Original Article

Bilateral internal iliac artery ligation in postpartum haemorrhage-my experience in rural setup

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Abstract

Background; Postpartum Haemorrhage (PPH) is one of the important cause of maternal mortality in both developed and developing countries. Blood loss of 1000ml or more occur in 1-5% of deliveries[2]. Internal iliac artery and its branches supply the pelvic organs. Bilateral ligation of Internal Iliac Artery (IIAL) is one of the life saving surgical technique in case of post partum haemorrhage **Objective:** To study the role of Bilateral ligation of Internal Iliac Artery (IIAL) in arresting and preventing PPH. **Design:** Retrospective chart review of women undergoing therapeutic IIAL for PPH or prophylactic IIAL for risk of PPH from April 2010 to July 2016**. Setting: A-**Tertiary Hospitals in Pune- Lokmanya Multispeciality Hospital Chinchwad and Nigdi Pune and Pawana multispeciality Hospital Somatane Pune **B-** Ashwinii Nursing Home and Laproscopy Centre Thergaon Chinchwad Pune. **Sample:** Women admitted in these above hospital who underwent IIAL to control or prevent PPH. **Methods:** Bilateral IIAL was performed in all cases. **Result and Conclusions:** Out of 50 women who underwent IIAL, 41 had therapeutic IIAL from PPH and 9 had Prophylactic IIAL. Obstetric hysterectomy done in 4 cases after IIAL failed to arrest haemorrhage. Failure to control haemorrhage was evident immediately and bleeding arrested by IIAL did not recur and no subsequent procedure required in any case. Out of 9 women at risk of PPH undergoing prophylactic IIAL none had subsequent haemorrhage. One women had iliac vein injury which was repaired by vascular surgeon without any morbidiry. There were no ischemic complications during in patient stay and up to 6 weeks and no deaths in these cases. IIAL is useful procedure in treatment and prevention of PPH from any cause. Early resort to IIAL effectively prevents hysterectomy in women with atonic PPH. In traumatic PPH, IIAL facilitates hysterectomy or repair as indicated and prevent reactionary haemorrhage.

Keywords: Post partum haemorrhage, Internal Iliac Artery Ligation.

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INTRODUCTION

PPH is a major cause of mortality worldwide ranging from 15% in developed countries to 35% in developing countries. Blood loss of 1000ml or more occur in 1-5% of deliveries and uterine atony is the common cause of PPH on 80% of cases. Other causes includes retained placental fragments, lower genital tract lacerations and uterine rupture. Known risk factors for atonic PPH are history of retained placenta, fibroids, polyhydramnios etc. Although Assessment of risk factors can be done but PPH typically occurs unpredictably and no parturient is exempted from the risk of PPH. When PPH continues despite of aggressive medical treatment early consideration to surgical intervention should be given. Various surgical techniques have been described in PPH patients refractory to massage and uterotonic therapy. Uterine compression sutures, bilateral uterine or internal iliac artery ligation and as a last resort subtotal or total hysterectomy can be performed[1]. The choice of procedure will depend on parity of women and desire for childbearing extent of haemorrhage and most importantly experience and judgement of surgeon. In most catastrophic situations hysterectomy if preferred in order to arrest blood loss. IIAL has been advocated as an effective means of controlling intractable PPH and preventing maternal death. Rationale of this based on the hemodynamic studies of Burchell which showed IIAL reduced pelvic blood flow by 49% and pulse pressure by 85% resulting

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in venous pressure in the arterial circuit thus promoting HEMOSTASIS. However the reported success rate of IIAL varies from 50% -100% and procedure averts hysterectomy in only 50% cases. IIAL is thought to be technically difficult although much quicker than hysterectomy. I present a case series of IIAL performed over 7 years at our institutions.

