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Post partum haemorrhage in cesarean section: A preventive measure – Does it help?

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Abstract:
Objective: *Our primary objective was- how much this method was helpful for prevention of PPH. Our secondary intension was to evaluate operative interference, operative time, and requirement of uterotonic agent.*
Study design: *This is a prospective cross sectional study of PPH in cesarean section, done at department of gynae & obstetric, Bankura Sammilani Medical College, Bankura, West Bengal, India, from January 2019 to October 2019. Total 608 number of mother was included in this study those who were prepared for cesarean section from Labour room and antenatal ward and were randomly selected -305 cases in study group and 303 in control group.*
In ***study group*** *we confirmed uterine contraction not only by inspection and palpation of uterus but also real time feeling of uterine contraction and retraction by putting surgeon's hand inside the uterine cavity in fan shaped manner over the placental surface after delivery of fetus. When uterine contraction is confirm then placenta is remove by control cord traction. In* ***control group*** *all the three steps of 3rd stage management of labour (AMTSL) were maintained, except introduction of hand inside the uterine cavity.*
Results and analysis: *Mean maternal age was 23.08 ± 3.67 years in study group and 23.12± 4.02 years in control group. Prime para and multi para was 152(49.83%) and 153(50.16%) vs 162(53.47%) and 141(46.53(%) in study and control group respectively. Most common gestational age was 37 – 40 weeks, 242 (79.34%) cases vs. 250(82.50%) cases in study and control group respectively.*
In study group, average and more than average blood loss was 280(91.80%) and 25(8.20%) cases and in control group it was 220(72.61%) and 83(27.39%) cases respectively, Chi square 38.34, P <0.0001. Blood loss was more than average in 9 of 280 cases in study group and 36 of 219 cases in control group, those uterine contraction was felt and it was 16 of 16 cases in study group and 47 of 48 cases in control group, those uterine contraction was not felt definitely, Chi Square 176.46, P <0.001 vs. Chi square 138.44, P < 0.001.
Oxytocin and additional uterotonic agent needed in 287 (94.10%) and 18(5.90%) vs. 234 (77.23%) and 69(22.77%) cases, Chi square 35.28, P <0.0001 for control of PPH respectively in study and control group. When uterine contraction was felt definitely only Oxytocin was sufficient to control or prevent PPH in 287 of 289 cases vs. 226 of 255 cases in study and control groups respectively. But oxytocin and additional uterotonic agent needed in 16 of 16 cases in study group and 40 of 48 cases in control group where uterine contraction was not felt definitely, Chi square 259.65, P <0.001 vs. Chi square 118.95, P <0.001. More than 60 units oxytocin needed in 14 out of 16 cases in study group and 43 of 48 cases in control group when uterine contraction was not felt definitely. Chi square 41.25, P <0.001 vs. chi square 38.57, P <0.001.
Operation completion time was more than 60 mins in 9 out of 16 cases in study group and 36 out of 48 cases in control group when uterine contraction was not felt properly. Chi square 1026, P <0.001 vs. Chi square 24.18, P <0.001.
In study group there is no requirement of relaparotomy but in control group two cases needed relaparotomy for atonic PPH.

Conclusion: *Real time feeling of uterine contraction and retraction by placing fan shaped hand inside the uterine cavity during cesarean section after delivery of fetus, in addition to normal steps in AMTSL; will enhance the confirmation of uterine contraction more specifically. Thereby it not only prevent atonic PPH but also restrict or decrease requirement of uterotonic agent, additional uterotonic agent, operative time and operative interference and there by decrease maternal morbidity and mortality. Larger and randomize control study required for further evaluation.*

Key wards: *Cesarean section/ Uterine atone/ Post partum haemorrhage/ Fan shaped hand/Real time feeling of uterine contraction and retraction.*

