

74. Benign Lesions of the Female Pelvis

Respiratory and bowel motion are minimal in pelvic imaging but can degrade image quality if unaccounted for. Fasting should commence 4-6 hours prior to pelvic MR. Administration of an antiperistaltic agent (glucagon - IV or IM - or butyl scopolamine IM) is recommended if no contraindications exist. Utilization of a compression band to restrict motion may decrease motion-induced artifact, as may respiratory gating, triggering, and utilization of navigator echoes. The bladder should be only moderately distended. Positive or negative oral contrast is not routinely utilized in MRI in the United States. T2 but not T1WI illustrate uterine junctional anatomy, distinguishing among the endometrium—high SI due to glandular tissue—junctional zone—hypointense muscular structures—and the myometrium—a moderate SI structure on T2WI during the proliferative phase but hyperintense during the secretory phase due to increased edema and vascular flow. Embryologically, two Müllerian ducts fuse to form the upper vagina, cervix, uterus, and fallopian tubes. Cysts arising from this fusion are similar in MR appearance and are named by location: Nabothian cysts in the cervix, Bartholin's gland cysts in the posterolateral vulvovaginal vestibular glands inferior to the pelvic diaphragm, and Gartner cysts, associated with congenital genitourinary abnormalities, above the diaphragm in the anterolateral vagina. Figure 74.1 demonstrates the characteristic appearance of a Bartholin's cyst—that is, low SI on (A) axial T1WI and high SI on (B) axial and (C) coronal FS T2WI. Cyst SI varies depending on content, and walls of noninfected cysts do not enhance.

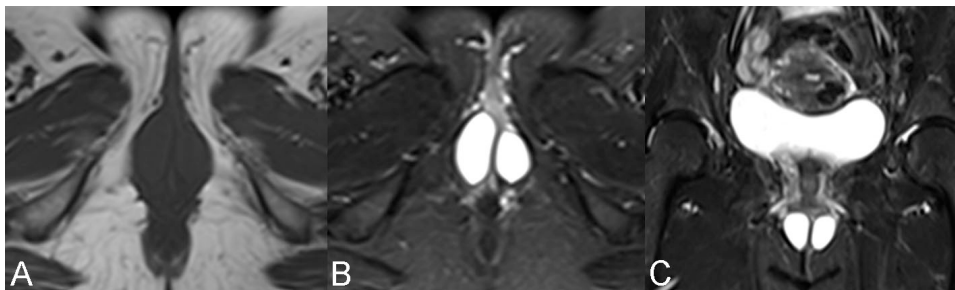


Fig. 74.1

Congenital defects in Müllerian duct fusion are reliably characterized on MR. The ESHRE/ESGE consensus classification system of female genital anomalies is based on anatomy. Class U5 / Aplastic Uterus lesions consist of Müllerian hypoplasia or agenesis. The uterus, if present, appears as a low SI structure on T2WI. A unicornuate uterus (Class U4 / Hemiuterus) results from unilateral Müllerian duct hypoplasia, the formed uterus appearing as a low volume, off-midline structure. The contralateral horn, if not aplastic



Fig. 74.2

(Class U4b), is either cavitary—with approximate preservation of junctional anatomy—or non-cavitary—with asymmetric low SI thickening on T2WI. The (A) axial T2WI of Fig. 74.2 illustrates uterus didelphys (Class U3b Complete Bicornate Uterus)—a fusion abnormality resulting in two normal-sized uteri and cervixes (Class C2) with a myometrial septum at the upper vagina. Junctional anatomy, as in Fig. 74.2A, is typically preserved. In this particular case, the uterine fundi lie opposite one another, while an endometrioma (asterisk) is incidentally present within the left ovary. A bicornate uterus (Class U3 / Bicornate Uterus)—with preserved junctional anatomy and partially duplicated uterine fundi (Class U3a / Partial Bicornate Uterus) that merge eventually more caudally—is illustrated in axial T2WI of Fig. 74.2B. A septate uterus (Class U2a/b partial/complete) represents failure of resorption of the fibrous septum between otherwise fused Müllerian ducts, and is illustrated in the (A) sagittal and (B) axial T2WI of Fig. 74.3. Here, no low SI fibrous component is present, only midline thickening of the fundal endometrium with indentation into the fundal cavity in a uterus with otherwise normal contour. T-shaped uteri from in utero exposure to diethylstilbestrol constitute Class U1a / T-shaped dysmorphic uterus abnormalities.

