

# Comparison of Blood Loss in Manual and Spontaneous Removal of Placenta in Caesarean Section

Sabeen Ashraf<sup>1</sup>, Azra Saeed Awan<sup>2</sup>, Hina Tabassum<sup>3</sup>, Omair Ashraf<sup>4</sup>,  
Touseef Fatima<sup>5</sup>, Wajeaha Shadab<sup>6</sup>

<sup>1</sup>Senior Registrar, Department of Obstetrics and Gynecology, Holy Family Hospital, Rawalpindi.

<sup>2</sup>Head of Department, Department of Obstetrics and Gynecology, Fauji Foundation Hospital Rawalpindi.

<sup>3,6</sup>Assistant Professor, Department of Obstetrics and Gynecology, Fauji Foundation Hospital, Rawalpindi.

<sup>4</sup>Final year MBBS Student, Al Nafees Medical College, Islamabad.

<sup>5</sup>Assistant Professor, Department of Obstetrics and Gynecology, IIMCT-Pakistan Railways Hospital, Rawalpindi.

## Author's Contribution

<sup>1,2,3</sup> Conception of study

<sup>1,3</sup> Experimentation/Study conduction

<sup>1,2,3,4,5,6</sup> Analysis/Interpretation/Discussion

<sup>1,2,3</sup> Manuscript Writing

<sup>1,2,3</sup> Critical Review

<sup>1,2,3,4,5,6</sup> Facilitation and Material analysis

## Corresponding Author

Dr. Sabeen Ashraf

Senior Registrar, Department of Obstetrics and Gynecology, Holy Family Hospital, Rawalpindi,

Rawalpindi,

Email: drsabeenashraf@gmail.com

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## Abstract

**Introduction:** Efforts should be made to minimize the blood loss at the time of caesarean section. The techniques used to reduce the blood loss 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.

**Objective:** The main objective of this study is to correlate the frequency of loss of blood between the placenta removed manually and spontaneously during caesarean section.

**Methods:** Randomized controlled trial in the department of Obstetrics and Gynecology, Fauji Foundation Hospital, Rawalpindi. The sample is collected through Consecutive (non- probability) sampling. The study was conducted after approval from the hospital ethical and research committee. Informed written consent was taken from all the patients. The patients were divided into two groups, group A and group B randomly by using random table numbers. Group A had spontaneous placental delivery. Group B had manual placental delivery. Each patient was examined thoroughly and detailed history was taken.

**Data Analysis:** Data was analyzed using SPSS 20 for windows. The frequency and percentage of blood loss were measured. A chi-square test was applied to correlate the blood loss between the two groups. p values <0.05 were considered statistically significant. Effect modifiers like age, gestational age, parity were controlled by stratification.

**Results:** The blood loss was compared between both groups using the chi-square test not assuming null-hypothesis. The blood loss was comparatively high in-group in which the placenta was removed manually (p=0.007).

**Keywords:** Caesarean Section, Placenta removal, Spontaneous, Manual, Blood loss.

## Introduction

Caesarean section is a major operation performed in pregnant women throughout the world if the baby cannot be delivered vaginally<sup>1</sup> and there are certain conditions in which caesarean section is the procedure of choice.<sup>2,3</sup> This procedure exposes women to risk of abdominal surgery, injury to the pelvic structures, infection<sup>4</sup>, and operative morbidity including anemia, hemorrhage, risk of blood transfusion, hysterectomy, and maternal death in severe cases.