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I. Introduction

Approximately 3-5% of obstetric patients will experience PPH. This preventable event is the cause of one fourth of maternal death worldwide**1**. A widely used definition of PPH proposed by WHO -"Any blood loss from the genital tract during delivery above 500ml" **2**. The average blood loss during normal vaginal delivery has been estimated around 500ml; however, around 5% women would lose >1000ml blood during vaginal delivery**3,4,5,6**. Cesarean deliveries are associated with an average estimated blood loss of 1000ml. ACOG 2010 defines early PPH as at least 1000ml blood loss or loss of blood with sign and symptoms of hypovolemia within 24 hrs after delivery of fetus or intrapartum loss**7,8** . Magann EF et al shows the PPH rate in nonelective cesarean (6.75%) was greater than elective cesarean (4.84%)**9**. Our tertiary maternity care teaching hospital is draining mainly three districts-Bankura, Purulia, Paschim Medinipur in West Bengal with annual delivery more than 21000 and cesarean section incidence is around 36%. In our institution PPH is one of the top most causes of maternal death.

Different causes of PPH can be grouped under four heading**-1. Uterine atone**, (Grand multipara, over distended uterus in multiple pregnancy, poly hydramnios, big baby, malnutrition and anemia, ante partum haemorrhage, prolonged labour, augmentation of labour with Oxytocin, placental bits or retained placenta, uterine malformation , uterine fibroid, miss management of 3rd stage of labour), **2.Trauma** (Laceration, haematoma, tear, ruptured uterus, inversion of uterus), **3. combination** of atone and traumatic **4. blood coagulation disorder.** 70% of PPH are atonic PPH (6)-9 and 25 % of PPH are traumatic.

Risk factors are well known by obstetrician. Prompt diagnosis & rapid team based management minimizes morbidity and mortality associated with PPH, regard less of causes. However 20% of PPH occurs in women with no risk factors. So obstetrician must be prepared to manage this condition at every delivery or better to experience enough to prevent the PPH. The most effective methods to prevent PPH is the active management of the 3rd stage of labour (AMTSL). Three golden rules of 3rd stage management are – **1**. Oxytocin 10 U i.m with or soon after delivery of anterior shoulder of fetus. **2**. Control cord traction to deliver placenta once uterus is contracted. **3**. Per abdominal uterine massage to keep uterus contracted.

First and 3rd components are easy to understand and easy to follow; but 2nd component needs some expartisation. Physician should confirm the uterine contraction first, followed by delivery of placenta by controlled cord traction. Premature attempt to deliver placenta before uterine contraction not only precipitate PPH but also increase requirement of uterotonic agent, operative interference, blood transfusion. It may event endanger the life of mother. In vaginal delivery, uterine contraction is confirmed per abdominally by palpation of uterus, when uterus becomes- firm in consistency and globular in shape (After contraction) from flabby in consistency and discoid in shape (Before contraction). Placenta usually spontaneously separated from uterine wall after uterus becomes contracted. Separated placenta comes down in lower segment of uterus and contracted uterus rest on top of it. There is slight budging of suprapubic region and there is slight gush of vaginal bleeding.

During cesarean section we also follow three components of AMTSL. Inspite of all three steps, PPH is a common event in labour room, operation theater, post operative word and 70% of all PPH are atonic PPH. In vaginal delivery uterine contraction is felt from outside, per abdominally and uterus is not directly approachable as approachable during cesarean section. Per abdominally sometimes it is very difficult to understand whether uterus is contracted or not. So, we are continuously searching for a new or more safer or any additional step for prevention of PPH.

In our present prospective, cross sectional study- "Post partum haemorrhage in cesarean section: A preventive measure –Does it help?" patient is under anesthesia, abdomen is opened for cesarean section, and uterus and uterine cavity is directly approachable. Here we take advantage of direct inspection, palpation of uterine contraction and it is confirmed by real time feeling of uterine contraction and retraction before control cord traction for placental delivery. We confirmed uterine contraction not only by inspection and palpation of uterus but also real time feeling of uterine contraction and retraction (**Study group**) and subsequent effect on

PPH compared with conventional methods of AMTSL (**Control group**). Our secondary intension was to evaluate operative interference, operative time, and requirement of uterotonic agent.

II. Materials & Methods

This is a prospective cross sectional study of PPH in cesarean section, done at department of gynae & obstetric, Bankura Sammilani Medical College, Bankura, West Bengal. This study was done among the cesarean section mother from January 2019 to October 2019. Total 608 number of mother was included in this study those who were prepared for cesarean section from Labour room and antenatal ward and were randomly selected. Placenta praevia cases were excluded from study.

