Role of Internal Iliac Artery Ligation in Control of Pelvic Haemorrhage

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Research Article

Abstract: **Aims and objectives:** Haemorrhage in pregnancy is the leading cause of maternal mortality in developing countries. Internal iliac artery ligation is one of the life saving procedure in intractable pelvic haemorrhage. Present study aims at sharing author's experience about usefulness of this surgical procedure in arrest of pelvic haemorrhage and to remove the inhibition among practicing gynaecologists regarding this procedure. In my study, 28 cases of pelvic haemorrhage were managed by internal iliac artery ligation over 5 year period at tertiary care centre. Haemorrhage could be arrested in all cases. **Materials and methods:** Study comprised of analysis of 28 cases of internal iliac artery ligation performed by author over 5 year's period at Krishna institute of Medical Science, Karad which is the only tertiary centre, treating majority of complicated and high risk obstetrical cases. This was done as a life saving measure to control pelvic haemorrhage. All cases were done by intra-peritoneal route. Associated operation like subtotal hysterectomy, total hysterectomy was done when indicated. Data analysis was done in relation to indications, complications and success rate related to the surgical procedure. **Results:** It is relatively simple operation, when performed by surgeon having adequate knowledge of pelvic anatomy. Bilateral internal iliac artery ligation is an effective life saving method to control obstetrical and gynaecological haemorrhage and a hysterectomy can often be avoided. In my study success rate was 93 percentages without any complication. **Conclusion:** It is important for every pelvic surgeon to learn life saving procedure like internal iliac artery ligation. Although, it may not always be effective in control of pelvic haemorrhage, it is more conservative procedure than obstetric hysterectomy in young women with intractable pelvic haemorrhage, involving lesser morbidity and giving chance of future fertility.

Keywords: internal iliac artery, pelvic haemorrhage, maternal mortality, total hysterectomy, subtotals hysterectomy, intra-peritoneal route.

Introduction

The historical background of ligature of the internal iliac artery for the control of haemorrhage is not clear.[1] In the United Kingdom and United States, the operation was reported before 1900 and, since then, many surgeons have practiced it and found it useful. Bilateral ligation of the internal iliac arteries is a safe, rapid and very effective method of controlling bleeding from genital tract. Howard Kelly first pioneered ligation of the internal iliac (hypogastric) artery in 1893 in the treatment of intraoperative bleeding from cervical cancer prior to this technique being applicable to postpartum haemorrhage in 1893.[2] The procedure was later introduced by Mangert W F *et al.* in 1969 and extensively investigated by Burchell RC in 1968.[3] It is also helpful in massive broad ligament hematoma, in torn vessels retracted within the broad ligament, and even in postoperative haemorrhage after abdominal or vaginal hysterectomy where no definitive bleeding point is detectable. Studies have shown that, in postpartum haemorrhage, the reduction of pulse pressure may only be achieved in 48% of cases. It is for this reason that other workers have advocated bilateral ligation of the internal iliac arteries to significantly improve the chances of reducing pelvic pulse pressure and facilitate haemostasis[2]. Bilateral ligation of internal iliac arteries is also helpful in controlling atonic postpartum haemorrhage[4,5]. Unilateral or bilateral hypogastric artery Ligation can be life-saving in patients with Massive postpartum haemorrhage.[4,5]Pelvis has an excellent collateral circulation, vascular compromise does not occur when one or both internal iliac arteries are ligated.

Aims

Haemorrhage in pregnancy is the leading cause of maternal mortality in developing countries. Internal iliac artery ligation is one of the life saving procedures in intractable pelvic haemorrhage. Although effective, the procedure is not commonly performed by obstetricians and gynaecologists. Present paper aims at sharing author's experience about usefulness of this surgical procedure in arrest of pelvic haemorrhage and to remove the inhibition among practicing gynaecologists regarding this procedure. 28 cases of pelvic haemorrhage were managed by internal iliac artery ligation over 5 year period at tertiary care centre. Haemorrhage could be arrested in all cases.

Objective

To evaluate the role of internal iliac artery ligation as an effective method of controlling pelvic haemorrhage.

Indications

Prophylactic	Therapeutic
Placenta with uterine atony. Abdominal pregnancy With pelvic implantation of the placenta. Placenta accreta with intractable bleeding, and prior to total or subtotal hysterectomy when all conservative measures have failed Recurrent major placenta previa	Where bleeding continues from the base of the broad ligament; Where there is profuse bleeding from the pelvic side-wall; Where there is profuse bleeding from the angle of the vagina; Where areas of diffuse bleeding are present without a clearly identifiable vascular bed;

The present study is done in regard to indications, usefulness and safety of internal iliac ligation in control of pelvic haemorrhage which were done in past 5 years at Krishna hospital, Karad.

Materials and methods

Study comprised of analysis of 28 cases of internal iliac artery ligation performed by author over 5 year's period at Krishna institute of Medical Science, Karad which is the only tertiary centre, treating majority of complicated and high risk obstetrical cases. This was done as a life saving measure to control pelvic haemorrhage. All cases were done by intra-peritoneal route. Associated operation like subtotal hysterectomy, total hysterectomy was done when indicated. Data analysis was done in relation to indications and complications related to the surgical procedure.General anaesthesia were used in majority of emergency procedures. All cases received broad spectrum antibiotics and adequate blood replacement in Post-operative period.

