

Manual Placental Removal versus Cord Traction for Placental Delivery at Caesarean Section in Correlation to Blood Loss

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Abstract: Background: Excessive bleeding is one of the major threats to women at childbirth. Blood loss during caesarean section is usually underestimated. **Objective:** The objective of this study was to compare the effects of manual extraction of placenta versus spontaneous delivery combined with cord traction on blood loss during elective caesarean section. **Subjects and Methods:** This is a comparative randomized controlled study was carried out at El-Hussein University Hospital OB/GYN Department and El Sahel Teaching Hospital OB/GYN Department from Feb. 2015 to December 2015. Eighty women with term gestation scheduled for elective lower segment caesarean section were randomized into 2 groups, Group I (manual removal of placenta) (n=40) and Group II (spontaneous placental delivery with cord traction) (n=40) and their intraoperative and postoperative outcomes were studied and were statistically compared. **Results:** There was a significantly higher estimated intraoperative blood loss in Group I when compared to Group II [505.08 ± 150.14 ml vs. 434.09±178.52 ml, respectively, p<0.001]. There were no statistically significant differences between women of both groups concerning postoperative hemoglobin and postoperative hemoglobin drop. Postoperative hematocrit [30.91 ± 2.49 vs. 32.6 ± 3.12, respectively, p=0.001] and postoperative hematocrit drop [3.06 ± 1.04 vs. 2.02 ± 1.47, respectively, p=0.003] were, however, significantly lower in Group I when compared to women in Group II. There was a significantly shorter mean duration of placental delivery [0.28 ± 0.15 min vs. 3.65 ± 2.75 min, respectively, p<0.001] in Group I, but the mean duration of the operation was similar. **Conclusion:** Our Study showed that Spontaneous delivery of the placenta combined with cord traction as compared to manual removal significantly reduces the blood loss without increasing the operating time.

[Mohamed Samir Foad, Tamer Fares Oof, and Emad Abd El-Tawab. **Manual Placental Removal versus Cord Traction for Placental Delivery at Caesarean Section in Correlation to Blood Loss.** *Nat Sci* 2017;15(7):131-136]. ISSN 1545-0740 (print); ISSN 2375-7167 (online). <http://www.sciencepub.net/nature>. 19. doi:[10.7537/marsnj150717.19](https://doi.org/10.7537/marsnj150717.19).

Keywords: Caesarean section; Placenta; Placental delivery; Blood loss; Hemoglobin.

1. Introduction

Delivery of the baby by abdominal and uterine incision is known as Caesarean section (C-section). It is increasingly used as safe delivery for fetal and maternal reasons^[1].

The overall rate of caesarean delivery has risen worldwide. WHO advocates that CS is an essential treatment in pregnancy and is recommended at an “optimal” national rate of 5–15 % of all births^[2]. A recent WHO publication reports that between 1990 and 2014 the global average CS rate increased to be 18.6 % with rates ranging, depending on region, between 6 and 27.2 %, and average annual rate of increase (AARI) of 4.4 % per year^[3].

In United States caesarean birth rate has increased from 5.5% to 15.2% during eight year interval^[4].

In Egypt, according to the latest data, more than half of all women give birth by CS without much difference between urban and rural areas^[5]. CS rates in Egypt rose from 4.6% to 51.8% (47.2 points) over the 24 year period with the largest worldwide AARI in CS rates (11.6%)^[3].

However, C-section is associated with more blood loss than normal spontaneous vaginal delivery^[6]. On average one liter of blood is lost during C-section.

Various techniques have been tried to reduce this blood loss. Such techniques include finger splitting versus scissor cutting of incision, in situ stitching versus exteriorization and stitching of uterus and finally spontaneous or manual removal of the placenta^[6-8].

The method of delivery of placenta may contribute to an increase or decrease in the morbidity of C-section^[9]. In spontaneous delivery, placenta is delivered spontaneously by applying gentle traction on umbilical cord after the delivery of baby. There is significant heterogeneity for the duration of surgery, blood loss, and hematological outcomes in spontaneous delivery of placenta.

