Open Access

Original Article

Placental Removal Methods

Pak Armed Forces Med J 2020; 70 (2): 578-83

EFFICACY OF DIFFERENT PLACENTAL REMOVAL METHODS IN TERMS OF BLOOD LOSS DURING CAESAREAN SECTION

Shaista Kanwal, Shanum Naseer Awan, Tameem-Ul-Hassan, Syed Sadiqa Batool

Combined Military Hospital Multan/National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objectives: This study compared efficacy of two methods of placental delivery at the time of cesarean section that is spontaneous and manual removal of placenta in terms of excessive blood loss during caesarean.

Study Design: Quasi-experimental study.

Place and Duration of Study: This study was conducted at the department of Gynaecology and Obstetrics, Combined Military Hospital Multan, from Nov 2016 to Apr 2017.

Methodology: Participants having similar demographic and clinical characteristics, were selected and divided into 2 groups. Group A underwent removal of placenta spontaneously, while group B underwent manual removal of placenta. The total amount of blood suctioned and sponges soaked during surgery were noted whereas, haemoglobin level at 6 hours post-operatively was noted for difference of ≥2 gm/dl as significant.

Results: In our study, mean maternal age and mean gestational age of study population was 26.77 ± 3.47 years and 36.96 ± 1.44 weeks respectively. Significant blood loss (>1000ml) was observed in 28 (20%) patients in group A, and in 47 (33.6%) patients of group B. Difference in pre-operative and post-operative haemoglobin levels of >2gm/dl was observed in 14 (10%) patients in group A and 28 (20%) patients in group B. Difference in number of patients having significant blood loss and significant decrease in haemoglobin levels between two groups was significant (p=0.01, p=0.019 respectively).

Conclusion: Manual removal of placenta was related to more blood loss as compared to spontaneous removal of placenta so spontaneous removal should be given preference on manual removal during caesarean section.

Keywords: Blood loss, Caesarean section, Placenta removal.

INTRODUCTION

Caesarean section is the most commonly performed surgical intervention in gynaecology and obstetrics worldwide. Owning to safety profile, the incidence of this surgery is on the rise, Since the surgery has got better and favorable results, recent surge has been seen in the number of patients willing for elective caesarean section. Its prevalence has been estimated to be 18.6% and ranged from 6 % to 27.2% in least and most developed countries respectively, demonstrated by data from 150 countries[1]. Whereas, Pakistan has seen an increase from 2.7% in 1990-91 to 15.8% in 2012-13 according to population and demographic health survey of Pakistan[1-5]. In the public health network, the rate is 35%, while in private hospitals the rate approaches 80%. Since the blood supply per unit area is maximum in gravid uterus, there can be tremendous amount of blood loss during caesarean section which is a major complication of the procedure. There are many factors responsible for per-operative blood loss including maternal health, anemia, surgical expertise, anesthesia, weight of the patient, fetal distress, parity, previous medical history, obstetrics history, polyhydraminos, multiple pregnancies, hypertension, poor and unusual presentation, type of incision, operative time, operative environment, choice of blood loss estimation method, choice of placenta removal, and choice of caesarean section.

On an average, one litre of blood is lost during caesarean section. Excessive blood loss leads to anemia that has a major impact on woman`s quality of life. To reduce this blood loss different techniques have been tried[6]. Such techniques include in situ versus exteriorization

Correspondence: Dr Shaista Kanwal, Graded Gynaecologist, CMH, Multan Pakistan (*Email: drshaistakanwal@hotmail.com)*

Received: 19 Dec 2018; revised received: 23 May 2019; accepted: 27 May 2019

and stitching of uterus, finger splitting versus scissor cutting of incision, and finally spontaneous or manual removal of placenta[6-8].

During caesarean section, placenta can be removed by two methods which are spontaneous and manual. Some of the placentae are morbidly adherent, for which caesarean hysterectomy is the only choice. Some trials concluded that no one method is superior over the other and in both methods, the outcome is the same. However some studies have shown a statistically significant difference in estimated blood loss and incidence of post-operative endometritis. In one study, patients in whom placenta was removed spontaneously, had reduced incidence of significant blood loss of more than 1000cc (12.82% vs 26.8%, $p<0.05$), difference in haemoglobin of >2 gm/dl (7.69% vs 19.40%, $p<0.05$) without increasing operating time[9,10].

