

Minimally Invasive Image Guided Interventions in Gynecology and Women's Health



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Introduction

Image guided interventions are increasingly being used in different fields of medicine. A large number of such minimally invasive interventions are routinely done for surgical, medical and oncological patients, besides the endovascular interventions performed for

a variety of vascular conditions and diseases. Minimally invasive image guided interventions in gynaecology are primarily embolization procedures where supplying arteries or draining veins are occluded using different embolization materials. The major image guided interventions are described below (Figure 1).

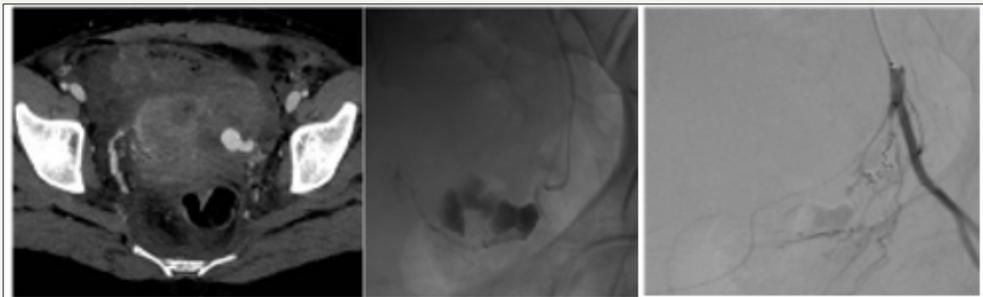


Figure 1: CT scanning reveals pseudo-aneurysm and active bleeding from left uterine artery after caesarian section. Patient continued to lose significant blood despite packing and re-look surgery. Hb fell significantly and patient was moribund. Angiography reveals a large active bleeding from left uterine artery embolized successfully with a microcoil. Patient had an uneventful recovery after embolization.

Hemorrhage

Uterine and pelvic arterial embolization is a life saving tool for post partum hemorrhage (PPH) [1,2], post-operative bleeding including after caesarian section and hysterectomy, and for bleeding (or risk of bleeding) in abnormal placentation, post-abortion/ectopic pregnancy, trophoblastic disorders and gynecological malignancies [3]. The embolization techniques are minimally invasive, quick and easy to perform saves a lot of blood transfusion and patients recover early with shorter hospital stay. Most embolizations are performed through a puncture in the right and/or left common femoral artery and use 4F-5F selective catheters, co-axial micro-catheters (2.4F-3F) and corresponding guide-wires. Typical embolization materials used to occlude the bleeding vessels are coils (steel, platinum, fibred or hydro gel coils), particles (uncalibrated Gelfoam, calibrated particles from 500-900 micron) and liquid embolic materials (Glue & Onyx). Coils and Gelfoam are the most frequently used embolic agents.

Uterine fibroids

Leiomyomas occur in 50-60% of women, rising to 70% by the age of 50 [4]. They cause pressure symptoms such urinary symptoms, heaviness, pelvic pain, infertility and obstetric complications, and in 30% of cases, cause heavy menstrual bleeding leading to anemia [5]. Effectiveness of uterine artery embolization (UAE) in treating selected patients with uterine fibroids has been established by multiple studies. Royal College of Obstetrics & Gynecologists (RCOG) recommends that UAE should always be considered along with surgical options [6]. UAE has similar outcome as surgery in up to a five-year follow up with no greater major complication rate [7]. On the other hand UAE is minimally invasive, can be performed on a day-care basis and thus has very short hospital stay compared to surgery, though with a higher re-intervention rate in the long term. Pre-treatment and follow up MR scanning is mandatory to diagnose, plan intervention and evaluate treatment success and rule out complications. UAE is always performed bilaterally as

leiomyomas tend to have bilateral uterine arterial supply. 500-900 micron particles are used for embolization until complete stasis of the uterine arteries. Smaller particles are usually not recommend-

ed to avoid complications such as necrosis of fibroid/ uterus. Cervical branches should also be avoided during UAE (Figure 2 & 3).

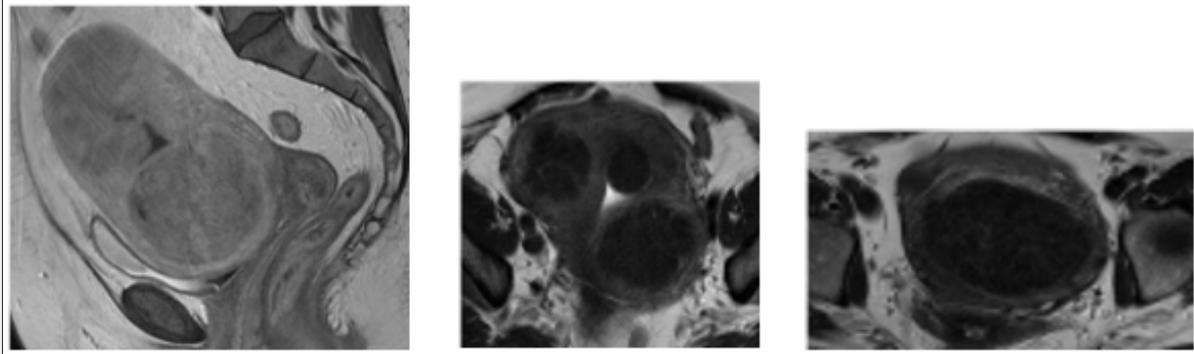


Figure 2: MR images show multiple large fibroids in uterus.

