A COMPARATIVE STUDY BETWEEN SPONTANEOUS PLACENTAL DELIVERY AND MANUAL REMOVAL OF PLACENTA DURING CAESAREAN SECTION

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ABSTRACT

BACKGROUND

The objectives of this study were to assess intra operative advantages and disadvantages, surgical benefits and problems, and postoperative febrile morbidity following spontaneous delivery of placenta, as compared to manual removal of placenta during caesarean section.

MATERIALS AND METHODS

Pregnant women with term gestation admitted as in-patients in SVIMS, Sri Padmavathi Medical College, Tirupathi over a period of 2 years from June 2015 to May 2017. 200 women scheduled for lower segment caesarean section through Pfannenstiel incision were randomized into spontaneous expulsion or manual removal of placenta group and their intraoperative and postoperative outcomes were studied which were statistically compared.

RESULTS

There was significant reduction in perioperative haemoglobin and PCV decrease ($P<0.05$) and duration of hospital stay ($P<0.05$) in the group where placenta was expelled spontaneously as compared to those in manual removal group. The shorter duration of hospital stay was due to decreased febrile morbidity and lesser postoperative blood transfusions. There was also a significant number with endometritis in MROP group. There was no significant difference in the operating time between both the groups.

CONCLUSION

Spontaneous delivery of placenta is associated with lesser perioperative Hb and PCV fall and reduced febrile morbidity, leading to shorter hospital stay as compared to manual removal of placenta during caesarean section.

KEYWORDS

Cesarean Section, placental Delivery, Endometritis, Blood Loss.

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BACKGROUND

Worldwide caesarean section is the most common major operation performed on women. Over the years there is a wider recognition of the desire to reduce caesarean section rate as it is associated with greater maternal mortality and morbidity. Some of the short-term morbidities include hemorrhage, postoperative fever and endometritis. Various studies on the technique of performing caesarean section have focused on reducing blood loss, operating time, wound infection and cost.

The method of delivering the placenta is one procedure that may contribute to an increase or decrease in the blood loss during cesarean section. Two methods to deliver the placenta at cesarean section are spontaneous delivery and manual removal. Some experts manually cleave the placenta from the decidua basalis and remove it from the uterus, while others prefer to wait for spontaneous delivery.[1]

Conventionally placental delivery was allowed to occur spontaneously with the infusion of oxytocic agents. Manual removal was done if the placenta failed to deliver spontaneously in a stipulated period of time, around 5 minutes. But several surgeons routinely advocate manual removal of placenta as soon as the baby is delivered with an apparent advantage of reducing the operative time.

The present study is being done with the following objectives- to evaluate and compare the two methods of placental delivery during cesarean section (spontaneous placental delivery versus manual removal of placenta) with respect to blood loss, duration of surgery, postoperative infection and secondary PPH.

Being the most commonly performed operation in obstetrics, the obstetrician should be familiar with the basics of the procedure as well as recent innovations of techniques relying on evidence-based medicine.

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MATERIALS AND METHODS

The present randomized study is to compare spontaneous placental delivery and manual removal of placenta during caesarean section.

The study was conducted in the Department of Obstetrics and Gynecology at SVIMS, Sri Padmavathi Medical College for Women, Tirupathi over a period of two years from June 2015 to May 2017.

Approval for the study protocol and clearance were obtained from the Ethical Review Committee of SVIMS, Sri Padmavathi Medical College for Women, Tirupathi.

200 patients undergoing caesarean section were selected randomly and divided into two equal groups.

Inclusion Criteria

- Pregnancy ≥ 37 completed weeks of gestation
- Elective or emergency caesarean section
- Primary or secondary caesarean section
- Booked or unbooked cases
- Singleton pregnancy
- No medical or obstetric antenatal complications

Ex. Jaundice in pregnancy, placenta praevia, abruptio placentae, pre eclampsia, eclampsia, DIC, anaemia, clotting disorders.