Table 1: Total Cases Done

Parity	Primi	multi	Total cases
Number	7	21	28

Table 2: Distribution Of Cases According To Age

Age	Primi	Multi
<20 YRS	1	1
21-30 YRS	6	14
31- 40 YRS	0	3
>40 YRS	0	3
Total Cases	07	21

Table 3: Type of Haemorrhage And Indication For Internal Iliac Artery Ligation

Type of Haemorrhage	Primary Cause	no
1)intra-abdominal with broad ligament Haematoma	A)Post-LSCS b)Traumatic PPH after forceps delivery	3 2
2)vaginal haemorrhage (post-operative)	a) primary atonic PPH after lscs b) traumatic PPH after suction and evacuation c) post vaginal-hysterectomy leads to vault haematoma d) post abdominal hysterectomy	4 3 2 2
3)vaginal haemorrhage(after normal or instumental delivery)	a) primary atonic pph after normal delivery b) primary traumatic pph after instrumental delivery c)secondary atonic pph due to retained placental bits	5 1 2
	Prophylactic – a) abdominal hysterectomy with fibroid uterus b) abdominal hysterectomy with ca of cervix c) abdominal hysterectomy with ovarian mass	2 1 1
		28

Table 4: Associated Operation

Type of Surgery	**No**
1)Hysterectomy	19
2)Haematoma Drainage	5
3)Parineal and cervical tear suturing	3

Table 5: Morbidity

		No
ADMISSION IN ICU		28
MEAN DURATION STAY IN ICU	40+/-5 HOURS	26
HOSPITAL STAY IN DAYS	9+1 DAYS	26
HIGHER ANTIBIOTICS(7-10 DAYS)		26

Table 6: Complication

A) Intra-operative complication	No
1) Accidental ligation of common or external Iliacartery ligation	0
2) Damage to Ureter	0
3) Intenstinal injury	0
4) Bladder Injury	0
5) Damage to Common or Iliac Vein	0
B) Post-operative complication	
1)Wound gape 2)Persistant haemmorrhage 3)Dic	0 2 1

Table 7: Condition at Discharge

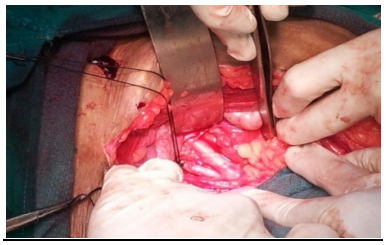
	No
Good	20
Fair	6
Expired	2

Surgical Technique-Intraperitoneal Approach[7]

The abdomen is opened and the viscera packed away in the usual manner. Identification of the bifurcation of the common iliac artery is made by two bony landmarks: the sacral promontory and an imaginary line drawn through both anterosuperior iliac spines. A longitudinal incision is made into the posterior parietal peritoneum directly over the bifurcation. Peritoneum on the lateral side of common iliac artery is vertically opened in such a way that the ureter remains attached to medial fold of peritoneal reflection and Internal iliac artery is traced downwards .The ureter was visualised, reflected, and protected with ease. Once the peritoneum is opened, loose areolar tissue is separated from artery by blunt dissection in the direction of the vessels. When the areolar tissue has been separated, the bifurcation comes into view. The bifurcation feels like an inverted Y.the branch coming off at right angle is the internal iliac artery. It courses medially and inferiorly to the palpating finger. The continuing branch is the external iliac artery. It courses laterally and superiorly out over the psoas muscles to the leg, where it becomes the femoral artery. Double thread of non absorbable suture is passed beneath the artery with the help of mixter forceps. First suture is tied firmly but gently at a level below the origin of posterior branch of internal iliac artery. Second suture is tied below the first to avoid postoperative recanalisation.Transfixation or division of the artery in between the two sutures is neither required nor desirable. The peritoneum was closed with interrupted suture by vicryl 2-0.[7]An alternative technique for internal iliac artery ligation is to slip the ligature under the common iliac artery and then pull it under the external iliac from lateral to medial side and take it out between external and internal iliac artery and ligate the internal iliac artery alone. It's a dictum that the artery is not ligated until the bifurcation of the common iliac artery is both palpated and visualized as there is no room for error. Hemodynamic considerations-The main underlying principle in ligation of the internal iliac artery for control of pelvic haemorrhage is the conversion of an arterial pressure circulation into a venous pressure circulation.[2] 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 by 85%. As a result of the reduction in the pulse pressure, blood clots begin to form at the site of bleeding from damaged vessels[2]. 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 haemorrhoidal and gluteal arteries. Collateral circulation becomes functional as early as 45-60 minutes after ligation. Author experienced little difficulty in palpating the pulsations of iliac vessels through the peritoneum in cases of hypovolemic shock. In such condition, the Vessel can be traced downwards from its origin. Pelvic or uterine bleeding was arrested in all cases that underwent internal iliac ligation.

Results and Discussion_Internal iliac artery ligation is an emergency life saving procedure that every pelvic surgeon must be able to perform. It is relatively simple operation, when performed by surgeon having adequate knowledge of pelvic anatomy. Bilateral internal iliac artery ligation is an effective life saving method to control obstetrical and gynaecological haemorrhage and a hysterectomy can often be avoided. Ligation of internal iliac artery was first performed by Kelly[2] with a success rate 95% and without any major complication. Mukherjee *et al.*[8] performed 36 cases of internal artery ligation with a success rate of 83.3% in 6 years. In my study success rate was 93 percentages. *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



Ligation of Rt Internal Iliac Artery

Conclusion

It is important for every to learn life saving procedure like internal iliac artery ligation. Although, it may not always be effective in control of pelvic haemorrhage, it is more conservative procedure than obstetric hysterectomy in young women with intractable pelvic haemorrhage, involving lesser morbidity and giving chance of future fertility Bilateral ligation of internal iliac artery is a safe, rapid and effective way of controlling obstetric and gynaecological haemorrhage. A plea is made for more frequent use of this Simple operation and for its routine teaching during the training of postgraduates.

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