

# Role of arterial embolisation in achieving hemostasis in gynaecologic oncology – a preliminary study

C.Y. Chen<sup>1</sup>  
C.L. Ong<sup>2</sup>  
D. Wong<sup>3</sup>  
E.H. Tay<sup>4</sup>

## ABSTRACT

**Objective:** The aim of this study is to evaluate the efficacy of emergency arterial embolisation in achieving hemostasis among patients with a gynaecological malignancy and the complications encountered.

**Materials:** All patients with a gynaecological malignancy who underwent emergency arterial embolisation for hemostasis from January 1998 to April 2000 in KK Women's and Children's Hospital.

**Results:** There were 9 patients who underwent emergency arterial embolisation for persistent pelvic bleeding. Hemostasis was achieved in 7(77.8%) of them. Most of the patients did not experience much pain after the procedure, and only 2 patients required morphine analgesia. There was no complication in the 7 patients in whom hemostasis was achieved. The other 2 patients had advanced stages of cancer and died within a month of the arterial embolisation.

**Conclusion:** Arterial embolisation is an effective method to achieve hemostasis among patients with a bleeding gynaecological tumour. It is not commonly associated with severe pelvic pain and usually mild oral analgesia will suffice. Post-embolisation monitoring is important to detect complications arising from the procedure. Severe pelvic pain is unusual and careful examination for non-target organ devascularisation should be undertaken.

**Keywords:** Gynaecological malignancy, arterial embolisation, hemostasis.

## INTRODUCTION

Pelvic and genital bleeding are common problems encountered by the obstetricians and gynaecologists, but they often pose a greater challenge when they occur in patients with gynaecological cancers as the

options available to achieve hemostasis may be limited. When conservative local measures fail to stop the bleeding, surgical intervention is the commonest alternative, with ligation or diathermy of the bleeding vessels; ligation of the bilateral internal iliac or uterine arteries; or hysterectomy. Success is variable as it is often difficult to visualise the bleeding vessel due to distorted anatomy and blood obscuring the surgical field<sup>1,2</sup>. There is also a high incidence of morbidity from ureteric injury, sepsis, and continued haemorrhage. Radiotherapy to pelvic carcinomas may stop the bleeding, but the time lag from treatment to cessation of bleeding makes it inappropriate for patients with profuse bleeding and associated hemodynamic disturbance.

Arterial embolisation has been used since 1972 to stop haemorrhage resulting from pelvic trauma<sup>1</sup>, postpartum haemorrhage and post-operative haemorrhage. The usage has increased in recent years with the advent of more sophisticated techniques using

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<sup>1</sup> Department of General Obstetrics and Gynaecology  
KK Women's and Children's Hospital

<sup>2</sup> Department of Diagnostic Imaging  
KK Women's and Children's Hospital

<sup>3</sup> Department of Radiology  
Tan Tock Seng Hospital

<sup>4</sup> Gynaecological Oncology Unit  
KK Women's and Children's Hospital

Correspondence:  
Dr. Chen Chern Yi  
KK Women's and Children's Hospital  
100 Bukit Timah Road  
Singapore 229899

specialised catheters and a wider range of embolic agents.

### OBJECTIVE

The aim of this study is to evaluate the efficacy of emergency arterial embolisation in achieving hemostasis among patients with a gynaecological malignancy and the complications encountered.

### METHOD AND MATERIALS

The gynaecological oncology unit in KK Women's and Children's Hospital manages an average of 750 new patients with pre-cancerous or malignant diseases annually. All the patients who underwent an emergency arterial embolisation for hemostasis in our hospital were reviewed and those with a gynaecological malignancy were included in this study.

From January 1998 to April 2000, our department of diagnostic imaging performed a total of 15 arterial embolisations, and 9 of them were for patients with a gynaecological malignancy. The arterial embolisations were performed by 4 different on-duty interventional radiologists. Gelfoam and polyvinyl alcohol were the two most common embolic agents used in all patients either alone or in combination. Only one patient had additional embolisation coils inserted into the internal iliac arteries bilaterally.

