

Original Article

Uterine and ovarian arteries ligation: A safe technique to control PPH during cesarean section

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Abstract

Objectives: To evaluate the efficacy of bilateral ligation of uterine and ovarian arteries simultaneously for the management of atonic post partum hemorrhage (PPH) during cesarean section. **Methods:** Out of 4936 cesarean sections, 42 atonic PPH mothers were selected for bilateral uterine and ovarian arteries ligation while medical management failed. Inclusion criteria: Those cases of LSCS who developed PPH due to atonicity of the uterus and who failed to respond to medical therapy such as injection oxytocin upto 40 units added to 1 L of iv. fluid in 30-40 minutes, injection methyl ergometrine 0.2mg given IM and injection 15 methyl prostaglandin F₂α 250 mcg IM for 3 doses in 15-20 minutes interval along with bi manual uterine compression and massage. Exclusion criteria were post partum hemorrhage arising after vaginal delivery and traumatic PPH. **Results:** Out of 42 women 26 (61.90%) were multigravid and 16 (38.10%) primigravid. Eighty percent were unbooked and referred from remote health centers. 35.72% had cesarean section due to prolonged labor with fetal distress. Other indications were postcesarean pregnancy in labor (19.05%), severe pregnancy induced hypertension (PIH) (14.29%), obstructed labor (9.52%) and accidental hemorrhage (9.52%) and placenta previa (11.90%). Uterine and ovarian artery ligation were performed in all the 42 cases. In 39 (92.85%) cases PPH was controlled successfully but two mothers with placenta previa and one mother with placental abruption required cesarean hysterectomy. **Conclusion:** Based on the result of the study we can conclude that the uterine devascularization by bilateral uterine and ovarian artery ligation is an effective, simple, rapid and safe method for controlling PPH during cesarean section.

Key words: uterine and ovarian artery ligation, internal iliac artery ligation, postpartum hemorrhage, cesarean section.

Introduction

Cesarean section is one of the most commonly performed surgical procedures¹. Its safety and acceptability has been established. Unfortunately

cesarean delivery has many potential complications. The most frequent are excessive blood loss and secondary infection. When medical therapy is unsuccessful surgical intervention may be required to control post partum hemorrhage (PPH) to ensure maternal survival. Proven surgical procedures are uterine packing, uterine and internal iliac artery ligation and recently described suture techniques. During pregnancy 90% of the blood supply to the uterus comes from the uterine arteries and rest from the ovarian and vaginal arteries. Occlusion of the uterine arteries reduces most of the uterine blood flow and produce uterine ischemia. Occlusion of the ovarian vessels result in the

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additional deprivation of the blood supply to the uterus. In uncontrollable hemorrhage the uterine arteries lose their ability to constrict because of an unidentified mechanism and their ligation seems to be justifiable treatment.

Methods

The present prospective study was carried out from 1st April 2003 to 31st March 2006. Out of the 4936 caesarean sections, 132 developed atonic PPH during caesarean section and 90 of them were successfully managed by medical therapy. Uterine devascularization technique by uterine and ovarian artery ligation was performed on 42 mothers who failed to respond to medical management 316 (38.1%) of primigravid & 26 (61.90%) multigravid. The step wise line of medical management followed was manual massage, bimanual compression, administration of oxytocin upto 40 IU added to one L of intravenous fluid, methylergometrine 0.2mg intramuscularly (if the mother was not hypertensive), intramuscular 15- methyl-prostaglandin F₂α 250μg, blood transfusion and careful inspection to exclude any traumatic cause.

After inadequate response indicated by persistence of uterine atonicity, persistent bleeding, tachycardia (>110/minute) and hypotension (<90/60 minutes) the patients were scheduled for uterine devascularization. Uterine artery ligation was performed by grasping the broad ligament such that the thumb was anterior and with the index finger lifting the base below the uterine incision; the uterine artery was singly ligated with No. 1 chromic catgut suture. Myometrium was included so that uterine vessels were not damaged.

For ovarian artery ligation: an avascular area in the mesovarium was chosen, to place a ligature around the utero-ovarian arterial anastomosis (between the ovary and the uterus). This study was approved by ethical committee of the institution and consent obtained from the patient’s responsible relatives. All the mothers were carefully observed in the postpartum period.