Obstetric hemorrhage is the prime cause of maternal mortality worldwide.<sup>5</sup> 14000 maternal deaths per year occur in Pakistan which is estimated to be one woman die after every 37 minutes, the worldwide ratio comes out to be 216 maternal deaths per 100,000 live births globally while 176 maternal death /1000,000 live births in Pakistan.<sup>6</sup> In under-developed countries, the maternal mortality rate is fifty to two hundred times higher. According to WHO, 10.5% of all live births are complicated by hemorrhage which is the prime cause of maternal deaths.<sup>7</sup>

The gravid uterus is perfused at a rate of 500 to 750 ml/min at term.<sup>8</sup> The average blood loss at caesarean delivery is 1000 ml due to physiologic hyperperfusion.<sup>9,10</sup> The efforts should be made by the obstetrician to minimize the blood loss at the time of caesarean section. The techniques used to reduce the blood loss 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.<sup>11,12</sup>

A critically important function of the placenta is an interface between maternal and the fetal tissues is to fulfil important roles such as preventing allograft rejection of the fetus, ensuring fetal nutrient supply along with respiratory gas exchange and enabling the transfer of the fetal toxic metabolic waste into the maternal blood circulation for excretion.<sup>13</sup> The placenta also functions as an endocrine organ producing different hormones for the protection of the pregnancy.<sup>14</sup>

The main objective of this study is to correlate the frequency of blood loss in the placenta removed manually and spontaneously during caesarean section. The operational definition of **blood loss** is the significant blood loss due to cesarean section is defined by a drop in hemoglobin concentration of more than 1g/dl after 48 hours of caesarean delivery in comparison with preoperative hemoglobin concentration.<sup>15</sup> Spontaneous removal of the placenta means the removal of the placenta by controlled cord

traction.<sup>16,17</sup> Manual removal of the placenta means, the placenta is removed and detached immediately manually by obstetrician after the delivery of the baby.<sup>18,19</sup>

## Material and Methods

A randomized controlled trial in the department of Obstetrics and Gynecology, Fauji Foundation Hospital, Rawalpindi. The sample is collected through Consecutive (non-probability) sampling through the following inclusion and exclusion criteria.

### Inclusion Criteria:

1. Age of the patients between 15-45 years
2. Gestational age of the patients should be > 34 weeks, confirmed by the first scan
3. Hemoglobin > 10g/dl with normal bleeding time (BT) and clotting time
4. Elective & emergency cesarean section

### Exclusion Criteria:

1. Prolonged rupture of the membranes with fever
2. Placenta previa
3. Placenta accreta
4. Multiple pregnancies
5. Polyhydramnios
6. Clotting disorder
7. Previous scar

A prospective randomized trial was carried out in the department of Obstetrics and Gynecology, Fauji Foundation Hospital, Rawalpindi. 170 patients who underwent caesarean section due to various indications were included according to the inclusion criteria. The study was conducted after approval from the hospital ethical and research committee. Informed written consent was taken from all the patients.

The patients were divided into two groups, group A and group B randomly by using random table numbers. Group A had spontaneous placental delivery with gentle cord traction applied to the umbilical cord until the placenta separated from decidua basalis. Group B had manual placental delivery, the obstetrician's dominant hand was introduced into the uterine cavity and cleavage was created between the placenta and decidua basalis, the placenta was grasped in the palm of the hand and was removed from the uterine cavity. Each patient was examined thoroughly and detailed history was taken. A blood complete picture was performed on admission. Hemoglobin was measured by an automated method by Sysmex XT-18001 and verified by a pathologist. After the delivery of the fetus, the incision was secured

