

Role of Uterine Artery Embolization in the Management of Cervical Cancer: Review Article

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Abstract

This article explores the role of uterine artery embolization in the management of bleeding secondary to cervical carcinoma. Uterine artery embolization is a safe and effective treatment for control of massive bleeding in cervical cancer. This conservative treatment not only improves the patient's quality of life by reducing the risk of profound anaemia but also help them to be ready for the next phase of treatment which could be radiotherapy or surgery.

Keywords: Uterine artery embolization; Cervical carcinoma

Introduction

Transcatheter uterine arterial embolization has been established in the management of pelvic haemorrhage secondary to uterine arteriovascular malformation, postpartum haemorrhage, ectopic pregnancy, gestational trophoblastic disease, uterine fibroid and gynaecological malignancies especially advanced uterine cancer and cervical cancer [1-5].

Procedure of uterine artery embolization is performed by radiologists. X-ray fluoroscopy, arteriography and embolization are performed via a percutaneous right femoral artery approach using local anaesthesia and intravenous sedation. Both internal iliac arteries are in turn selectively catheterised and limited arteriography is obtained to identify the uterine arteries. Polyvinyl alcohol or gelfoam particles are used to effect embolisation of the uterine vascular bed. Mixed with contrast they are injected through the catheter and flow directed. Embolisation is considered complete when the flow is arrested. Following embolisation the patients are hospitalised for 24–36 hours for pain control (Figure 1 and 2).

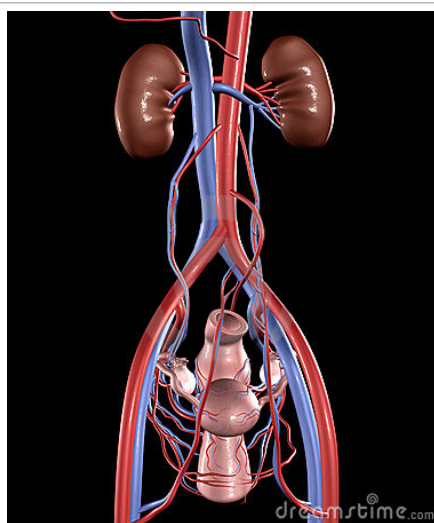


Figure 1: Blood supply of uterus
Courtesy of Dreamstime.com (Royalty free images)
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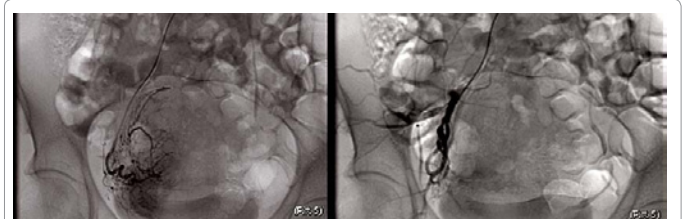


Figure 2: Uterine artery before (right) and after (left) the procedure from bleeding site of a pelvic tumor.

Regarding cervical cancer, one in ten female cancers diagnosed worldwide are cancers of the cervix and it is the most commonly diagnosed cancer among women in Southern Africa and Central America. As per Cancer Research UK, the annual incidence of cervical cancer in the UK is approximately 9 in 100,000 cases [6].

The major risk factor is persistent Human papilloma virus (HPV) infection, particularly types 16 and 18 [7].

Symptoms could be intermenstrual, post coital & post menopausal bleeding, menorrhagia, and continuous vaginal discharge. Symptoms of advanced cervical cancer may include, anorexia, weight loss, fatigue, backache, pelvic and or leg pain, bone fractures, urinary or faecal incontinence and heavy vaginal bleeding.

Cervical smear screening is very successful tool. Definitive diagnosis is based on histological biopsy. EUA, Chest x-ray, Cystoscopy, Intravenous pyelogram (IVP), CT scan and MRI are helpful in staging (Table 1 and 2).

Discussion

Cervical haemorrhage can be a difficult problem during cervical

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Stage	
I	The carcinoma is strictly confined to the cervix (extension to the corpus would be disregarded).
IA	Invasive carcinoma, which can be diagnosed only by microscopy with deepest invasion \leq 5 mm and largest extension \geq 7 mm.
IA1	Measured stromal invasion of \leq 3.0 mm in depth and extension of \leq 7.0 mm.
IA2	Measured stromal invasion of $>$ 3.0 mm and not $>$ 5.0 mm with an extension of not $>$ 7.0 mm.
IB	Clinically visible lesions limited to the cervix uteri or preclinical cancers greater than stage IA.
IB1	Clinically visible lesion \leq 4.0 cm in greatest dimension.
IB2	Clinically visible lesion $>$ 4.0 cm in greatest dimension.
II	Cervical carcinoma invades beyond the uterus but not to the pelvic wall or to the lower third of the vagina.
IIA	Without parametrial invasion.
IIA1	Clinically visible lesion \leq 4.0 cm in greatest dimension.
IIA2	Clinically visible lesion $>$ 4.0 cm in greatest dimension.
IIB	With obvious parametrial invasion.
III	The tumour extends to the pelvic wall and/or involves lower third of the vagina and/or causes hydronephrosis or nonfunctioning kidney.
IIIA	Tumour involves lower third of the vagina with no extension to the pelvic wall.
IIIB	Extension to the pelvic wall and/or hydronephrosis or nonfunctioning kidney.
IV	The carcinoma has extended beyond the true pelvis or has involved (biopsy proven) the mucosa of the bladder or rectum. A bullous oedema, as such, does not permit a case to be allotted to stage IV.
IVA	Spread of the growth to adjacent organs.
IVB	Spread to distant organs.