There is need to compare these two commonly used procedures in order to determine efficacy of superior method for placenta removal. It is imperative to estimate blood loss exactly, or as close to original as possible, in order to cater for per-operative complications and post-operative well-being of the patient. This will help the surgeon to be more cautious in addressing high risk cases, and avoid mortality and morbidity associated with caesarean section. This will also help in reducing un-necessary blood transfusions. Most of the methods of calculating the blood loss do a subjective assessment, and depend on observer variations, choice of method, time of measurement, and varies tremendously from one observer to other, from one method to other and from one hospital to another.

The rationale of this study is to compare the efficacy of spontaneous and manual removal of placenta in terms of blood loss duringcaesarean section. The result of this study may then be implemented in our operative practice to have better outcome locally.

METHODOLOGY

This randomized controlled trial was carried out at Gynaecology & Obstetrics department of Combined Military Hospital Multan from November 2016 to April 2017. The sample size was calculated by World Health Organization sample size calculator based on outcome variables with anticipated population proportion P1 of 7.692% and anticipated population proportion P2 of 19.40%[7], power of test was 80% and level of significance was 5%. The sampling technique was non-probability purposive sampling. In our study, 296 patients were initially included, 16 patients had complicated or prolonged surgery, or failed to follow up and were thus excluded. A final of 280 patients undergoing un-eventful caesarean section were analyzed. They were randomly and equally divided in two groups using lottery method with 140 patients each in group A and B. Permission from hospital ethical committee was duly sought and written informed consent were taken from the patients prior to inclusion in the study after explaining the risk and benefits of the study. All efforts were made to maintain patient's privacy and confidentiality. Patients were selected from the women getting admission for emergency or elective caesarean section at Gynaecology & Obstetrics department of Combined Military Hospital, Multan. Pre-operative haemoglobin levels of all patients were recorded. In group A, there were women whose placenta was removed spontaneously and in Group B, the placenta was removed manually. Then the total amount of blood suctioned and the number of abdominal sponges soaked during the surgery were noted. Haemoglobin levels of all the patients were checked pre-operatively and then 6 hours post operatively. The difference between pre-operative and post-operative haemoglobin was assessed and difference of more than 2 gm/dl was considered significant. The findings were noted on proforma attached as annexure A. Results were analyzed. The presence of confounding variables and bias were controlled by random allocation of patients to either group by lottery method and by following all exclusion criteria. The data was analyzed using SPSS version 21. Mean and standard deviation was computed for numerical variables like maternal

and gestational age and percentages were computed for categorical variables like efficacy and type of caesarean section. Effect modifiers like maternal age, gestational age, parity and type of caesarean section were controlled by stratification. Post stratification, chi square test was applied to compare efficacy between two groups in terms of significant blood loss and significant fall in haemoglobin levels. A *p*-value of 0.05 was considered to be significant.

of group B women were noted having more than 1000ml loss of blood as compared to 28 (20%) in group A with *p*-value of 0.010. The second outcome measure chosen was pre and post operation comparison of haemoglobin for which 28 (20%) in group B as compared to 14 (10%) in group A women found out to have more than 2 gm/dl difference pre and post operation haemoglobin levels with the *p*-value of 0.019 table-II. Stratification analysis of different variables in terms of

Table-I: Frequency distribution of different variables for both groups.

Variables		Group A (n=140)	Group B (n=140)	Total Study Population
Maternal Age (Mean ± SD)		27 ± 3.45	26 ± 3.48	26.78 ± 3.47
Gestational Age (Mean ± SD)		38.12± 1.54	37.82± 1.60	37.97 ± 1.58
Parity	Primigravida	42 (30%)	56 (40%)	98 (35%)
	Multigravida	84 (60%)	70 (50%)	154 (55%)
	Grand Multigravida	14 (10%)	14 (10%)	28 (10%)
Indication for C-Section	Fetal distress	56 (40%)	70 (50%)	126 (45%)
	Previous Surgery	42 (30%)	28 (20%)	70 (25%)
	Dystocia	28 (20%)	28 (20%)	56 (20%)
	Breech	14 (10%)	14 (10%)	28 (10%)
Type of C-Section	Elective	42 (30%)	44 (31.4%)	86 (30.7%)
	Emergency	98 (70%)	96 (68.6%)	194 (69.3%)

Table-II: Relationship of group a and b with efficacy of placental removal type and pre and post operative hemoglobin levels.

