CASE REPORT

Fertility following ligation of internal iliac arteries for life-threatening obstetric haemorrhage

P.T. Wagaarachchi1 and L. Fernando

Department of Obstetrics & Gynaecology, University of Kelaniya, Castle Street Hospital for Women, Sri Lanka

1To whom correspondence should be addressed at: Dugald Baird Centre for Research on Women’s Health, Department of Obstetrics & Gynaecology, University of Aberdeen, Aberdeen Maternity Hospital, Cornhill Road, Aberdeen AB25 2ZL, UK.
E-mail: ogy158@abdn.ac.uk

Bilateral ligation of internal iliac (hypogastric) arteries (BIL) is a life-saving operation in cases of massive obstetric haemorrhage. This operation preserves reproductive function as opposed to the more commonly performed emergency hysterectomy in such situations. We report on effectiveness and future fertility in 12 women who had internal iliac ligation to control severe obstetric haemorrhage: in 10 out of the 12 women, BIL was successful. Of the two women who subsequently needed emergency hysterectomy, one woman died of disseminated intravascular coagulation. Of the eight women we were able to follow-up to assess reproductive performance, two did not desire future fertility. Three had subsequent pregnancies (50%), of whom two proceeded to term. We conclude that BIL is a safe and effective procedure for treating life-threatening obstetric haemorrhage with preservation of future fertility. This technique should be performed more often when indicated.

Introduction

Uterine atony is the commonest cause of life-threatening obstetric haemorrhage. In women not responding to medical treatment, the traditional surgical treatment is to perform an emergency hysterectomy, eliminating any possibility of future fertility. Bilateral ligation of internal iliac (hypogastric) arteries (BIL) is an alternative life-saving operation, which preserves reproductive capacity. Despite this, only a few obstetric surgeons opt for this operation as opposed to emergency hysterectomy in such a situation, the reason being unclear.

BIL is mainly indicated in post-partum haemorrhage due to uterine atony rather than due to obstetric trauma. However, some report successful use of BIL in patients with ruptured uterus and placenta accreta (Stephen and Patricia, 1985; Paraskevaides et al., 1993). In the event of supra levator haematoma not responding to conservative management, the recommended treatment is internal iliac ligation, not hysterectomy (Beazley, 1994). The surgical technique and effectiveness is extensively described in the literature (Thavarasah et al., 1989; Nandanwar et al., 1993) although data regarding future fertility following the procedure are scarce.

The aim of this case series is to describe effectiveness and future fertility in women who had internal iliac ligation for control of life-threatening obstetric haemorrhage.

Materials and methods

Women who had iliac ligation for obstetric haemorrhage over a period of 6 years (1991–1996) at Castle Street Teaching Hospital for Women, Colombo, Sri Lanka were reviewed. The patients were identified using operating theatre registers and record office sources. Case notes were reviewed for clinical details and outcome of surgery. Subsequent fertility was assessed by means of a follow-up visit or a postal questionnaire sent to the patient. Three consultants in the hospital performed all the operations.

Surgical technique

All the patients in the study had BIL by a transperitoneal approach. A sound knowledge of pelvic anatomy was essential prior to the procedure. The common iliac artery bifurcates into external and internal iliac arteries at the pelvic brim. The ureter crosses the common iliac artery at this level and descends into the pelvis, parallel to the internal iliac artery. These structures could readily be identified through the peritoneum when the puerperal uterus was moved to the opposite side. A 6–8 cm incision was made in the posterolateral peritoneum in line with the ureter. The peritoneal flap was then retracted medially, with the ureter still attached. The internal iliac artery was identified and exposed by separating pelvic areolar tissue carefully for a length of 2–3 cm. It was not necessary to completely free the artery. The exposure was mainly attempted at the distal end of the internal iliac artery, in order to avoid ligation of the posterior branch, which supplies the gluteal muscles and buttocks. Once the site of ligation was selected, a right-angled clamp was used to place sutures around the artery. It was important to work within the adventitia of the artery to avoid damage to the veins in the vicinity. The ligature placed under the artery was then tied without cutting the vessel. Any suture material can be used with similar success. Complications of BIL include injury to the iliac vein, ligation of the external iliac artery and failure to control haemorrhage.

Case reports

Clinical details and outcome for the 12 women who had BIL are summarized in Table I. In all patients, the principal contributor to haemorrhage was an atonic, empty uterus not responding to oxytocics. Almost all the patients required blood
transfusions of >4 units. In two women (case nos. 3 and 6), hysterectomy was performed following BIL due to continuing haemorrhage.

There was one maternal death in our series of 12 patients (case no. 3). This patient was a 35 year old, primiparous woman who had an uneventful pregnancy up to 32 weeks of gestation when she developed moderate pregnancy-induced hypertension. At 35 weeks gestation the patient was admitted in spontaneous labour and had a vaginal delivery of a live infant weighing 3.2 kg. During labour, her platelet count was normal. Immediately following delivery, severe post partum haemorrhage occurred. This was treated with oxytocics and a blood transfusion was commenced. Due to continuing haemorrhage, the patient was taken to the operating theatre 2 h after delivery and BIL was performed, followed by hysterectomy. The patient developed disseminated intravascular coagulation during surgery and died 7 h later.

