MR Imaging Features of Ovarian Fibroma, Fibrothecoma and Thecoma

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Target Audience: Genitourinary or general radiologist, Radiology Resident, Radiologic technician.

Purpose: To retrospectively evaluate the conventional and functional (diffusion- or perfusion-weighted) magnetic resonance (MR) imaging features of ovarian fibroma, fibrothecoma and thecoma.

Methods: Histologically proven ovarian fibromas (n = 19), fibrothecomas (n = 7) and thecomas (n = 2) were reviewed (26 patients). The morphologic and signal intensity (SI) characteristics on conventional MR imaging (n=28, all cases) were analyzed. The b1000 signal intensity on diffusion-weighted image (DWI) (n = 22) and the time-to-signal intensity curve on perfusion-weighted image (PWI) (n = 7) were also analyzed. The presence and shape of the ipsilateral ovarian tissue surrounding the lesions were evaluated on T2-weighted image.

Results: Twenty-two cases (79%) were predominantly solid tumor. Majority of the detected lesions exhibited the characteristic homogeneous low SI on T1- (24/28, 86%) and T2- (19/28, 68%) weighted image. Conversely, a number of lesions exhibited high SI (9/28, 32%) on T2-weighted image. Most lesions presented with a detectable ipsilateral ovary on T2-weighted image (24/28, 86%). Tumors larger than 6 cm more likely showed atypical morphology (mixed solid and cystic, cystic), atypical SI (high on T1- and T2-weighted image) and large amount ascites. Larger tumor group (> 6 cm) was more likely diagnosed as fibrothecoma or thecoma than fibroma by pathology. On DWI, 16 lesions showed low b1000 signal intensity (16/22, 73%). On PWI, all lesions showed curve type 1 or 2 (7/7, 100%), which tends to characterize benign lesions. All (16/16, 100%) pre-menopausal women had a detectable ipsilateral ovary, and six (60%) out of 10 post-menopausal women had a detectable ipsilateral ovary (p < 0.05).

Table 1. MR imaging characteristics of fibromas, fibrothecomas, and thecomas

Imaging finding	Fibroma (n = 19)	Fibrothecoma/thecoma (n = 9)	Total (No./total)
Conventional MR (n = 28)			
Morphology			
Predominantly solid	84.2% (16/19)	66.7% (6/9)	78.6% (22/28)
Mixed solid/cystic	10.5% (2/19)	33.3% (3/9)	17.8% (5/28)
Predominantly cystic	5.3% (1/19)	0% (0/9)	3.6% (1/28)
Signal intensity			
T1 signal intensity			
Low to intermediate	94.7% (18/19)	66.7% (6/9)	85.7% (24/28)
High	5.3% (1/19)	33.3% (3/9)	14.3% (4/28)
T2 signal intensity			
Homogeneously/heterogeneously low	73.7% (14/19)	55.6% (5/9)	67.9% (19/28)
High	26.3% (5/19)	44.4% (4/9)	32.1% (9/28)
Ascites			
None	36.8% (7/19)	11.1% (1/9)	28.6% (8/28)
Present	63.2% (12/19)	88.9% (8/9)	71.4% (20/28)
Small	47.4% (9/19)	66.7% (6/9)	53.6% (15/28)
Large	15.8% (3/19)	22.2% (2/9)	17.8% (5/28)
Ipsilateral ovary detection			
Not detected	5.3% (1/19)	33.3% (3/9)	14.3% (4/28)
Detected	94.7% (18/19)	66.7% (6/9)	85.7% (24/28)
Crescent-shaped	57.9% (11/19)	22.2% (2/9)	54.2% (13/24)
Ovoid-shaped	36.8% (7/19)	44.4% (4/9)	45.8% (11/24)
DWI (n = 22)			
Signal intensity (*b1000*)			
Low	93.3% (14/15)	28.6% (2/7)	72.7% (16/22)
High	6.7% (1/15)	71.4% (5/7)	27.3% (6/22)
PWI (n = 7)			
Time-signal intensity curve			
Type 1 or 2	100% (7/7)	0% (0/7)	100% (7/7)
Type 3	–	–	0% (0/7)

DWI diffusion-weighted image, *PWI* perfusion-weighted image

Typical Fibroma — T2, DCE MR; Atypical Thecoma — T2, Diffusion (M)
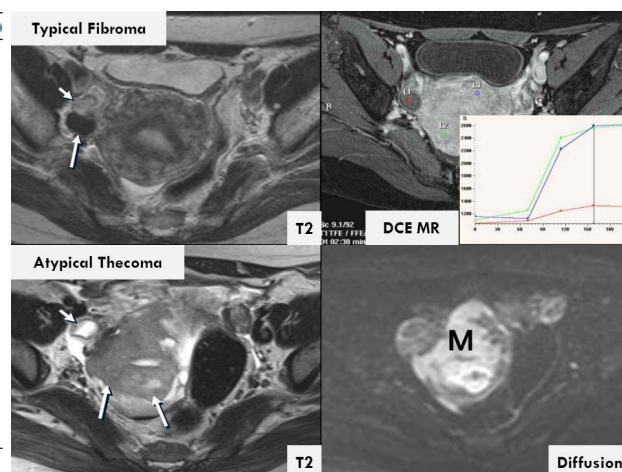
Discussion: We can determine the diagnostic clues and increase the diagnostic accuracy by detecting ipsilateral ovary on T2-weighted images with conventional MR imaging and use additional diffusion- or perfusion-weighted imaging.

Conclusion: Combining conventional morphologic and signal intensity characteristics with the findings from DWI or PWI might help differentiate ovarian fibroma, fibrothecoma and thecoma from ovarian malignancy, although further prospective larger scale study using DWI and PWI is needed.