### RESULTS

There were a total of 9 patients with malignancies who required emergency arterial embolisation between January 1998 and April 2000. Of these, 5 patients had cervical carcinomas, 2 had gestational trophoblastic tumours, 1 patient had endometrial carcinoma and 1 had ovarian carcinoma.

Four patients had bleeding from the primary tumour, 4 from tumour recurrences, and 1 patient had a stenotic vagina following radiotherapy that bled after physical examination. In all the patients except one, the bleeding sites were initially packed in an attempt to stop the bleeding but were unsuccessful. The exception was a patient who had an invasive mole involving the lower uterine segment and underwent emergency arterial embolisation as the primary method of hemostasis.

A summary of the patients' age, malignancy, angiogram finding, site of embolisation and outcome is given in Table 1.

Hemostasis was achieved in 7 (77.8%) of the 9 patients. Hypervascularity of the pelvic lesions is the most common feature (figures 1 and 2), with only 3

patients showing actual extravasation (figures 3 and 4). Hemostasis was achieved in all the 3 patients and although extravasation of contrast was not demonstrated in the remaining 6 cases, hemostasis was achieved in 4 patients by embolising the hypervascular lesions.

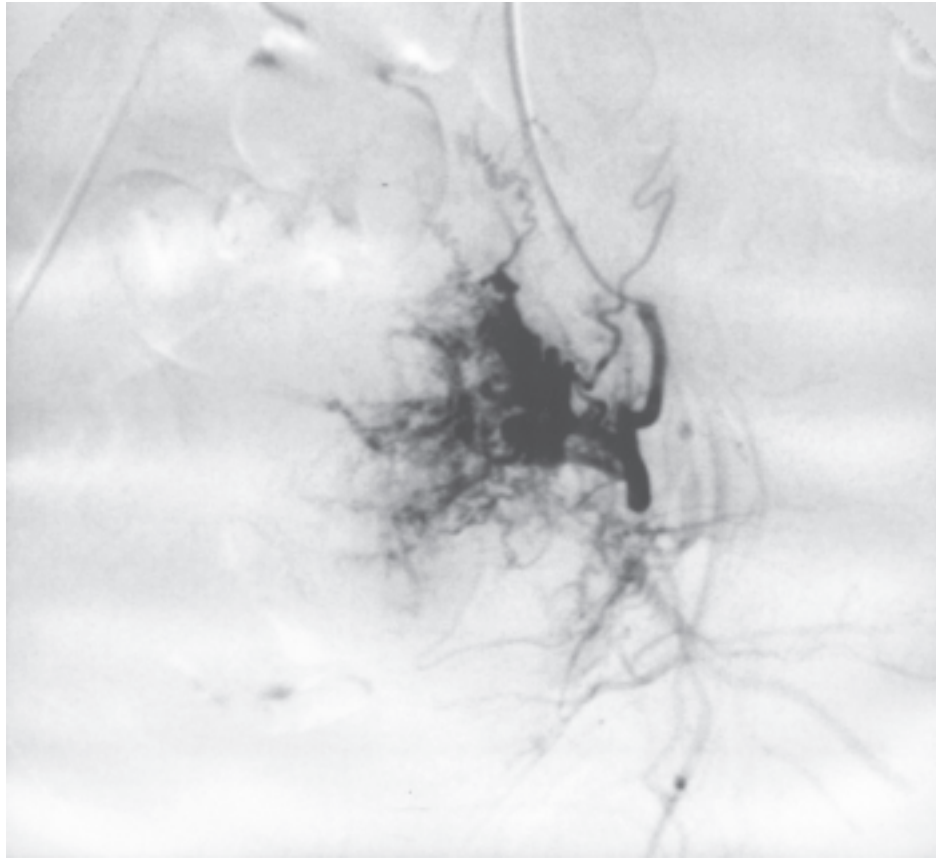
There was no complication in the 7 patients in whom hemostasis was achieved. Two patients had persistent bleeding and unfortunately died within a month of the embolisation. One patient had Stage IVA squamous cell carcinoma of the cervix and was treated by radical radiotherapy. She was admitted 1 year later due to severe bleeding from pelvic tumour recurrence and underwent emergency arterial embolisation. The pre-embolisation arteriogram showed that the left internal iliac artery was encased by the tumour and there was extensive neovascularity within the right hemipelvic cavity from the right uterine artery, but no extravasation of contrast. Embolisation of the distal left internal iliac artery and right uterine artery was performed with satisfactory reduction of tumour vascularity. Over the next few days she complained of severe pain and numbness in the left lower limb, however assessment was difficult due to previous deep vein thrombosis in that limb. She was treated symptomatically with morphine and sodium valproate. She subsequently suffered devascularisation of the left lower limb. An arteriogram showed thrombosis in the left common and external iliac arteries. She refused any surgical procedure and died 9 days after the embolisation procedure. The other patient had stage IVB endometrial carcinoma, and underwent debulking surgery followed by radiotherapy in May 1999. She presented 5 months later with bleeding from pelvic tumour recurrence and computed tomography revealed multiple liver metastases and tumour deposits on the abdominal wall. She was initially treated conservatively with vaginal packing but as the bleeding continued, she underwent emergency arterial embolisation. The arteriogram did not show any extravasation of contrast, but there was moderate tumour hypervascularity noted with feeding branch vessels from the internal iliac arteries bilaterally. Embolisation was performed using gelfoam and post-embolisation arteriogram showed no significant tumour hypervascularity. She however continued to have slow bleeding from the pelvic tumour recurrence, requiring 6 units of packed cells transfusion over the next 3 weeks. She subsequently developed deep vein thrombosis and pulmonary embolism, and died 27 days after the arterial embolisation.

