

COMPARISON OF SPONTANEOUS AND MANUAL PLACENTA EXTRACTION
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ABSTRACT

Background: Placental removal options at cesarean section are either spontaneous with gentle cord traction or manual, and the mode of placental delivery contributes to morbidity. **Objective:** The aim of this study was to compare the effectiveness of spontaneous extraction of placenta versus manual type regarding of intra-operative blood loss and endometritis. **Patients and Methods:** A prospective randomized controlled trial study was conducted for the period one year (2023-2024) at Tishreen University Hospital in Lattakia-Syria. The study included 400 women underwent cesarean delivery, who were divided into group1 included 200 women with spontaneous extraction of placenta, and group 2 included 200 women who underwent manual extraction, in which final outcome was compared between two groups. **Results:** Ages of the study population ranged from 20 to 37 years, with a mean age of 28.49 ± 3.2 , without significant differences between the two groups regarding of demographic characteristics, obstetric status, and indication of cesarean section ($p > 0.05$). Duration of placental extraction was significantly lower in manual group (0.39 ± 0.3 versus 2.8 ± 1.7 minute, $p: 0.001$) without significant differences between two groups regarding of duration of surgery ($p: 0.2$). Compared with manual extraction, blood loss was significantly lower in spontaneous group (469.6 ± 147 versus 539.8 ± 167 ml, $p: 0.0001$) with less change in hemoglobin levels at delivery (0.65 ± 0.12 versus 1.63 ± 0.21), as well as low frequency of endometritis (1% versus 3.5%, $p: 0.04$). **Conclusion:** Spontaneous placental extraction at cesarean section is recommended due to low frequency of associated morbidity of infection and the need for blood transfusion.

KEYWORDS: Manual, spontaneous, placental extraction, cesarean section.

INTRODUCTION

A cesarean section is a surgical intervention in which incisions are made through woman's abdomen then uterus to give birth. This procedure is done when vaginal delivery is considered dangerous to the baby or the mother, so it is a life-saving operation.^[1] According to a WHO statement published in 2015, the ideal rate for caesarean section in a given population should be 10-15 %. But on the contrary; the incidence of caesarean delivery is rising in many parts of the world including Syria and becoming a cause of concern as it has been shown to be positively associated with maternal mortality and severe morbidity. The rate of cesarean section has increased from 5% to more than 20% over the last 3 decades as a belief that cesarean section will reduce perinatal mortality. This rate has been increasing and continue in future to the extent that cesarean section can be done as an elective as well as emergency procedure.^[2,3] Cesarean section may be associated with complications like hemorrhage, fever and endometritis, venous thromboembolism, and abnormal placentation in

the following pregnancies. Women undergoing cesarean delivery have higher risk of hemorrhage compared to those undergoing normal delivery.^[4] Endometritis is the most common post operative infection after caesarean delivery. An elevation of maternal temperature more than 38 degree C (100.4F) in the post op period associated with uterine tenderness and foul smelling lochia is the characteristic of endometritis.^[5] Although fever is a hallmark of pelvic infection but other causes of fever such as UTI, respiratory tract infections, tropical infections (malaria, dengue etc), drug or IV fluid reaction and should be ruled out in first 48 hrs.

^[6]Spiking fever of 39° C occurring within 24 hrs of surgery is uncommon but may be associated with virulent pelvic infection.^[7] Fever because of breast engorgement typically occurs after 48 hours. There is leucocytosis in the range of 15,000 to 30,000/cmm but delivery itself increases the leukocyte count.^[8] Uterine tenderness alone is not sacrosanct of pelvic infection as 'After pains' which is physiological and all patients have

some degree of post op uterine tenderness and sometimes become more pronounced during breastfeeding because of release of Oxytocin by the pituitary gland. The endometrial culture report is also uncertain because of contamination of specimen while collected transcervically.^[9]