We give cesarean section incision at lower uterine segment. Baby delivered as usually procedure and handed over to assistant for initial management of new born baby. Surgeon carefully inspected for any large vessel injury (Uterine artery tear) at incised margin of uterus and temporally haemostasis is achieved by grasping the vessel by haemostatic forceps if needed. Surgeon then introduced his/her right hand inside the uterine cavity and placed the hand over placenta surface in fan shape manner. Gradually, uterus start to contract over the fan shape hand (Grasping sensation over hand) and this real time feeling of uterine contraction, confirm the uterine contraction and retraction. Here, we confirmed uterine contraction not only by inspection and palpation of uterus (uterus becomes pyriform or globular in shape, multiple rugosities over the surface of uterus and firm in consistency) but also real time feeling of uterine contraction and retraction by putting surgeon's hand inside the uterine cavity. When uterine contraction is confirm then placenta is remove by control cord traction. Our primary objective was- how much this method was helpful for prevention of PPH. Our secondary intension was to evaluate operative interference, operative time, and requirement of uterotonic agent. (**Study Group**)

In **control group** all the three steps of 3rd steps management of labour (AMTSL) were maintained, except introduction of hand inside the uterine cavity for real time feeling of uterine contraction.

During cesarean section 10 units Oxytocin injection im & 5 units Oxytocin injection in infusion drip given after delivery of anterior shoulder of baby in both group. In postoperative ward all patients received 10 units syntocinon for first 2 bottles. Other uterotonic agents – misoprostol, inj methergin, inj prostodin is used in PPH cases as needed. All most all cesarean section cases were done ↓ SA. Blood loss for this study is assessed clinically during cesarean section and number of vulval pad used in first 24 hrs after operation.

Statistical analysis

Statistical calculation like descriptive statistic, chi-square test were done with the help of excel and Epi-Info version 3.5 software. A probability value $P<0.05$ was regarded as statistically significant.

III. Result and analysis

Maternal profile of the study group and control group were summarized in **Table -1 & Chart 1**. Mean maternal age was 23.08 ± 3.67 years in study group and 23.12± 4.02 years in control group. Prime para and multi para was 152(49.83%) and 153(50.16%) vs 162(53.47%) and 141(46.53(%) in study and control group respectively. Most common gestational age was 37 – 40 weeks, 242 (79.34%) cases vs. 250(82.50%) cases in study and control group respectively.

Pre operative findings and events were summarized in **Table-2**. Indication of emergency and non emergency cesarean section (CS) were 152 (49.84%) and 153 (50.16%) vs. 158 (52.15%) and145 (47.85%) in study group and control group respectively. All most all cesarean section were done under spinal anesthesia. Per abdominal and per vaginal findings were similar both in study and control group.

Per operative and post operative events were summarized in **Table-3.** Uterine contraction felt definitely in 289(94.75%) cases and 255 (84.16%) cases and not felt definitely in 16(5.25%) cases and 48 (15.84%)cases, Chi square 18.12, $P <0.001$ in study group and control group respectively.

Operation completion time - <45 mins,- 45 to 60 mins, >60 mins were 199 (65.25%), 60 (19.67%) and 46 (15.08%) vs. 236 (44.89%), 106 (34.98%) and 61 (20.13%), Chi square 4.52, $p <0.001$ in study and control groups respectively.

In post operative period requirement of vulval pad <6, 6 to 12, >12 were 257 (84.26%), 39 (12.79%), and 9 (2.95%) vs. 194 (64.03%), 57 (18.81%), and 52 (17.16%), Chi Square 42.48, $P <0.001$ in study and control groups respectively.

In post operative period exploration of vagina for PPH was required in 9 (2.96%) vs. 35(11.55%), Chi square 16.75, $P <0.001$ in study and control groups respectively.

In study group there is no requirement of relaparotomy but in control group two cases needed relaparotomy. (Case -1 eclampsia, twin pregnancy – relaparotomy for atonic PPH and case -2 emergency caesarean section for obstructed labour followed by relaparotomy for atonic PPH).