- Irrespective of status of membranes, presentation and gravida
- Epidural or spinal anaesthesia
- LSCS only.

Exclusion Criteria

- Women with gestational age less than 37 completed wks.
- Multiple pregnancy
- Obstetric antenatal complications like placenta praevia, abruptio placentae, pre-eclampsia, eclampsia, DIC.
- Morbid adherence of placenta
- Suspected chorioamnionitis
- Medical complications like clotting disorders, intrapartum fever, anaemia, jaundice
- General anaesthesia
- Classical caesarean section.

Procedure of Study

For women allocated to the first group, the obstetrician waits for 5 minutes, for spontaneous delivery of the placenta. Controlled cord traction is performed if needed, to facilitate placental delivery. To avoid excessive bleeding in the interval, clamps are placed on the uterine incision for haemostasis. If spontaneous delivery does not occur after 10 minutes, or in case of bleeding, manual removal of the placenta is performed.

In the manual removal group, the surgeon introduces his/her hand into the uterine cavity to detach and remove the placenta as soon as possible after the delivery of the infant. In both groups, Oxytocin (10 units in 500ml of Ringer Lactate) is administered intravenously after the delivery of the infant followed by tablet Misoprostol 800ug per rectally at the end of the surgery.

In all cases, uterine closure was done in single layer by continuous interlocking sutures.

Estimated blood loss is evaluated by calculating the drop in Hb% and PCV. Preoperative haemoglobin is measured. Repeat measurement performed on the 3rd postoperative day. Significant blood loss is defined as a fall greater than 2.5g/dl of Hb% or 7.5% of PCV.

Secondary outcome measures include operating time, use of additional uterotonics (Oxytocin, Ergometrine or Prostaglandins), the presence of postoperative fever or need for antibiotic administration, secondary postpartum haemorrhage. Fever is defined as temperature above 38^0C on two consecutive days, excluding the first 24 hours during the hospital stay of six postoperative days (patient is discharged on 6th postoperative day after the removal of sutures). Duration of surgery is calculated from extraction of the foetus to closure of the abdomen.

All patients were to be evaluated at the end of 6 weeks.

Statistical analysis of 2 groups was done by frequencies, percentages, cross tabulations, T test – Independent sample, Paired T test, χ^2 test by using Windows SPSS 20.

RESULTS

Age (yrs.)	Spontaneous		Manual	
	No.	%	No.	%
≤ 20	18	18	18	18
21-25	56	56	54	54
26-30	18	18	16	16
31-36	8	8	12	12
Total	**100**	**100**	**100**	**100**
Mean age	24.2 ± 4.0		24.5 ± 4.4	
Age range	18-35		18-36	

Table 1. Age wise Distribution

ANC	Spontaneous		Manual		SP vs man	
	No.	%	No.	%	χ^2	P
Booked	82	82%	78	78%	0.5	0.48
Unbooked	18	18%	22	22%		

