

## The Reversible and Irreversible Ischemic Changes of MRI Findings in Torsion of a Normal Adnexa: A Case Report and Review of The Literature

*Adnex Torsiyonununun MRI Bulgularınının Reversible - Irreversible İskemik Özellikleri: Olgu Sunumu ve Literatürün Gözden Geçirilmesi*

Ramazan ALBAYRAK<sup>1</sup>, Bumin DEĞİRMENCİ<sup>1</sup>,  
Figen KIR ŞAHİN<sup>2</sup>, Güleğül KÖKEN<sup>2</sup>

<sup>1</sup> Afyon Kocatepe University, Faculty of Medicine, Department of Radiology, Afyonkarahisar, Turkey

<sup>2</sup> Afyon Kocatepe University, Faculty of Medicine, Department of Obstetric and Gynecology, Afyonkarahisar, Turkey

**ABSTRACT:** A 21-year-old virgin young woman who was admitted to emergency room with severe lower quadrant pain. Doppler ultrasound of the pelvis revealed nonhomogenous solid mass behind the bladder at the midline. The Doppler ultrasound did not show blood flow in the mass. MRI showed an ovoid mass measuring approximately 8 cm medially in the minor pelvis between the uterus and the rectum.

In this report, the MRI findings of adnexal torsion is described and reversible – irreversible ischemic features of MRI are discussed.

**Key Words:** Ovary, torsion, Ischemic changes, Magnetic resonance imaging

**ÖZET:** 21 yaşında evlenmemiş genç bayan hasta şiddetli alt kadranda ağrısı ile acil servise başvurdu. Yapılan pelvik Doppler ultrasonu incelemede mesane posteriorunda orta hatta nonhomojen solid kitle izlendi. Kitlede kan akımı saptanmadı. MRI incelemede 8 cm boyutunda uterus ve rektum arasında oturan ovoid kitle saptandı.

Bu vakada adnex torsiyonununun MRI bulguları tanımlanmış ve reversible–irreversible iskemik özellikler tartışılmıştır.

**Anahtar Kelimeler:** Over, torsiyon, iskemik değişiklikler, MRI

### INTRODUCTION

Adnexal torsion is twisting of ovary or ipsilateral Fallopian tube or both, which results in vascular compromise, first venous then arterial. In the beginning, massive congestion develop in the parenchyma of ovary then hemorrhagic infarct is formed. Preoperative diagnosis of adnexal torsion is difficult and should be distinguished from other causes of the acute abdomen. Immediate diagnosis and early surgical intervention is the only way to save the ovary from necrosis (1,2). Ultrasonographic examination is initial evaluation and enough for diagnosis in typical cases (3,4). Pelvic MRI may be very useful if US findings are doubtful. MRI is also useful in determination of grade of ischemic changes in the ovary. In this report, the MRI findings of normal adnexal torsion in a young women in reproductive age is described and reversible – irreversible ischemic features of MRI are discussed.

### CASE REPORT

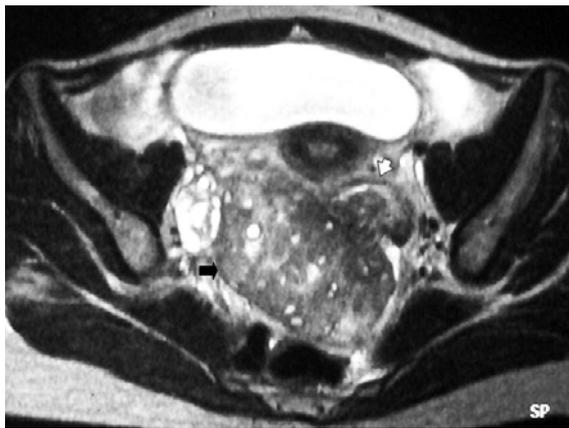
A 21-year-old virgin young woman who was admitted to emergency room with severe lower quadrant pain was found to have soft but tender abdomen in the lower region, without any rebound at physical examination. No mass was palpable.

