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**Magnetic resonance imaging findings of spontaneous pyomyoma in a premenopausal woman managed with myomectomy: A case report**

Martinez D. *et al* MRI finding pyomyoma

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## **Abstract**

### **BACKGROUND**

Acute Fibroid complications are rare indeed; however, when they occur, failure to recognize and deal with acute complications expeditiously can lead to catastrophic even deadly complications. Pyomyoma is a rare but potentially fatal condition resulting from infarction and infection of a fibroid through bacterial seeding and direct, hematogenous, or lymphatic dissemination. Eventhough the diagnosis is established through clinical and laboratory findings, imaging is an important complimentary method to support the suspected diagnosis.

### **CASE SUMMARY**

Herein, we report a case of a pyomyoma in a nulliparous woman previously diagnosed with uterine leiomyomatosis according to ultrasound findings. The patient had previously attended the emergency room due to hypogastric pain unresponsive to analgesics. After a week of persistent pain, she developed sepsis without any identifiable foci. MRI revealed findings compatible with uterine myomatosis with red degeneration, and a possible diagnosis of a pyomyoma was made according to the imaging findings along with the patient's clinical features. We decided to perform myomectomy due to the patient's desire to preserve fertility (which is an infrequently performed surgical treatment due to the procedure's intrinsic implications).

Histopathologic results revealed a uterine leiomyoma with coagulative and liquefactive necrosis, while the tissue culture showed gram-negative cocci bacteria, which were successfully treated using antibiotic therapy. The patient's health status improved after several days.

### **CONCLUSION**

The main diagnostic tool to evaluate Pyomyomas is both the clinical and laboratory findings, as well as tissue cultures. Nonetheless, MRI imaging can help to backup these

findings, as well as to better characterize Myomas along with its different complications.

**Key Words:** Diffusion-weighted images, Apparent diffusion coefficient, Case Report, Leiomyoma, sepsis, Magnetic Resonance Imaging.

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**Core Tip:** Diffusion-weighted images (DWI), ADC quantification and the addition of T1- and T2-weighted sequences with fat suppression can improve the characterization of the components of a myoma during degeneration.

## **INTRODUCTION**

A pyomyoma is a rare but potentially fatal condition resulting from infarction and infection of a leiomyoma<sup>[1]</sup> through bacterial seeding and direct, hematogenous, or lymphatic dissemination. Because of the rarity of pyomyomas, low clinical suspicion delays its diagnosis and predisposes patients to possible complications, such as purulent peritonitis or sepsis.

The definitive treatment of a pyomyoma is hysterectomy <sup>[2]</sup>. An alternative to this, consists in intravenous administration of broad-spectrum antibiotics and myomectomy. Surgery can be adjusted according to the size and number of pyomyomas, while considering the future reproductive wishes of the patient <sup>[3]</sup>. Surgery can also be performed to make a definitive diagnosis<sup>[4]</sup>, while decreasing associated morbidity and mortality <sup>[5]</sup>

While ultrasound and computed tomography are often the first tools used for the detection of pyomyomas <sup>[6]</sup>, MRI is the most precise imaging technique that can be used to characterize myomas with different types of degeneration (including the

identification of purulent collections in the pyomyoma) which makes it potentially useful for diagnosis. However, the emergency use of MRI is still controversial [7].

Differential diagnoses of pyomyoma include gynecological tumors, (benign or malignant ovarian tumors, tubo-ovarian abscess, uterine sarcoma, or pyometra), endometritis, gastrointestinal stromal tumors, and appendiceal mucocoele [3,8]. However, red degeneration should be considered as an important entity, due to its similarities to a pyomyoma on MRI.

<sup>1</sup> Red degeneration can exhibit peripheral or diffused hyperintensities in T1-weighted images and variable signal intensity, with or without a hypointense rims in T2-weighted images [7]. As an additional complimentary sequence, diffusion-weighted imaging can be obtained. Generally, tissues with high cellularity have lower diffusion coefficients, which can be clinically related to purulent materials.

The ethics committee of hospital Christus Muguerza Hospital Betania approved this study. A signed <sup>3</sup> informed consent by the patient was obtained for the publication of this case report.

## CASE PRESENTATION

### *Chief complaints*

A 26-year-old premenopausal nulliparous woman was evaluated for severe hypogastric pain for the past 24 h with no response to analgesics.

### *History of present illness*

The patient had a history of uterine myomatosis, which was confirmed by a pelvic ultrasound. She was prescribed with analgesics and sent home; however, she returned to the emergency department of our hospital a week later with abnormal uterine bleeding <sup>4</sup> and abdominal pain.

### *History of past illness*

The patient had no prior chronic or systemic disease. The patient had no prior surgeries

#### *Personal and family history*

The patient did not have prior pregnancies or deliveries. Her menstrual cycle was reported as regular. There was no family history of chronic diseases or cancer.

#### *Physical examination*

A depressible and tender abdomen with a slight increase in volume in the hypogastrium was observed during the physical examination.

#### *Laboratory examinations*

On admission, there were no abnormal laboratory findings. An RT-PCR for SARS-CoV-2 was obtained with negative result.

