the manual group and 613.7 in the forceps group, according to a research by **Ingole *et al.*,**[6] which found that this is greater.

In the present study, the three groups were comparable in birth weight 'gm.' with the Mean ± SD in each of manual extraction group, single blade forceps group and double blade forceps group was 2895.62 ± 589.51, 3007.40 ± 466.02 and 2973.60 ± 516.98 respectively, This is less than a study conducted by **Wahab AS and Aboulouz**[2] who reported that the mean birth weight was (3.51 0.26 in manual group, 3.54 0.25 in single blade group, and 3.51 0.33 in double blade group), which was found by **Ingole *et al.***[6] to be 2.93 0.86 in the manual group and 3.07 0.04 in the forceps group.

There was a statistical significant distinction among the groups for the expectation of pain in that study, as shown in (Table 2) with a *P* value of (0.05). According to **Wahab and Aboulouz,**[2] there is no discernible difference in the level of anticipated pain across groups, hence this is not advised.

Additionally, there was a statistically significant difference between the groups in terms of pain during fundal pressure (*P* value 0.001). Group III had the second-highest value (mean 5.331.27), Group I had the greatest value (mean 6.581.79), and Group II had the lowest value (mean 4.791.56). This is comparable to the report made by **Wahab and**

Table 1. Comparison between groups according to baseline characteristics.

Demographic data	Manual Extraction Group (n = 200)	Single Blade Forceps Group (n = 200)	Double Blade Forceps Group (n = 200)	Test value	*P* value
Age [years]					
Mean ± SD	26.54 ± 3.96	26.64 ± 3.23	27.04 ± 3.63	F=1.085	0.339
Range	20–36	20–33	20–34		
Parity					
*P*1	52 (26.0%)	49 (24.5%)	51 (25.5%)		
*P*2	68 (34.0%)	71 (35.5%)	68 (34.0%)	x^2=0.441	0.998
*P*3	52 (26.0%)	55 (27.5%)	54 (27.0%)		
*P*4	28 (14.0%)	25 (12.5%)	27 (13.5%)		
G.A [weeks]					
Mean ± SD	38.22 ± 0.44	38.17 ± 0.26	38.18 ± 0.39	F=1.016	0.363
Range	38–40	38–39	38–39		
Maternal weight [kg]					
Mean ± SD	71.08 ± 7.04	69.64 ± 5.26	70.18 ± 6.45	F=2.672	0.070
Range	60–90	56–89	61–84		

Table 2. Comparison between groups according to Expectation of pain and Pain during fundal pressure.

	Manual Extraction Group (n = 200)	Single Blade Forceps Group (n = 200)	Double Blade Forceps Group (n = 200)	H-test	P value
Expectation of pain					
Mean ± SD	5.83 ± 2.63A	4.04 ± 1.41B	4.58 ± 1.24B	4.682	0.011*
Range	3–8	2–6	3–7		
Pain during fundal pressure					
Mean ± SD	6.58 ± 1.79A	4.79 ± 1.56B	5.33 ± 1.27B	15.332	<0.001**
Range	3–9	1–7	2–8		

Table 3. Comparison between groups according to complications.

Complications	Manual Extraction Group (n = 200)	Single Blade Forceps Group (n = 200)	Double Blade Forceps Group (n = 200)	Chi-square test	P value
Uterine Vessels Injury					
No	174 (87.0%)	184 (92.0%)	180 (90.0%)	2.734	0.255
Yes	26 (13.0%)	16 (8.0%)	20 (10.0%)		
Uterine Wound Extension					
No	171 (85.5%)	182 (91.0%)	178 (89.0%)	3.046	0.218
Yes	29 (14.5%)	18 (9.0%)	22 (11.0%)		
Fetal Head Injury					
No	199 (99.5%)	193 (96.5%)	196 (98.0%)	4.592	0.101
Yes	1 (0.5%)	7 (3.5%)	4 (2.0%)		

Aboulouz,[2] who said that there is a statistically significant difference between the groups with (P value 0.001).