Transabdominal sonography of the pelvis revealed nonhomogenous solid mass behind the bladder at the midline. The left ovary could not be observed, but the right ovary appeared normal and was seen adjacent to the mass. The sonographic findings were suggestive of a complex ovarian mass. Doppler sonography did not show blood flow in the mass.

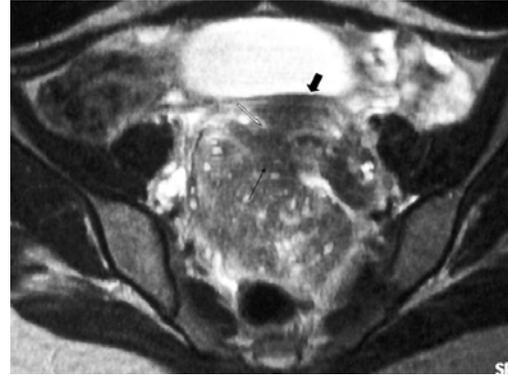
The nonspecific sonographic findings made us to perform pelvic MRI (1.5T Gyroscan ACS NT Hollanda). The T2-weighted (TR/TE ms 5500/90) images in sagittal plane were obtained with a slice thickness of 7 mm and intervals of 1.0 mm. The T2-weighted (TR/TE ms 3840/99) images in coronal plane were obtained with a slice thickness of 7 mm and intervals of 1.0 mm. The T2-weighted (TR/TE ms 5500/50) images in transversal plane were ob-

tained with a slice thickness of 8.4 mm and intervals of 1.0 mm. The T1-weighted (TR/TE ms 640/12) images in transversal plane were obtained with a slice thickness of 8.4 mm and intervals of 1.0 mm. MRI showed an ovoid mass measuring approximately 7 x 9 x 8 cm medially in the minor pelvis between the uterus and the rectum. The mass was sharply delineated and had a smooth surface. On T2-weighted images multiple hyperintense approximately 10 mm with diameter cyst-like lesions of were found to be located predominantly at the scattered of the mass. The uterus was slightly dislocated ventrally and to the left. In addition to the mass, twisted structure was observed from the anterior – left lateral aspect of the mass and to the posterior – left lateral aspect of the uterus, consistent with a twisted and thick vascular pedicle (Fig 1). The beak-like protrusion of this twisted thickened vascular pedicle was seen in all images. Its relation with uterus can only be observed in transversal images (Fig 2). The mass and twisted thickened pedicle were slightly hyperintense (hemorrhagic) in contrast to adjent muscle tissue on T1-weighted images and were nonhomogen hypointense on T2-weighted images (Fig 3,4).

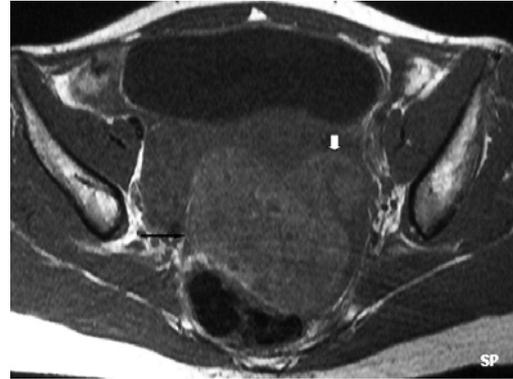
Laparotomy revealed a large, congested, strangulated left ovary and twisted – thickened vascular pedicle with torsion. A left-sided salpingoophorectomy was performed. The pathologic diagnosis was hemorrhagic necrosis of the left ovary with torsion.



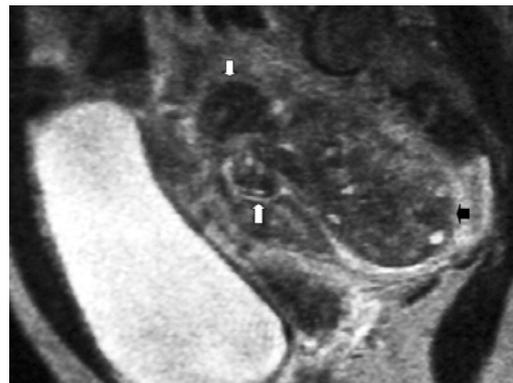
**Fig 1.** The twisted ovary (black arrow) and Fallopian tube (white arrow) shows nonhomogeneous hypointense on transversal T2-weighted images.



