



## Case Report *Vascular Interventions*

# Inferior epigastric origin of the uterine artery during uterine artery embolization

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## ABSTRACT

The uterine artery (UA) originates from the anterior branch of the internal iliac artery (IIA). Several variants within the IIA territory have been described. More distant sites of origin include the superior mesenteric, inferior mesenteric, and external iliac arteries. Specifically, origin from the external iliac artery is extremely rare and we are only aware of one reported case in the literature. Herein, we report a case of a 43-year-old woman who required UA embolization to control abnormal uterine bleeding secondary to cervical cancer that was refractory to medical management and palliative radiation. During the procedure, it was discovered that the left UA shared a common trunk with the left inferior epigastric artery and arose from the external iliac artery.

**Keywords:** angiography, embolization, iliac artery, Menorrhagia, uterine artery

## INTRODUCTION

Uterine artery embolization (UAE) is regularly performed for various causes of abnormal uterine bleeding (AUB). Common causes include leiomyoma and adenomyosis while less commonly employed for endometrial disorders, coagulopathy, ovulatory dysfunction, and malignancy.<sup>[1,2]</sup> The procedure involves selective catheterization of the bilateral uterine arteries (UAs) which originates from the internal iliac artery (IIA) in the majority of cases. This is done through common femoral or radial artery access approach. Knowledge of variant anatomy is essential for the technical and clinical success of the procedure.

Here, we describe a case of left UA origin variant anatomy that was encountered during an UAE procedure for the management of AUB secondary to Stage III C1, grade I cervical squamous cell carcinoma (SCC).

## CASE REPORT

The patient is a 43-year-old female with a medical history of Stage III C1, grade I cervical SCC who has undergone six cycles of chemotherapy with cisplatin. Pre-procedurally, the patient had undergone magnetic resonance imaging cross-sectional imaging demonstrating the cervical malignancy [Figure 1]. She presents with recurrent AUB and anemia which was refractory to medical management and palliative radiotherapy. The patient was informed of the risks and benefits of the procedure and elected to undergo UAE.



**Figure 1:** A 43-year-old female with Stage III C1 cervical cancer who presented with abnormal uterine bleeding. Coronal T2-weighted magnetic resonance image demonstrating the cervical malignancy (white arrow).

Right common femoral artery access was obtained through micro-puncture technique with placement of a 5 French vascular sheath. A 5 French Omni Flush catheter (Accu-Vu Omni™, Angiodynamics, Latham, NY, USA) was advanced to select the left IIA. The right IIA was selected using a 5 French Bernstein catheter. All other selections were performed with 2.5 French Progreat catheter (PROGREAT®, Terumo Interventional Systems, Somerset, NJ, USA) and 0.014 Fathom microwire (Fathom™, Boston Scientific, Marlborough, MA, USA).

The initial left internal iliac angiogram displayed no classic UA. Additional catheter selections of the anterior division were performed to confirm the absence of the left UA from the IIA. The left external iliac artery was then interrogated in which medially coursing arteries that supplied the uterus were noted arising from the left inferior epigastric artery [Figure 2a and b]. Angiography was performed to confirm the origin of the left UA at the left inferior epigastric artery. To prevent non-target particle embolization of the rectus muscles, protective coil embolization of distal inferior epigastric artery was performed [Figure 3]. The aberrant left UA was then embolized with 250 micron microspheres through selective catheterization. Post embolization angiogram revealed adequate hemostasis to the UA.

After the successful embolization of the left sided UA, the right internal iliac was accessed. Diagnostic arteriogram showed normal UA anatomy and two cervico-vaginal branches supplying the cervix in the known mass area. Successful embolization of the two right cervico-vaginal branches was achieved through metallic coils [Figure 4]. Embolization of the right UA was achieved with 500–700



**Figure 2:** (a and b) A 43-year-old female with Stage III C1 cervical cancer who presented with abnormal uterine bleeding. Digital subtraction angiograms, (a) early arterial phase of the left proximal inferior epigastric artery demonstrating the tortuous, medially coursing, and uterine artery (solid black arrow) originating from the left inferior epigastric artery (dashed black arrow). (b) Delayed arterial phase, image 2b, was obtained immediately following image 2a and shows continued course of the uterine artery (solid black arrow).



