





simultaneously as well as visualize the surfaces three dimensionally.[8,9] It thus provides a unique diagnostic tool for noninvasive visualization of the uterine morphology as well as the diagnosis of congenital uterine anomalies [4].

MRI also provides detailed information on the uterovaginal anatomy, particularly in the study of the external profile of the uterine fundus and the cavity shape, and it also allows visualization of the septum within the cavity

#### *Role of Ultrasonography (USG) and Magnetic Resonance Imaging (MRI).*

The clinical and imaging diagnosis must be certain before proceeding with an invasive (even diagnostic) surgical intervention

#### *Patient Preparation*

The patient is preferably scheduled for surgery in the early proliferative phase of the menstrual cycle. This ensures that the endometrial lining is at its minimum thickness, and smaller shape defects like an arcuate uterus, or a unilateral convergent wall (the 7- shaped uterus) are not missed during the primary examination because of being obscured by the thick endometrium.

Hysteroscopy is best performed using a 2.9 mm or 1.9 mm hysteroscope that allows easy entry into the uterine cavity. The administration of vaginal misoprostol 400 µg, 4 hrs before the procedure may aid in an easy entry into the

cavity, although there is no evidence to support its routine use in hysteroscopy [5].

#### **Hysteroscopic approach**

##### *Entry*

The preferred route of entry into the uterine cavity is by using the vaginoscopy- hysteroscopy technique. In patients undergoing an office procedure, this is the only available technique [6]. However, even in patients who are being operated upon under anaesthesia, performing a vaginoscopy – hysteroscopy and ‘entering under vision’ is equally important. This ensures that the entire vagina, its fornices and the cervical anatomy, along with the external os is clearly visualized before an entry is made into the cavity. This ensures that even minor defects are not missed out. Needless to say, vaginoscopy is an adjunct to, and does not replace a thorough per speculum and per vaginal exam.

Some of the anomalies/ abnormalities that could be detected at this stage are

1. Complete vaginal septum – associated with a complete uterine + cervical septum

Both halves of the vagina, and both hemi cervixes are inspected after distending each hemi vagina with the distension medium. The telescope is inserted in each hemi cavity and both ostia visualised

2. Transverse vaginal septum – possibly associated with agenesis of the lower cervix / upper vagina. A pinpoint opening of the transverse septum may be seen, though in most cases it is too small to be negotiated with a telescope
3. Concomitant puckering and nodularity of the posterior fornix suggesting recto vaginal septum endometriosis – frequently associated with a non communicating functional hemi uterus and pelvic endometriosis
4. A pinpoint external os – in patients with hypoplastic uterus
5. Cervix completely flushed to the vaginal wall

#### **The view from the internal os**

Once the internal os has been negotiated, the first look into the cavity provides a wealth of information

The surgeon must carefully inspect the fundus, lateral walls and both ostial openings from the vantage point of the internal os. On inspection, a 'normal' uterus should have the following features (fig 1)

1. The fundus is usually curved slightly inwards, rather than completely flat. Subsequently, the area between the two ostia appears slightly elevated and projecting into the cavity
2. The two ostia are equidistant from the midline
3. Both ostia are seen in one single view (not a very consistent finding)
4. If the two ostia are not seen together in a single frame, each ostium is at least visible from the internal os when the light cable is tilted from the 6 O'clock to the 3 and 9 O'clock positions
5. The overall cavity appears 'spacious'. This is a subjective assessment, learnt over a period of time after performing a number of cases