Most of the patients were comfortable after the procedures. Four (44.5%) patients did not require any analgesia, 3 (33.3%) received paracetamol analgesia and only 2 (22.2%) required morphine for pain relief.

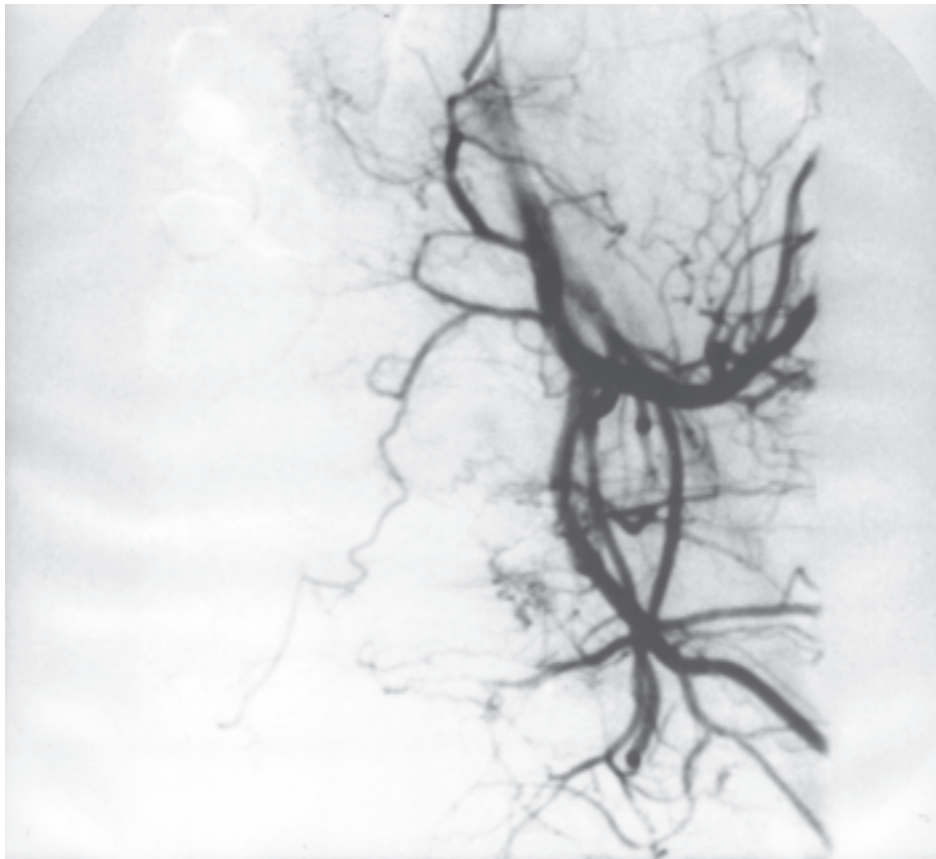
ROLE OF ARTERIAL EMBOLISATION IN ACHIEVING HEMOSTASIS  
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**TABLE 1**  
**Patients' data, angiogram finding, embolisation and outcome**