The process of placental separation starts immediately after delivery of the baby by contraction and retraction of uterine muscle which result in reduction in the size of the uterus consequently, the placental bed to which the placenta is attached become smaller than the incompressible placenta. The placenta sheared off and blood vessels supplying the naked placental bed are compressed by continued contraction and retraction of uterine muscle to reduce the bleeding. So the degree of blood loss depends on timing of the placental separation from the uterine wall and the time of uterine muscle contraction.^[10] the placenta can be delivered by spontaneous placental delivery with cord traction and manual removal of placenta. The method of placental removal is one of the factors that may increase or decrease in the morbidity of cesarean section.^[11] The purpose of the study was to evaluate the impact of the methods of placenta removal during elective caesarean delivery on operative time, maternal blood loss and incidence of endometritis during post op period after caesarean delivery.

MATERIALS AND METHODS

The Study Design, Area and Duration

A prospective randomized controlled trial, double-blinded study was conducted at department of obstetrics & gynecology at Tishreen University Hospital in Lattakia-Syria from 2023 to 2024.

Study Population

The study population comprises of all antenatal patients who were at term and underwent elective c section.

The study included 400 women underwent cesarean delivery, who were randomly divided into group1 included 200 women with spontaneous extraction of placenta, and group 2 included 200 women who underwent manual extraction. This was after a written informed consent was obtained from the participants.

Inclusion Criteria

All antenatal patients with singleton pregnancy who underwent elective CS at term at our centre were included in the study.

Exclusion Criteria

The pregnant woman refused to enter the study, multiple pregnancy, morbidly adherent placenta(placenta previa, placenta accreta, placenta percreta), abruption placenta, high risk pregnancy (diabetes, pre-eclampsia, polyhydramnios), uterine fibroids, PROM, chorioamnionitis, inability to spontaneously extract the placenta in the spontaneous extraction group, Rh-

negative in the manual extraction group, Hemoglobin levels <10 g/dL at the time of CS, clotting disorder, taking anticoagulants and cortisone and other immunosuppressants, previous history of postpartum hemorrhage.

The selected patients were subjected to careful history taking including age, parity, date of the last menstrual period from which the gestational age was calculated, general examination, auscultation of fetal heart rate, vaginal examination was performed at time of delivery to exclude PROM, routine laboratory investigations for antenatal care, and abdominal ultrasound.

All the participants were administered 1gm ceftriaxone i.v. (after skin sensitivity test preoperative)

Spinal anesthesia was used for all included cases, and the cesarean section was performed as follows, a Pfannenstiel abdominal incision was used, the skin and rectus sheath were opened transversely using sharp dissection, the rectus sheath was dissected free from the underlying rectus abdominus muscles, the peritoneum was opened longitudinally using sharp dissection, the uterus was opened with a transverse lower segment incision then delivery of the fetus was done, to avoid excessive bleeding in the interval, clamps were placed on the uterine incision for hemostasis.

At this stage, **Group 1:** Placenta was allowed to be separated spontaneously and removed by gentle cord traction. **Group 2:** Placenta was removed manually by the surgeon's hand introduced into the uterine cavity and cleavage plane was created between the placenta and decidua basal is following which the placenta was grasped and removed. With the use of oxytocin by intravenous infusion 10 units, followed by a continuous of 20 units in 1 liter of dextrose 5% within 2 hours immediately after delivery of the baby in both groups. After placental delivery, the uterine incision was closed with continuous sutures. Both peritoneal layers are closed with continuous sutures. The fascia was closed with continuous sutures. The skin was closed with continuous subcutaneous suture.

Postoperative care

Hemoglobin and Hematocrit values were determined before and 24 hours after delivery to evaluate post-operative hemoglobin concentration, hemoglobin drop.

The blood loss during cesarean section was assessed. Amount of blood which collected from towels was measured according to gravimetric method which reported by Vitello *et al.*^[12] This method assumes that the density of blood and water are equal as 1g =1ml. So blood volume = weight of blood soaked towels – weight of dry towels, then this was added to collected volume from suction bottle in additional to our observation to the amount of blood loss which could not be collected.