METHODS

The study was carried out from April 2010 to July 2016 on Pawana Hospital Somatane Pune, Lokmanya Hospitals Nigdi and Chinchwad Pune and Ashwinii Nursing Home and Laproscopy Centre Thergaon Chinchwad Pune. All procedure in this study are performed by Dr Ammbalal Gurram Consultant Obstetritian. Women with atonic PPH at vaginal delivery /LSCS were initially treated with massage and uterotonics but if bleeding continued even after this then decision of IIAL. Therapeutic IIAL was performed in a women with PPH at Cesearian section or at laparotomy performed at a variable time after vaginal delivery/ LSCS. At the time of LSCS IIAL was done in women with Placenta previa, Abruptio Placentae, coagulopathy.

Procedure

Understanding of retroperitoneal anatomy is essential for performing IIAL. Position is either supine or semilithotomy position. Incision Midline infraumbilical incision if patient is in shock otherwise transverse incision. Abdomen opened in layers. Bowel packed. Left side IIAL done standing from right side and vise versa for convenience. Left side sigmoid colon dissection is required. Sacral promontory (SP) is important landmark. Dissection starts from SP. Ureter crosses from lateral to medial at SP. Entire vasculature is lateral to ureter. Identify the ureter pick up peritoneum lateral to ureter at the level of SP. Dissect and open para rectal space. Go lateral to ureter and dissect IIA. Approximately 4 cm below bifurgation pass right angled artery forceps /mixters from lateral to medial between artery and vein. Use any ligature linen, vicryl or silk. IIA ligated singly. No attempt was made to locate the posterior division. Pulsation of femoral artery and dorsalis pedis were checked after tying ligature. Once IIAL done control of heamorrhage confirmed by improvement in vital signs as well as decrease in amount of vaginal bleeding. Abolition of trip hammer effect of arterial pulsation that allows effective clotting to take place so that small vessels stop bleeding. This explains bilateral IIAL works better than unilateral IIAL[3,5]. If bleeding continued decision of hysterectomy was taken. No special care needed in postoperative period.

Figure 1:

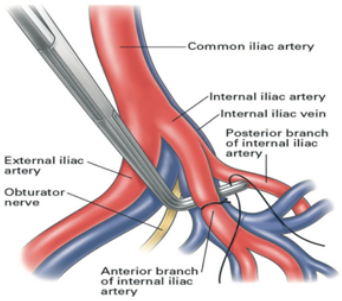

Figure 2:

Video of procedure can be seen at following link https://youtu.be/_FmvaYwF7_w

DISCUSSION

In this study, the efficacy of bilateral internal iliac artery ligation performed with the indication of serious obstetrical bleeding was detected to be 92%. I didn't encounter any procedure-related major complications which were reported in the literature such as major vessel and ureter injury or inadvertent ligation of the external iliac artery[4] Internal iliac artery ligation is an emergency life saving procedure that every pelvic surgeon must be able toper form. It is relatively simple operation, when performed by surgeon having adequate knowledge of pelvic anatomy.

Anatomical considerations

Internal iliac or hypogastric artery arises at the bifurcation of the common iliac arteries on either side at the level of the lumbosacral intervertebral disc and in front of sacroiliac joints, from where it descends to the upper margin of the greater sciatic foramen for 3-4 cms where it divides into an anterior trunk which continues in line with the
parent vessel towards the ischial spine and the posterior trunk which passes backwards towards the foramen.

Hemodynamic considerations

The main underlying principle in ligation of the internal iliac artery for control of pelvic hemorrhage is the conversion of an arterial pressure circulation into a venous pressure circulation. Unilateral ligation of the internal iliac artery, decreases the pulse pressure distal to point of ligation by 77%, while bilateral ligation decreases the pulse pressure by85%.As a result of the reduction in the pulse pressure, blood clots begin to form at the site of bleeding from damaged vessels. Blood supply to the pelvis continues via extensive collateral circulation with the aorta and the femoral artery including the lumbar, iliolumbar, middle sacral, lateral sacral, superior and middle hemorroidal and gluteal arteries. Collateral circulation becomes functional as early as 45-60 minutes after ligation. Selective arterial embolization is an option in managing PPH if women is