In spontaneous delivery less blood loss, less decrease in hematocrit levels post-operatively and short hospital stay is observed as compared to manual.

Various studies have suggested that method of delivery of placenta plays a key role in determining

the blood loss during C-section [9-11]. Research has shown that spontaneous delivery of placenta is associated with less blood loss than manual extraction [12-14].

Aim of the Work

The objective of this study was to compare the effects of manual extraction of placenta versus spontaneous delivery on blood loss during elective C-section.

2. Subjects and Methods

This comparative randomized controlled study was carried out at El-Hussein University hospital and El Sahel Teaching Hospital OB/GYN Department in the period from Feb. 2015 until December 2015.

The study was commenced after the approval of the Hospitals Ethical Committee. The involved subjects were informed and consented. Eighty women with term gestation scheduled for elective lower segment caesarean section were randomized into 2 groups. In Group I placenta was extracted manually and in Group II it was delivered spontaneously combined with umbilical cord traction method. It included full-term pregnant females with normal placental localization scheduled for elective C-section under spinal anesthesia. Exclusion criteria included placenta previa, placenta accrete, placental abruption, Medical disorders with pregnancy, pregnancy with fibroid, multiple pregnancy, bleeding disorder, and patients using anticoagulants.

After taking written consent, all patients were subjected to full history taking, full general and abdominal examination. In all cases, the information sheet was completed it included age, parity, gestational age at delivery. Hematocrit and HB values were noted before delivery and 24 hours postpartum. The need for additional oxytocic therapy, operating time, placental separation time, need for blood transfusion, and any significant puerperal morbidity were also recorded.

C-sections were performed by specialist gynecologist under spinal anesthesia. Blood loss was estimated by visual estimation of blood loss in towels (each fully soaked napkin was estimated to absorb approximately 50 ml blood), swabs and in the suction bottle in the two groups with subtraction of amniotic fluid volume. Also by changes in hematocrit and hemoglobin values 24 hour post-operatively (in comparison with its pre-operative values), in addition to our observation to the amount of blood loss which could not be collected or soaked by napkin. All patients underwent lower uterine segment C-section; and received one gram of intravenous cefotaxime.

Data were collected, revised and verified, data were then analyzed statistically using SPSS version as follows:

*Description of quantitative variables as mean, SD.

*Description of qualitative variables as number and percentage.

*Chi- square test was used to compare qualitative variables between groups.

*Fisher exact test was used instead of chi – square test when one expected cell < 5.

*Unpaired t–test was used to compare two groups as regard quantitative variables in parametric data (SD < 50% mean).

P value >0.05 insignificant.

P value <0.05 significant.

P value <0.01 highly significant.

3. Results

Eighty women with term gestation scheduled for elective lower segment caesarean section were randomized into 2 groups. In Group I placenta was extracted manually and in Group II it was delivered spontaneously combined with umbilical cord traction method.

The mean age in Group A was 25.34±5.224 years and in Group B 25.06±5.48 years.

There was no statistically significant difference between both groups as regard general data by using unpaired t-test.

The indications of Caesarean section did not differ significantly with previous caesarean delivery being commonest in 65% women.

There was no statistically significant difference between both groups concerning indications for CS.

There was a significantly higher estimated intraoperative blood loss in women who had their placentae manually separated when compared to women who had spontaneous placental separation [505.08 ± 150.14 ml vs. 434.09±178.52 ml, respectively, p<0.001]. There were no statistically significant differences between women of both groups concerning postoperative hemoglobin and postoperative hemoglobin drop. Postoperative hematocrit [30.91 ± 2.49 vs. 32.6 ± 3.12, respectively, p=0.001] and postoperative hematocrit drop [3.06 ± 1.04 vs. 2.02 ± 1.47, respectively, p=0.003] were, however, significantly lower in women who had their placentae manually separated.