Duration of cesarean section was estimated from time of skin incision till the time of last stitch. Duration of placental separation was measured from time of complete delivery of the fetus till the time of complete delivery of placenta.

Need for blood transfusion, and any significant puerperal morbidity were also recorded.

Vital signs were monitored continuously during surgery and every 30 min until the patient was transferred to the postpartum ward.

Secondary outcome measures included presence of post-operative endometritis and delayed complications. Post-operative endometritis was defined by the presence of fever (above 38°C excluding the first 24 hours) in addition to the presence of two of the following: uterine tenderness, foul smelling lochia, and leukocytosis after ruling out other causes of fever such as fever UTI, respiratory tract infections, drug or IV fluid reaction, wound sepsis, mastitis, breast engorgement, and tropical infections (malaria, dengue etc).

The main outcome measures for each case in each group were registered in the patient input form.

Statistical analysis

Analysis of data was done by IBM computer using SPSS (version 20) 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.

RESULT

A total of 400 women were randomised, 200 in **Group1**(spontaneous extraction) and 200 in **Group2**(manual extraction)

This study showed:

1- There were no statistically significant differences between the studied groups in demographic characteristics ($p>0.05$); maternal age, BMI, gestational age.

Ages of the study population ranged from 20 to 37 years, with a mean age of 28.49 ± 3.2 . **table1**

Table (1): Demographic data among the two studied groups.

	Group 1 (spontaneous)	Group 2 (manual)	P-value
Maternal age(years)	28.69 \pm 2.8	29.22 \pm 3.1	0.5
BMI	29.33 \pm 2.1	28.98 \pm 2.9	0.8
Gestational age(weeks)	38.60 \pm 1.6	38.89 \pm 2.1	0.2

2- There were no statistically significant differences between the studied groups in obstetric status ($p>0.05$). **table 2**

Table (2): Obstetric status of patients among the two studied groups.

Obstetric status	Group 1 (spontaneous)	Group 2 (manual)	P-value
Primigravida	148(74%)	156(78%)	0.9
Multigravida	52(26%)	44(22%)	

3- Mother's desire was the most common indication for elective cesarean section in both groups and there were no statistically significant differences between the studied groups in indication of cesarean section ($p>0.05$). **table 3**

Table (3): Indications of Cesarean Section among the two studied groups.

Indication of cesarean section	Group 1 (spontaneous)	Group 2 (manual)	P-value
Mother's desire	93(46.5%)	110(55%)	0.08
Cephalopelvic disproportion	56(28%)	52(26%)	
Malpresentation	51(25.5%)	38(19%)	

4- Duration of placental extraction was statistically significantly lower in manual group(0.39 ± 0.3 versus 2.8 ± 1.7 min, $p:0.001$), and there were no statistically significant differences between two groups regarding of duration of surgery(39.51 ± 4.1 versus 40.22 ± 3.9 min, $p:0.2$). **table 4**

Table (4): Difference between Study Groups concerning Duration of Placental extraction and Duration of surgery.

	Group 1 (spontaneous)	Group 2 (manual)	P-value
Duration of placental extraction(min)	2.84 \pm 1.7	0.39 \pm 0.3	0.001
Duration of surgery(min)	40.22 \pm 3.9	39.51 \pm 4.1	0.2

5- There were no statistically significant differences between women of both groups concerning preoperative Hemoglobin, postoperative Hemoglobin and Compared with manual extraction, blood loss was significantly lower in

spontaneous group(469.6 ± 147 versus 539.8 ± 167 ml, $p:0.0001$) with less change in hemoglobin levels at delivery(0.65 ± 0.12 versus 1.63 ± 0.21), as well as low frequency of endometritis(1% versus 3.5%, $p:0.04$). **table 5**

Table (5): Difference between study groups concerning laboratory investigations and blood loss and postoperative endometritis.

