Multi-Focal Endometriosis in a Young Woman with Adnexal Para-Mesonephric Cyst: Role of MRI in Surgical Planning

Albarello F*, Deriu G*, Zagatti Y1, Goletti S1 and Campioni P1
1Department of Radiology, University of Ferrara, Ferrara, Italy
2Department of Radiology, CTO A Alesini Hospital, Rome, Italy

Case Presentation

In September 2011, a 22-year-old woman went to the emergency room of our hospital referring abdominal pain; she was nullipara, with no history of weight or appetite change. She was afebrile, with a normal blood leukocyte count; her menarca was at 12 years. Trans-vaginal ultrasonography (TVUS) showed left ovarian increased in volume, with dysomogeneous structure, ecastic right tube (8 mm) and two disomogeneous right ovarian cysts, suspicious for endometriomas.

A nodule of about 1.5 cm was found in the recto-vaginal septum, which confirmed the palpatory finding of the gynecological examination.

The patient has been therefore submitted to pelvic MRI after the clinical and ultrasonographic suspet of endometriosis.

MRI of the pelvis was performed at 1.5 T (Signa General Electric, Milwaukee, USA), using a 16-channel pelvic phased array surface coil.

MRI analysis was performed with T1 and T2-weighted Spin Echo, Fast Spin Echo and Fast Recovery Fast Spin Echo sequences, with axial, coronal and sagittal planes, with and without fat saturation, without gadolinium injection; the patient was prepared with a water-based gel (ultrasonography gel) in the rectum.

MRI protocol for the suspicion of endometriosis includes axial T1-weighted SE, T2-weighted FSE, T1-weighted FSE fat-sat and T2-weighted FSE fat-sat sequences in the axial plane and T2-weighted FSE fat-sat sequences in the sagittal plane. To complete the study, T2-weighted FSE fat-sat sequences were acquired in the sagittal plane.

MRI confirmed the presence of a bilobate, ovalor formation, on the right side of the recto-vaginal septum, hyper-intense on both T1 and T2-weighted images, with hypo-intense peripheral crest-wreath, compatible with endometriotic lesion (Figure 1); MRI also emphasize the presence of a cystic formation, with axial diameter of about 6 mm, tightly adherent to the terminal tract of the right falloppian tube and set to the ovari compatible with a non endometriotic adnexal cyst probable due to malformative origin also compatible with hydatid of Morgagni (Figure 2).

Another cystic pluriconcamerate formation, of about 1.3 cm, was found also near the distal tract of the right tube, in posterior-medial position, compatible with another endometriotic lesion which caused structural distortion of the tube morphology, that appared ecastic (8 mm) and spread along an area of about 2 cm (Figure 3).

MRI finally confirmed, in comparison with the examinations previously performed, the bilateral ovarian functional cystic aspects and the normal uterine morphology.

The patient has been, therefore, submitted to laparoscopy that confirmed the aforesaid findings.

Discussion

Endometriosis is defined as the presence of functional endometrial glands and stroma outside the uterine cavity, which responds to hormonal stimulation with various degrees of cyclic hemorrhage. Deep endometriosis is the sub peritoneal invasion by endometriotic lesion that exceeds 5 mm in depth. It can affect the rectovaginal septum and uterosacral ligaments, as well as the vagina, the urinary and the alimentary tract [1,2]. The etio-pathogenesis of endometriosis is still unclear and probably multifactorial. Three theories of histopathogenesis have been proposed:

The metastatic theory of Sampson: this is the most widely accepted theory at present. According to this theory, endometriosis results from the metastatic implantation of endometrial tissue from retrograde menstruation that is due to endometrial tissue reflexes through the fallopian tube during menstruation and is then deposited on the peritoneal surface or pelvic organs. Other possible means of metastatic spread includes the transport of endometrial cells to distant sites from the pelvis via the bloodstream or lymphatic channels and iatrogenic spread during needle biopsy or surgery [3]. Favoring factors of this theory are both uterine mullerian anomalies (according to the classification of the American Fertility Society) and dismenorrhea, considered as a symptom of illness but also a risk factor: it would be...

Figure 1: Endometriotic lesion on the right side of the recto-vaginal septum. Sequences T2 fat sat on axial plane (A), sagittal plane (B) and coronal plane(C). Typical “shading” phenomenon on T2 images of endometriotic lesions.