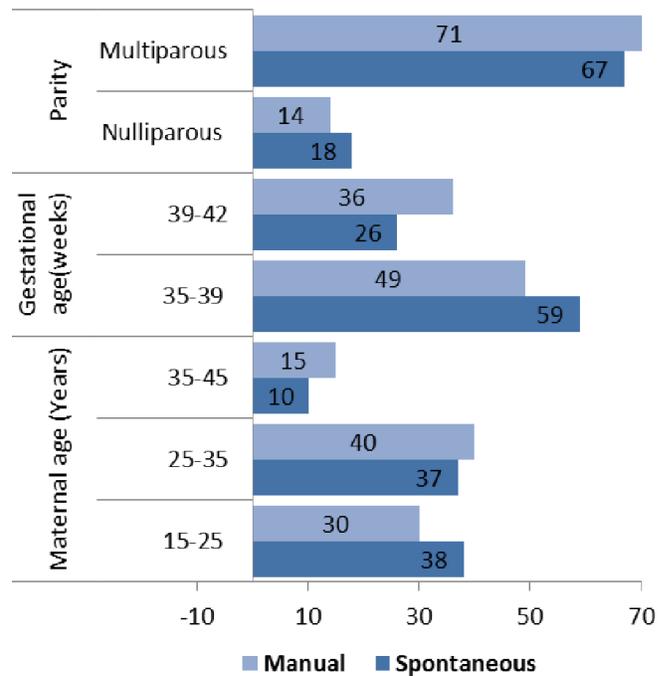
with Green Armytage forceps. The umbilical cord was cut and clamped. Ten (10) units of oxytocin were given at delivery of the baby, 40 units oxytocin in 1000ml ringer lactate was given for 6-8 hours. All patients were given intravenous Cepharadine 1g followed by oral Cepharadine 500mg eight hourly for 5 days. Data was analyzed using SPSS 20 for windows. The frequency and percentages of blood loss were measured. A chi-square test was applied to compare the significant blood loss between the two groups. P values <0.05 were considered statistically significant. Effect modifiers like age, gestational age, parity were controlled by stratification. A post-stratification chi-square test was applied.

## Results

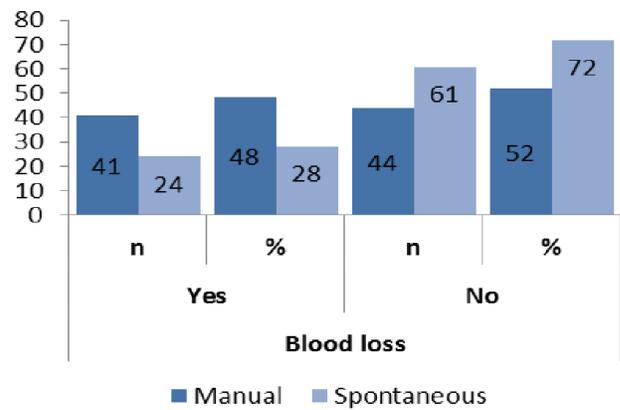
In my study, I included a total of 170 patients. The patients were randomized into two groups by lottery method. 85 patients were included in manual removal of the placenta group and 85 patients were included in the spontaneous removal of the placenta group.

**Table 1: Characteristics of study participants expressed as n(%)**

	<i>Spontaneous</i> (n=85)	<i>Manual</i> (n=85)
<b>Maternal age (years)</b>		
15-25 (n=68)	38(56)	30(44)
25-35(n=77)	37(48)	40(52)
35-45(n=25)	10(40)	15(60)
<b>Gestational age(week)</b>		
35-39 (n=108)	59(55)	49(45)
39-42(n=62)	26(42)	36(58)
<b>Parity</b>		
<i>Nulliparous</i> (n=32)	18(56)	14(44)
<i>Multiparous</i> (n=138)	67(49)	71(51)



**Figure 1: Shows characteristics of study participants**



**Figure 2: Shows comparison of blood loss through Placental removal by Manual & Spontaneous methods during CS**

The blood loss was compared between both groups using the chi-square test not assuming null-hypothesis. The blood loss was comparatively high in the group in which the placenta was removed manually (p=0.007).