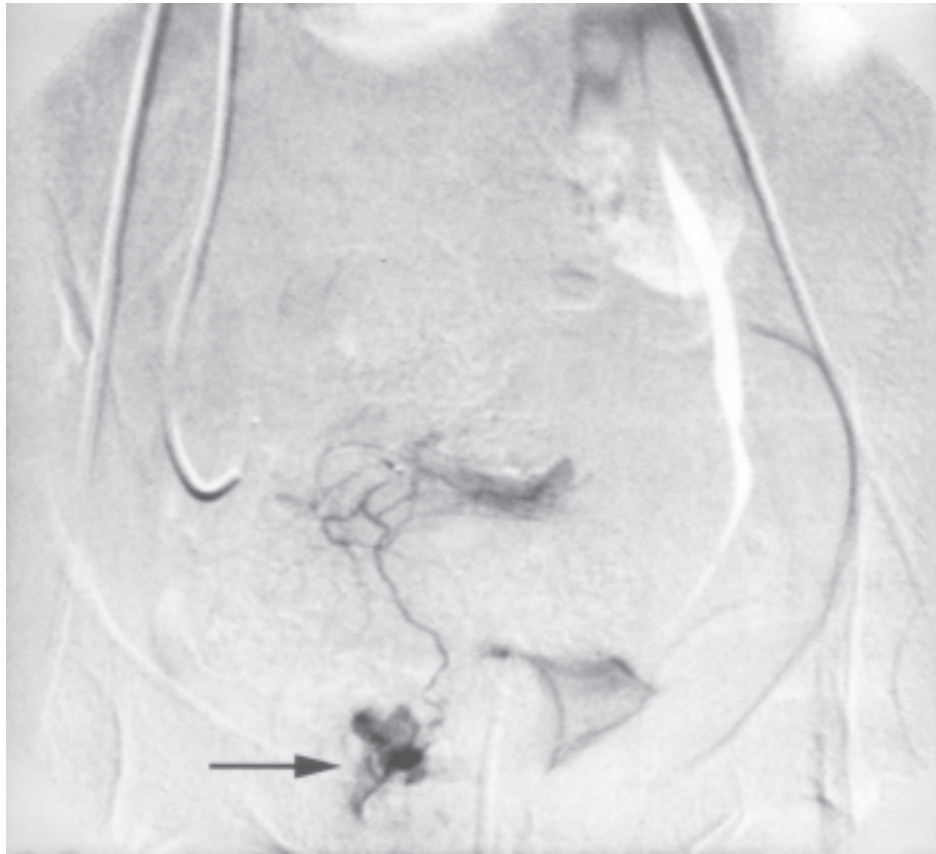
Patient	Bleeding Site	Angiogram	Embolisation	Outcome
35 years old Invasive mole	Tumour	Feeding branch vessels from bilateral uterine arteries	Selective embolisation of bilateral uterine arteries	Hemostasis achieved
47 years old Stage IIB cervical carcinoma	Tumour biopsy site	Extravasation from bilateral uterine arteries	Selective embolisation of bilateral uterine arteries	Hemostasis achieved
48 years old Cervical carcinoma	Pelvic tumour recurrence	Extravasation from uterine branch of left internal iliac artery	Embolisation of anterior division of bilateral internal iliac arteries	Hemostasis achieved
46 years old Choriocarcinoma in vagina	Tumour in vagina	Extravasation from vagina branch of right uterine artery	Selective embolisation of vagina branch of right uterine artery	Hemostasis achieved
72 years old Stage IIIC ovarian carcinoma	Vault recurrence	No contrast extravasation, small feeder vessels from bilateral internal iliac arteries	Selective embolisation of feeder vessels from left internal iliac artery, and anterior division of right internal iliac artery	Hemostasis achieved
63 years old Stage IIIB cervical carcinoma	Post-radiotherapy stenotic vagina	Extravasation from an end branch of left internal pudendal artery	Embolisation of anterior division of bilateral internal iliac arteries	Hemostasis achieved
52 years old Stage IVA cervical carcinoma	Pelvic tumour recurrence	Tumoural encasement of left internal iliac artery, Neovascularity from right uterine artery	Embolisation of distal portion of left internal iliac artery, and right uterine and internal iliac arteries	Bleeding persisted Devascularisation of left lower limb days later, and died 9 days later
56 years old Stage IVB endometrial carcinoma	Pelvic tumour recurrence	No contrast extravasation moderate tumour blush with feeding vessels from bilateral internal iliac arteries	Embolisation of anterior division of bilateral internal iliac arteries	Bleeding persisted Developed deep vein thrombosis 1 month later and died.
45 years old Cervical carcinoma	Tumour	No contrast extravasation, hypervascular uterus and cervix	Embolisation of bilateral uterine arteries	Hemostasis achieved



