Original Article

Internal Iliac Artery Ligation - Life Saving Procedure in Massive Postpartum Hamorrhage

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Objective: To study the role of bilateral internal iliac ligation in arresting postpartum hamorrhage.

Material and Methods: The study was carried out from 1st July 2012 to 30th June 2014 in the department of Obstetrics and Gynaecology unit II, Services Institute of Medical Sciences / Services Hospital Lahore. Total births were 4496 in the duration of two years. Out of them 3366 were caesarean section and 1130 were spontaneous vaginal deliveries. Total massive postpartum hemorrhage that is blood loss > 1 litre, was in 46 patients. Internal iliac ligation was carried out in fifteen patients. In all these patients they were failed medical treatment. Even after B-Lynch suture and abdominal hysterectomy bleeding did not stop.

Results: Total patients enrolled in the study were fifteen. Two (13%) patients were primigravidae in which uterus was saved and bilateral internal iliac ligation was done due to uterine atony. In five (33%) patients due to uterine rupture and in eight (53%) patients due to morbidly adeherant placenta there was massive hamorrhage and bilateral internal iliac ligation was done. In thirteen (86%) patients total abdominal hysterectomy was done along bilateral internal iliac ligation. In five (33%) patients packs were inserted after ligation at bladder base in case of morbidly adherent placenta. Packs were removed after 48 hours in second laparotomy. All the patients were saved and discharged in satisfactory condition except one who already came with disseminated intracoagulation disorder. Among complications in three (20%) patients there was injury to bladder that was stitched and in seven (46%) patients there was wound infection.

Conclusion: Early resort of bilateral internal iliac ligation effectively prevents hysterectomy in women with atonic uterus and in uterine rupture and morbidly adherent placenta it saves the life if done on time.

Keywords: pregnancy, iliac artery, postpartum haemorrhage.

Introduction

Ligation of hypogastric Internal iliac arteries for the control of profuse pelvic bleeding has long been recognized as a life saving procedure. First reports of successful internal iliac ligation were published as early as the 1890s. It is a long established method for controlling hemorrhage refractory to vaginal tamponade. In patients with cervical cancer.[1] By the middle of 20th Century, the indication has been widened to control excessive post delivery haemorrhage.[2] Since that time hypogastric ligation has been a main stay of controlling intractable haemorrhage in an effort to pressue the uterus used in both obstetric and gynaecologic surgery.[3]

There are several reports of pregnancies carried to full term after bilateral internal iliac artery ligation.[4] Postpartum haemorrhage is one of the five leading causes of maternal mortality world wide.[5] Massive haemorrhage after child birth occurs with a frequency of one or two in 1000 deliveries in the developed countries and it is even more prevalent in the developing countries.[5] In developing countries, 140,000 women are dying of postpartum haemorrhage world wide each year.[6]

Haemodynamic changes occur after ligation of internal iliac arteries. There is rich collateral circulation on both sides of the pelvic cavity, with both horizontal and vertical anastomosis. It is chiefly the vertical part of this network that is activated upon ligation, with the iliolumbar, lateral sacral, uterine and middle rectal arteries. The horizontal system is mainly based on anastomosis between the obturator and inferior epigastric arteries.[7] Significant changes include a decrease in pelvic arterial blood pressure and pelvic arterial blood flow 25 % and 50 % decrease respectively. The net effect of internal iliac artery ligation is a transformation of the pelvic circulation into a venous system. Venous bleeding can usually be controlled by temporary pressure like by packs, so that blood clot could form at the site.[8]

Technique of internal iliac ligation is easy to learn. During laparotomy the technique includes palpation of bifurcation of the common iliac artery and opening of the posterior peritoneum just distal to that site. Anatomy is usually revealed demonstrating the internal and external iliac arteries and their veins as well as ureter generally retracted medially. Using right angle clamp, manipulating internal iliac artery from lateral to medial, ligation is placed with double strand absorbable suture distal to the bifurcation by atleast two to three centimeter.[9] Dorsalis pedis pulses bilaterally should be checked after ligation.