In addition to generating pain and discomfort, the fundal pressure may have other repercussions. In their work, **Kurtay *et al.***[8] consequently came to the conclusion that fundal pressure might greatly raise intraocular pressure. A different study by **Kim and Ryu**[9] found that applying fundal pressure significantly reduces heart rate, cardiac output, blood pressure, and mean systolic aortic flow time.

In the current investigation, group I had a higher frequency of uterine vascular injury (13%) than group III (frequency: 10%), group II (frequency: 8%), or group III (frequency: 9%). As seen in Table 3 with a P value of >0.05 NS, there was no statistically significant difference between the groups. This is similar to the results of Wahab and Aboulouz 2 and Bofill et al.,[10] who found no appreciable difference between groups. **While Ingole *et al.***[6] discovered a highly significant difference between the forceps group (0.75%) and the manual group (5.5%) in terms of the percentage of uterine artery injury. Furthermore, Group I had the highest frequency of uterine wound extension (14.5%), followed by group III with the second-highest frequency (11%) and group II with the lowest frequency (9%), but there was no statistically significant difference between the groups as shown in Table 3 with (P value > 0.05 NS). Similar findings were made by **Wahab and Aboulouz,**[2] who discovered that there was little difference between the groups. In contrast, The groups differ significantly in a meaningful way., with the proportion of uterine wound extension in the manual group being 7.75% and in the forceps group being 2%, according to **Ingole *et al.***[6]

While there was no The groups differ significantly in a meaningful way. The groups when it came to foetal head injury, the single forceps group had a greater rate of foetal head injury (3.5%), as can be

Table 4. Assessment between groups according to neonatal outcome.

Neonatal outcome	Manual Extraction Group (n = 200)	Single Blade Forceps Group (n = 200)	Double Blade Forceps Group (n = 200)	Test value	P value
Birth Weight [gm]					
Mean ± SD	2895.62 ± 589.51	3007.40 ± 466.02	2973.60 ± 516.98	F = 2.670	0.070
Range	2600–3300	2700–3500	2800–3300		
APGAR Score 1 min					
Mean ± SD	7.88 ± 0.44	7.90 ± 0.33	7.89 ± 0.34	H = 0.307	0.858
Range	6–9	6–8	6–8		
APGAR Score ≤7	25 (12.5%)	18 (9.0%)	20 (10.0%)	$x2$=1.383	0.501
APGAR Score 5 min					
Mean ± SD	8.57 ± 0.54	8.59 ± 0.51	8.72 ± 0.47	H = 2.056	0.092
Range	7–9	7–9	7–9		
APGAR Score ≤7	4 (2.0%)	2 (1.0%)	2 (1.0%)	X^2 = 1.014	0.602

seen in (Table 4). This is comparable to the report by **Swan *et al.*** [7] that there is no discernible difference between the groups. Another study by **Verma *et al.*** [11] used outlet forceps during emergency and elective CS and discovered that 2.6% of foetuses suffered mild head and face injuries as a result of the forceps' pressure.

According to the results of the current study, there was no The groups differ significantly in a meaningful way of APGAR scores at 1 and 5 min Group I had the highest frequency of APGAR scores at these times (12.5% and 2%, respectively), followed by Group III with 10% and 1%, respectively, and Group II with 9% and 1%, respectively (Table 4). **Ingole *et al.*,** [6] **Swan *et al.*,** [7] **Wahab and Aboulouz,** [2] and they indicated that there The groups differ significantly in a meaningful way.

5.1. Conclusion

Based on the findings of the current study, we can state that Forceps is preferable to and has fewer complications than manual delivery of the foetal head during elective caesarean section in terms of patient expectation of pain and pain scores, unintended extension of the uterine incision, uterine vessels injury, and neonatal outcomes.

It is advised that more research be done to compare various maternal and fetal outcomes, such as predicted blood loss, variations in hemoglobin levels before and after surgery, and the requirement for neonatal intensive care units.

Disclosure

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Authorship

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Conflict of interest

There are no conflicts of interest.

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