**Table 2: Comparison of significant blood loss between spontaneous removal of placenta group and manual removal of placenta group (n=170)**

Placental removal	Significant blood loss		p-value
	No	Yes	
Spontaneous removal of placenta	61	24	0.007
Manual removal of placenta	44	41	

**Table 3: Stratification according to the Age of patient**

Age/ Gestational age	Significant blood loss in spontaneous removal of placenta		Significant blood loss in manual removal of placenta		P-value
	Yes	No	Yes	No	
15-25 years	12	26	13	17	0.318
26-35 years	11	26	20	20	0.07
36-45 years	1	9	8	7	0.027

**Table 4: Stratification according to the Gestational age**

Age/ Gestational age	Significant blood loss in spontaneous removal of placenta		Significant blood loss in manual removal of placenta		P-value
	Yes	No	Yes	No	
35-39 weeks	15	44	21	28	0.056
40-42 weeks	9	17	20	16	0.103

## Discussion

In this study, a total of 170 patients divided into two groups randomly. 85 patients were included in manual removal of the placenta group and 85 patients were included in the spontaneous removal of the placenta group. The mean age of the patients was  $34.14 \pm 7.192$  years. The mean gestational age of the patients was  $38.54 \pm 2.398$  weeks.

The blood loss was compared between the two groups. In the group of spontaneous removal of placenta 24 (28.2%), patients had significant blood loss. In the group of manual removal of placenta 41 (48.2%),

patients had significant blood loss. The results of the study are comparable to the study done by Dehbashi S. in which 400 patients were divided into two groups: spontaneous placental delivery and manual placental delivery. 200 patients were included in each group. Significant blood loss was compared in both groups. The significant blood loss was experienced by 52 patients (26%) in the group with spontaneous placental delivery as compared to 100 patients (50%) in the group with manual placental delivery ( $p < 0.001$ ).<sup>7</sup> The comparable results of my study and the study done by Dehbashi S. can be attributed to the similar demographics of the patients, comparable culture and geographical regions. Dehbashi S. also compared the frequency of post-operative endometriosis in both groups. 40 patients (20%) patients in group A and 68 patients (34%) in group B had endometriosis ( $p = 0.001$ ). The results of Dehbashi S. were not stratified according to age, gestational age and parity of the patients, so that comparison may not be possible.

Post-stratification results of my study demonstrated that the patients between 15-25 years of age did not have a significant difference in the two groups ( $p = 0.318$ ). The patients between 25-35 years of age had a difference in blood loss in two groups but it was not statistically significant ( $p = 0.07$ ). The patients between 35-45 years of age had a statistically significant difference in two groups ( $p = 0.027$ ). Stratification according to the gestational age showed the patients with gestational age between 35-39 weeks had a significant difference in the blood loss in both groups ( $p = 0.056$ ). The patients with gestational age between 39-42 weeks, however, did not show a significant difference in blood loss in both groups ( $p = 0.103$ ). Stratification according to the parity of the patients showed that the nulliparous patients did not show a significant difference in blood loss in both groups ( $p = 0.093$ ). The multiparous patients showed a significant difference in blood loss in both groups ( $p = 0.028$ ).

In another study, I. Gun compared the post-operative blood loss in the two groups of spontaneous removal of placenta and manual removal of placenta after cesarean section. 50 patients were included randomly in the manual removal group and 50 patients were included randomly in the spontaneous removal group. There was no difference in both groups in terms of change in hemoglobin levels after cesarean section ( $p = 0.711$ ). The results of I. Gun, are contrasting to those of my study. This may be due to the small sample size in I. Gun study and may also be due to

difference in demographics and epidemiology of the two regions where these are conducted.<sup>20</sup>

Many other studies show that there is a difference in significant blood loss after cesarean section with different methods of placental removal. The study results and literature review shows spontaneous removal of the placenta is the best method of placental removal after cesarean section. Large, multi-centered, randomized control trials are required to establish the superiority of the spontaneous removal of the placenta over the manual removal.

## Conclusion

The results of this study show that the spontaneous removal of the placenta after the cesarean section is better as compared to the manual removal of the placenta for reducing blood loss at the time of delivery. Further large, multi-centered, randomized control trials are required to establish the superiority of spontaneous removal of the placenta over the manual removal.

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