Visualising the Reproductive Tract

Chaired by Madeleine Campbell

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Uterine hysteroscopy

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Hysteroscopy (endoscopy of the uterus) of the mare is an extremely useful technique in the investigation of the problem mare and is easily performed in the practice situation. Hysteroscopy allows direct visualisation of the interior of the uterus allowing various pathological conditions to be detected:

- Intrauterine lumenal adhesions
- Endometrial cysts
- Focal lesions
- Uterine neoplasia
- Foreign bodies
- Retained endometrial cups
- Endometritis
- Exudate

Other diagnostic techniques (ultrasonography, cytology, culture and biopsy) may detect many of these conditions but hysteroscopy allows a more thorough and direct evaluation of them. Uterine adhesions in particular are difficult to diagnose with any procedure other than endoscopy of the uterine lumen (Fig 1).

Equipment

Whilst any flexible endoscope can work if it is capable of blowing a sufficient amount of room air through it to inflate the uterus, ideally a videoendoscope at least 1.3 m in length and with an outer diameter of more than 9 mm (to provide rigidity) should be used. A videoendoscope makes it easier for both examiners to negotiate and evaluate the reproductive tract. The endoscope must be cleaned and sterilised for hysteroscopy and the portion of the endoscope that will be placed inside the mare can be soaked in a sterilising agent such as Cidex. The outer surface and inner channels must be thoroughly rinsed with sterile water as sterilising agents are irritating to the uterus as well as being spermicidal.

Technique

The mare should be restrained in stocks as this maintains proximity to the endoscopic equipment. Although the uterus does not have sensory pain receptors, mares become uncomfortable due to the pressure of the distended uterus. Therefore sedation and pain control should be provided with detomidine or romifidine and butorphanol. A uterine relaxant such as hyoscine (buscopan injection NOT compositum) is useful on occasions. The rectum is evacuated and the mare’s perineal area hygienically prepared to a very high standard.

One examiner should wear a sterile shoulder length glove covered by a sterile surgical glove and a sterile surgical glove on the other hand. Sterile water-soluble lubricant should be placed on the back of the hand and lower arm. The gloved hand introduces the endoscope into the vagina and one finger is passed into the cervix. The endoscope should be guided alongside the finger through the cervix and slowly advanced into the uterus. The operator placing the endoscope through the cervix into the uterus has a vital role in directing the endoscope. The second operator manipulates the controls for fine movements within the genital tract, controls the insufflation and the rinsing of the lens. Once the endoscope is inside the uterine lumen, quickly inflate the uterine lumen through the working or biopsy channel. Most endoscopes will pump sufficient air through the flush channel to meet this need, but an auxiliary pump is useful. This can be connected to the endoscope to blow air through the biopsy channel. This speeds procedure and is critical in mares with dilated cervices. Place the tip of the endoscope in the uterine body and proceed along the uterine body to the bifurcation. This is visualised as a more or less vertical column of tissue. The uterine bifurcation is a major landmark. The endoscope should be advanced slowly and care must be taken to maintain the viewer’s orientation within the tract. The uterus may be distended with room air or sterile saline/Ringer’s solution. Fluid may provide a clearer view and require less distension, but if exudate is present within the lumen, it will mix with the water and obstruct the view.

In the normal uterus, it should be relatively easy to reach the tip of the uterine horn. The oviductal papilla should be readily visible, slightly protruding into the lumen and surrounded by normal (smooth and pink) endometrium. Visualising this structure confirms that the entire length of the uterine horn has been examined. If the images seen are not clear, slightly pull back the endoscope and distend the uterus a bit more and rinse the lens of the endoscope. A gentle, patient technique with slow advancement of the endoscope is important. Hysteroscopy causes a marked inflammatory response, the degree depends on stage of the oestrous cycle and the susceptibility of the mare. Any laser therapy leaves debris in the uterus. Air should be aspirated during removal of the endoscope. Oxytocin, uterine flushing and intrauterine antibiotics should be given immediately afterwards and the mare given prostaglandin if she was not in oestrus during the procedure.
Hysteroscopy: Use of diode laser

