
INTERNAL ILLIAC ARTERY LIGATION IN THE MANAGEMENT OF PELVIC HEMORRAGE. A DISTRICT GENERAL HOSPITAL EXPERIENCE

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Abstract

Haemorrhage from obstetric and gynaecological surgery is a major causes of morbidity and mortality. Various methods have been described to treat women with intractable haemorrhage. Internal iliac artery ligation (IAL) is an under used but potentially very effective technique, We described four cases where the procedure was used in controlling sever pelvic haemorrhage when local surgical methods had failed.

Cases

Gynaecology Cases Study 1. (1996):

A 78 year old patient Presented with a large abdominal mass with no history of vaginal bleeding or weight loss. Ultrasound examination demonstrated a huge mass with mixed echoes suspicious of a malignant ovarian tumour.

At laparotomy, de-bulking of a bilateral infiltrating ovarian tumour (20x20cm and 15x15 cm) was performed along with subtotal hysterectomy. This resulted in sever pelvic haemorrhage from severed veins along the floor of the pelvis. Applying pressure with

packs did not arrest the bleeding. The blood loss was estimated as 4500 ml. Bilateral internal iliac artery ligation was performed resulting in prompt control of the haemorrhage. There were no further complications, the patient remains well with no signs of recurrence.

Gynaccology Case study 2. (1998)

A 55 year old patient presented with lower abdominal pain and was found to have a lower abdominal mass. Ultrasound scan of the pelvis showed bilateral ovarian cysts with possible uterine fibroids.

At laparotomy, bilateral Haemorrhagic ovarian cysts with dense adhesions to bowel and rectum and other sites of endometriosis were noted. Total abdominal hysterectomy and bilateral

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salpingo-oophorectomy was undertaken after extensive dissection of adhesions. This resulted in continuous bleeding arising from the pelvic floor mainly on the left side with a total measured blood loss of 3400 mls.

Pressure application with warm packs failed to achieve adequate haemostasis. Left internal iliac artery ligation was performed, achieving prompt haemostasis, post-operative recovery was uneventful. Histology showed bilateral poorly differentiated adenocarcinoma. Six months post-operatively the patient was found to have abdominal metastases and died one month later.

Gynaecology Cases Study 3 (1998)

A 47 year old patient who had previously undergone a right oophorectomy for an ovarian cyst in 1992 and total abdominal hysterectomy in 1994 presented with left iliac fossa pain of 2 months duration. This was not associated with any gastrointestinal or urinary symptoms. Abdominal examination revealed a painful lower abdominal mass arising from the pelvis to the umbilicus, Ultrasound scan confirmed the presence of a cystic pelvic mass measuring 20cm x 20cm.

At laparotomy there was a large cystic mass densely adherent to the floor of the pelvis, large intestine, peritoneum and omentum and was presumed to have completely replaced the left ovary. Extensive dissections were followed by removal of the entire cystic mass. The omentum was biopsied to exclude malignancy. The surgical procedure resulted in moderately severe bleeding from the pelvic floor, which did not respond to application of pressure. The left internal iliac artery was ligated resulting in prompt haemostasis. Total blood loss was more than 3 liters. The patient made an uneventful recovery. Histopathology showed a benign

siderotic cyst. The patient remains well at the writing of this study.

Obstetric Case study 1(2002)

A 30 year old healthy primiparous woman underwent an emergency lower segment caesarean section for failure to progress in the second stage of labour. Immediate postoperative recovery was uneventful and the patient was discharged home on the fifth day. Four weeks later the patient presented to the Accident and Emergency department having had a sudden, painless, moderate loss per vaginam not associated with any signs of infection. Examination revealed a normal sized uterus and closed cervix, ultrasound examination did not show evidence of retained products and a diagnosis of endometritis was made. Treatment comprised the administration of Syntometrine and antibiotics and the patient was discharged home the next day.

She was readmitted a week later with a further episode of bleeding with blood loss estimated as approximately 1000 mls. Medical treatment with Syntometrine and Prostaglandins failed to control the bleeding. Examination under general anaesthesia revealed a bulky uterus with fresh blood through the cervix. Hysteroscopic examination failed to locate the source of bleeding. Gentle suction curettage led to more brisk bleeding successfully controlled by intrauterine packing with gauze. Removal of the pack under general anaesthesia forty-eight hours later resulted in brisk haemorrhage. Immediate laparotomy revealed a 10 week sized uterus with an intact healed lower segment scar. There was no evidence of infection or haemoperitoneum. Bilateral internal iliac artery ligation was performed achieving prompt haemostasis. There was no vaginal blood loss for nearly a week. However on the eighth day there was further

bleeding estimated as 500 mls. Effective control was achieved by the insertion of a rush balloon catheter. Pressure from this stopped the bleeding and the catheter was left in situ for one week when the balloon was deflated to half its original volume. The following day the catheter fell out spontaneously without any further blood loss. Total blood loss was approximately 3500 mls. The patient remained well at follow up one month later..