In study group and control group post operative febrile illness was 14(4.60%) cases and 17(5.61%) cases respectively and was not statistically significant, Chi square 0.33, p 0.56.

Table -4 & Chart -2 summarized per and post operative blood loss and blood transfusion. In study group, average and more than average blood loss was 280(91.80%) and 25(8.20%) cases and in control group it was 220(72.61%) and 83(27.39%) cases respectively, Chi square 38.34, P <0.0001.

Two units and more than two units blood transfusion were needed in 5 (1.64%) and 4 (1.31%) vs. 19 (6.23%) and 11 (3.61%) cases, Chi square 0.18, p 0.67, in study and control groups respectively.

Table – 5 & Chart 3 Summarized need for per and post operative uterotonic agents. Oxytocin and additional uterotonic agent needed in 287 (94.10%) and 18(5.90%) vs. 234 (77.23%) and 69(22.77%) cases, Chi square 35.28, P <0.0001 for control of PPH respectively in study and control group. Less than 40 units and more 60 units oxytocin needed in 232 (76.07%) cases and 18(5.90%) cases in study group and 140(46.20%) cases and 102(33.64%) cases in control group respectively with Chi square 29.09, P <0.001.

Table-6 & Chart 4 Summarized uterine contraction and sub sequent effect. Blood loss was more than average in 9 of 380 cases in study group and 36 of 219 cases in control group, those uterine contraction was felt definitely and it was 16 of 16 cases in study group and 47 of 48 cases in control group, those uterine contraction was not felt definitely, Chi Square 176.46, P <0.001 vs. Chi square 138.44, P < 0.001.

When uterine contraction was felt definitely only Oxytocin was sufficient to control or prevent PPH in 287 of 289 cases vs. 226 of 255 cases in study and control groups respectively. But oxytocin and additional uterotonic agent needed in 16 of 16 cases in study group and 40 of 48 cases in control group where uterine contraction was not felt definitely, Chi square 259.65, P <0.001 vs. Chi square 118.95, P <0.001.

More than 60 units oxytocin needed in 14 out of 16 cases in study group and 43 of 48 cases in control group when uterine contraction was not felt definitely. Chi square 41.25, P <0.001 vs. chi square 38.57, P <0.001.

Operation completion time was more than 60 mins in 9 out of 16 cases in study group and 36 out of 48 cases in control group when uterine contraction was not felt properly. Chi square 1026, P <0.001 vs. Chi square 24.18, P <0.001.

IV. Discussion

Maternal profile – Age, parity and gestational age were comparable in both in study and control group (**Table-1& Chart-1**). Indications of emergency and non emergency cesarean section were similar in both groups. Per abdominal and per vaginal findings were similar in both groups.

Uterine contraction did not definitely feel in 48 (15.84%) cases in control group, compared to 16(5.25%) cases in study group, p <0.001. This statistical significant difference indicates real time feeling of uterine contraction and retraction by placing fan shaped hand inside the uterine cavity during cesarean section, in addition to normal steps in AMTSL, will enhance the confirmation of uterine contraction more in study group specifically. Operative time significantly more in control group than in study group 45-60 mins, >60 mins time 60(19.67%) and 46(15.08%) vs. 106(34.98%) and 61 (20.13%) in study and control group respectively p <0.0001. Post operative requirement of number vulval pad and post operative exploration of vagina were statistically more in control group than study group. When we compared per and post operative blood loss and blood transfusion – it had been seen that there had been significantly less blood loss in study group than in control group 25(8.20%) vs. 83(27.39%) p <0.0001. Two or more units blood transfusion needed in 30(12.84%) cases in control group compare to only 9(2.95%) cases in study group. (**Table – 4 & Chart -2**)