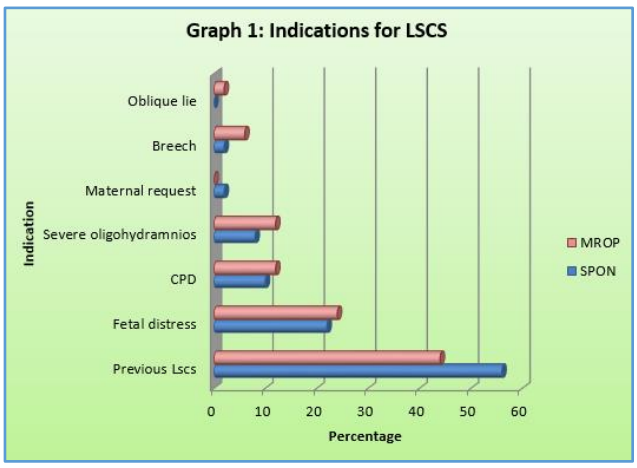
Table 2. Antenatal Care

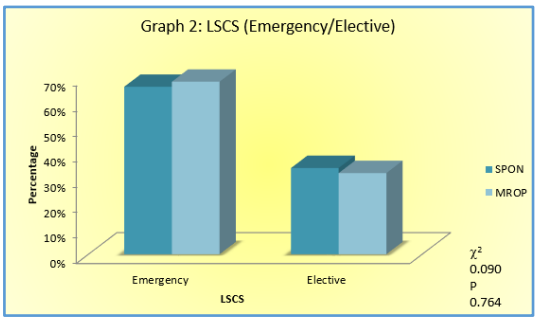
Gravidity	Spontaneous		Manual		SP vs man	
	No.	%	No.	%	χ^2	P
Primi	38	38	46	46	1.31	0.25
Multi	62	62	54	54		

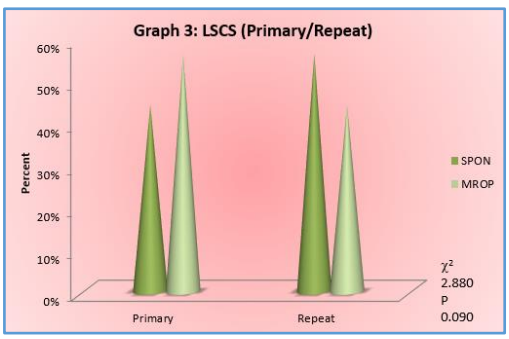
Table 3. Obstetric History

This shows that the difference between the 2 groups was not statistically significant with respect to age, antenatal care and gravidity.

Details of LSCS







There was statistically no difference between the 2 groups with respect to the various details of LSCS.

Method	Particulars (Hb %)	Pre op	Post op	Reduction (diff)	χ^2	p	No. of Cases with Reduction of Hb ≥ 2.5gm%
Spontaneous	Mean ± SD	10.84 ± 0.56	9.39 ± 0.72	1.45 ± 0.51	13.20*	0.04	6 (6%)
Manual	Mean ± SD	10.82 ± 0.78	9.13 ± 1.10	1.69 ± 0.64	24.86**	0	20 (20%)
Sp. Vs man				t* =2.9			$\chi^2 = 8.47$*
				p: 0.003			P: 0.014

Table 4. Blood Loss (Reduction in Hb levels)

6 (6%) in group A showed significant blood loss of ≥ 2.5 g/dl, whereas 20 (20%) cases in group B had blood loss ≥ 2.5g/dl; which is statistically significant.

Method	Particulars (PCV)	Preop	Postop	Reduction (diff)	No. of cases with Reduction of PCV ≥ 7.5%
Spontaneous	Mean ± SD	32.15 ± 1.81	27.90 ± 2.26	4.25 ± 1.60	4(4%)
Manual	Mean ± SD	32.41 ± 2.27	27.34 ± 3.25	5.07 ± 1.98	17 (17%)
Sp. Vs man				t* = 3.212	$\chi^2 = 6.965$
				p: 0.002	P=0.031

Table 5. Blood Loss (Reduction in PCV levels)

4 (4%) in group A showed significant blood loss of ≥ 7.5%, whereas 17 (17%) cases in group B had blood loss ≥ 7.5%; which is statistically significant.

Measurement		Spontaneous	Manual	Mean diff.	Sp vs. man	
					t	P
Infant to placenta delivery interval (min)	Mean ± SD	2.98 ±0.22	1.34±0.19	1.7	55.83	0
	Range	2.4 – 3.5	1.0 – 1.8			
Operating time (min)	Mean ± SD	25.12± 1.96	24.58±3.31			
	Range	22 – 30	20 – 30	0.5	1.4	0.16

Table 6. Operating Time

The average time for infant to placental delivery interval was 2.98 ± 0.22 min., with a range being 2.4 - 3.5 min. in group A. In group B, it was 1.34 ± 0.19 min. with a range between 1.0 - 1.8 min which is statistically significant.

