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Case report

Transient uterine contraction mimicking adenomyosis on MRI

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Abstract. Transient myometrial contraction as a physiological phenomenon may simulate pathological conditions, such as a focal or diffuse adenomyosis. Clinicians should be aware of the potential presence of this phenomenon and imaging should be repeated after a suitable interval when the nature of a bulge or a region of low intensity in the myometrium is in doubt. In this paper, we report a transient myometrial contraction that mimics an adenomyosis, but disappears in repeated series.

Key words: Uterus, anatomy – Uterus, MRI – Uterus, myometrium

Introduction

The junctional zone is an anatomical landmark in the assessment of adenomyosis. Transient uterine contractions that cause a focal area of low signal intensity with an increase in thickness of the junctional zone should not be misinterpreted as an organic lesion.

Case report

A 35-year-old woman consulted with a problem of recurrent abortion. The obstetric history showed a term spontaneous delivery of a normal baby 8 years previously, followed by eight miscarriages. There was no reason for her miscarriages on looking through the results of her clinical and diagnostic investigations. MRI was performed in the secretory phase of the menstrual cycle using a circularly polarized (CP) spine coil and a Siemens Magnetom Open System (Siemens, Erlangen, Germany) operating at 0.2 T. Sagittal and axial images were obtained utilizing a T2-weighted TSE sequence with a 7 turbo factor (TR 3500–4000 ms, TE 102 ms). Imaging parameters included a slice thickness of 6 mm with a 0.10 distance factor, 154 × 512 matrix to increase the spatial resolution and 4 acquisitions. Additional sagittal T2-weighted images with fat suppression (TR 3300 ms, TE 48 ms) were obtained. Imaging parameters for this sequence were a slice thickness of 6 mm with a 0.20 distance factor, 126 × 256 matrix and 4 acquisitions.

T2-weighted sagittal MR images demonstrated a focal, ill-defined region of decreased signal intensity on the anterior wall of the retroverted uterus, in continuity with the junctional zone (Fig. 1 a, b). On T2-weighted sagittal images with fat suppression, this focal area disappeared, only the discrete irregular border of the anterior uterine wall still being visible (Fig. 2). T2-weighted sagittal images repeated after a 10-min interval following removal of the tampon showed the normal uterine zonal anatomy and normal thickness of the junctional zone (Fig. 3). The transient nature of this finding and the presence of normal uterine zonal anatomy are diagnostic for a transient uterine contraction and thus allowed the differentiation of uterine contraction from adenomyosis.

Discussion

Besides depicting many organic lesions [1, 2], MRI is able to demonstrate the variability in the appearance of the normal uterus [3]. In women of reproductive age, three distinct layers can be identified within the uterine corpus on T2-weighted MR images [4, 5]. A central stripe of high signal intensity corresponds to the endometrium and endometrial secretions. A band of low signal intensity surrounding the endometrium is termed the junctional zone or inner myometrium. Finally the peripheral zone of intermediate signal intensity is the outer myometrium [3–5]. Although there is no obvious histological zonal equivalent on light microscopy, morphometric studies have shown that the junctional zone represents the innermost layer of the myometrium. In

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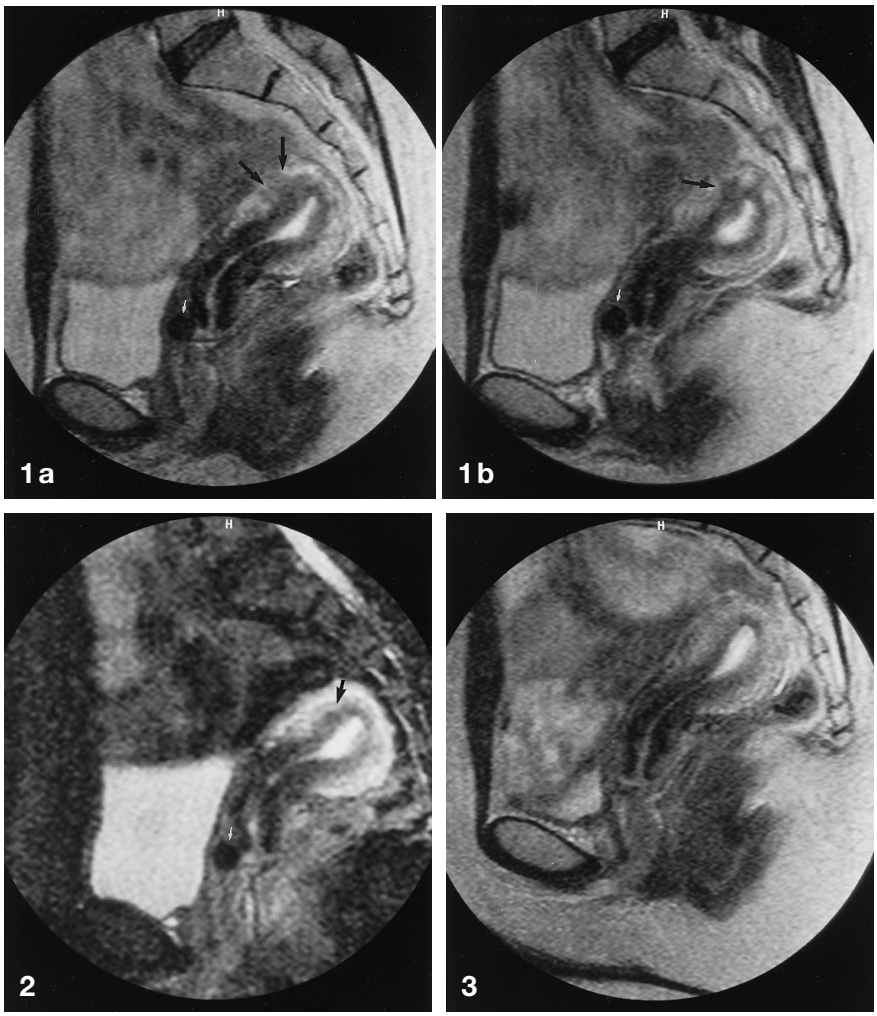