- Endometrial cysts
- Intrauterine lumenal adhesions
- Retained endometrial cups
- Focal lesions
- Uterine neoplasia
- Foreign bodies
- Vestibulovaginal varicosity

Historically we used a neodymium:yttrium aluminium garnet (Nd:YAG) laser system with a 4 m long, 800 µm diameter transmitting fibre with the beam passed through a 1 mm orb-tip with settings of 25W at 1064 nm. We currently use a Biolitec diode laser with a wavelength of 980 nm. Two North American theriogenology colleagues recently began using a diode laser both with 810 nm wavelength. Settings not well established for diode laser:

- 20 W repeated at 7 s intervals (Holyoak)
- 30 W repeated at 5–7 s intervals (Brinsko)
- 20 W repeated at 5 s intervals continuous mode (ERS Pycock)
- We use a more powerful laser: 980 nm wavelength.

Hysteroscopy: Endometrial cysts

In vitro laser application demonstrated that increasing power density resulted in increased depth of uterine tissue ablation. Uterine cysts are superficial endometrial structures and any ablation of endometrium and myometrium should be considered excessive. Endometrial cysts are often cited as a cause of subfertility, but a cause and effect relationship not been clearly established. The proportion of mares with endometrial cysts increases with age and reports that associate endometrial cysts with a lower pregnancy rate or increased embryonic loss fail to account for the effect of advancing age. When confounding effects such as parity and age are controlled for, the assumption of cysts causing subfertility is not supported. If numerous throughout uterus, they may embarrass placental function and cause mid–late term abortions. If they are large and obstructive, they may inhibit maternal recognition of pregnancy during embryonic mobile phase (14–19 days) and cause early pregnancy failure.

Technique for laser ablation of lumenal adhesions

Perform a thorough ultrasound examination initially to map out the cysts, followed by a thorough-endoscopic examination. After all cysts are located, it is helpful to start at the tip of the horn and work downwards. Position the tip of endoscope approx 1.5 cm off the uterus until between 1 and 2 cm of the fibre is visible and guide onto the cyst to be lasered and pass the laser fibre through the biopsy port until about 1 cm past the biopsied endometrium. Energy may have to be applied at various points if the cyst is large.

Smoke evacuation

Smoke can be suctioned off using a reverse pump or tape a device such as a Foley catheter alongside the endoscope. If you distend the uterine lumen with 2 litres of lactated Ringer’s solution, the smoke dissolves in the fluid.

- Need to increase power settings compared with air insufflation.
- Provides an immediate uterine lavage.

There are problems with using fluid in the uterus if there is any exudate present or if a vessel is hit and blood clouds the fluid. Fluid needs to be drained and either re-infuse or use air. Following laser ablation, the uterus should be flushed daily and oxytocin and antibiotics given until the uterus has no detectable fluid on ultrasonography examination. There have been a few controlled studies on effectiveness despite the large number of variables (Griffin and Bennet 2002; Bartmann et al. 2008; Kollmann et al. 2008).

Technique for laser ablation of endometrial cysts

Adhesions may be fine synechiae or wide bands of pale or white fibrous tissue that are translumenal or completely occlude the uterine lumen. Removing an obstruction using cautervation or laser techniques one should start at the thin membranous parts of the obstruction.

Hysteroscopy: Foreign bodies

These can be remnants of previous pregnancies or diagnostic equipment.

Hysteroscopy: Retained endometrial cups

Mares that lose the pregnancy between 40 and 100 days of gestation may persist with endometrial cups at the base of the previously gravid uterine horn for many months, much longer than thought possible (Willis and Riddle 2004; Steiner et al. 2006). They can be the cause of anovulatory haemorrhagic follicles (AHFs) and failure to cycle normally during the breeding season. The persistent cups can be visualised with hysteroscopy.

Hysteroscopy: Vaginal varicose veins

Vaginal bleeding from varicose veins at the dorsal vestibulo-vaginal junction can be readily visualised with endoscopy. Treatment is not usually necessary, but if there is a large mass of dilated and tortuous vessels, evaluation with a videendoscope followed by laser photoacoagulation is effective.

References