Discussion

Ligation of the internal iliac arteries for the control of pelvic haemorrhage was first performed in the early 19th century and was described by Kelly¹ who used the procedure to control bleeding from carcinoma of the cervix.

Despite increased medical knowledge and understanding of the circulatory system, pelvic surgeons remain reluctant to learn and develop this straightforward procedure.

Pelvic hemorrhage, regardless of cause, is associated with a higher degree of morbidity and mortality and needs to be controlled immediately. Ligation of the internal iliac artery is a tried and tested method of achieving this goal without compromising the rest of the pelvic blood supply which has a rich collateral circulation. Rich and Nechtow² emphasized that the biggest pitfall with iliac artery ligation is delaying the procedure. Ledee et al suggested internal iliac artery ligation should be taught to junior doctors in an attempt to decrease the number of patients with intractable PPH transferred to tertiary referral centers³. The complications encountered are few if the procedure is performed carefully and with sound knowledge of pelvic anatomy⁴.

Internal iliac artery ligation was used in the emergency management of three gynaecological and one obstetric patient in Yeovil District Hospital.

The procedure was successful in arresting pelvic hemorrhage promptly in all four patients. None of the patients had any adverse effects directly related to the procedure. Only one patient died 7 months after the operation as a consequence of metastatic spread.

In the obstetric case, the procedure was initially successful. However bleeding recurred one week following internal artery ligation, this was subsequently controlled by insertion of a Rusch balloon. Internal iliac artery ligation is successful in obstetric patients, an observation which is supported by the experience of others who report a failure rate in obstetric patients of 25-34%^{5,6}.

The authors believe that the procedure of internal iliac artery ligation is not as difficult to perform as is commonly perceived. In comparison to procedures with a similar outcome, it can be performed quickly with no need for patient transfer to other departments and less involvement of other health professionals, as would be the case with internal iliac artery embolisation which is equally successful but is mainly performed in territory referral centers and requires specialist radiology input. It demands specialist radiology input. It demands specialist skill, training and facilities taking longer to perform, which may not be in the patient's best interest. Delaying the procedure can result in increased morbidity such as disseminated intravascular coagulation. Unilateral internal artery ligation can be equally successful in controlling bleeding in certain situations. In our study this was the procedure undertaken in two of the gynecological patients who continued to bleed intra-operatively after pelvic surgery. The bleeding in both cases, although moderately severe, was localized to one side of the pelvis.

In obstetrics, bilateral iliac ligation is an effective alternative to emergency

hysterectomy, therefore preserving reproductive function in young patients. Uncomplicated term pregnancies after bilateral internal iliac artery ligation have been reported by Mengert et al⁷.

In conclusion therefore the authors believe that the expertise to perform IAL should be acquired by every obstetrician and Gynaecologist who may be faced with the need to immediately control severe pelvic hemorrhage.

From the presentation of four cases studies managed in a district general hospital, our aim was to demonstrate that the use of internal iliac ligation as a valuable and effective procedure in obstetrics and Gynaecology. The authors advocate more widespread training in the use of this under utilized procedure in United Kingdom.

Background Mechanism

The uterine artery, which is a branch of internal iliac artery, is the main blood supply to the uterus. Burchell et al in the 1960s^{8,9} established the true mechanism by which internal iliac artery ligation controlled haemorrhage. It was shown that if the uterine artery were transected after internal iliac ligation, blood continued to flow at which necessitate ligation of the cut uterine artery. Burchell's studies demonstrated the haemodynamics of the pelvic vasculature measuring diastolic blood pressure and blood flow in the uterine and internal iliac arteries before and after internal ligation. He

demonstrated that the near elimination of the pulse (arterial) pressure distal to the ligation was decreased by 77% on the side of the ligation, But by only 14% on the opposite side by 85% if but internal iliac arteries were ligated. The effect of this procedure is to change a pulsating arterial system in the uterus to a system more closely resembling a venous supply. By so doing, a Blood clot could form distal to the ligation and remain in place rather than being dispersed.

Technique

Technique involves identifying the bifurcation of the internal iliac artery where it is crossed by the ureter. A 3-4cm incision is made in the peritoneum lateral to the line of the ureters. With the peritoneum open, the ureter is retracted medially and the internal iliac artery is ligated¹⁰ preferably at a point distal to the origin of its posterior division as this has been demonstrated to enhance the haemostatic effect⁹. A curved or right angled clamp is passed behind the artery, the appropriate non absorbable suture material is fed around the artery and two free ligatures tied 1-2 cm apart. The vessel is NOT divided. Care must be taken to avoid trauma to the internal iliac veins which lie immediately underneath. Before and after internal iliac ligation, The external iliac artery and femoral pulses must be identified in order to avoid accidental ligation of the external iliac artery¹⁰.

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