**Figure 3:** A 43-year-old female with Stage III C1 cervical cancer who presented with abnormal uterine bleeding. Fluoroscopic angiogram of the left inferior epigastric artery showing successful coil embolization (solid black arrow) of the distal inferior epigastric artery with a microcatheter in the origin of the left uterine artery (dashed black arrow).

micron microspheres. An aortogram was performed directly after bilateral embolization that demonstrated no variants or parasitized vessels that could potentially supply the cervical mass [Figure 5]. Following embolization, a hypogastric nerve block was performed at the lower border of the L4 vertebra injecting 20 mL of 0.5% bupivacaine under fluoroscopic guidance.



**Figure 4:** A 43-year-old female with Stage III C1 cervical cancer who presented with abnormal uterine bleeding. Digital subtraction angiogram demonstrating normal right sided uterine artery (solid black arrow) originating from the internal iliac artery. In addition, coil embolization (dashed black arrow) of the two right cervico-vaginal branches can be appreciated.



**Figure 5:** A 43-year-old female with Stage III C1 cervical cancer who presented with abnormal uterine bleeding. Digital subtraction angiogram of the abdominal aorta demonstrating bilateral coil embolization and no further arterial supply to the cervical malignancy.

## DISCUSSION

UAE is a minimally invasive alternative to hysterectomy in the management of AUB not responding to the medical management as well as symptomatic relief of uterine fibroids. While UAE can obviate the need for hysterectomy, its success is dependent on an accurate understanding of the

UA anatomy in each individual.<sup>[3]</sup> The UA most commonly originates from anterior division of the IIA in the majority of the cases.<sup>[4]</sup> However, anatomical variations in the origin of the UA are frequently encountered, such as originating from the inferior gluteal artery being one of its common variant origins. A comparison between the findings of several studies also suggests that there could also be different anatomical variants of the UA origin between different populations.<sup>[5]</sup> The variant observed in this case involved the UA arising from the inferior epigastric artery. This is a rare variant which to the best of our knowledge has been reported only once in the literature.<sup>[6]</sup>

The inferior epigastric artery supplies the lower abdominal wall and involves anastomoses with the superior epigastric artery. Typically, the UA is appreciated interrogating divisions of the internal iliac. In this case, the external iliac artery was interrogated, which is not routinely performed in a UAE procedure, and revealed the aberrant vessel. Failure to properly recognize this anatomical variant could result in ineffective treatment of target regions with continued breakthrough bleeding. Given the anatomic location and short origin of the left UA, ischemic necrosis of the lower abdominal wall is a potential complication of treatment.<sup>[7]</sup> Careful consideration was taken in the embolization of this case to avoid lower abdominal wall infarct. In our experience, to prevent non-target embolization, a metallic coil was placed in the left inferior epigastric artery distal to the UA origin. After coil placement, 250  $\mu\text{m}$  microspheres were first used to embolize the catheter selected aberrant left UA. In this case, the left UA was much smaller in caliber with sluggish flow and preferential flow of blood into the more dominant parent inferior epigastric artery. Therefore, the inferior epigastric artery was embolized with coils and smaller particle size was used to achieve deeper penetration of embolic agent. The right uterine was larger in caliber with typical origin off the anterior division of the right IIA. Therefore, 500–700  $\mu\text{m}$  particles were used which is typical for a UAE.

## CONCLUSION

Variant anatomy of the origin of the UA can present challenges during the procedure and effective achievement of embolization. Pre-procedural imaging, such as CT aortogram, can be used to identify variant anatomy before a UAE procedure. Clinicians must be aware of potential variations, such as the example discussed in this case. In cases where variant anatomy is encountered, careful catheterization should be used to access aberrant vessels to avoid procedural complications.

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