Fig. 1 a, b. T2-weighted consecutive sagittal MR images show a focal, ill-defined area of low signal intensity on the anterior wall of the retroverted uterus, inseparable from the junctional zone, which is mimicking the adenomyosis *(black arrows).* Note the discrete bulging of the junctional zone into the endometrial cavity. The round low-intensity aspect in the anterior vaginal fornix is due to a tampon *(white arrow)*

Fig. 2. Fat-suppressed T2-weighted sagittal MR image demonstrates the normal thickness of the junctional zone with only a slightly irregular border of anterior wall *(black arrow).* The tampon in the anterior vaginal fornix is still partially visible *(white arrow)*

Fig. 3. T2-weighted sagittal MR image with the same parameters as in Fig. 1 repeated after a 10-min interval by emptying the bladder and removing the tampon. The thickness of the junctional zone is normalized and no more focal signal alterations are visible

comparison with the outer myometrium, the junctional zone has an increased nuclear area per unit area, a decreased extracellular matrix per unit volume, and a lower water content [5–7]. The increased nuclear area reflects an increased nucleo-cytoplasmic ratio of the myocytes and an increased smooth muscle density [5]. This may explain the observed decreased signal intensity on T2-weighted MR images.

Adenomyosis is defined as the presence of heterotopic endometrial glands and stroma deep within the myometrium and exhibits two patterns of distribution: focal and diffuse [1]. On MRI, focal adenomyosis appears as a localized but ill-defined region of decreased intensity, inseparable from the junctional zone [1]. Irregular thickening of the junctional zone has been proposed as the MR criterion for the diagnosis of diffuse adenomyosis [5, 8].

Mark et al. [1] first proposed that the diagnosis of adenomyosis can be made with confidence when the junctional zone measures more than 5 mm in thickness. However, later published data do not adequately support this statement [3, 7, 8]. Recently, Kang et al. [8] reported that taking 8 mm as the upper limit of normal thickness of the junctional zone may improve the specificity of MRI for diagnosing adenomyosis in the symptomatic patient population up to 100 % [1, 2, 8, 9]. Although adenomyosis and leiomyoma can have the same clinical presentation, their treatment differs [1]. The adequate treatment for adenomyosis is hysterectomy [1, 2], while leiomyomas can be treated with myomectomy or conservative hormonal therapy [2]. MRI can therefore play an important role by offering preoperative differentiation of these lesions [2].

Because the junctional zone is an anatomical landmark in the assessment of adenomyosis [1, 2], other causes for junctional zone alterations such as diffuse smooth muscle hypertrophy with an increase in thickness [9] or a broad and ill-defined junctional zone in the early postpartum period [4], should also be considered in the differential diagnosis of adenomyosis.

Transient contraction of the myometrium as a physiological condition may also simulate a focal or diffuse adenomyosis [8, 10, 11]. Myometrial contractions in a non-pregnant woman originate exclusively from the junctional zone, and their amplitude, frequency and direction depend on the phase of the menstrual cycle [5]. Togashi et al. [11] have noted this phenomenon in women of reproductive age in the secretory phase of the menstrual cycle. They also reported that the contractile activity of the uterus has an important role in its blood

circulation [11]. Although myometrial contraction is transient, it can be sustained for as long as 30–45 min [10]. The transient nature of these findings make it unlikely that they are caused by adenomyosis or any other organic lesion [8, 10].

In this case we did not use hypotonic agents, and we do not have any further experience in preventing transient uterine contractions by using hypotonic agents or removing the tampon.

In conclusion, thickening of the junctional zone has been proposed as the MR criterion for the diagnosis of adenomyosis. Clinicians should be aware of the potential presence of the transient low-intensity distortion of the uterine zonal anatomy caused by myometrial contractions, which should not be misinterpreted as an organic lesion. Imaging should be repeated after a suitable interval of up to 20–45 min if the nature of a bulge or a region of low intensity in the myometrium is in doubt.

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