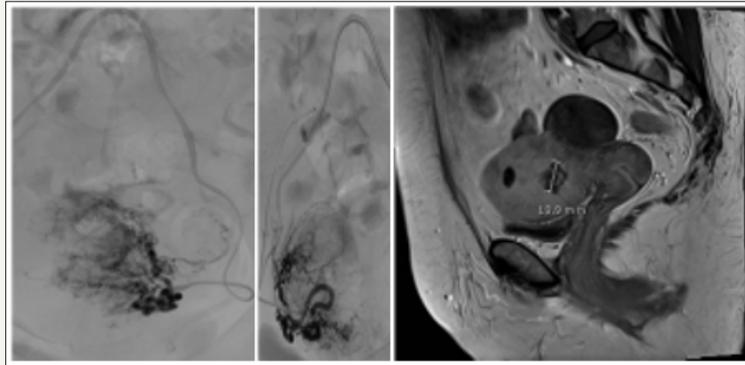


Figure 3: Bilateral uterine artery embolization (UAE). Significant shrinkage of fibroids after UAE at 6 months follow-up.

Pelvic congestion syndrome (PCS)

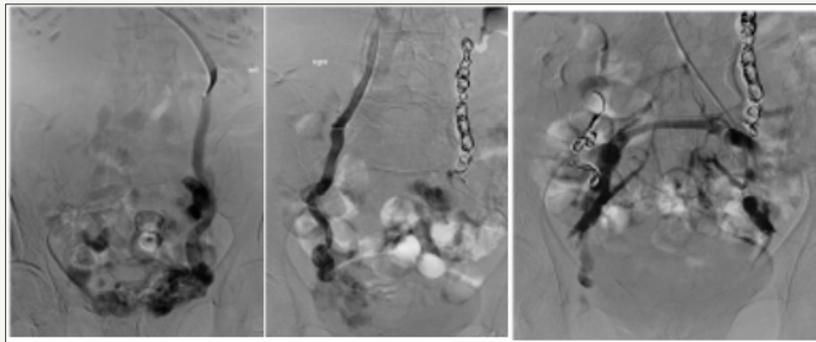


Figure 4: A woman with PCS during phlebography shows large incompetent bilateral ovarian veins, particularly on the left side crossing the midline and communicating with each other. Successful embolization of both ovarian veins with macro-coils.

PCS is a differential diagnosis for a patient with chronic pelvic pain (CPP), which is present in about 2-24% women from 18-50 years of age [8]. The prevalence of PCS in patients with PCC is about 10-30%, where no other obvious pathologies have been found [9]. Symptoms of PCS include CPP lasting at least 3-6 months, heaviness, pain during and after coitus, pain that can be exacerbated

before or during menses, relived in supine position and can last several hours at a time. Diagnostic modalities are transvaginal color or Doppler scanning, MR and contrast CT scanning. Although medical and surgical treatments are available for the treatment of PCS, pelvic venous embolization is currently considered the best treatment available for the treatment of PCS [10]. Ovarian and pelvic

vein embolization has been recommended as the standard of care with grade 2B recommendation by Society for vascular Surgery and American Venous Forum [11]. Refluxing ovarian and iliac veins can be approached from femoral, jugular, subclavian and brachial routes, all with high technical success and low complication rates [12]. Various embolic materials have been used in embolization for PCS including coils, foam (sclerotherapy), glue, plugs etc. However coil-embolization and/or foam sclerotherapy are most commonly used techniques. Clinical success rate has been described from about 70-100% in various studies although there lacks a well-designed large randomized control trial [10]. Complication rate is low and minor, a majority (around 15%) of which is self-limiting post-embolization syndrome [13-15] (Figure 4).

Conclusion

The role of minimally invasive image guided interventions in gynecology is constantly evolving and is best defined in a multidisciplinary setting where decisions for interventions are jointly taken by the gynecologist and the interventional radiologist. Many of the procedures can be performed under local anesthesia or conscious sedation, in a day care basis in a minimally invasive manner with short hospital stay and very low complication rate. Most complications are minor and are either self-limiting or requires minimal medication/therapy. The role of image guided intervention in gynecology and women's health can be lifesaving, assisting in surgery by decreasing vascularity and blood loss in the operating field or significantly improve symptoms and quality of life.

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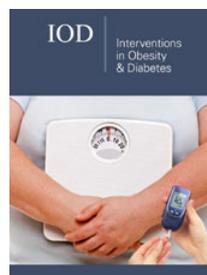
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