hemodynamically stable but skilled intervention radiologist and radiology setup is must. Complication of embolization are postoperative fever, uterine and bladder necrosis, ischemic nerve injury, vascular perforation and infection. Uterine artery ligation is promising technique but in uterine trauma and broad ligament heamatoma it can't be done so IIAL is helpful in such cases. In placenta previa placental site receives a significant amount of its arterial supply from descending cervical and vaginal arteries. These arteries continues to perfuse even after uterine artery ligation. Stepwise devascularization is effective but uterine ischemia, synechia formation, prematuration ovarian failure and secondary amenorrhea has been reported following this procedure. B Lynch sutures works only for atony and failure can occur. IIAL not only contributes to the prevention of hysterectomy but also facilitates hysterectomy as in case of trauma by decreasing bleeding so clears operative field thus enables surgeon to avoid blind clamping and ligating tissues in pool of blood and thereby reducing ureteric injury. Morbidity of IIAL in an experienced hands is less than that of a re-laparotomy so a concurrent prophylactic IIAL is justified when one is doing LSCS for women with high risk factors for PPH. Following BIIAL, uterine arterial pressure drops with virtual elimination of the trip-hammer effect. The average decrease being 14% with the opposite side, 77% with the same side and 85% with both sides ligated[6,7] On the other hand, owing to the presence of collaterals between peripheral and central segments of internal iliac artery, peripheral and aortic branches, uterine artery and subcutaneous abdominal, ovarian, and renal arteries, development of uterine and pelvic necrosis is prevented.[8] Spontaneous birth rate after BIIAL was reported as 51.7%, and a decrease in uteroplacental blood was not asserted during pregnancies of these cases.[9,10] Since BIIAL requires more expertise than a routine obstetric surgery, internal iliac artery ligation is not preferred by many obstetricians and gynecologists for the management of postpartum bleeding.

RESULT

Out of 50 women who underwent IIAL, 41 had therapeutic IIAL from PPH and 9 had Prophylactic IIAL. Obstetric hysterectomy done in 4 cases after IIAL failed to arrest haemorrhage. Failure to control haemorrhage was evident immediately and bleeding arrested by IIAL did not recur and no subsequent procedure required in any case. Out of 9 women at risk of PPH undergoing prophylactic IIAL none had subsequent haemorrhage. One women had iliac vein injury which was repaired by vascular surgeon without any morbidiry. There were no ischemic complications during in patient stay and up to 6 weeks and no deaths in these cases. IIAL is useful procedure in treatment and prevention of PPH from any cause. Early resort to IIAL effectively prevents hysterectomy in women with atonic PPH. In traumatic PPH, IIAL facilitates hysterectomy or repair as indicated and prevent reactionary haemorrhage. Injury to internal iliac vein occurred in one patient which was repaired by applying vascular clamp and then sutures taken with 4.0 silk sutures and defect closed. There were no ischemic complications like gluteal muscle ischemia or bladder ischemia in post operative period up to 6 weeks. There were no maternal deaths in our series. 3 women conceived after IIAL. These pregnancies continued till term with no evidence of fetal growth restriction. The risk factors associated with patients who underwent IIAL as listed in table 1.

Table 1: Obstetric risk factors in patients who had IIAL

PIH	12
Prior LSCS	10
Forceps Delivery	6
Anaemia	6
Placenta previa	9
Placental Abrubtion	7

The indication of IIAL as listed in table 2.

Table 2: Indications of IIAL

Uterine Atony	21
Placenta Previa	9
Placental Abruption	7
Ecclampsia and HELLP	5
Genital Tract Injury	8

CONCLUSION

In conclusion, internal iliac artery ligation is an easily applicable, safe and effective method in experienced hands for the management of life threatening obstetrical bleeding such as postpartum atony. Before hysterectomy, in order to control life threatening intractable postpartum bleeding especially in young women with lower parities, it should be tried because it is not costly and does not required complex equipment with superior advantages such as scarcity of complications and preservation, and maintenance of fertility.

Ethical approval: The study was approved by the Institutional Ethics Committee

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