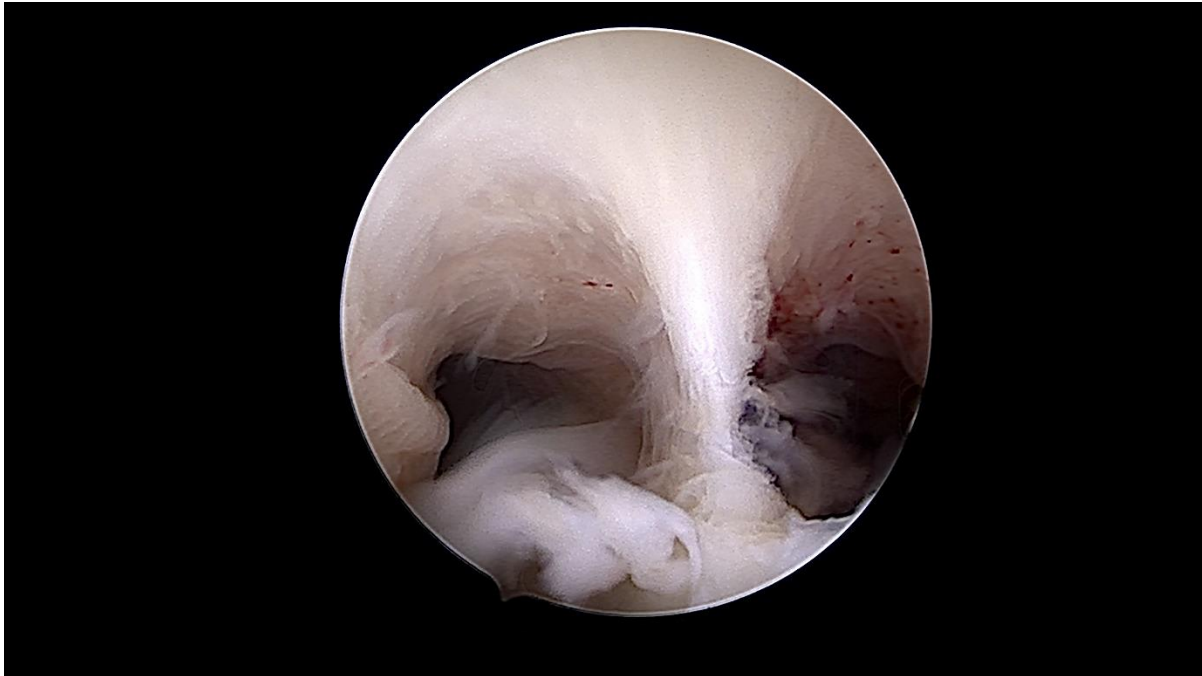
**Figure 1.** Normal uterine cavity (U0). By S. Pisat.

Any variations to this anatomy should raise the suspicion of a uterine anomaly. Of course, the hysteroscopy findings must complement, and not dispute the diagnosis that has been made on imaging pre operatively

- a. The Septate/ arcuate Uterus ( Class U2): Any projection of the fundus in the midline, equal to or more than one third distance from the internal os to the fundus, can directly be called a septate uterus (fig 2). Smaller indentations than this may be arcuate rather than septate. This is however, a subjective assessment and not nearly as reliable as measuring the depth of the septum in relation to the myometrial thickness on 3D USG, which is considered the gold standard.

There is no universally accepted technique of making objective measurements inside the uterine cavity. The graduated uterine palpator by Karl Storz is used at some centres [6]. The other way to get an approximate estimate of distance is using a hysteroscopic instrument (grasper or scissor).

The distance between the open jaws of the instrument is first measured outside the uterine cavity. Using this information, the total length of the septum is assessed during surgery without actually cutting the septum. Similar information can also be obtained by using the straight resectoscope loop [7].

