Note: MRI is used for patient selection, planning and documenting baseline appearances prior to uterine artery embolisation (UAE). Additionally, MRI is also useful following UAE, where it is used to assess post-embolisation outcome and complications

**Technique:** MRI for preoperative assessment for Uterine artery assessment -:

(T1 and T2 fast spin echo (FSE) in sagittal, coronal and axial planes. MR angiography using 3D gradient recalled echo with IV gadolinium. 20 mg IV hyoscine butylbromide is given to suppress uterine and intestinal peristalsis.)

**Findings:**

1. Appearance: non-degenerate/ degenerate (hyaline or cystic; myxoid; red)
   * Non-degenerate fibroids appear as well-circumscribed masses of homogenous decreased signal intensity (cf. outer myometrium) on T2 images. Cellular leiomyomas show a slightly higher signal intensity on T2 images as well as enhancement on post-contrast images.
   * Degenerate fibroids show variable appearances on T2 images and contrast-enhanced images.
     1. Fibroids with cystic degeneration show high signal intensity on T2 images. Cystic areas do not show enhancement.
     2. Fibroids with hyaline or calcific degeneration show low signal intensity on T2 images, this is similar to a typical fibroid.
     3. Fibroids with hyaline degeneration may show a cobblestone appearance on post-contrast images.
     4. Fibroids with myxoid degeneration demonstrate very high signal intensity on T2 images and minimal enhancement on contrast-enhanced images .
     5. Fibroids with red degeneration may show peripheral or diffuse high signal intensity on T1 images (probably due to the proteinaceous content of blood or T1 shortening effects of methaemoglobin). They may show variable signal intensity on T2 images, with or without a low signal intensity rim.
2. **Location:**
   * Uterine fibroids are, usually, seen within the uterine corpus, ~8% occur within the cervix. They may be classified as follows:
3. submucosal: projecting within the endometrial cavity
4. intramural: within the substance of the myometrium
5. subserosal: lie beneath the serosa
6. Pedunculated fibroid: can be subserosal or submucosal in location, this is defined by the presence of a stalk which <50% of the fibroid diameter.
7. **Fibroid size:** Although the relationship between the size of the fibroid and post-embolisation outcome is not entirely clear, most operators select a threshold of 13-15 cm. It is suspected that embolisation of larger leiomyomas may still result in bulk symptoms due to residual fibroid mass. Additionally, with larger amount of necrotic tissue, prolonged post-embolisation syndrome might occur.
8. **Vascularity :** Enhancement of the fibroids depends on their vascularity which is assessed on post-contrast images. The goal of uterine artery embolisation (UAE) is to cause infarction of the fibroid while maintaining endometrial and myometrial perfusion. Fibroids that are already infarcted are unlikely to show volume reduction following UAE.
9. Vascular anatomy is assessed on 3D contrast-enhanced MRA. This permits assessment of the anatomy of the uterine vessels. It also has a role in depicting ovarian artery contribution to the uterine fibroid blood supply.
10. **Differential diagnosis :** MRI helps in confirming the diagnosis of uterine fibroids and differentiating it from a variety of gynaecological conditions.

* [adenomyosis](https://radiopaedia.org/articles/adenomyosis?lang=gb)
* solid adnexal mass
* [uterine leiomyosarcoma](https://radiopaedia.org/articles/uterine-leiomyosarcoma?lang=gb)
* [endometriosis](https://radiopaedia.org/articles/endometriosis?lang=gb)

**Post UAE MRI appearances**

1. **Vascularity :**Lack of enhancement on post-contrast images in a previously enhancing fibroid represents fibroid infarction. Complete fibroid infarction has been shown to have a higher symptom control and a lower rate of gynaecological intervention at 5 years when compared to incomplete infarction.
   1. Persistent fibroid enhancement on post-contrast images or visualisation of the uterine arteries on MRA is considered treatment failure.
2. **Liquefaction :** With increased interval between 3 months and 1 year following embolisation, there is progressive liquefaction of necrotic fibroids. This results in increased signal intensity on T2 images.
3. **Size reduction :** Successful embolisation may result in some reduction of fibroid size.
4. **Location:** Some fibroids (1-5%) may demonstrate change in location, e.g. a submucosal fibroid may become endocavitary. Similarly subserosal fibroids may develop a submucosal or intramural component.
5. **Fibroid recurrence:** This is considered a late treatment failure.
6. **Complications**
   * 1. Some complications are evidence of post UAE MRI:
7. [endometritis](https://radiopaedia.org/articles/endometritis?lang=gb)
   1. uterine enlargement
   2. T1 hyperintense intracavitatory haematoma
   3. gas associated with endometritis appears as a signal void on all sequences (the presence of gas alone does not indicate infection)
8. [uterine infarction](https://radiopaedia.org/articles/missing?article%5Btitle%5D=uterine+infarction%0A%0A&lang=gb)
   1. uterine infarction is a very rare complication
   2. non-enhancement of uterine corpus
   3. widening of the endometrial stripe
   4. the uterus shows homogeneous low signal intensity on T1 images and areas of high signal intensity on T2 image

Uterine artery is end branch of anterior division of internal iliac artery.

<https://www.youtube.com/watch?v=zTzxJ2-ni_E>

Report templates:

**MRI PELVIS for preoperative fibroid assessment for UAE:**

There are following fibroids noted-:

* + 1. Fibroid # 1:
       1. Location [serosal/submucosal/myometrial]
       2. Size: (< 14 cm or > 14 cm)
       3. T2 signal [low- typical fibroid/intermediate – cellular fibroid/T2 hyperintense – cystic or myxoid degeneration/T2 very low – hyaline or calcific degeneration/T1 hyperitnense rim – red degeneration.
       4. Vascularity
          1. Uterine artery status
          2. Contribution from ovarian artery.
       5. d/d

Describe for each relevant fibroid which is potential candidate for UAE.

**MRI PELVIS for post operative assessment fibroid following UAE-:**

Size : reduced or same

Liquification: after 3 months

Location- can change

Vascularity-: Successful fibroid infraction or not. Treatment failure of persistent fibroid enhancement and visualisation of uterine arteries.

Complications-:

Endometritis [bulky uterus / endometrial cavity show T1 hyperintense contents / haemorrhage / gas in endometrial cavity in addition to symptoms and other two findings ]

Uterine infraction [Non enhancement of uterine corpus +/- widening of endometrial stripe +/- Homogenous low T1 signal intensity with scattered T2 hyperintense areas]