

Evaluation of uterine myomas during pregnancy using magnetic resonance imaging

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Abstract

Patients with infertility commonly undergo various diagnostic and therapeutic procedures that may affect the future course of the pregnancy. In this presented case a female patient with infertility has been subjected to laparoscopic myomectomy and chromoscopy of the fallopian tubes, as it turned out later, 4 days after spontaneous conception. Due to severe pain in the 19th week of pregnancy the uterus area with the scar resulted from the removed myoma was visualised by magnetic resonance imaging (MRI). The MRI showed an active red degeneration in one of the myomas. At the same time the thickness of the uterus wall in previous myomectomy area was normal. The control MRI performed in the 36th week of pregnancy showed a hyaline degeneration of the myoma, underlying its dynamic refraction. The MRI approach enabled a non-invasive treatment and delivery in term.

INTRODUCTION

Myomas are the most common benign tumours of the uterus, with cases reported both in female individuals capable of reproduction and after menopause. Most commonly, the diagnosed patients are females before their first pregnancy or exhibiting fertilization problems. In these cases, the selected treatment must preserve the future conception capability of the patient. Currently, in addition to the traditional enucleation procedures, myomas treatment includes endoscopic procedures, pharmacological treatment and embolizations. During pregnancy, uterine myomas can either grow or become necrotic. Taken pregnancy as a restrictive factor, post-operative treatment and further diagnosis becomes problematic. The ultrasound analysis, routinely performed on the developing

foetus at various times post-conception, might not be a sufficient mean to precisely assess the uterus abnormalities. Therefore, finding another method to visualise uterus tumours during pregnancy is of highest interest. In the presented case, a pregnant patient was subjected to MRI in order to study the fate of a uterine subserosal myoma which has been laparoscopically removed shortly after natural conception.

CASE STUDY

A 30-years-old female patient, exhibiting infertility problems, including two failed intra-uterine inseminations, was qualified for a laparoscopic enucleation of uterine myomas. During the surgery, performed on the 15th day of the menstrual cycle, a 5 cm subserosal myoma was removed from

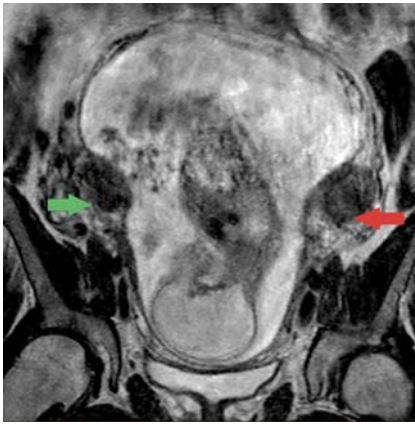


Fig. 1. A T2-weighted, MRI image of the uterus in the 19th week of pregnancy is presented in the frontal section. The red arrow points out the myoma with red degeneration and congestion of the surrounding tissues. A typical myoma is marked with the green arrow.

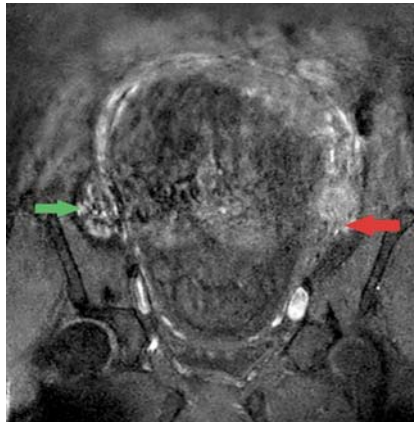


Fig. 2. A T1-weighted, MRI image of the uterus in the 19th week of pregnancy is presented in the frontal section. The red arrow points out the myoma with red degeneration and congestion of the surrounding tissues. A typical myoma is marked with the green arrow.

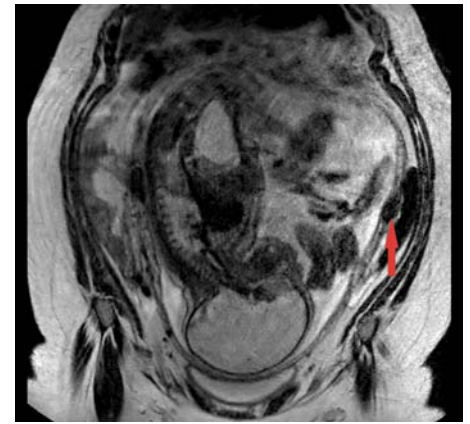


Fig. 3. A T2-weighted, MRI image of the uterus in the 36th week of pregnancy is presented in the frontal section. The arrow points to significant reduction of the myoma and the absence of tissue congestion compared with the one observed in the 19th week of pregnancy.

the left uterus corner. A subsequent chromoscopy in conjunction with methylene blue staining confirmed the patency of fallopian tubes. One month after the surgical procedure, the patient was diagnosed with an intrauterine pregnancy. Interestingly, based on the size of the fetus, the conception occurred 4 days before the surgery. Progesterone was applied intravaginally (200 mg/day) for the relaxation of the uterine muscle.