	Group A (n=140)	Group B (n=140)	*p*-value
Efficacy of placental removal type in terms of significant blood loss (>1000ml)			
Efficacy-yes (Blood Loss <1000ml)	112 (80%)	93 (66.4%)	0.010
Efficacy-No (Blood Loss >1000ml)	28 (20%)	47 (33.6%)	
Pre-Operative and Post-Operative Hemoglobin levels of >2 gm/dl			
Efficacy-yes (Decrease in H level <2gm/dl)	126 (90%)	112 (80%)	
Efficacy-No (Decrease in Hb level >2 gm/dl)	14 (10%)	28 (20%)	

RESULTS

There were 280 patients (n=280). The ages of patients ranged from 18-40 years with mean age of 26.78 ± 3.47 years. The mean age of patients in group A was 27 ± 3.45 years and in group B was 26.56 ± 3.48 years whereas mean gestational age was 37.97 ± 1.58 weeks in overall study population. Mean birth weight of babies was 3.05 ± 0.15 weeks table-I. A total of 86 (30.7%) underwent elective caesarean section as compared to 194 (69.3%) emergency caesarean sections. When groups compared against blood loss, 47 (33.6%)

efficacy was done. The data was stratified according to age, parity and type of cesarean section performed table-III.

DISCUSSION

The ideal method of placental removal during caesarean delivery is still a conflicting issue as the previous studies have shown widely heterogenous and inconsistent results[11-15]. So this study was aimed at evaluating the two commonly used procedures for placenta removal during caesarean section in order to evaluate better profile of any procedure in terms of blood

loss. The sample size was kept relatively higher in order to accommodate the patients loosing follow up and provide better statistical analysis.

Studies have revealed that on average, decrease in blood haemoglobin level of more than 2.5 gm/dl was considered a significant value, and considered a cut off for defining blood loss. We kept this value at 2gm/dl in order to find even more precise and accurate blood loss, and improve efficiency of our study. Few studies have even considered a 1gm/dl decrease in blood haemoglobin level to be analytically and statistically significant. Few studies have considered comparing haematocrit levels between pre-operative value and post-operative value and found them to be an effective mean of blood loss evaluation[16-19]. There are more sophisticated methods available for estimating blood loss including volumetric and gravimetric methods, which have been measured frequently in many studies[20-23]. A statistically significant difference in efficacy was found between groups in terms of preoperative and post-operative haemoglobin difference and also difference in estimated blood loss of more than 1000 cc[10]. The results are in conjunction with international data and literature. Different studies have considered different timeline to measure the haemoglobin level for their analysis. In our study group a difference of 2gm/dl haemoglobin preoperatively and postoperatively (after 6 hours) was taken to be significant criteria for blood loss. Given more time for measurement of haemoglobin level, amounts to false calculations due to transfusions, intravenous antibiotics and fluids amounting to haemodilution[12], further evaluation using different timelines for measurements in this aspect will help in more objective analysis.

Table-III: Stratification for different variables.

Strata	Group	Efficacy Yes	Efficacy No	*p*-value
Stratification for frequency of Efficacy for Maternal Age				
20-26 years	Group A	70 (83.3%)	14 (16.7%)	<0.001
	Group B	47 (51.1%)	45 (48.9%)	
27-32 Years	Group A	42 (75%)	14 (25%)	0.005
	Group B	46 (95.8%)	2 (4.2%)	
Stratification for frequency of Efficacy for Parity				
Primigravida	Group A	42 (100%)	-	<0.001
	Group B	25 (44.6%)	31 (55.4%)	
Multigravida	Group A	56 (66.7%)	28 (33.3%)	0.152
	Group B	54 (77.1%)	16 (22.9%)	
Grand Multigravida	Group A	14 (100%)	-	1
	Group B	14 (100%)	-	
Stratification for frequency of Efficacy for Type of Caesarean Section				
Elective	Group A	42 (100%)	-	1
	Group B	43 (97.7%)	1 (2.3%)	
Emergency	Group A	70 (71.4%)	28 (28.6%)	0.006
	Group B	51 (52.1%)	46 (47.9%)	