Eight women were followed up at varying intervals of 2–7 years to assess reproductive performance. Of these, two were using contraception and did not desire future fertility (case nos. 2 and 10). Three women had subsequent pregnancies, of which two proceeded to term.

In case no. 5, induction of labour was undertaken at 41 weeks of gestation with artificial rupture of membranes and syntocinon infusion. The patient had a prolonged labour (14 h) and finally an emergency Caesarean section was performed because of failure to progress in stage I. The uterus was relaxed and atomic after the section with continuing bleeding although oxytocics were used. At this juncture, BIL was performed successfully, and the haemorrhage was controlled.

A spontaneous pregnancy occurred 2 years after BIL and the patient delivered a baby boy, weighing 3.3 kg by elective Caesarean section.

Case no. 9 had an uneventful pregnancy and labour, and spontaneously delivered a 3.5 kg baby. She started to bleed profusely 1 h after delivery, and, following rapid blood loss which did not respond to oxytocics, BIL was performed. Excessive venous oozing occurred on the left side which was controlled well by direct pressure using a pack. Her post-operative period was uneventful. She conceived spontaneously 20 months after BIL, and subsequently had a normal vaginal delivery of a baby weighing 2.8 kg.

In case no. 12, the patient had a short labour (3 h) and vaginal delivery, which was followed by severe haemorrhage due to uterine atony. She received a massive blood transfusion and bleeding was controlled with BIL. She subsequently became pregnant on two occasions, both of which ended as first trimester miscarriages. No investigations were done to identify a possible cause for repeated miscarriages.

### Discussion

BIL (previously referred as to hypogastric artery ligation) to control pelvic haemorrhage was first supposedly performed by Kelly in 1894. Since then, many reports have emerged describing its diverse indications, surgical technique and effectiveness in controlling pelvic haemorrhage (Rajaram et al., 1993; Torreblanca et al., 1993). However, this is not a technique that has been widely practised by British obstetric surgeons over the years.

A major portion of the blood supply to the pelvic viscera is via branches of the internal iliac artery. BIL minimizes the pulse pressure of the arterial system, converting it to a venous-like system. This reduces bleeding appreciably by facilitating clot formation distal to the site of ligation. However, three principal collateral circulations involving vessels of smaller diameter prevent ischaemia to the pelvis (Burchell, 1964). These collateral are able to undergo hypertrophy in the event of a subsequent pregnancy. Demonstration of normal uterine and fetal circulation monitored with colour Doppler imaging in pregnancy after BIL has clearly confirmed this (Papp et al., 1996).

Of the eight patients we were able to follow up, three had pregnancies of which two were term deliveries. Only two women out of eight did not desire any more children due to the traumatic experience and were using contraception (case
associated with trauma to the bladder, which needs to be relatively easy. Emergency total hysterectomy can be planes are easier to dissect and structures are larger, making 242 associated with less post-operative morbidity compared with and ovarian artery ligation in the control of pelvic haemorrhage.

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following BIL (case nos. 3 and 6), demonstrating the effect- bleeding

BIL is only rarely associated with complications, which can result from damage to ureter, iliac veins and accidental ligation of the external iliac artery. These complications can be avoided by appreciation of important surgical anatomy and meticulous dissection. Venous bleeding can occasionally be very troublesome. We had only one patient with such bleeding which responded well to direct pressure.

The type of suture material used for BIL does not seem to affect either the effectiveness of the technique or subsequent fertility. However, recanalization rates may be greater with absorbable suture materials.

In conclusion, BIL is a safe, effective procedure for treating life-threatening obstetric haemorrhage with preservation of future fertility. It should be the operation of choice to control severe bleeding in young women of low parity. There is an urgent need to train and familiarize the younger generation of obstetricians to perform BIL.

References


Report on confidential enquiries into Maternal Deaths in the United Kingdom 1998). Some surgeons combine BIL with bilateral ovarian artery ligation to improve the haemostatic effect (Cruikshank and Stoelk, 1985). We did not perform this operation in our series of BIL.

Part from conserving future fertility, BIL has other advantages over the more commonly performed emergency hysterectomy for life-threatening obstetric haemorrhage. BIL is associated with less post-operative morbidity compared with emergency hysterectomy and requires less operating time for those experienced with the technique. In pregnancy, tissue planes are easier to dissect and structures are larger, making BIL relatively easy. Emergency total hysterectomy can be associated with trauma to the bladder, which needs to be reflected down to incorporate the indistinct post-delivery cervix. Bladder damage, haematomas, post-operative adhesions and vault prolapse can be avoided by choosing BIL instead of hysterectomy. Long-term observation of patients after BIL has not shown any increase in distant side-effects (Olezczuk et al., 1995).

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