



# Results of Internal Iliac Artery Ligation in Pelvic Bleeding

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## Abstract

Postpartum haemorrhage in obstetric patients, if not managed immediately can be fatal. When local packing, pharmacotherapy and even hysterectomy fail, ligation of internal iliac artery may be needed. This study was conducted on the patients who had significant postpartum bleeding, and in whom all other measures of arresting the bleeding failed. A detailed history, through general / systemic examination was contemplated, baseline investigations were sent in all the patients approaching labor. The cause of bleeding was recorded in both vaginal and caesarean delivery. Internal artery ligation was done either by the obstetrician or the vascular surgeon. 44 patients underwent internal artery ligation. Uterine atony, placenta praevia and post-partum haemorrhage were common indications for ligation. 36 patients had undergone caesarean section, 12 vaginal delivery and 8 hysterectomy. Women with atonic PPH at vaginal delivery or caesarean section were initially treated with conservative / pharmacotherapy. Iliac vessels were approached by transverse or midline approach. Bilateral ligations were done in 41 patients. There was no mortality. Pelvic bleeding after any mode of delivery, or surgery on uterus and ovaries can present with a grim phenomenon. Accurate diagnosis, and immediate precise surgical intervention decreases morbidity and mortality.

## Key Words

Postpartum hemorrhage, Internal artery ligation, Placenta previa

## Introduction

Internal Iliac Artery Ligation (IIAL) can be a lifesaving procedure for patients with intractable haemorrhage from pelvic viscera. This is especially true in the field of obstetrics and gynaecology, where postpartum haemorrhage (PPH), remains a major cause of mortality. In severe bleeding, vaginal packing, suturing of vaginal vault and supra-cervical hysterectomy may not always arrest the bleeding. Mortality was high before the internal artery ligation was practised. It is not only the PPH, where in patients where all other approaches of arresting bleeding fail, ligation of internal arteries should be considered, which is safe, can be done by any surgeon and has few side effects. The internal iliac artery is the medial branch of common iliac artery, and gives iliolumbar, lateral sacral and superior gluteal arteries from the posterior division. Parietal branches from anterior division are obturator, internal pudendal and inferior gluteal arteries, visceral branches from anterior division are umbilical,

superior vesical, inferior vesical, middle hemorrhoidal, uterine and vaginal artery. Internal iliac artery is a retroperitoneal structure, and on the right-side terminal end of ileum and cecum may overlie the peritoneum. Ligation of the hypogastric system was regarded as equivalent to shutting off all blood to the area, which not true. In fact, the hypogastric artery distal to the ligation is never emptied of blood.

## Material and Methods

The study was conducted in the department of Obstetric and Gynaecology, Government Hospital Sarwal, Jammu, where all Obstetric and Gynaecology patients are routinely admitted and managed. The study included all the patients with intraperitoneal haemorrhage in the immediate post-operative period, conization of the cervix, lacerations of the cervix, lower uterine segment and upper vagina, uterine atony, placenta previa, uterine rupture, advanced

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endometrial carcinoma, late stage carcinoma cervix, haemorrhage from vaginal angles during or after abdominal hysterectomy, vaginal vault bleeding after vaginal hysterectomy, placenta accreta, and placental implantation in broad ligament. In addition, intraligamentous pregnancy / leiomyoma, pelvic inflammatory disease, extensive endometriosis, and Wertheim's hysterectomy were also considered for intervention. Iliac vessels were approached during caesarean section / hysterectomy if the haemorrhage was observed during surgery or were approached by midline or transverse abdominal incision. Bilateral ligations were performed in majority. Morbidity and mortality were recorded.

### Results

44 patients were included in the study, majority were in 3rd decade of life, 24 patients 54.54% had undergone caesarean section, 14 patients 31.81% had undergone vaginal delivery and 18.18% had undergone hysterectomy. In 35 patients 79.54% bleeding was observed in immediate postoperative period / post vaginal delivery, one had uterine rupture. 18 patients 40.90% had PPH from atony, 11 (25%) had genital tract injury, 7 (15.90%) had placenta praevia, 4 (9.09%) had placental abruption, coagulopathy, uterine inversion and uterine rupture were the causes of bleeding in others. Women with atonic PPH at vaginal delivery or caesarean section were initially treated with conservative measures / pharmacotherapy. Iliac vessels were approached by transverse or midline approach. Bilateral ligations were done in 95.45%, and hysterectomy even after bilateral internal artery ligation was done in 13.63% of the patients. There was no mortality.

### Discussion

Postpartum haemorrhage (PPH) is a major cause of maternal mortality ranging from 13% in developed countries to 34% in developing countries. It is reportedly responsible for 125000 maternal deaths each year and is associated in morbidity in around 20 million women per year. Major PPH or loss of over 1000 ml of blood occurs in 1 to 5% of deliveries. Uterine atony is the common cause of PPH and accounts for 80% of all cases. Less invasive procedures for reducing bleeding besides others are selective arterial embolization. Emergency hysterectomy was the most commonly performed procedure for pelvic haemorrhage in obstetrics and gynaecology patients, which besides being time

consuming, prevented further fertility. Internal artery ligation which reduces pelvic blood flow by 49% and pulse pressure by 85 % is an effective means of controlling intractable PPH and preventing maternal deaths (1). However the reported success rate of IIAL varies from 40 to 100%, 2 and the procedure averts hysterectomy in 50% only (2,3). PPH can be fatal in spite of all the resuscitative measures, and one of the reasons can be delayed surgical intervention (4,5). Uterine artery ligation is a promising technique in management of PPH as the occlusion of uterine artery reduces 90% of the blood flow. It is useful in uterine atony but in uterine trauma the vessels in to broad ligament and may not be identified and ligated, also uterine artery ligation is not helpful in deep forniceal tears and haematomas. Bilateral internal artery ligation is an effective life saving method to control pelvic haemorrhage, hysterectomy can be avoided and future fertility preserved. Internal iliac artery ligation for control of pelvic haemorrhage is more than century old (1). The findings of the present study with regard to indications are in accordance to other studies (6). Use of right-angled clamp for identification, isolation and looping has been reported by others also (7). Use of silk and polyglycolic acid suture for ligation of internal iliac arteries is well reported (8). The findings of the present study are in accordance to other reports, where even after bilateral internal artery ligation hysterectomy was needed in four patients, but are in contrast with regard to mortality because none of the patients died in the present study (9). Hypogastric internal artery ligation was pioneered by Howard Kelly for the treatment of intraoperative bleeding from cervical cancer prior to its application in PPH, and it is well established that hypogastric artery ligation can be life-saving in patients with massive pelvic haemorrhage (10,11). The observations of the present study are at variance to those who have recommended internal artery ligation even in spontaneous haemorrhage from advanced pelvic cancer, none of our patient were from this group, possibly any such others, where arterial embolization, preferably proximal embolization has been preferred (12). Transabdominal / trans-peritoneal approach used in the present study for ligation of internal iliac arteries is well established, so is the retroperitoneal (13). The study is at variance to the endovascular approach used for ligation / obliteration of internal iliac arteries (14,15).

In conclusion selective therapeutic embolization of bleeding vessels is an excellent modality of arresting haemorrhage in pelvic haemorrhage, however, this facility



is not available in all the centres. Internal artery ligation is safe, performed quickly, without significant blood loss, decreases morbidity / mortality, can be done in majority of the centres, preserves fertility and gives excellent results.

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