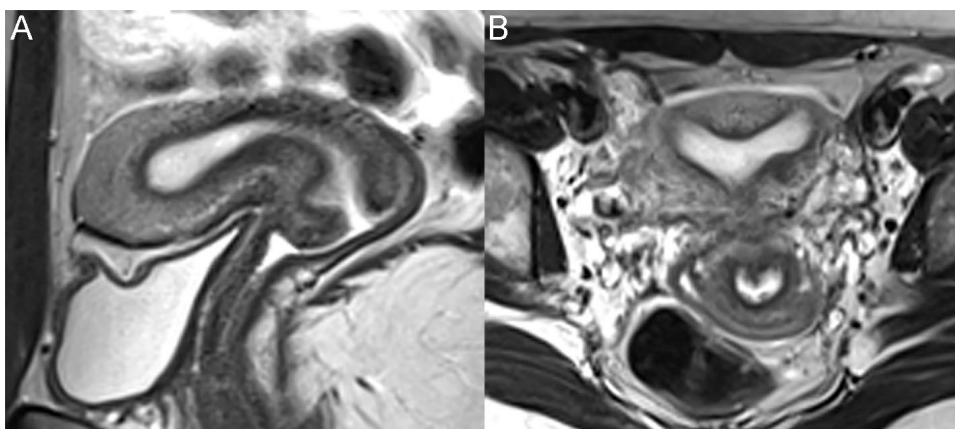


Fig. 74.3

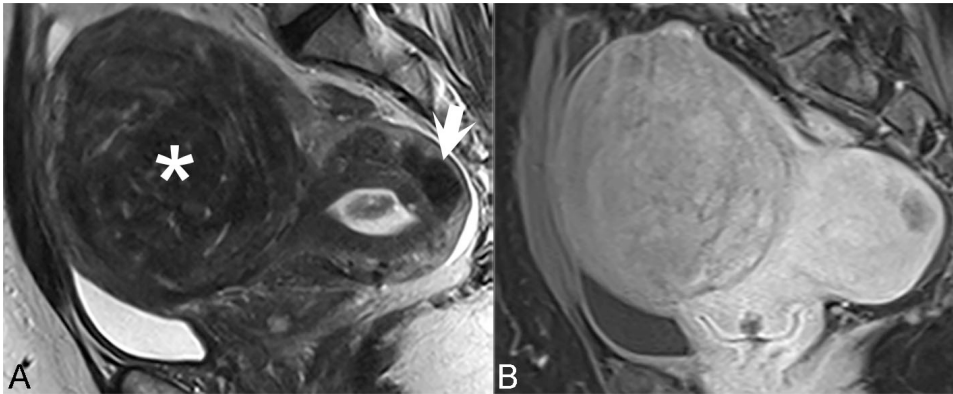


Fig. 74.4

Leiomyomas are optimally evaluated on T2WI, as in Fig. 74.4A where multiple heterogeneous lesions are present. The fundal lesion (white arrow) is characteristic in appearance—a well-defined mass hypointense to myometrium on T2WI. Hypointensity correlates with predominant smooth muscle and fibrous content, while the lesion is distinct due to its surrounding pseudocapsule of compressed myometrium. On (B) CE T1WI, the leiomyomas all appear well-demarcated but with diminished enhancement compared to the normal uterus. Leiomyoma enhancement does vary, with hypervascularity correlating to favorable outcomes with uterine artery embolization. Foci of hyperintensity on T2WI, evident in the largest leiomyoma in Fig. 74.4 (asterisk), are nonspecific correlating with hyaline, fatty, cystic, hemorrhagic (including carneous or red degeneration), mucinous, and myxomatous degeneration. Hemorrhagic degeneration is, however, reliably identified by hyperintensity on T1WI and a lack of contrast enhancement—characteristics foretelling a poor outcome with uterine artery embolization. Cellular leiomyomas may also appear hyperintense on T2WI, and exhibit avid contrast enhancement. Differential considerations for leiomyomas vary by lesion location: subserosal lesions may be confused with ovarian fibroids, both lesions being benign, while myometrial contractions may also appear as myometrial hypointensity presumably due to decreased perfusion within contracting tissue. Such contractions deform the endometrium, sparing the uterine contour. Transience is their most characteristic feature. Rare leiomyosarcomas are not reliably distinguished from benign leiomyomas, with a distinguishing feature being sudden enlargement on serial imaging. However, they may have less distinct borders and may show diffusion restriction, contrast enhancement, necrosis or hemorrhage. Focal adenomyosis is the major differential consideration for an intramural leiomyoma. Figure 74.5 illustrates a typical appearance of an adenomyoma on (A) sagittal and (B) axial FS T2WI. The lesion (white arrows) appears as ill-defined thickening (> 8 mm) of the junctional zone on both images, the hypointensity correlating with smooth muscle hyperplasia. The lack of endometrial mass effect and (B)

hyperintense foci and striations—potentially representing hemorrhage or ectopic endometrium—leading from the endo to the myometrium are also characteristic. Adenomyosis may also appear as interspersed foci of hyperintensity corresponding to ectopic endometrium. Foci of hemorrhage may appear bright on T1WI. On CE T1WI, an adenomyoma may enhance less rapidly than the normal myometrium and take-on a so-called Swiss cheese appearance due to the lack of enhancement of ectopic endometrial glands.

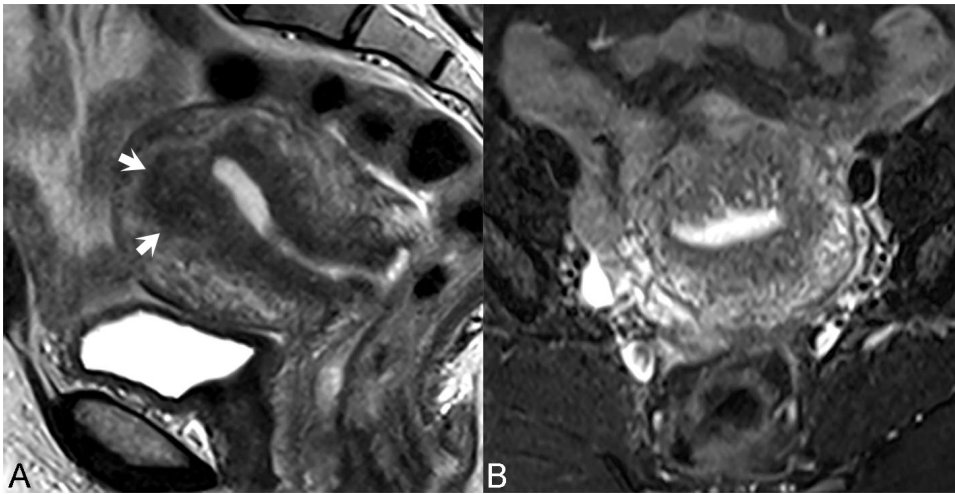


Fig. 74.5