**Fig 2.** Beaked protrusion of the Fallopian tube on the side facing the ovary (thin black and white arrows) and the side facing the uterus on transversal T2-weighted image (thick black arrow).



**Fig 3.** The twisted ovary (black arrow) and Fallopian tube (white arrow) shows slightly hyperintense (hemorrhagic) on transversal T1-weighted images.



**Fig 4.** Twisted left normal ovary on sagittal T2-weighted image. Enlarged left ovary (black arrow) medial in the pelvis with scattered hyperintense cysts representing follicles and thickened - twisted vascular pedicle or Fallopian tube (white arrows).

## DISCUSSION

No adnexal mass accompanies normal ovarian torsion which is generally seen in children and in young women in reproductive ages. It is more common at right and generally occurs due to mobility of adnexa. Clinically sudden onset abdominal pain, nausea, vomiting and fever generally accompany. Palpable abdominal mass is present in almost half of cases (1-6).

US, the first examination in the adnexal torsion. Typically unilateral enlarged ovary and peripherally located, multiple, uniform, anechogenous cysts are present. The absence of blood flow in torsion on Doppler sonography is an important finding however, generally US findings are nonspecific and Doppler US examination is normal in most cases (1-4). The role of sonographic imaging in the early diagnosis of adnexal torsion is not yet fully established. CT and MR imaging are still commonly used to evaluate lower abdominal pain and suspected pelvic masses (1-3).

The MR findings of ovarian torsion are: (1) medially replacement of ovary with its smooth border, oval shape, and increased dimensions, (2) peripherally located, cyst like follicles in ovary, (3) most importantly; Fallopian tube or a twisted vascular pedicle which is seen as thickened – twisted cord located between ovary and uterus, (4) a beaked protrusion of Fallopian tube or twisted vascular pedicle, (5) the minimal deviation of uterus from midline to affected side, (6) variable amount of intraabdominal free fluid (1,5,6). Our patient had similar MR findings. Contrary to the general literature in our patient follicles were scatteredly located in ovary. Vascular pedicle or Fallopian tube were seen as thickened, twisted cord in all images but best seen at sagittal images. The beaklike protrusion of this structure and its relation with uterus and ovary can only be observed in transversal T2-weighted images.

In MRI hypointense T2-weighted images of ovary and Fallopian tube are among irreversible ischemic changes of ovarian torsion. Hemorrhage on T1-weighted images and lack of contrast enhancement in contrast studies are findings of other irreversible ischemic changes (1,5,6). Bader et al. stated that the hypointense images of ovary and vascular pedicle on T2-weighted images were evidences of necrosis and irreversible ischemic changes. On T1-weighted images concerning hemorrhage may be seen (1). In our patient hypointensity of ovary and vascular pedicle were observed on T2-weighted im-

ages and hemorrhagic signal intensity was observed on T1-weighted images.

Hyperintensity at T2-weighted images of affected ovary and Fallopian tube, absence of hemorrhage at T1-weighted images and contrast enhancement in contrast studies are findings of reversible ischemic changes of MRI in ovary torsion (2,7-9). Haque et al. stated that in T2-weighted images hyperintense of enlarged ovary and variable signal intensity of vascular pedicle were reversible ischemic changes which show stromal edema. They have reported no signal intensity of hemorrhage at T1-weighted images (2).

The most common accepted management in ovarian torsion is salpingoophorectomy. Recurrence of torsion, thromboembolism from thrombosed ovarian vein and inability of detecting the viability of ovary make adnexectomy as a first preference of management. However, there are several studies which reported conservative treatment might result in preservation of ovarian function on fertility without thromboembolism (6,10,11). Furthermore the viability of ovary is defined to be determinable by MRI (2).

In conclusion, in ovarian torsion MRI is useful in both differential diagnosis and the severity of ischemic changes. Therefore even for cases with typical sonographic findings of ovarian torsion, MR images should be performed to determine viability of ovary and to plan surgical intervention.

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