Management of cervical cancer depends on stage of disease [8-11].

Table 1: FIGO Staging of cervical cancer.

Stage	Treatment
Stage 1A1	Hysterectomy with or without oophorectomy.(in absence of fertility issues)
Stage 1A2	Typically radical hysterectomy with lymph node dissection is carried out.
Stage 1B1 Stage IIA ($<$ 4 cm)	Radical hysterectomy with lymph node dissection/Radical radiotherapy.
Stage 1B2 - IVA	Concurrent cisplatin based chemotherapy plus radiotherapy.
Stage IVB	Palliative treatment for symptom control

Table 2: Reflects the management of cervical cancer.

cancer management. The cervical cancer related bleeding can increase the morbidity either by a secondary anaemia and its complications or by haemorrhagic shock [12]. Though ligation of the hypogastric artery is a standard and effective procedure in controlling massive bleeding in advanced cervical carcinoma but embolization and other endovascular techniques have become the significant therapeutic options for the management of intractable obstetrical and gynaecologic haemorrhage [13,14].

There are scattered reports throughout the medical literature primarily as case reviews with very few large series on the role of uterine artery embolization in the gynaecologic malignancies. The gynecologic use of transcatheter arterial embolization was first reported for treatment of intractable pelvic hemorrhage related to pelvic malignancies [15]. Brown et al. [13] in 1979 described the use of embolization in the treatment of post partum haemorrhage which did not respond to other surgical techniques like bilateral ligation of hypogastric arteries. Later, with angiography bleeding vessel was identified and embolised with Gelofoam and bleeding was arrested.

Author recommended this procedure as an alternative approach for the control of pelvic haemorrhage.

Emergency arterial embolization is a safe and effective means of control of irrepressible genital haemorrhage. In one of German case series in 1987, five patients between the ages of 42 to 86 years (four cervical carcinomas, one endometrial carcinoma) were treated by embolization with Gianturco-Anderson-Wallace springs. Bleeding was successfully controlled in 4 cases with minor side effects. One patient died after second haemorrhage. Authors recommended that nevertheless, catheter embolization should be performed only after alternative methods had been tried [16].

Pisco et al. [17] published reports of transcatheter embolization of the internal iliac arteries in 108 patients with uncontrollable bleeding in pelvic neoplasm (uterus in 39, ovary in 16, urinary bladder in 50 and prostate in 3). This study results show complete control of the haemorrhage in 69% of the patients and partial control 21% of the patients. They were unable to reduce the need for transfusion in 11 patients, 6 of whom had only unilateral embolization due to anatomic reasons. But recommendation based on this study was that embolization should be bilateral and permanent material to be used.

Yamashita et al. [2] reported 100% temporary control of bleeding in 17 patients with malignant pelvic neoplasm in emergency but bleeding recurred in 7 patients. All patients underwent subsequent treatment including radiation therapy (n = 10), operation (n = 5) or chemotherapy (n = 2).

Case series from Mihmanli et al. [18] showed six patients, four with cervix carcinoma, one endometrial carcinoma, and one vaginal metastasis of ovarian carcinoma underwent percutaneous embolization with polyvinyl alcohol due to intractable vaginal bleeding. Complete embolization has been achieved in all the patients recurrent bleeding did not occur in any of the cases. There were no complications related to the embolization procedure.

In another case series from Ankara Turkey in 2002 [19], eight patients with advanced cervical cancer were treated with UAE to control bleeding as alternative and palliative procedure. Overall, bleeding was controlled in 100% cases and most common side effect was temporary severe pain related to tissue necrosis of tumor.

There are some case reports published in literature from different parts of the world about the usefulness of this procedure to control massive, intractable haemorrhage.

In 1996 reported by Lin et al. [20], a haemodynamically unstable woman brought in emergency department. She had life threatening bleeding from a pelvic tumor. After initial resuscitation and blood transfusion, angiogram identified the haemorrhage from uterine branch of right internal iliac artery. Embolization of both anterior and posterior branch of internal iliac artery was performed with Gelfoam, Ivalon and coils arrested the bleeding.

In 2005 [21], published from Tunisia is another case report where a woman with cervical cancer developed massive pelvic haemorrhage after radiotherapy. Angiography demonstrated extravasation of contrast from both uterine arteries. The bleeding was controlled after hyperselective embolization.

A rare case of primary cervical choriocarcinoma presented with heavy vaginal bleeding not responding to other conservative

managements was also treated with UAE initially to control haemorrhage followed by chemotherapy [22].

A recent case report is published in *Maedica* (a journal of clinical medicine) which again showed the benefit of emergency uterine artery embolization for uncontrolled haemorrhage from cervical cancer prior to planned Wertheim hysterectomy [12].

Based on these limited reports, it appears that arterial embolization plays a significant role in urgent control of massive bleeding in gynaecologic malignancies as it provides visualization of the bleeding site and enables flow directed, targeted, minimally invasive therapy to achieve hemostasis. This is evident from the literature that after this procedure, the need for blood transfusion was eliminated in almost all of the cases. Additionally potential complications related to blood transfusion were prevented. The most common side effect of severe pain due to tissue necrosis could be managed with simple analgesics.

Conclusion

Uterine artery embolization is a safe and effective treatment for control of massive bleeding in cervical cancer. This conservative treatment not only improves the patient's quality of life by reducing the risk of anaemia but also enable them to be ready for the next phase of treatment which could be radiotherapy or surgery.

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