MR Imaging of Testicular Torsion: Features of Testicular Hemorrhagic Necrosis and Clinical Outcomes

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Purpose: To determine whether dynamic contrast-enhanced subtraction MR imaging in combination with T2-weighted imagings of the testis can be useful in the evaluation of patients with testicular torsion.

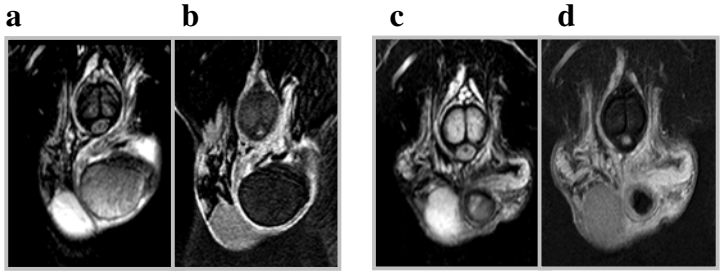
Introduction: MR imaging including dynamic contrast-enhanced subtraction method has been reported to provide additional information about testicular blood flow by evaluating testicular contrast enhancement and to be an applicable method for diagnosing scrotal disorders and differentiating testicular torsion from other scrotal disorders. When patients with acute scrotal symptoms are diagnosed to have testicular torsion, emergency surgery will be performed to salvage an affected testis or to resect a necrotic testis to exclude possibility of production of anti-testicle or anti-sperm antibody. However, only visual findings and/ or intraoperative US findings have not always seemed to provide appropriate therapeutic decision as to which surgical procedure should be performed, orchiectomy or orchiopexy, since late testicular atrophy after orchiopexy has been reported.
The purpose of this study is to further investigate whether MR imaging of the testis can be useful to evaluate patients with testicular torsion and to detect irreversible testicular damage.

Materials and Methods: Fifteen patients with surgically proven testicular torsion (13 complete torsion, 2 spontaneous detorsion) were examined with preoperative MR imaging including fat-suppressed T2-weighted, heavily T2-weighted, T2*-weighted and dynamic contrast-enhanced subtraction imagings. The affected testes were examined histologically in 9 patients who underwent orchiectomy and with follow-up MR imaging in 6 patitents who underwent orchiopexy. Diagnostic criteria of testicular torsion and hemorrhagic necrosis is decreased or no enhancement and low signal intensity in one of those T2-weighted images. The intraoperative findings, histological findings and clinical outcomes were also compared.

Results: The histological findings and follow-up MR images revealed total or partial necrosis of affected testes in 11 patients (8 underwent orchiectomy, 3 underwent orchiopexy) among the 15 patients. In the preoperative MR evaluation, decreased or lack of enhancement of the affected testes was shown in all the 13 patients with complete torsion. The overall accuracies in the detection of testicular necrosis was 93% for the T2-weighted imagings, 73% for dynamic contrast-enhanced subtraction MR imaging, 73% for intraoperative findings, and 93% for the 12-hour-time from the onset.

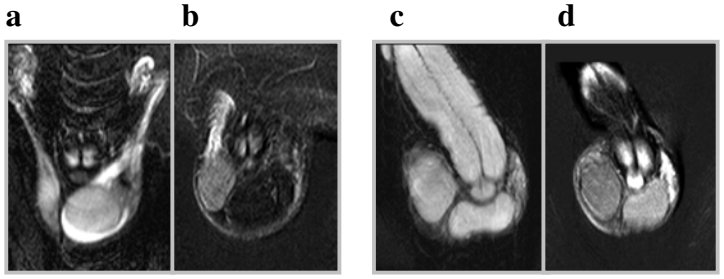
Conclusion: The preoperative and follow-up MR imaging using the dynamic subtraction MR imaging in combination with the T2-weighted imagings can help to accurately diagnose testicular torsion and to demonstrate testicular necrosis as well.

Figure 1 Testicular torsion with hemorrhagic necrosis treated with orchiectomy: 15 hours from the onset
a: Pre-operative FS-T2,
b: Pre-operative dynamic subtraction MRI
c: Post-operative FS-T2,
d: Post-operative dynamic subtraction MRI



Preoperative MR imaging showed no enhancement of left testes with FST2-hypointensity. Postoperative MR imaging revealed atrophy and no enhancement of the affected testis.

Figure 2 Testicular torsion without necrosis treated with orchiectomy: 3 hours from the onset
a: Pre-operative FS-T2,
b: Pre-operative dynamic subtraction MRI
c: Post-operative FS-T2,
d: Post-operative dynamic subtraction MRI



Preoperative MR imaging showed no enhancement of left testes without FST2-hypointensity. Postoperative MR imaging revealed normal enhancement of the affected testis.