Also, There was a significantly shorter mean duration of placental delivery [0.28 ± 0.15 min vs. 3.65 ± 2.75 min, respectively, p<0.001] in women who had manual placental separation when compared to women who had spontaneous separation, while there was no statistically significant difference

between women of both groups concerning mean duration of the whole CS procedure.

Table (1): Difference between Study Groups concerning Demographic Data.

		Group I [Manual Separation] (n=40)	Group II [Spontaneous Separation] (n=40)	P Value
Age (Years)	Mean ± SD	25.34 ± 5.224	25.60 ± 5.48	0.809 NS
Gestational age (Weeks)	Mean ± SD	38.71 ± 1.13	38.31 ± 1.12	0.426 NS
Parity	Mean ± SD	1.000±0.7824	1.120±0.7182	0.851 NS

NS non-significant.

Table (2): Indications of CS in All Included Women.

Indication	No. (%)
Previous CS	52 (65%)
Infertility	4 (5%)
Bad obstetric history	4 (5%)
Cephalopelvic disproportion	12 (15 %)
Malpresentation	8 (10%)

Table (3): Difference between Study Groups concerning Indications of CS.

Indication for CS	Group I (n=40) [No. (%)]	Group II (n=40) [No. (%)]	P value
Previous CS	24 (60)%	25 (62.5%)	> 0.05 NS
Infertility	3 (7.5%)	2 (5%)	
Bad obstetric history	2 (5%)	1 (2.5%)	
Cephalopelvic disproportion	9 (22.5%)	10 (25%)	
Malpresentation	2 (5%)	2 (5%)	

Analysis done by using chi-square test.

Table (4): Difference between Study Groups concerning Duration of Placental Delivery and the Whole CS Procedure

		Group I (n=40)	Group II (n=40)	P Value
Duration of Placental Delivery (min)				<0.001
	Mean ± SD	0.28 ± 0.15	3.65 ± 2.75	HS
Duration of CS Procedure (min)				0.956
	Mean ± SD	56.900 ± 6.89	56.5100 ± 7.57108	NS

Table (5): Difference between Study Groups concerning intraoperative blood loss and Postoperative laboratory Investigations

		Group I (n=40)	Group II (n=40)	Pvalue
Estimated intraoperative blood loss (ml)				<0.001*
	Mean ± SD	505.08±150.14	434.09±178.52	HS
Postoperative Hemoglobin (g/dl)				0.963
	Mean ± SD	10.62 ± 0.9665	10.53 ± 1.19	NS
Postoperative Hematocrit				0.001*
	Mean ± SD	30.91 ± 2.49	32.6 ± 3.12	S
Postoperative Hemoglobin Drop (g/dl)				0.069
	Mean ± SD	1.23 ± 0.54	0.96 ± 0.23	NS
Postoperative Hematocrit Drop				0.003 *
	Mean ± SD	3.06 ± 1.04	2.02 ± 1.47	S

HS: Highly significant S: Significant NS: Not significant Analysis done by using chi-square test