The total operating time, the time taken from infant delivery until skin closure was 25.12 ± 1.96 min (range 22-30 min) in group A; in group B, average was 24.58 ± 3.31 (range 20-30 min) which is statistically non-significant.

Particulars	Spontaneous		Manual		SP vs man	SP vs man
	No.	%	No.	%	χ^2 value	P value
Additional oxytocics	24	24	28	28	0.416	0.519
Blood transfusion	-	-	6	6	6.185	0.013
Additional antibiotics	2	2	8	8	2.083	0.149
Endometritis	-	-	6	6	6.185	0.013
Febrile morbidity	4	4	10	10	2.765	0.096
UTI	-	-	2	2	2.02	0.155
Wound infection	2	2	-	-	2.02	0.155
Suture cut	7^{th} day		7^{th} day		-	

Table 7. Intra-op and Postoperative Morbidity

	SPON	MROP	t value*	P – value
Mean ± SD	8.04 ± 0.281	8.48 ± 1.73	2.508*	**0.013**
Range	8 – 10	8 – 14		

Table 8. Hospital Stay (Days)

DISCUSSION

	Spontaneous	Manual
Michel M et al[2]	31 ± 5.0	31 ± 5.2
Ramdani et al[3]	28 ± 6.0	27 ± 5.0
Fareesa et al[4]	26.10 ± 4.8	25.57 ± 5.0
Gahlot Ajay et al[5]	24.6 ± 3.8	23.4 ± 3.2
Present study	24.2 ± 4.0	24.5 ± 4.4

Table 9. Mean Age (in years) in Different Studies

Obstetric history (parity)	Spontaneous		Manual	
	Primi	Multi	Primi	Multi
Michel M et al[2]	42%	58%	48%	52%
Fareesa et al[4]	26%	74%	18%	82%
Present study	38%	62%	46%	54%

Table 10. Parity in Different Studies

LSCS	Spontaneous		Manual	
	Emergency	Elective	Emergency	Elective
Michel M et al[2]	34%	66%	34%	66%
Ramdani et al[3]	55%	45%	54%	46%
Fareesa et al[4]	74%	26%	73%	27%
Present study	66%	34%	68%	32%

Table 11. Details of LSCS in Different Studies

LSCS	Spontaneous		Manual	
	Primary	Repeat	Primary	Repeat
Michel M et al[2]	57%	43%	61%	39%
Ramdani et al[3]	55%	45%	54%	46%
Present study	44%	56%	56%	44%

Table 12. Details of LSCS in Different Studies

	Michel M et al[2]		Fareesa et al[4]		Ajay et al[5]		Present study	
	Spon	Man	Spon	Man	Spon	Man	Spon	Man
Previous LSCS	37%	32%	22%	24%			56%	44%
Fetal distress	5%	6%	26%	27%	56%	40%	22%	24%
CPD	21%	22%	15%	16%	10%	12%	10%	12%
IUGR/oligoamnios					2%	12%	8%	12%
Breech	24%	27%	13%	15%	24%	16%	2%	6%
BOH					2%	14%		
Others	14%	14%	22%	21%	6%	6%	2%	2%

Table 13. Indications for LSCS in Different Studies

Blood Loss

Blood loss at caesarean section is difficult to assess accurately. More accurate assessment of blood loss can be done by using plastic drapes with pockets for collection of blood, heparinisation of blood amniotic fluid mixture in the suction bottle and estimation of blood fraction in the mixture by comparing Hb concentration in the mixture with that of patient's blood.

In this present study, to obviate the above limitation, change between preoperative Hb% and the postoperative Hb% after 48 hrs. was studied to assess the blood loss indirectly.