Lill Trine Nyfløt et al**10** 2017 Risk factors for severe postpartum hemorrhage: a case-control study shows incidence of severe PPH 2.5% (Blood loss ≥1500 ml and need blood transfusion). Alexander Butwick et al**11** 2017, Risk Factors for Severe Postpartum Hemorrhage After Cesarean Delivery: Case-Control Studies. shows 3-5% all obstetric patient will experience PPH. Tatsuya Fukami et al**12** 2019 shows 8.7% women had PPH ≥1000 ml and 2.1% had severe PPH ≥1500 ml. Ahmad F, et al**13** 2018 A comparative study on infusion of usual dose of oxytocin and 80 units dose of oxytocin in the prevention of postpartum hemorrhage in cesarean section, shows incidence of PPH after natural delivery 2-4% and in caesarean section 6%. Carlos Montufar-Rueda et al**14** 2013, Severe Postpartum Hemorrhage from Uterine Atony: A Multicentric Study reported that 15% PPH at birth in Hondura.

Our study also co-relates the above study with more than average blood loss and need blood transfusion in 12.84% cases in control group but in study group it was only 2.95% cases.

In our study per and post operative uterotonic agent requirement review showed that 69(22.77%) cases in control group there is additional requirement of uterotonic agent other than oxytocin, in comparison to only 18(5.90%) cases in study group, p < 0.0001. In control group there was also more requirement of oxytocin units than in study group, >60 units -18(5.90%) vs. 102(33.64%), p <0.0001 in study and control group respectively. (**Table-5 & Chart- 3**)

Ann Eversen et al**1** 2017 shows 20% PPH occurs in women with no risk factor. AMTSL should be used routinely to reduce PPH. Use of oxytocin after delivery of anterior shoulder is the most important and effective components of AMTSL. Oxytocin used as fist line agent for prevention and treatment of PPH. Oxytocin is more effective than misoprostol and has fewer adverse effects. Ahmad F, et al**13** 2018 study shows additional uterotonic drug in group 80 units was significantly lower compare to that in group 30 units and there was no significant different in drop of BP.

Our study showed that addition of one extra step along with AMTSL ensures definite confirmation of uterine contraction and there by reduces requirement of oxytocin dose and additional uterotonic agents. Lill Trine Nyfløt et al**10** 2017 states that most common etiologies for severe PPH were uterine atony (60%) and placental complication 36%. Ann. Eversen et al**11** 2017 shows 20% PPH occurs in women with no risk factor. AMTSL should be used routinely to reduce PPH. Carlos Montufar- Rueda et al**14** 2013 shows approximately 75% PPH were secondary to atonic PPH and required additional administration of uterotonic. Breathnach F et al**15** 2008 uterine atony or failure of uterus to contract following delivery was most common cause of PPH.

Our study also co-relates with these studies. When we observed the uterine contraction with subsequent events (**Table 6 &Chart- 4**) – it had been seen that blood loss, requirement of additional uterotonic agent, oxytocin units and OT completion time - all were decreased when uterine contraction was felt properly before delivery of placenta. It was applicable both in study and control group.

V. Conclusion

PPH is leading cause of maternal morbidity and mortality and 60-70% PPH are due to atonic PPH. AMTSL is most important for prevention of PPH. Confirmation of uterine contraction before delivery of placenta is most important and it should be confirm by surgeon by whatever methods he/she can. When we add real time feeling of uterine contraction and retraction by placing fan shaped hand inside the uterine cavity during cesarean section after delivery of fetus in addition to normal steps in AMTSL, it will enhance the confirmation of uterine contraction more specifically. Thereby, it not only prevents atonic PPH but also restricts or decrease requirement of uterotonic agent, additional uterotonic agent, operative time and operative interference and thereby decrease maternal morbidity and mortality. Larger and randomize control study required for further evaluation.

Table-1: Maternal Profile

	Study group/Case (n=305)	Control group (n=303)
Age (Years)- <20	47 (15.41%)	47 (15.51%)
20-30	241 (79.02%)	230 (75.91%)
>30	17 (5.57%)	26 (8.58%)
Mean Age ± SD	**23.08 ± 3.67**	**23.12 ± 4.02**
Parity- Prime Para	152(49.83%)	162(53.47%)
Multi Para	153(50.16%)	141(46.53(%)
Gestational age- <37 Weeks	16 (5.25%)	23 (7.60%)
37-40 Weeks	242 (79.34%)	250 (82.50%)
>40 Weeks	47 (15.40%)	30 (9.90%)