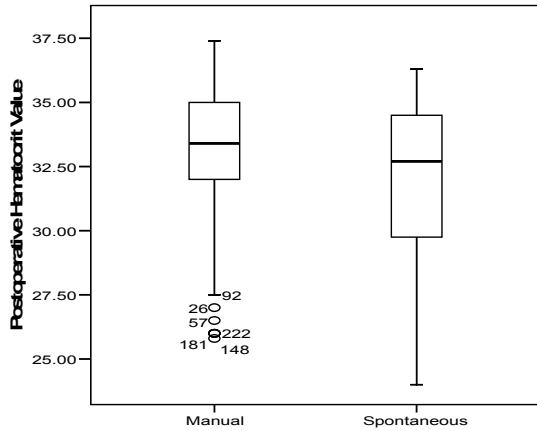


Figure (1): Comparison between both groups as regard hematocrit value after CS

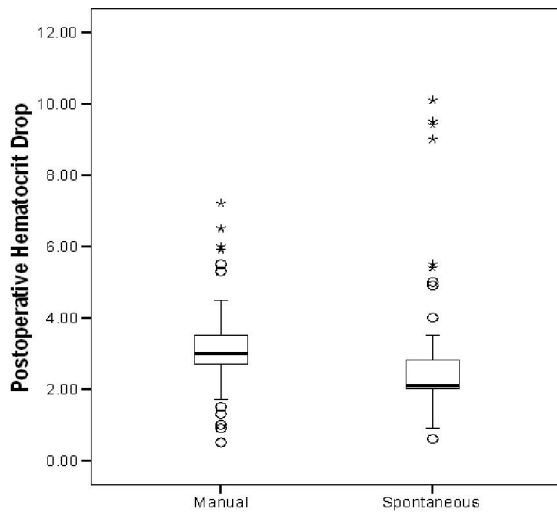


Figure (2): Box-Plot Chart showing Difference between Both Groups concerning Postoperative Hematocrit Drop.

4. Discussion

Studies of the relationship between placental delivery mode and intraoperative blood loss have been carried out. **McCurdy et al. (1992)** found that manual removal of the placenta was associated with greater operative blood loss compared with spontaneous separation of the placenta [15]. In contrast, **Gol et al. (2004)** and **Gun et al. (2013)** recently observed no significant difference [16, 17]. In our study we compare the risk of significant blood loss associated with spontaneous and manual removal of the placenta during C-section and duration of the surgery need for blood transfusion and duration of hospital stay.

The study showed that there were no significant differences between both groups in demographic data in relation to maternal age, parity, gestational age, indication of C-section. That was in agreement with the findings from (**Morales et al**) [24].

In our study there was a significantly higher estimated intraoperative blood loss in group of manually separated placenta (505.08 ± 150.14 ml), when compared to spontaneous placental separation group (434.09 ± 178.52 ml) ($p < 0.001$).

These results were similar to that obtained by some studies (**Vijayasree, 2015; Pokharel, 2011; Cernadas, 1998; Chandra, 2002; Magann, 1993; Magann, 1995; McCurdy, 1992; Morales, 2004; Ramadani, 2004 and Gahlot et al., 2009**). They have found that Women who had manual removal of the placenta lost significantly more blood than those who had cord traction [14, 15, 18-26].

Ramadani found that the amount of blood loss associated with manual removal and spontaneous separation of the placenta was 713 ± 240 and 669 ± 253 ml, respectively (**Ramadani, 2004**) [25].

Two other trials (**Dehbashi, 2004 and Morales, 2004**) estimated blood loss greater than 1000 ml and this also was significantly more common in the manual removal group [14, 24].

Regarding to our study, the concern that measurement or estimation of blood loss may have been subject to observer bias is addressed by the fact that there were significantly greater absolute and relative falls in haematocrit levels in the manual removal group. Change in haematocrit level is a more objective method of measuring blood loss than estimation of volume of blood loss at operation. Manual removal is therefore associated with significantly greater blood loss compared with delivery of the placenta by cord traction.

In the current study hematocrit value was decreased after CS with statistically significant difference in comparison to hematocrit value before CS between both groups ($p = 0.001$). Hematocrit value in group I before CS was 35.97 ± 2.52 and after CS was 30.91 ± 2.49 while hematocrit value in group II before CS was 34.46 ± 3.16 and after CS was 32.6 ± 3.12 with statistically significant difference between both groups [$p = 0.001$]. **Magann (1993 and 1995)** [22, 23] produced the same results which are opposite to that of **Gol et al. (2004)** [16].

Postoperative hematocrit drop [3.06 ± 1.04 vs. 2.02 ± 1.47 , respectively, $p = 0.003$] was, however, significantly lower in manual separation group compared to spontaneous separation group which is the same results produced by **Magann (1993); Atkinson (1996); Baksu (2005) and Hidar (2004)** [9, 22, 27-28].

There were no statistically significant differences between women of both groups concerning preoperative, postoperative hemoglobin and postoperative hemoglobin drop ($p > 0.05$).