	Group 1 (spontaneous)	Group 2 (manual)	P-value
Preoperative Hemoglobin (g/dl)	11.52 ± 0.9	11.69 ± 0.8	0.4
Postoperative Hemoglobin (g/dl)	10.87 ± 0.8	10.06 ± 0.6	0.07
Postoperative Hemoglobin Drop (g/dl)	0.65 ± 0.12	1.63 ± 0.21	0.03
blood loss(ml)	469.6 ± 147	539.8 ± 167	0.0001
Post-operative endometritis	2(1%)	7(3.5%)	0.04

DISCUSSION

In this study we compare between two groups of patients concerning placental delivery during CS (manual removal of the placenta and spontaneous placental delivery).

In the present study, we found that allowing spontaneous separation of the placenta during caesarean section reduces significant blood loss without increasing the overall surgery time.

Some previous studies showed a difference in estimated blood loss^[26,27,28] while others did not.^[29]

There were no statistically significant differences between women of both groups concerning preoperative, postoperative hemoglobin. But, there were statistically significant differences in postoperative hemoglobin drop, as the hemoglobin drop was less in the spontaneous placenta delivery group.

The duration of placental delivery was shorter in manual separated group than spontaneously separated group, while the overall duration of surgery was statistically not significantly differs in both groups.

We found reduction in the risk of post-operative endometritis with spontaneous removal of placenta. This is supported by some of the previous trials^[26, 28], whereas other trials did not do so.^[29]

CONCLUSION

In this randomized study a statistically significantly increased amount of blood loss and post-operative endometritis with manual removal of the placenta compared to the spontaneous placental separation group with shorter duration of placental delivery, while the duration of surgery was statistically not significantly differs in both groups.

Spontaneous placental extraction at cesarean section is recommended due to low frequency of associated morbidity of infection, blood loss and the need for blood transfusion.

REFERENCES

1. Choudhury C Cesarean births: the Indian scenario. Population Association of America, 2008; 1-18.

- Betrán A, Ye J, Moller A et al. The increasing trend in cesarean section rates: global, regional and national estimates: 1990-2014. PloS One, 2016; 11(2): 136-145.
- Dhillon B, Chandhiok N, Rao M Is emergency cesarean section more risky than elective cesarean section in women with previous cesarean section?. International Journal of Reproduction, Contraception, Obstetrics and Gynecology, 2018; 7(5): 1881-86.
- Bateman B, Berman M, Riley L et al. The epidemiology of postpartum hemorrhage in a large, nationwide sample of deliveries. Anesthesia & Analgesia, 2010; 110(5): 1368-1373.
- Dehbashi S, Honarvar M, Fardi FH. Manual removal or spontaneous placental delivery and postcesarean endometritis and bleeding. Int J Gynaecol Obstet., 2004; 86(1): 12-5. doi: 10.1016/j.ijgo.2003.11.001.
- Maharaj D. Puerperal Pyrexia: a review. Part II. Obstet Gynecol Surv., 2007; 62(6): 400-6. doi: 10.1097/01.ogx.0000266063.84571.fb.
- Crum NF, Chun HM, Gaylord TG, Hale BR. Group A streptococcal toxic shock syndrome developing in the third trimester of pregnancy. Infect Dis Obstet Gynecol., 2002; 10(4): 209-16. doi: 10.1155/S1064744902000248.
- Hartmann KE, Barrett KE, Reid VC, McMahon MJ, Miller WC. Clinical usefulness of white blood cell count after cesarean delivery. Obstet Gynecol., 2000; 96(2): 295-300. doi: 10.1016/s0029-7844(00)00911-x.
- Anderson BL. Puerperal group A streptococcal infection: beyond Semmelweis. Obstet Gynecol., 2014; 123(4): 874-82. doi: 10.1097/AOG.000000000000175.
- Cotter A, Ness A, Tolosa J Prophylactic oxytocin for the third stage of labour. Cochrane Database of Systematic Reviews, 2001; 4: 18-23.
- Anderson E, Gates S Techniques and materials for closure of the abdominal wall in cesarean section. Cochrane Database of Systematic Reviews, 2004; 4: 155-159.
- Vitello D, Ripper R, Fettiplace M et al. Blood density is nearly equal to water density: a validation study of the gravimetric method of measuring intraoperative blood loss. Journal of Veterinary Medicine, 2015; 16: 36-43.