Figure 2: Hydatid of Morgagni (red circle). Axial T2 fat sat sequence (A) that shows the Hydatid cyst, of about 6 mm, and the endometriotic lesion on the right side of the recto-vaginal septum, with “shading” phenomenon. Sagittal T2 fat sat sequence (B): the hydatid cyst is tightly adherent to the terminal tract of the right fallopian tube and set to the ovary. Coronal T2 fat sat sequence (C): hydatid cyst and fimbria.

Figure 3: Axial T2 fat sat sequence (A): endometriotic cyst pluricomcamerate formation, of about 1.3 cm, near the distal tract of the right tube, in posterior-medial position, which caused structural distortion of the tube morphology, that appeared ectasic (8 mm) and spread along an area of about 2 cm. Axial T1 (B) and T1 fat sat sequence (C): endometriotic lesion near the tube and on the right side of the recto-vaginal septum, with hyper-intense signal (red circle).
related to vigorous uterine contractions, indeed, that would cause an obstacle to the normal menstrual flow with consequent retrograde flow.

The metaplastic theory of Meyer: it’s related to metaplastic differentiation of serous surface (coelomatic epithelium) or the remnants of Mullerian tissue in endometrium-like tissue under the influence of estrogen. The strongest evidence for this theory is the demonstration of endometriosis in women who lack of functional ectopic endometrium (including those with Turner syndrome, gonadal dysgenesis, etc.), as well as in men.

The induction theory: it combines the first two proposed mechanism and suggests that shed endometrium releases substances that induce undifferentiated mesenchyme to form endometriotic tissue [4].

The persistence of residual of para-mesonephric ducts or more rarely of the mesonephric ducts causes the formation of paraovarian or paratubal cysts (3-20% of the adnexal masses) [5]. Such formations result constituted by totipotent epithelium celiacmous cells. Among these structures derived from Mullerian remnants, we can enumerate the hydatid cyst of Morgagni [6,7], which is the most common benign non-inflammatory adnexal condition. Characteristically, it appears as a simple cyst (maximum axial diameter less than 2 cm) containing serous material, pedunculate, which typically locates next to the fimbria [8].

The hydatid cyst of Morgagni is the most common benign non-inflammaratory tubaric condition and it usually appears as a simple cyst generally with an axial diameter smaller than 2 cm, containing serous material, pedunculate, typically located next to the fimbria. It originates from Mullerian remnants [9] and it is usually found accidentally during laparoscopy or laparotomy, because it cannot be always visualized during transvaginal sonography. The presence of this formation, according to the data found in literature could constitute a substratum of coelomatic tissue that, under the estrogen stimulation, could differentiate, through metaplastic mechanism, in functioning endometrium-like tissue, tucked to the serous tubal surface (Meyer’s theory). This theory is supported by the presence of a voluminous endometriotic lesion in the recto-vaginal septum of the patient [10], which is interlinked with Mullerian remnants right in this site that could become endometrium-like tissue under the estrogenic stimulation after the menarcha [11].

It’s important to keep in mind that in young patients with endometriosis, the concomitant presence of cystic ovarian lesions <1 cm has to raise the diagnostic doubt between further endometriotic lesion, functional cysts or hydatid cyst of Morgagni. The distortion of tubal morphology could be partly the result of the chronic inflammatory condition caused by the endometriosis, partly due to the possible alterations of the ciliary motility of the tubal epithelium induced by the paramesonephric cysts. Consequently, it results in tubal adherences that could contribute to tubal ectasia and also to the possible reflux of menstrual blood, which can be a concomitant of the distal peritubal endometriotic implants as described in the Sampson’s theory, MRI allows discriminating between these lesions on the base of theirs different signal features [12].

Both simple cysts and hydatid Morgagni cysts are hypointense on T1-weighted images and hyperintense on T2-weighted images; their different spatial position allows to discriminate them: the first ones are in the context of the ovary, instead the other ones appear as pedunculate appendixes of the fimbria and they can lean against the ovary and compress it, giving the characteristic “beak sign” [13].

Endometriotic cysts, instead, have variable signal on MRI [14] depending on the time between menstrual bleeding and the execution of MRI exam because, as we know, the paramagnetic properties of hemoglobin catabolites change according to the degradation phase [15].

Conclusion

MRI, due to higher spatial resolution, allowed us to identify endometriotic implants and incidental findings too small to be seen with USTV. Furthermore, an optimal tissue characterization was possible through the MRI in order to differentiate in the pre-operative phase the ovarian cystic formations. According to our preliminary experiences, with the limitations of a case report MRI showed to be more helpful than the US, in the pre-operative planning. MRI played a crucial role in distinguishing the multiple endometriotic lesions from the malformative cysts, giving important informations to the surgeon in the pre-operative planning.

References