The preoperative hemoglobin in manual separation group was (11.63 ± 1.11) and in spontaneous separation group was (11.3 ± 1.07) , postoperative hemoglobin in manual separation group was (10.47 ± 0.95) and in spontaneous separation group was (10.3 ± 1.25) and postoperative hemoglobin drop in manual separation group was (1.23 ± 0.54) and in spontaneous separation group was (0.96 ± 0.23) . **Gol (2004), Ramdani (2004) and Gun (2013)** have found no statistically significant difference in preoperative or postoperative hemoglobin ^[16,17,25] in contrast to **McCurdy (1992) and Hidar (2004)** there were greater fall in hemoglobin level postoperative, both studies specified that cord traction was combined with uterine massage. This suggests that uterine massage may have added to the protective effect of cord traction ^[15,30].

Also **Gahlot et al. (2009)** found a significant greater decrease in hemoglobin concentration at 48 hours after operation (1.31 vs. 0.67 g/dL) in manual separation group when compared to spontaneous separation group ^[26].

Vijayasree (2015) found a significant reduction in perioperative Hb and Hematocrit. Mean perioperative Hb% decrease was found to be 1.69 ± 0.64 gm% in MROP group vs. 1.45 ± 0.51 gm% in spontaneous delivery group. Mean perioperative HCT decrease was found to be $4.25 \pm 1.6\%$ in spontaneous delivery group and 5.07 ± 1.98 in MROP group. Shorter duration of hospital stay ($P < 0.05$) in spontaneous delivery group. The shorter duration of hospital stay was due to decreased febrile morbidity (due to endometritis) and lesser postoperative blood transfusions ^[18].

Cochrane Database Systematic Reviews have the most information about this subject. The results of three systematic reviews in Cochrane Database demonstrated that manual removal of the placenta have an increased risk for blood loss compared to spontaneous removal of the placenta during caesarean delivery. **Anorlu et al.** ^[29] performed the most recent review in **2008**, by examining 15 studies, involving 4,694 women. This review provided the most important information about this subject. According to the analysis of this study, manual removal of placenta had more blood loss, greater decrease in hematocrit levels and lower hematocrit values than spontaneous removal of the placenta, and the adjusted odds ratios (OR) for blood loss more than 1,000 ml was 1.81 (95 % CI: 1.44–2.28). But, the study found no significant difference between the

need for blood transfusions (there are very few of such studies).

In our study There was a significantly shorter mean duration of placental delivery in Group I [0.28 ± 0.15 min vs. 3.65 ± 2.75 min, respectively, $p < 0.001$] this agree with **Morales et al (2004)** ^[24] ($P = 0.0001$) and **Gahlot et al. (2009)** ^[26] (50.5 vs. 62.02 seconds).

However, in our study no statistically significant difference between women of both groups concerning mean duration of the whole CS procedure.

Ramadani (2004) ^[25] found the operating time to be significantly shorter in the manual removal group, which are opposite to **Cernadas (1998); Chandra (2002); Gol (2004); Magann (1993); Magann (1995); McCurdy (1992); Morales (2004) and Gahlot et al. (2009)** ^[15,20-24,26] as they found no significant difference in the duration of operation between both groups.

Also, our study shows no statistically significant difference between women of both groups concerning hospital stays or need for blood transfusion intraoperative or postoperative. Only (2) patients in manual separation group and (1) patient in spontaneous separation group have been taken blood transfusion postpartum. These results were similar to that obtained by **Atkinson et al. (1996); Gol et al. (2004); Morales et al. (2004) and Ramadani (2004)** ^[16,24,25,27].

Conclusion

Delivery of placenta with cord traction at caesarean section has more advantages compared to manual removal. Spontaneous delivery of the placenta combined with cord traction as compared to manual removal significantly reduces the blood loss without increasing the operating time.

Recommendations

Spontaneous separation of the placenta during caesarean section is more beneficial than manual separation.

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7/11/2017