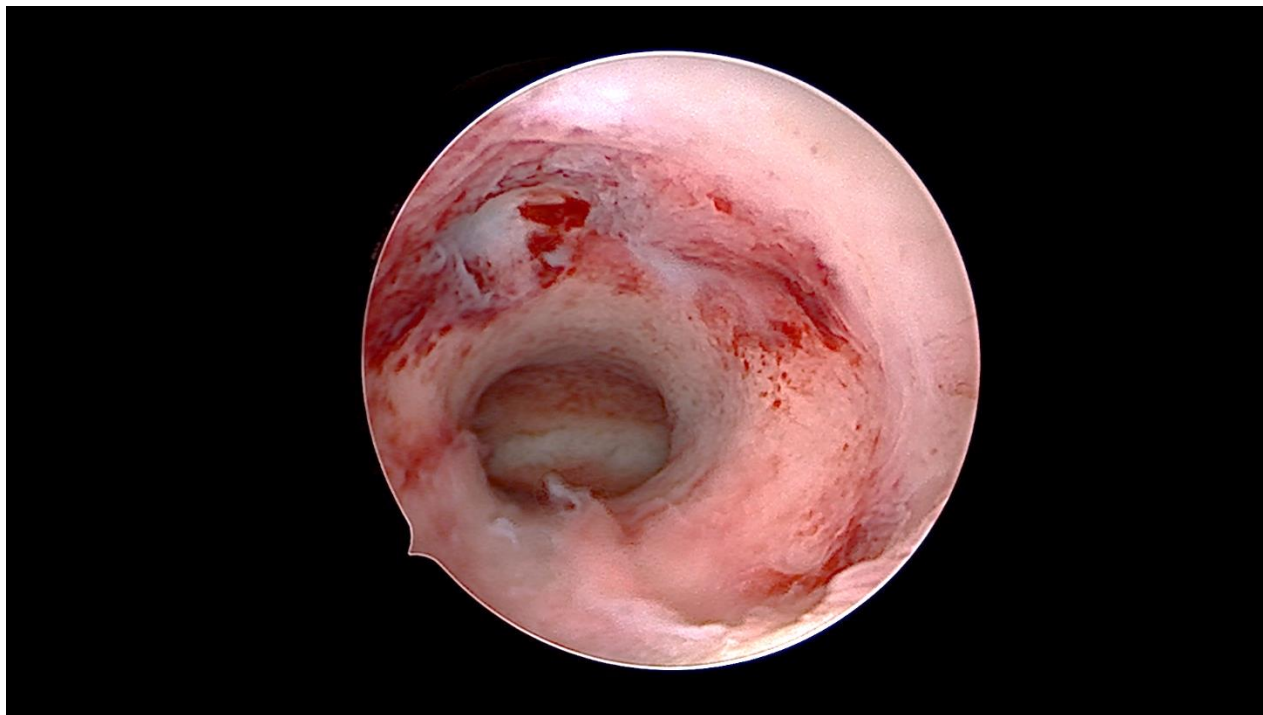


**Figure 1.** Septate uterus (U2a). By S. Pisat.

There is consistent data indicating arcuate uterus as an acceptable variety of normal uterus, which does not need any surgical repair.

- b. The T shaped uterus (Class U1): a tubular, tunnel like cavity is seen beyond the internal os. Both tubal ostia are not visualised (fig 3). The telescope has to be advanced higher into the uterine cavity, usually beyond half the distance of the cavity. At this stage, tilting the light cable allows visualisation of the tubal

ostium. In case of a unilaterally convergent wall (the 7 shaped uterus), the view of only one of the ostia may be hindered by the hypertrophied lateral wall, and the other ostium clearly seen from the internal os. Making this observation carefully at this stage is very important, because this is also considered as the end point of surgical correction once the lateral wall has been incised with an electrode or a scissor.



**Figure 3.** Narrow cavity of T shaped uterus (U1a). By S. Pisat.

It is worthwhile to remember that a uterus which is hypoplastic may have a cavity that looks exactly like that of a T shaped uterus which is normal in size externally. The distinction between these two must be made on pre operative imaging by 3D ultrasound, because only the latter is a case justified to undergo surgical correction

c. The bicornuate uterus (Class U3): The cavity of a bicornuate unicollis uterus looks exactly same as that of a completely septate uterus. It is very important to distinguish between the two, because a casual septal incision initiated by just seeing an inward midline indentation could result in a catastrophic perforation if the uterus is bicornuate, or

bicorporeal septate, rather than septate. This distinction can be made pre operatively using a 3D ultrasound to define the degree of serosal indentation, or intra operatively by performing a concomitant diagnostic laparoscopy

d. The unicornuate uterus (Class U4): a banana shaped, rather than a tubular cavity is seen with a single terminal ostium. Obviously, the volume of the cavity is reduced. The surgeon must be careful to make sure that he/she has not missed the other half of a bicornuate uterus, and mistakenly visualised only one half of the cavity thereby labelling it as a unicornuate uterus. It is best to confirm the size and functionality of the other horn by

performing a simultaneous diagnostic laparoscopy

- e. The Accessory cavitated uterine mass (ACUM) (Class U6): Previously known as juvenile cystic adenoma (JCA), ultrasound leaves behind a diagnostic dilemma, confusing the entity with a functional non communicating uterine horn with hematometra. In both cases, the patient presents with severe dysmenorrhoea. In these cases, a diagnostic hysteroscopy performed before laparoscopy effectively rules out the possibility of a non-communicating horn, if both ostia are visualised.
- f. The Robert's Uterus (Class U6): this condition is also best diagnosed by pre operative pelvic MRI, and is an asymmetric fusion of the vaginal septum to one side of the midline. Consequently, hematocolpos and hematometra, sometimes hematosalpinx ensues. On vaginoscopy, a bulge is seen distending one half of the vagina, and only half the circumference of the cervix is visible. The appearance of the uterine cavity, before corrective surgery is performed, is like a unicornuate uterus [8].

## Conclusion

In summary, diagnostic hysteroscopy plays a vital role in both the diagnosis and management of congenital anomalies of the genital tract. Used in conjunction with clinical examination and imaging, hysteroscopy provides an invaluable tool for assessing and correcting these anomalies resulting in optimal surgical outcome.

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