No difference was seen in amount of blood loss using two different methods of placenta removal in some international studies[16,18]. A study by Altraigey *et al*[16], reported that of the studied placental delivery techniques, there was no clinically significant difference in blood loss[16]. Kamel *et al*[17], concluded that manual removal of the placenta at caesarean section is associated with a higher risk of blood loss, post- partum haemorrhage and blood transfusion[17]. Another study by Gun *et al*[18], showed that there is no association between the method of removal of placenta and post-partum blood loss in caesarean deliveries[18]. Whereas Waqar *et al*[10], concluded that spontaneous delivery of placenta has

significant reduction of blood loss as compared to manual removal at caesarean section[24].

It is imperative to ask why the findings of studies differ from each other and why there is disparity between both types of findings. There are more than 15 trials comparing the two techniques. A good insight is revealed by a recent meta-analysis, which made use of at least fifteen different studies, comparing and estimating almost 4694 women. This analysis revealed that spontaneous removal was better than manual removal in terms of blood loss, calculated in terms of mean change in blood haemoglobin and hematocrit levels. Since it is the recent and most authentic meta-analysis available, we believe it to be in coherence with our findings. In our study, the pre-operative and post-operative hemoglobin difference was statistically significant when the spontaneous removal group was compared with the manual removal group (p<0.05). Meta-analysis also suggested that spontaneous method was also superior to manual method in terms of post-operative rate of endometritis[25].

Our study has few limitations. The amount of blood loss could have been calculated using more sophisticated methods like haematocrit count, Bourke and Smith equation or alkaline haematin method. This could have revealed a more objective analysis of amount of blood loss. Also, a large number of patients in our setup have anaemia, and amount of blood loss is estimated to be different for patients with different degrees of anaemia. Amount of blood transfused could have been recorded and would have served as a better predictor of blood loss.

CONCLUSION

Manual removal of placenta was related to more blood loss as compared to spontaneous removal of placenta so spontaneous removal should be given preference on manual removal during caesarean section.

CONFLICT OF INTEREST

This study has no conflict of interest to declared by any author.