Anatomical consideration the common iliac artery bifurcates into two main branches the external iliac artery which becomes the femoral artery at the inguinal ligament and internal iliac artery, that descends into the true pelvis. The latter divides into anterior and posterior branches. The important anatomical relations of internal iliac artery are as follows. Anterior and medial is covered by peritonium, ureter is anterior, external iliac vein an obturater nerve are posterolateral and internal iliac vein is postero medial. Complications of the procedure include injury to iliac vessels, ureter and surrounding organs.[8] Alternative surgical methods to internal iliac artery ligation are uterine artery ligation[10] and selective arterial embolization of either hypogastric or uterine arteries.[11]

Material and Method

The study was carried out from 1st July 2012 to 30th June 2014 in the period of two years in the department of Obstetrics and Gynaecology unit II Services Institute of Medical Sciences/Services Hospital Lahore. Total births were 4496 in the duration of two years. Out of them 3366 were caesarean section and 1130 were spontaneous vaginal deliveries. Total massive postpartum hemorrhage was in 46 patients. Internal iliac ligation was carried out in fifteen patients. In all these patients they were failed medical treatment. Even after B-Lynch suture and abdominal hysterectomy bleeding did not stop. They all came with massive postpartum haemorrhage. Blood loss was more than one litre. After evaluation, I/V lines were secured. Atleast six units of blood were arranged. Two patients were primigravidae, came with home delivery with uterine atony and severe postpartum haemorrhage. Medical treatment failed to control bleeding. Her laparotomy was done and B-lynch suture was applied, but bleeding persisted. Internal iliac ligation was done and uterus was saved. Five patients came with uterine rupture. Out of them three patients had history of previous caesarean section and had trial of labour at private setup. They came with history of bleeding per vaginun. After evaluation and arrangement of blood, laparotomy was done. Baby was found in peritonial cavity. Tears were extending to broad ligament laterally and to Cervix inferiorly. Inspite of hysterectomy bleeding did not stop. So internal iliac artery ligation was done. Eight patients were diagnosed case of placenta praevia with previous caesarean section and percreta was diagnozed on doppler ultrasound. All were elective procedures. At least ten units of blood was arranged and further six units were cross matched. In all cases senior team of obstetrician and anaesthetist dealt with the patients. After delivery of baby, placenta was found to be morbidly adherent. Hysterectomy was immediately planned. Even after hysterectomy, bleeding persisted. Bilateral internal iliac ligation was done. In five patients there was still ooze from bladder base. Three packs were inserted at bladder base. Drain was inserted in abdomen and was closed. Packs were removed after forty eight hours. All the patients were saved and discharged in satisfactory condition except one who was already received in dessiminated intra vascular coagulation DIC in the condition of shock. She expired due to DIC. She came with uterine rupture with previous caesarean section in emergency. She was unbooked patient. Inspite of total abdominal hysterectomy and internal iliac ligation we could not save her.

Results

Total fifteen patients had internal iliac ligation. Internal iliac ligation was more indicated in morbidly adherent placenta. If expertise are available, there are lesser chances of complications. In long term follow up after six months the morbidity was in the form of hot flushes, anxiety and depression. This table shows that more procedures were done as elective, with senior team of obstetrician and anesthetist.

Table-1: General distribution of age and parity.

Age	Years	no	%
	20-30	05	33.33
	31-40	08	53.33
	41-50	02	13.33
Parity	P1	02	13.33
	P-2-P5	10	66.66
	P5 and above	03	20

Table-2: Indications.

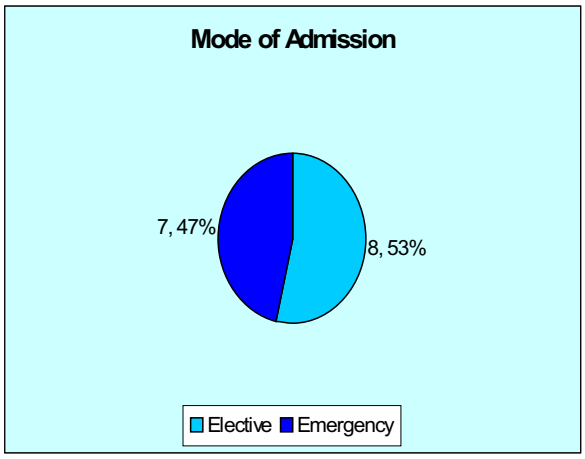
Cause	no	%
Atony	02	33.33
Uterine Rupture	05	33.33
Adherent Placenta	08	53.33
DIC	01	6.66

Table-3: Complications.