Results

Out of 4936 cesarean sections 132 (2.67%) mothers developed primary atonic PPH. In 68.18% (90/132) PPH was controlled by medical methods. Forty two women underwent uterine and ovarian artery ligation. 7.15% of them (3/42) required hysterectomy (Table 1). Therefore this surgical method was effective in 92.85% cases. The age of the women ranged from 19 to 30 years with mean ±SD of 24.5±6.5 years. Out of the 42 cases 80% were unbooked and were referred from primary health centers. Twenty six were multigravid and 16 primigravid. The indications for cesarean section in the 42 cases are shown in Table 2. Majority (35.40%) underwent cesarean section for prolonged labor with fetal distress. Nine of the 42 (21.42%) had cesarean section due to antepartum hemorrhage. Uterine and ovarian arteries ligation were done in all cases.

Table 1(a). Incidence of PPH during CS (n=4936).

	No. of cases	%
LSCS	4936	
PPH	132	2.67%

Table 1(b). Distribution of cases according to management (n=132).

Method of Control of PPH	Total No. of cases	%
Surgical method	90	68.18
Medical method	42	31.12

Table 1(c). Success by uterine and ovarian arteries ligation (n=42).

Surgical Method control of PPH	No. of cases	%
Uterine and ovarian ovarian arteries ligation	39	92.85
Hysterectomy	3	7.15

Table 2. Indication of cesarean among the women selected for devascularization (n=42).

Indication of LSCS	No.	Percentage	Elective CS	Emergency CS
Prolonged labor with fetal distress	15	35.72	-	15
Previous cesarean section	8	19.05	2	6
Severe pregnancy induced hypertension	6	14.29	1	5
Obstructed labor	4	9.52	-	4
Placenta previa	5	11.90	2	3
Accidental hemorrhage	4	9.52	3	1

Discussion

Hysterectomy is the definite surgery for uncontrollable atonic postpartum hemorrhage when medical therapy fails. After hysterectomy many young women have to live with amenorrhea permanently which can be psychological traumatizing. In this study a significant number of mothers were at or below 30 years of age. This is consistent with the study reported by AbdRabbo² in which 26% were primigravid and 74% multigravid. Internal iliac artery ligation, although a lifesaving procedure for the control of pelvic hemorrhage is not the best technique for the management of atonic PPH. Apart from its limitation of success it requires more dissection and experience³. In an extensive study for 30 years O'Leary⁴ had advocated the uterine artery ligation as an effective and alternative technique to internal iliac artery ligation although in his series 10 out of 265 cases failed to respond.

In the series of Fahmy⁵ and of O'Leary⁴ bilateral uterine artery ligation failed to control bleeding in some cases with placenta previa and accreta needing hysterectomy. In our study three patients of placenta previa and accreta needed hysterectomy. Several authors reported that bilateral uterine artery ligation is a safe and effective method to control PPH, but unfortunately failure to control hemorrhage is seen in 8 to 20% of cases needing hysterectomy⁵.

AbdRabbo² has reported 100% success is controlling atonic PPH by stepwise uterine devascularization by ligating uterine and ovarian vessels. This technique seems to be very much efficacious but needs skill and experience and time. Salvat et al⁶ in their review on vascular ligation for severe obstetric hemorrhage observed stepwise procedure with progressive ligation of the uterine and ovarian arteries as a good solution (100%) for uterine atony. They expressed their opinion that bilateral ligation of internal iliac arteries can provide success in 66% whereas uterine and ovarian arteries ligation can be the alternative between embolization and hysterectomy.

In another excellent review related to intractable PPH due to uterine atony by the authors reported that arterial embolization and uterine artery ligation are equally effective with close to 100% success⁷. Embolization can be recommended after vaginal birth in hemodynamically stable patients but it needs skilled training and facilities. In our study we did uterine devascularization by bilateral uterine and ovarian arteries ligation simultaneously. We observed that the success rate was 92.85%. This procedure is simple and takes less time.

Conclusion

Uterine devascularization by bilateral uterine and ovarian artery ligation is an effective, simple and safe method for controlling PPH during cesarean section.

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