Table-2: Pre operative findings and events-

	Study group/Case (n=305)	Control group (n=303)
Indication of LUCS		
- Emergency	152 (49.84%)	158 (52.15%)
- Non emergency	153 (50.16%)	145 (47.85%)
Types of anaesthesia		
- Spinal (SA)	305 (100%)	303 (100%)
- General (GA)	0	0
Par abdominal		
a) Uterine contraction		
- Contraction +	153 (50.16%)	156 (51.49%)
- Contraction -	152 (49.84%)	147 (48.51%)
b) Presentation		
- Cephalic	290 (95.08%)	280 (92.41%)
- Breech	6 (1.97%)	15 (4.94%)
- Others	9 (2.95%)	6 (2.64%)

Per Vaginal		
a) OS		
- Closed	152 (49.83%)	145 (47.85%)
- <4cm	123 (40.33%)	128 (42.25%)
≥4cm	30 (9.84%)	30 (9.90%)
b) Cervix		
- <Fully taken up (<FTU)	132 (43.27%)	142 (46.86%)
- Fully taken up (FTU)	21 (6.89%)	14 (4.63%)
- No taken up	152 (49.84%)	147 (48.51%)
c) Station (St)		
- (-1) or above	286 (93.77%)	281 (92.74%)
- 0 or below	19 (6.23%)	22 (7.26%)
d) Membrane		
- Present (+)	209 (68.52%)	223 (73.60%)
- Absent (-)	96 (31.48%)	80 (26.40%)
Pre operative event		
a) Induction of labour		
- No	277 (90.82%)	279 (92.8%)
- Yes	28 (9.18%)	24 (7.92%)
b) Augmentation of labour		
- No	251 (82.30%)	257 (84.82%)
- Yes	54 (17.7%)	46 (15.18%)

Table- 3: Per operative & Post operative event.

	Study group/Case (n=305)	Control group (n=303)	Chi Square	P- Value
Uterine contraction feel definitely				
- Yes	289 (94.75%)	255 (84.16%)		
- No	16 (5.25%)	48 (15.84%)	18.12	<0.001
Incision to OT completion time				
- <45 mins	199 (65.25%)	236 (44.89%)		
- 45 to 60 mins	60 (19.67%)	106 (34.98%)	4.52	<0.001
- >60 mins	46 (15.08%)	61 (20.13%)		
Post operative no. Of vulval pad use				
- <6	257 (84.26%)	194 (64.03%)		
- 6 to 12	39 (12.79%)	57 (18.81%)	42.48	<0.001
- >12	9 (2.95%)	52 (17.16%)		
Post operative exploration of vagina				
- No	296 (97.04%)	268 (88.45%)	16.75	<0.001
- Yes	9 (2.96%)	35 (11.55%)		
Re laparotomy				
- NO	305 (100%)	301 (99.34%)	0.51	o.47
- Yes	0	2 (%)		
Post operative fever				
- No	291 (95.40%)	286 (94.39%)	0.33	o.56
- Yes	14 (4.60%)	17 (5.61%)		

