Degenerated uterine leiomyoma: How to avoid misdiagnosis with MRI.

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Purpose

To identify and characterize uterine leiomyomas degeneration on MRI correlating findings with histopathologic features.
Methods and Materials

In a retrospective and descriptive study we analyzed the presence of uterine leiomyomas in 82 patients in a period of four years using a 1.5 tesla MRI. T1 Spoiled Echo, T1 fat sat Spoiled Echo, T1 Phase and out of Phase with/ without gadolinium, T2 fast Spin Echo, STIR, sequences were acquired.

All our patients were evaluated according to:

* Age
* Leiomyoma number: solitary/multiple
* Location: subserosal, intramural, submucous
* Presence of uterine leiomyoma degeneration by MRI correlated with histopathological findings:

Nondegenerated uterine leiomyomas have a typical appearance on MRI, are well circumscribed masses of homogeneously decreased signal intensity compared with the myometrium on T2 weighted images and similar signal intensity on T1 weighted images (fig.1) on page

There are different types of uterine leiomyomas degeneration.

* Type of degeneration by MRI correlated with histopathological findings:

1.-Hyaline degeneration-. Involves the presence of homogeneous eosinophilic bands or plaques in the extracellular space, which represent accumulation of proteinaceous tissue. Have low signal intensity on T2 weighted images and shows no enhancement after contrast administration.

2.-Cystic degeneration- Liquefaction follows extreme hyaline degeneration. Have high signal intensity on T2 weighted images and shows no enhancement after contrast administration.

3.-Mucoid degeneration- Hyaline areas are replaced by a soft, gelatinous material that contain hialuronic acid rich mucopolissacharides. Have very high signal intensity on T2 weighted images and shows gradual enhacement after contrast administration.
4.- Fatty degeneration - Lipids are found inside smooth muscle fibers. Have high signal intensity on T1 weighted images and shows no enhancement after contrast administration.

5.- Red degeneration - Occurs secondary to venous thrombosis within the periphery of the tumor or rupture of intratumoral arteries. Have high signal intensity on T1 weighted images and variable signal intensity with or without a low signal intensity rim on T2 weighted images. Shows no enhancement after contrast administration.

6.- Calcification - Precipitation of calcium carbonate and phosphate will most frequently occur in areas with circulatory deprivation. Have low signal intensity on T2 weighted images and shows no enhancement after contrast administration.

7.- Necrotic leiomyomas - It occur for insufficient blood flow. If not liquefied (hyaline) have variable signal intensity on T1 weighted images and low signal intensity on T2 weighted images.

8.- Sarcomatous degeneration - Leiomyosarcoma is a rare malignant neoplasm composed of cells that have smooth muscle differentiation. They have variable appearance on MRI.

9.- Cellular leiomyoma - composed of compact smooth muscle cells with little or no collagen, can have higher signal intensity in T2 weighted images and demonstrate enhancement on contrast enhanced images.

10.- Lipoleiomyomas - histologically consist of smooth-muscle tissue admixed with varying amounts of mature adipose tissue. Have fat signal intensity in all MR imaging sequences.
Results

* Age: range was 31 to 79 years with a mean age of 52.12 years and 10.72 standard deviation.

* Leiomyoma number: Magnetic Resonance Imaging showed 66% of multiple leiomyomas (n=54) (fig.2) and 34% (n=28) solitary leiomyomas

* Location: the most frequent location was intramural in 45% (n=36) of the patients, submucous in 38% (n=32) and less frequent subserosal in 17% (n=14) of the patients (fig.3).

* Presence of uterine leiomyoma degeneration by MRI with histopathological findings correlation: 66% (n=54) of patients without uterine leiomyomas degeneration and 34% (n=28) of patients with uterine leiomyoma degenerated were found.

* Type of degeneration by MRI correlated with histopathological findings: Magnetic Resonance Imaging showed 7 different types of degeneration (fig.4).

Hyaline degeneration showed to be the most frequent (fig.5a) (fig.5b) with 35% followed by necrotic leiomyomas with 25% (fig.6a) (fig.6b), cystic degeneration 14% (fig.7), mucoid degeneration 11% (fig.8a) (fig.8b), red degeneration 7% (fig.9a) (fig.9b), calcification 4% (fig.10), and finally Sarcomatous degeneration with 4% (fig.11). Fatty leiomyoma degeneration (fig.12a) (fig.12b), cellular leiomyoma degeneration (fig.13), and lipoleiomyoma degeneration (fig.14) were not found in our series.

When compared with pathological findings, 66% of the patients (n=54) without leiomyomas degeneration, 51% (n=44) of them correlates with MR imaging findings and 10 patients did not correlated. On the other hand when compared with pathological findings, 27 of 28 patients (34%) correlates with MR imaging findings and only one patient did not correlated.

Therefore when compared with pathological findings MR imaging presented in our series the following results: true negative= 44, false negative= 10, true positive= 27 and false
positive= 1. Finally our series showed 97% of specificity, 72% of sensitivity, 96% of positive predictive value and 81% of false predictive value.
Conclusion

The MRI is a highly reliability diagnosis method to define uterine leiomyomas degeneration that allow us to avoid misdiagnosis on adnexal and pelvic mass and therefore unnecessary treatments.
References