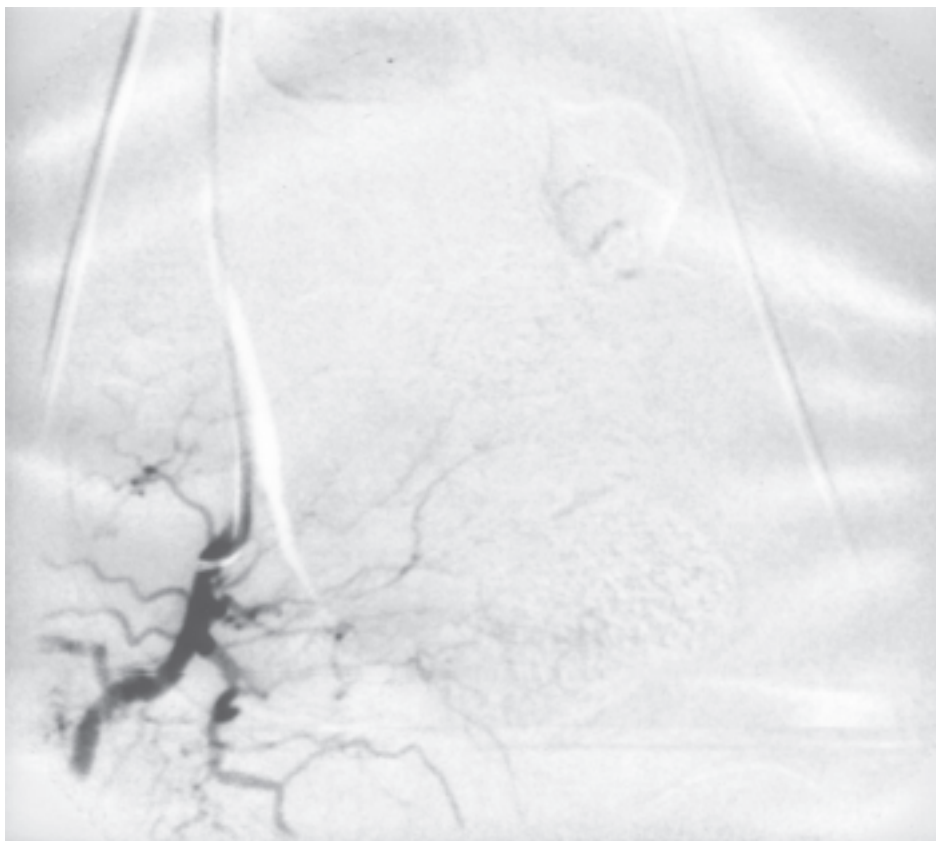
**Fig. 1.** Selective left uterine angiogram showing hypervascular uterus and cervix.