During the 19th week of pregnancy, the patient experienced strong pain, localized to the left corner of the uterus. The biochemical tests confirmed inflammation (leukocytosis 14.12 G/L and CRP 18.4 mg/L). The ultrasound revealed a 35 mm intramural myoma. The left uterine area was difficult to visualize and assess. Therefore, further diagnosis required the MRI procedure. A 40 mm myoma has been found in the left corner of the uterus. The detailed analysis showed a significant signal in the T1-weighted images that was heterogeneously reduced in images T2-weighted. These observations pointed to the red degeneration and a 35 mm focal signal, hypointensive in T2-weighted images and isointensive in images T1-weighted. The described abnormalities were similar to these observed for typical myomas. The degenerated change with visible congestion has been observed (Figures 1 and 2). No infiltration was observed in the left corner of the uterus wall. Based on the MRI results it was decided to implement antibiotic treatment supplemented with non-steroidal anti-inflammatory drugs. As a result, pain and inflammation symptoms receded. In the control MRI, performed on the 36th week of pregnancy, the described myoma with red degeneration shrunk significantly to 20 mm and was classified with hyaline degeneration. This diagnosis was based on a low signal in T2-weighted images with no signs of congestion in the surrounding tissue (Figure 3). No further myomas characterized with the

red degeneration were diagnosed in the course of this study. Due to the previous myoma surgery, the pregnancy was terminated with a caesarean section in the 38th week of pregnancy. The delivered male child was in good condition and weighed 3 190 g. Minor myomas protrusions were identified on the surface of the uterus wall, with a diameter that did not exceed 20 mm. A small cavity was observed in the left uterus corner with no signs of infiltration. A control ultrasound, that was performed 6 week after the delivery, revealed four intramural myomas up to 18 mm.

DISCUSSION

Surgical treatment of uterine myoma in female patients with diagnosed infertility remains to be controversial (Metwally *et al.* 2012). However, despite the risk of wound dehiscence, a higher proportion of pregnancies and live births after myomectomy are being reported (Marchionni *et al.* 2004; Campo *et al.* 2003; Soriano *et al.* 2003; Dessolle *et al.* 2003; Seracchioli *et al.* 2003; Ribeiro *et al.* 2003; Sudik *et al.* 1996). Growth and secondary ischemia of existing myomas progresses during pregnancy. These processes result in red degeneration of the tumour mass, which may cause pain with moderate fever, leukocytosis and local sensitivity (Pedrosa *et al.* 2007; Murase *et al.* 1999). To select the consecutive treatment, it is important to precisely diagnose the cause of these symptoms, taking into account the possible propagation of the postoperative wound.

Ultrasound examination is the most common diagnostic tool for uterus visualisation. However, due to the limited sensitivity of this method, the assessment of scar and myomas during pregnancy is compromised, especially in the third trimester (Sieroszewski *et al.* 2002). Multisection and spatial imaging using

MRI allows for precise assessment of the uterus muscle structure. The use of MRI is particularly useful in cases where ultrasound is inconclusive. Diagnosis of uterine myomas using the ultrasound is primarily based on their round- or oval-like shape, multiple layer structure and increased echogenicity. The echogenicity can be influenced by the level of fibrous-like structures and local calcification. Thus, the output image of the uterus may differ from the typical one. Magnetic resonance imaging allows for a better diagnosis of not only the number, size and location of myomas, but above all, the nature of the degenerative changes. On the MRI images the majority of myomas is well defined, characterised with a low signal on T2-weighted images and almost izointensive with the uterine muscle in T1-weighted images. However, myomas morphology can differ in the degeneracy between hyaline, mucoid, cystic or red. In the case of hyaline myoma the signal is low in both the T1- and T2-weighted images. Cystic degeneration is characterized by a significant decrease of the signal in T1-weighted images and a significant increase in T2-weighted images, without contrast enhancement. In contrast, mucoid degeneration is characterised with a moderate decrease of the signal in T1-weighted images and the increase in T2-weighted images with a delayed contrast-enhanced. Congestion of the leiomyoma and the surrounding tissue progresses in the early stages of ischemia. This is reflected by an increase of the signal in T1-weighted images and izointensity in T2-weighted images. Myoma infarction leads to haemorrhage and blood decay products cause a decrease of signal in T2-weighted images and an increase in T1-weighted images (Murase *et al.* 1999).

Up to date, there is no uniform treatment for the degenerative changes of uterine myomas during pregnancy. Non-surgical treatment is possible in cases where pain symptoms can be controlled. Patients with peritoneal symptoms can be considered for surgical treatment, which upon correct diagnosis is effective and safe (Bińkowska *et al.* 2009; Pajszczyk-Kieszkiewicz *et al.* 2002). We report that MRI is an important tool in the process of selecting the consecutive treatment of diagnosed uterine myomas during pregnancy.

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