Complications	no	%
Injury to bladder	07	20
Woud infection	03	46.66
DIC	01	6.66
Injury to ureter	0	0
Injury to adjancet vessels	0	0
Mortality	01	6.66
Long term morbidity Follow up six months	06	40

Table-2: Indications.

Procedure	no	%
Total abdominal hysterectomy	13	86.66
Uterus conserved	02	13.33
Packs inserted and remover after 48 hrs	05	33.33
B-Lynch suture	02	13.33



More than 10 units of blood were arranged and bed for patient in intensive care unit was booked for intensive care.

Discussion

Postpartum haemorrhage is associated with a great degree of morbidity and mortality and has to be controlled immediately without compromising the rest of the pelvic blood supply. Internal iliac artery ligation is a time tested, easy method and achieves the goal. In a study carried out at KEM hospital, Pune India, out of 110 women who had internal iliac ligation, 88 had postpartum heamorrhage for uterine atony 36, genital tract injury 23, placenta previa 21, abruption 4, uterine inversion 3, and coagulopathy 1, hysterectomy was performed after internal iliac ligation failed to arrest bleeding in 33 39% of 84 women. Hysterectomy was more in uterine rupture 79%, one women had iliac vein injury that was repaired. There was no ischemic complication during six week period.[12] In our study in 15 patients internal iliac ligation was done. Out of them 8 53% patients had procedures due to morbidly adherent placenta 5 33% had due to uterine rupture two 13% had due to uterine atony and 1 6% had due to coagulopathy. In 13 86% patients total abdominal hysterectomy was done. In 2 13% cases uterus was conserved in young patients that had uterine atony.

In 5 33% patients in spite of total abdominal hysterectomy and internal iliac ligation, there was ooze from bladder base, three packs were inserted at bladder base and abdomen was cloded. Packs were removed after 48 hours in second laparotomy.

Out of complications, in our study there was injury to bladder in 3 20% cases, wound infection in 7 46% and mortality in 1 6%. There was no injury to ureter or adjacent vessels. In follow up after six months, 6 40% patients had minor disorders like hot flushes and depression. There was no ischaemic compromise.

In another study of DICLE University Medical Faculty Diya, Yarbakir, Turkey, Total 58 patients underwent internal iliac ligation. All patients were haemodynamically unstable uterine atony was leading cause of severe postpartum heamorrhage coagulopathy developed in 26 days in postpartum period. Uterus was preserved in 17 32%, 3 patients died of complications. In 13% life threatening cases of severe PPH, could not be controlled with conservative medical and surgical treatment and finally internal iliac ligation was carried out.[13]

In another study carried out by Poppz, in 117 patients with massive pelvic haemorrhage only one woman

had surgical complications that is injury to internal iliac vein. It was sutured and patient recovered uneventful.[14] in our study there was no injury to adjacent vessels or ureter. In another carried out at Semmal Weis university hospital in Budapest, in 37 obstetric cases, indication of bilateral ligation was placenta praevia and abruption in 4 cases, placenta accreta, increta and percreta in 3 cases. Paravaginal tumor in 1 case and dehiscence of previous caesarean section in 1 case. Hysterectomy was done in 7 patients and in 2 uterus was preserved. In the same study second laparotomy was performed in 10 cases of uterine atony. Following caesarean section bleeding was controlled by bilateral ligation of internal iliac in 4 cases, hysterectomy was performed in 1 case and uterus was preserved in 3 out of 10. In uterine rupture bilateral ligation was done 3 cases and hysterectomy in 2 cases. In our study B-Lynch suture was applied in 2 out of 15 cases for uterine atony. In uterine rupture hysterectomy was only done when repair was not possible due to tear extending to broad ligament.

Conclusion

Internal iliac ligation is useful in treatment and prevention of postpartum haemorrhage from any cause. Early resort of internal iliac ligation effectively prevents hysterectomy in women with atonic uterus when medical treatment fails. Internal iliac ligation facilitates hysterectomy to prevent massive haemorrhage. In antenatal period patients have risk factors of PPH, they must be transferred to appropriate centers to prevent postpartum haemorrhage. Inspite of aggressive medical treatment, early consideration should be given to surgical intervention.

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