Several authors have used different methods of estimation of blood loss and have produced results as follows:

		Pre op Hb	Post op Hb	Mean Diff	P
Ramdani et al[3]	Spon	11.2 ± 1.1	9.9 ± 1.2	1.3 ± 0.1	0.006
	Manual	11.6 ± 1.21	9.1 ± 1.2	2.5 ± 0.1	0.003
Ajay et al[5]	Spon	10.10 ± 0.82	9.43 ± 0.90	0.67	<0.001
	Manual	10.07 ± 0.82	8.76 ± 0.91	1.31	<0.001
Present Study	Spon	10.84 ± 0.56	9.39 ± 0.72	1.45 ± 0.51	0.04
	Manual	10.82 ± 0.78	9.13 ± 1.10	1.69 ± 0.64	0

Table 14. Estimation of Blood Loss with Respect to Fall in Hb following Surgery in Different Studies

Significant blood loss (Hb fall >2.5 g %)	Spon	Manual	
Michel M et al[2]	13%	21%	RR:0.62
Fareesa et al[4]	7.69%	19.40%	P:0.037
Debashi et al[6]	26%	50%	P:0.000
Present study	6%	20%	P:0.014

Table 15. Estimation of Blood Loss with Respect to Fall in Hb following Surgery in different studies

	SPON	MANUAL	p
Ramdani et al[3]	669 ± 253	713 ± 240	0.04
Everett F et al[7]	640 ± 234	1342 ± 549	<0.001
Mert Gol et al[8]	625 ± 253	589 ± 272	>0.05
Charles M et al[9]	666 ± 271	967 ± 248	0.0001

Table 16. Estimation of Actual Blood Loss during Surgery

Mean Blood loss (ml) in different studies.

As per Mert Gol et al manual delivery of the placenta is not associated with a significantly greater risk of operative blood loss.[8]

No significant difference with regard to blood loss was reported by Chandra P et al in 2002, who studied 375 subjects and found operative blood loss to be 1.81 and 1.72 g/dl in spontaneous placental delivery and MROP group respectively.[10]

Samir H et al reported mean perioperative blood loss to be significantly greater in MROP group in comparison to spontaneous placental delivery group.[11]

	Spontaneous	Manual	p
Michel M et al[2]	3.4 ± 2.8	1.9 ± 1.2	
Fareesa et al[4]	2.79 ± 1.43	1.25 ± 0.45	0.05
Ajay et al[5] (seconds)	60.02 ± 21.68	50.50 ± 20.5	
Present study	2.98 ± 0.22	1.34 ± 0.19	0

Table 17. Infant to Placental Delivery Interval

	Spontaneous	Manual	P
Michel M et al[2]	50 ± 15	49 ± 15	
Ramdani et al[3]	45.5 ± 3.9	40.2 ± 3.2	0.001
Everett F et al[7]	34.6 ± 11	38.2 ± 8.5	
Fareesa et al[4]	38.88 ± 7.9	40.06 ± 6.9	0.349
Present study	25.12 ± 1.96	24.58 ± 3.31	0.16

Table 18. Total Operating Time

Ramadani et al reported shorter operative time with MROP compared with spontaneous placental separation.[3] In the present study there was no significant difference in the total operating time.

In the present study, additional oxytocics were used in 24% cases amongst spontaneous delivery group and 28% cases in MROP group, p value is 0.51, that shows non-significant difference. Michel M et al, in their study reported the use of additional oxytocics in 31% cases in spontaneous delivery group and 34% cases in MROP group, showing a non-significant difference.[2]

As regard to blood transfusion, 6 (6%) women in MROP received postoperative blood transfusion due to anaemia arising from excessive blood loss whereas no women were transfused blood in spontaneous delivery group, p value being 0.013, shows a significant trend. In a similar study by Michel M et al, they reported 1.34 times increased chances of blood transfusion in MROP group [3(1%) cases] as compared to spontaneous delivery group [4 (2%) cases].[2]