#### *Imaging examinations*

Requested MRI showed a mass located in the posterior wall of the uterus, with T1- and T2-weighted hyperintense component, a T1-weighted hyperintense halo, as well as some materials with high T1-weighted FAT-SAT signal (suggesting a hematic content), and content with high T2-weighted FAT-SAT signal indicating liquid content (Figure 1). In the diffusion-weighted images, an apparent diffusion coefficient map was obtained by measuring ROI with low ADC value ( $1.5 \times 10^{-3} \text{ mm}^2/\text{s}$ ) figure 2. The results obtained suggested the presence of a leiomyoma with red degeneration; however, pyomyoma was considered as a differential diagnosis due to the low ADC value.

#### **FINAL DIAGNOSIS**

The final given diagnosis was uterine myomatosis with red degeneration complicated with pyomyoma.

#### **TREATMENT**

After evaluating the case and considering that the patient was a nulliparous woman, a laparoscopic myomectomy was performed to preserve the patient's fertility wishes (figure 3). This also resulted in the discovery of an intraoperative large myoma that was peripherally hypovascularized with friable tissue in its center.

### **OUTCOME AND FOLLOW-UP**

At 12 h postoperatively, the patient experienced sepsis symptoms, consisting on hypotension (70/40 mmHg), tachycardia (150 bpm), fever (39.8 °C), respiratory distress (30 rpm; SPO<sub>2</sub> 80%) and drowsiness. Therefore, she was admitted to the intensive care unit for management with oxygen therapy, fluid resuscitation, and empiric antibiotic therapy.

After performing myomectomy, laboratories were obtained, showing anemia (10.4 g/dL), leukocytosis with bandemia (18.32 K/uL; 10.0%), high C-reactive protein levels (123.94 mg/L), procalcitonin (5.55 ng/mL), pCO<sub>2</sub> 31.0 mmHg, HCO<sub>3</sub> 20.6, BEb -2.5, and Lactate 1.3

The histopathologic report showed a uterine leiomyoma with coagulative and liquefactive necrosis, while a tissue culture showed gram-negative cocci bacteria, which confirmed the diagnosis of a pyomyoma. Antibiotic treatment was adjusted towards gram-negative cocci, resulting in normalization of inflammatory markers and clinical improvement after 3 days.

### **DISCUSSION**

Myomas stand as the most common solid pelvic tumor in women during reproductive years, occurring in approximately 20 - 40% of this population [9]. It is estimated that 50% of women bearing myomas will remain asymptomatic through their lives.

Also known as fibroids or leiomyomas, these tumors are benign and originate from smooth muscle cells of the uterus, but cases have been reported in which smooth muscle from uterine blood vessels may become their source [9].

The remaining 50% of women will develop symptoms related to their size, location, or degenerative changes, if present. Some of these symptoms may include polymenorrhea, hypermenorrhea or even menometrorrhagia [9].

Associated pain in myomatosis is relatively infrequent, and it usually presents upon certain criteria meeting: 1) Fibroids above 5 cm 2) Posterior wall fibroids 3) Fibroids with sudden increase in size (often related to pregnancy) as the blood supply may become insufficient, producing tissue anoxia, necrotic infarction and the subsequent release of prostaglandins [10].

Cases of severe pain are often associated with torsion of pedunculated myomas, cervical dilation by submucousal myomas and fibroid red degeneration of the pregnancy [10]. All of these conditions usually call for immediate action.

In this reviewed case, the patient had a previous history of myomatosis, presenting now with acute persistent pain, which prompted an ultrasound evaluation. The study did not show relevant changes within myomas (**On Ultrasound, a painful myoma above 200 cm<sup>3</sup> with changes in the ecogenicity suggesting internal cystic lesions can suggest red degeneration and infarction** [10]). Even so, according with clinical suspicion, an MRI was ordered nevertheless, to discard complications in her myomas, considering that red degeneration is an important complication of leiomyomas.

**Myomas with red degeneration are characterized by acute onset abdominal pain, mild fever, localized tenderness over the myoma (as in this case), and leukocytosis. As mentioned before, they can become infected and turn to Pyomyomas. Extensive necrotic areas can become infected with anaerobic bacteria. MRI should be considered in such situations to confirm the diagnosis and facilitate fibroid mapping before surgery.** Pyomyomas usually lead to inflammatory changes and tissue necrosis, compatible with those present at the moment of presentation in this case, arising suspicion due to the low ADC value in MRI [10].

Patients with a history of myomatosis who develop sepsis with unidentifiable foci, should be discarded for pyomyoma. In our case, sepsis became present after the surgical procedure; however, according to available literature, the clinical picture can be



very unspecific and the clinical presentation of pyomyomas can be insidious. Therefore, the diagnosis could be complicated.

### **CONCLUSION**

The main diagnostic tool to evaluate Pyomyomas is both the clinical and laboratory findings, as well as tissue cultures. Nonetheless, MRI imaging can help to backup these findings, as well as to better characterize Myomas along with its different complications.

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