REFERENCES

1. Betran AP, Ye J, Moller AB, Zhang J, Gulmezoglu AM, Torloni MR. The Increasing Trend in Caesarean Section Rates: Global, Regional and National Estimates: 1990-2014. Plos One 2016; 11(2): 01-11.
2. Vogel JP, Betrán AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J et al. On behalf of the WHO Multi-Country Survey on Maternal and Newborn Health Research Network. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. Lancet Glob Health 2015; 3(5): e260-70.
3. Mumtaz S, Bahk J, Khang YH. Rising trends and inequalities in cesarean section rates in Pakistan: Evidence from Pakistan Demographic and Health Surveys, 1990-2013. Plos One 2017; 12(10): 01-13.
4. Lumbiganon P, Laopaiboon M, Gulmezoglu AM, Souza JP, Taneepanichskul S, Ruyan P, et al. Method of delivery and pregnancy outcomes in Asia: the WHO global survey on maternal and perinatal health 2007- 08. Lancet 2010; 375(9713): 490-99.
5. Asıcıoglu O, Gungorduk K, Asıcıoglu BB, Yıldırım G, Gungorduk OC, Ark C. Unintended extension of the lower segment uterine incision at cesarean delivery; a randomized comparison of sharp versus blunt techniques. Am J Perinatol 2014; 31(10): 837–44.
6. Saad AF, Rahman M, Costantine MM, Saade GR. Blunt versus sharp uterine incision expansion during low transverse cesarean delivery: a metaanalysis. Am J Obstet Gynecol 2014; 211(6): 684.e1-11.
7. Dodd JM, Anderson ER, Gates S, Grivell RM. Surgical techniques for uterine incision and uterine closure at the time of caesarean section. Cochrane Database Syst Rev 2014; 7(3): CD004732-63.
8. The CAESAR study collaborative group. Caesarean section surgical techniques: a randomised factorial trial (CAESAR). BJOG 2010; 117(11): 1366–76.
9. Mittal S, Pardeshi S, Mayadeo N, Mane J. Trends in cesarean delivery: rate and indications. J Obstet Gyna Ind 2014; 64(4): 251-53.
10. Waqar F, Nasar R, Fawad A. The comparison of placental removal methods on operative blood loss. J Ayub Med Coll Abott 2008; 20(3): 03–05.
11. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, Gulmezoglu M, et al. Classifications for cesa-rean section: a systematic review. PLoS One 2011; 6(1): e14566-75.
12. Zuckerwise LC, Pettker CM, Illuzzi J, Raab CR, Lipkind HS. Use of a novel visual aid to improve estimation of obstetric blood loss. Obstet Gynecol 2014; 123(5): 982-86.
13. Eke AC, Drnec S, Buras A, Woo J, Martin D, Roth S. Intrauterine cleaning after placental delivery at cesarean section: a randomized controlled trial. J Matern Fetal Neonatal Med 2019; 32(2): 236-42.
14. Wilkinson C, Enkin MW. Manual removal of placenta at caesarean section. Cochrane Database Syst Rev 2003; 3(1): 19-23.
15. Anya SU, Onyekwulu FA, Onuora EC. Comparison of visual estimation of intra-operative blood loss with haemoglobin estimation in patients undergoing cesarean section. Niger Postgrad Med J 2019; 26(1): 25-30.
16. Altraigey A, Ellaithy M, Atia H, Ali I, Kolkailah M, Abbas A. How can methods of placental delivery in cesarean section affects perioperative blood loss? A randomized controlled trial

of controlled cord traction versus manual removal of placenta. J Obstet Gyna Res 2019; 45(1): 133-40.
17. Kamel A, El-Mazny A, Salah E, Ramadan W, Hussein AM, Hany A. Manual removal versus spontaneous delivery of the placenta at cesarean section in developing countries: a randomized controlled trial and review of literature. J Matern Fetal Neonatal Med 2018; 31(24): 3308-3313.
18. Gun I, Ozdamar O, Ertugrul S, Oner O, Atay V. The effect of placental removal method on perioperative hemorrhage at cesarean delivery; a randomized clinical trial. Arch Gynecol Obstet 2013; 288(3): 563-67.
19. Merchavy S, Levy A, Holcberg G, Freedman EN, Scheiner E. Method of placental removal during cesarean delivery and post partum complications. Int J Gynaecol Obstet 2007; 98(3): 232-36.
20. Creanga AA, Bateman BT, Butwick AJ. Morbidity associated with cesarean delivery in the united states: Is placenta accrete an increasingly important contributor ? Am J Obstet Gynecol 2015; 213(3): 384.e1-11.
21. Gahlot A, Suman A. Spontaneous delivery or manual removal of placenta during caesarean section: A randomised trial. J Obs Gynae India 2009; 59(2): 127-30.
22. Hofmeyr UG, Novikova N, Mathai M, Shah A. Techniques for cesarean section. Am J Obstet Gynecol 2009 ; 201(5): 431-44.
23. Xiao CW, Climan AB. The effect on peri-operative bleeding of placental extraction from an exteriorized uterus during cesarean section. J Obstet Gynaecol Can 2014; 36(5): 384-90.
24. Bose P, Regan F, Paterson-Brown S. Improving the accuracy of estimated blood loss at obstetric haemorrhage using clinical reconstruction. BJOG 2006; 113(8): 919-24.
25. Main Ek, Cape V, Abreo A, Vasher J, Woods A, Carpenter A, et al. Reduction of severe maternal morbidity from hemorrhage using a state perinatal quality collaborative. Am J Obstet Gynecol 2017 ; 216(3): 298.e1-298.e11.

.....