	Spontaneous	Manual	p
McCurdy et al	3%	23%	<0.05
Chandra P et al[10]	1.7%	2.5%	>0.05
Debashi et al[6]	27%	34%	0.001
Magann EF et al[12]	24%	45%	<0.05
Present study	0	6%	0.013

Table 19. Post op infectious morbidity

In their study by Michel M et al, they reported postoperative fever (≥ 38.5^0C) in 6 and 5 cases in MROP and spontaneous delivery group respectively with additional antibiotics used in 14 (6%) and 12 (5%) cases respectively. That is, in their study, spontaneous delivery group had 1.2 times more chances of acquiring febrile morbidity and additional antibiotic administration post operatively, though statistically not significant.[2]

In a similar study, H. Ramadani in 2004 reported the incidence of endometritis, wound infection and need for blood transfusion to be similar in 2 groups.[3]

In a similar study, Mert Gol et al did not find increased incidence of endometritis when the 2 groups were compared.[8]

In their study, Deborah et al found postoperative infection to be higher in MROP group (27% women) in comparison to spontaneous delivery group (15%), p = 0.01.[13]

In a study by M. Wendy et al, they reported that intraoperative glove change does not decrease post caesarean endometritis. In fact, manual extraction of placenta is associated with significantly greater risk of the same than that observed with assisted spontaneous placental delivery.[14]

Wilkinson C et al found that the MROP was associated with increased postpartum endometritis (odds ratio 5.44, 95% confidence interval 1.25 to 23.75) and a non-significant trend towards an increase in foetomaternal haemorrhage.[15]

In another comparative prospective study by Alparslan B et al, 840 women undergoing caesarean delivery were randomized to have manual placental delivery and exteriorized uterine repair (group 1 = 204); spontaneous placental delivery plus exteriorized uterine repair (group 2 = 220); manual placental delivery and in situ uterine repair (group 3 = 216); or spontaneous placental delivery with in situ uterine repair (group 4 = 200). The authors concluded that manual removal of the placenta increases surgical blood loss, whereas spontaneous placental delivery lowers the risk of endometritis. Also, they found that the type of repair did not significantly influence rates of endometritis and blood loss.[16]

In the present study, the mean duration of hospital stay was significantly longer in MROP group (8.5 ± 1.8 days) when compared to spontaneous delivery group (8.04 ± 0.28 days) p <0.013, due to increased postoperative complications.

In a similar study by Everett F. Magann et al, they concluded MROP and exteriorization of the uterus and repair of the hysterotomy incision increases the infectious morbidity rate in women receiving prophylactic antibiotics at the time of caesarean delivery and increase the length of hospitalization.[13]

In the present study all the cases were followed up at the end of 2 weeks, no patient had secondary PPH. 30% patients in Group A and 40% in Group B were lost for follow up at 6 weeks. Among those who came for follow up there were no cases of secondary PPH.

CONCLUSION

Spontaneous delivery of placenta during caesarean section is associated with lesser perioperative blood loss, lesser perioperative haemoglobin and PCV fall, as compared to MROP.

It is also associated with shorter hospital stay because of lesser postoperative febrile morbidity (mainly endometritis) and lesser requirement for blood transfusion post operatively, compared to MROP.

No patient in either of the groups had secondary PPH.

During MROP, placenta is separated from the uterine wall before the normal physiological phase of effective uterine contraction and retraction is achieved, leaving behind the dilated placental sinuses; also, it requires the exploration of the cavity to ensure the complete removal of placenta which exposes the patient to various complications. On the contrary, spontaneous expulsion of the placenta allows these sinuses to be closed by uterine musculature contractions as the placenta detaches. This may also autotransfuse blood back into the maternal circulation, accounting for lack of haematocrit decrease in this group.

Though the interval between the delivery of the newborn and the placenta is longer in spontaneous delivery group, but the mean duration of the operation remains similar.

Thus, based on the study, spontaneous delivery of placenta during caesarean section is a preferred method.

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