Table-4: Per & Post operative blood loss & blood transfusion

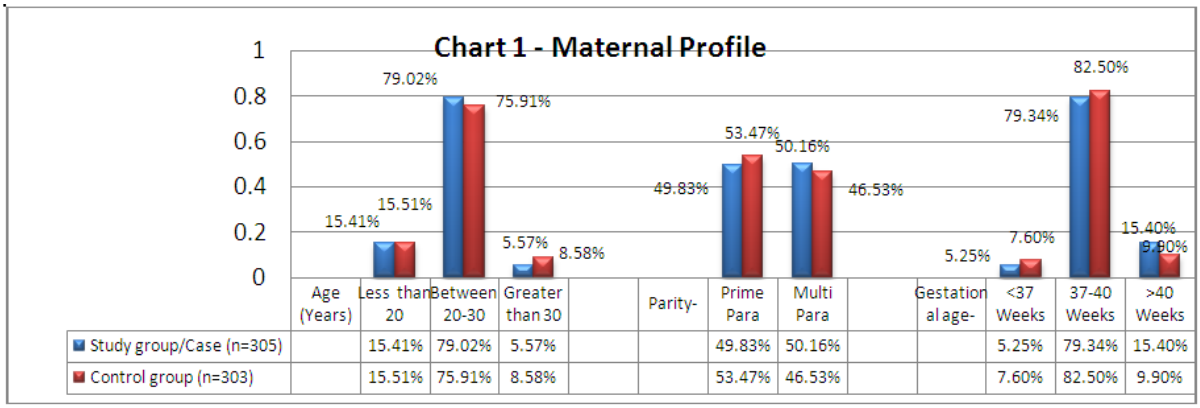
	Study group/Case(n=305)	Control group (n=303)	Chi Square	P- Value
Blood loss				
-Average	280 (91.80%)	220 (72.61%)	38.34	< 0.0001
->Average	25 (8.20%)	83 (27.39%)		
Blood Transfusion				
-No	296 (97.05%)	273 (90.09%)	-	-
-2 units	5 (1.64%)	19 (6.23%)	11.1	0.00024
->2 units	4 (1.31%)	11 (3.61%)		

Table-5: Per & Post operative Uterotonic agent needed

	Study group/Case (n=305)	Control group (n=303)	Chi Square	P- Value
Uterotonic agent				
-Oxytocin	287 (94.10%)	234 (77.23%)	35.28	< 0.0001
-Oxytocin & others	18 (5.90%)	69 (22.77%)		
Oxytocin units				
- <40 units	232 (76.07%)	140 (46.20%)		
- 40 to 60 units	55 (18.03%)	61 (20.13%)	29.09	< 0.001
- >60 units	18 (5.90%)	102 (33.64%)		

Chart – 6: Uterine contraction and subsequent effect

Uterine contraction felt					
Study group/ Case (n = 305)			Control (n = 303)		
	Contraction felt definitely – **Yes** (n =289, 94.75%)	Contraction felt definitely – **No** (n =16, 5.25%)		Contraction felt definitely – **Yes** (n = 255, 84.16%)	Contraction felt definitely - **No** (n = 48, 15.84%)
a) Blood loss Average (280) >Average(25)	280 09	0 16	**Blood loss** Average (220) >Average(83)	219 36	01 47
	Chi Square – 176.46, P value <0.001			Chi Square -138.44, P value <0.001	
b) Uterotonic agent Oxytocin (287) Oxytocin + Others (18)	287 02	0 16	**Uterotonic agent** Oxytocin (234) Oxytocin + Others (69)	226 29	08 40
	Chi Square – 259.65, P value <0.001			Chi Square – 118.95, P value <0.001	
c) Oxytocin Units < 40 IU (232) 40 – 60 IU (55) >60 IU (18)	231 54 04	1 1 14	**Oxytocin Units** < 40 IU (140) 40 – 60 IU (61) >60 IU (102)	138 58 59	02 03 43
	Chi Square – 41.25, P value <0.001			Chi Square – 38.57, P value <0.001	