**Fig. 2.** Post-embolisation angiogram of the left common iliac artery showing significant reduction in uterine artery blood flow and vascularity.



**Fig. 3.** Highly selective cannulation of the vaginal branch of the right uterine artery showing a small hypervascular focus (metastatic choriocarcinoma) in the vagina with contrast extravasation (arrow).



**Fig. 4.** Post-embolisation angiogram of the right internal iliac artery revealing obliteration of the hypervascular vaginal tumour and cessation of extravasation.

## DISCUSSION

Arterial embolisation is an effective modality for achieving hemostasis among patients who experience bleeding from gynaecological malignancies that fail to respond to conservative local measures. There are many advantages for this approach as compared to a surgical approach. These include selective occlusion of the bleeding vessel which may be obscured by haemorrhage in the operative field, and embolisation of more distal parts of the vessels and their collaterals<sup>3</sup>. In cases where extravasation of contrast is not seen at arteriography, embolisation of the uterine arteries or hypervascular tumour often resulted in cessation of haemorrhage. The success of the procedure can be immediately verified by post-embolisation arteriogram and re-embolisation of bleeding vessels easily undertaken if necessary<sup>1</sup>. General anaesthesia is usually not required, and therefore risks associated with general anaesthesia and surgery are eliminated.

Complication rate associated with arterial embolisation is usually in the range of 6-7%<sup>4</sup>, and these include pelvic pain; post-embolisation syndrome; puncture site infection; guide wire perforation of artery and thrombo-embolic phenomena. Other complications like lower limb paresis; bladder necrosis and gangrene are associated with emergency arterial embolisation<sup>5</sup>. Pelvic pain is usually limited to the first 6-12 hours after the procedure<sup>5</sup>, although some patients may require opioid analgesia for up to 4 days<sup>6</sup>. In those patients who experience severe pelvic pain, careful examination should be performed to exclude

inadvertent embolisation or migration of embolic materials into vessels of non-target organs. One of our 2 patients who required morphine analgesia, complained of severe lower limb pain and numbness and subsequently had devascularisation of the left limb secondary to left common iliac and external iliac arteries thrombosis.

The major determinants of incidence of complications include the nature of the underlying lesion; the overall clinical status of the patient; the level of occlusion to achieve hemostasis; the vascular anatomy; the experience of the interventional radiologists; the catheters and contrast used; the embolic agents and the adequacy of follow-up care<sup>7</sup>. As the machines, materials and expertise necessary for undertaking emergency arterial embolisation continue to improve, and more cases of haemorrhage are managed in this way, it is important to have good post-embolisation monitoring to detect and minimise complications resulting directly from the procedure.

## CONCLUSION

Arterial embolisation is an effective method to achieve hemostasis among patients with a bleeding gynaecological tumour. Pain after emergency arterial embolisation is usually mild, requiring only oral analgesia. Post-embolisation monitoring is important to detect complications arising from the procedure. Severe pelvic pain is unusual and careful examination for non-target organ devascularisation should be undertaken.

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