13. Gün İ, Özdamar Ö, Ertuğrul S et al. The effect of placental removal method on perioperative hemorrhage at cesarean delivery; a randomized clinical trial. *Archives of Gynecology and Obstetrics*, 2013; 288(3): 563-567.
14. Sethi N, Sharma S Rising trends of cesarean section: a retrospective study. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 2019; 8(4): 1549-54.
15. Gol M, Baloglu A, Aydin C et al. Does manual removal of the placenta affect operative blood loss during cesarean section?. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 2004; 112(1): 57-60.
16. Manoj K, Swati L, Mehta S A Comparative Study of Effects of Spontaneous Delivery of Placenta versus Manual Removal of Placenta During Cesarean Section. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 2015; 14(1): 09-12.
17. Magann E, Dodson M, Allbert J et al. Blood Loss at Time of Cesarean Section by Method of Placental Removal and Exteriorization Versus in Situ Repair of the Uterine Incision. *Obstetrical & Gynecological Survey*, 1993; 177(4): 389-392.
18. El Garhy E, Mohamed A, Shaaban H et al. Manual Placental Removal versus Cord Traction for Placental Delivery at Cesarean Section in Correlation to Blood Loss. *The Egyptian Journal of Hospital Medicine*, 2018; 73(1): 5849-5855.
19. Ramadani H Cesarean section intraoperative blood loss and mode of placental separation. *International Journal of Gynecology & Obstetrics*, 2004; 87(2): 114-118.
20. Huppertz B The anatomy of the normal placenta. *Journal of Clinical Pathology*, 2008; 61(12): 1296-1302.
21. Baksu A, Kalan A, Ozkan A et al. The effect of placental removal method and site of uterine repair on postcesarean endometritis and operative blood loss. *Acta obstetrica et gynecologica Scandinavica*, 2005; 84(3): 266-269.
22. Morales M, Ceysens G, Jastrow N et al. Spontaneous delivery or manual removal of the placenta during cesarean section: a randomised controlled trial. *BJOG: An International Journal of Obstetrics & Gynaecology*, 2004; 111(9): 908-912.
23. Ajay G, Suman A Spontaneous delivery or manual removal of the placenta during cesarean section: A randomized controlled trial. *J of ObstetandGynecol of India*, 2009; 127-130.
24. Sekhavat L, Zare F, Naghshi N Influence of placental removal method on the incidence of post-cesarean infections and operation duration. *Koomesh*, 2008; 9(4): 293-296.
25. Altraigey A, Ellaithy M, Atia H et al. How can methods of placental delivery in cesarean section affect perioperative blood loss? A randomized controlled trial of controlled cord traction versus manual removal of placenta. *Journal of Obstetrics and Gynaecology Research*, 2019; 45(1): 133-140.
26. Rose I Anorlu, babalwa Maholwana, G Justus Hofmeyr. Methods of delivering the placenta at caesarean section. *Cochrane Database of Systematic Review* 2008, Issue 3, Art No. : CD004737.
27. Fareesa Waqar, Razia Nasar, Anisa Fawad. THE COMPARISON OF PLACENTAL REMOVAL METHODS ON OPERATIVE BLOOD LOSS. *J Ayub Med Coll Abbottabad*, 2008; 20(3).
28. Wilkinson C, Enkin MW. Manual removal of placenta at caesarean section. *Cochrane Database Syst Rev.*, 2007; (2): CD000130.
29. Chandra P, Schiavello HJ, Kluge JE, Holloway SL. Manual removal of the placenta and postcesarean endometritis. *J Reprod Med.*, 2002; 47: 101– 106.