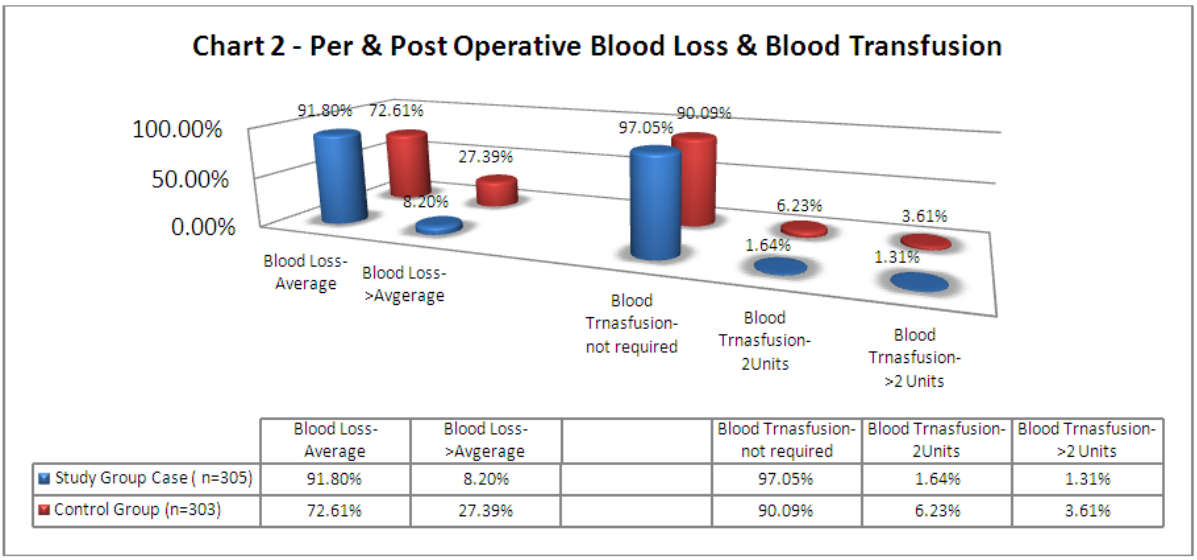
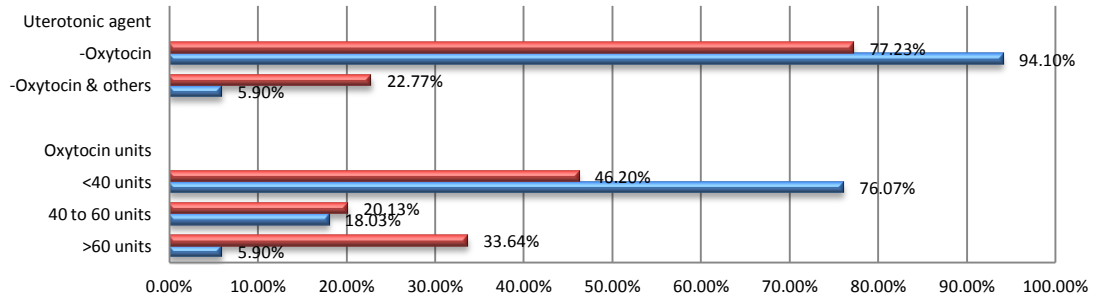
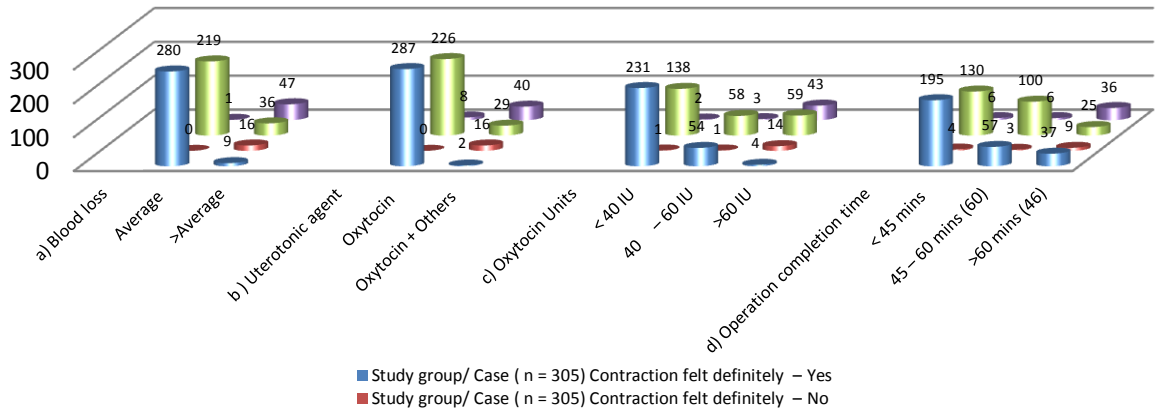


Chart 3 - Per &Post-operative Uterotonic agent needed



	>60 units	40 to 60 units	<40 units	Oxytocin units		-Oxytocin & others	-Oxytocin	Uterotonic agent
Control group (n=303)	33.64%	20.13%	46.20%			22.77%	77.23%	
Study group/Case (n=305)	5.90%	18.03%	76.07%			5.90%	94.10%	

Chart 4 - Uterine contraction and subsequent effect



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