Pediatr Radiol (2002) 32: 126–129
DOI 10.1007/s00247-001-0616-0

CASE REPORT

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Transverse testicular ectopia detected by MR imaging and MR venography

Received: 4 May 2001
Revised: 21 August 2001
Accepted: 19 September 2001
Published online: 15 December 2001

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Abstract Crossed testicular ectopia is a rare anomaly, characterised by migration of one testis towards the opposite inguinal canal. In most reported cases, the correct diagnosis was not made pre-operatively. We report a case of transverse testicular ectopia diagnosed pre-operatively with MRI. MRI and MR venography demonstrated unilateral location of both testes in the right inguinal canal, which was confirmed by surgery. We provide a brief literature review of transverse testicular ectopia and the imaging of undescended testis.

Keywords MR imaging · MR venography · Testes · Ectopia

Introduction

Transverse testicular ectopia is an extremely rare entity in which both testes migrate towards the same hemiscrotum [1]. The clinical findings are usually symptomatic inguinal hernia on one side to which the ectopic gonad has migrated, and an impalpable testis on the other side. Patients usually present at a very young age, around 1–2 years old. The correct diagnosis is usually not made pre-operatively, but on the operating table when patients undergo repair of an inguinal hernia.

Case report

A 10-year-old boy presented with left undescended testis. On physical examination, the right testis could be found in the right groin region. The left testis was impalpable. He had a history of right inguinal hernia repair, but details of the operation could not be traced.

The patient underwent MRI (1.5-T imager using a body coil) to look for the left testis. The scan details were: sagittal spin-echo localiser (TR/TE, 500/9), coronal and axial T2-weighted (T2-W) fat-saturation fast-spin-echo sequences (TR/TE, 4000/102; Nex = 4; 4 mm thickness; 192×256), and axial T1-weighted (T1-W) spin-echo sequence (TR/TE, 600/9; Nex = 2; 4 mm thickness; 192×256). MR venography was obtained by a three-dimensional (3D) fast-spoiled gradient-recalled-echo (FSPGR) pulse sequence (10.2/1.9; flip angle 60°) with images taken in the coronal plane. Non-breath-hold dynamic 3D images were obtained simultaneously after IV bolus injection of gadolinium chelate. Images were taken at 1, 2, 3, 4 and 5 min from the start of contrast medium injection. The dose of contrast medium was 0.3 mmol/kg body weight of gadolinium-diethylenetriaminepentaacetic acid bismethylamide (Omniscan; Nycomed, Torshov, Norway).

MR images showed an oval right testis, which was hypointense on T1-W images and hyperintense on T2-W images (Fig. 1), in the right groin region. Another elongated lesion with similar signal intensity was seen superior to the oval right testis (Fig. 2). This was the ectopic left testis. MR venography (MRV) showed two enhancing pampiniform venous plexuses draining from the right and left testes in the right groin region (Figs. 3, 4). Laparoscopy showed the left testicular vascular bundle traversed to the right side. The

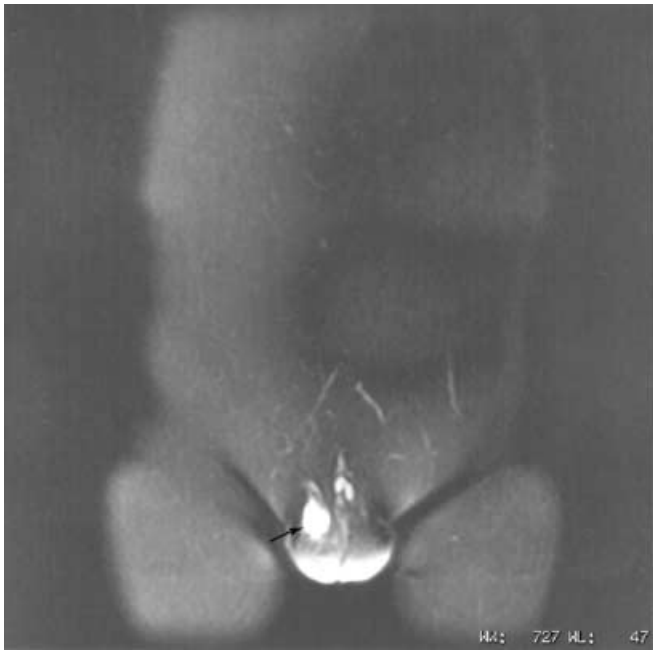

Fig. 1 T2-weighted (T2-W) coronal MRI shows the hyperintense, oval right testis (*arrow*) in the right groin region

Fig. 2 T2-W coronal MRI shows the hyperintense, elongated, left ectopic testis (*arrow*) situated higher than the right testis in the right groin region

right testis was seen at the right external inguinal ring and the left testis at the right deep inguinal ring. Bilateral orchidopexies were performed.

Fig. 3 Post-contrast MRV shows a bright, linear, enhanced, pampiniform venous plexus (*arrow*) draining from the right testis. Another bright, linear, enhanced pampiniform, venous plexus (*arrowhead*) draining from the left ectopic testis was seen on the lateral aspect of the first one. The right testis (*T*) was hypointense in appearance

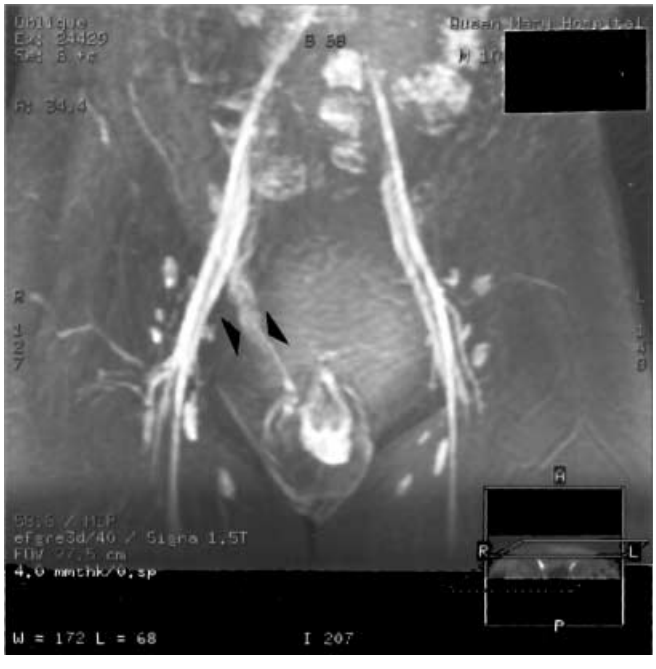

Fig. 4 Post-contrast MRV shows the two pampiniform venous plexuses (*arrowheads*) draining to right side of the abdomen instead of draining separately to right and left sides

Discussion

Transverse testicular ectopia is a rare, but well-recognised anomaly in which both testes migrate towards the same hemiscrotum [1]. The first description of this entity is attributed to von Lenhossek [2], who described this form of ectopia in 1886. It is often associated with other disorders such as inguinal hernia, hypospadias, pseudohermaphroditism and scrotal abnormalities. It has been associated with an increased incidence of upper and lower urinary tract anomalies ranging from 2% to 97% [3]. Like all dysgenetic testes, progression to malignancy is relatively frequent [4].

For the aetiology of ectopic testes, Gupta and Das [5] postulated that adherence and fusion of the developing Wolffian ducts took place early and that descent of one testis caused the second one to follow it. Kimura [6] suggested that if fusion of the ducts was present, it could be assumed that the two testes arose from the same genital ridge and that true crossing of the testes occurred only when a separate ductus deferens reached each testis.

In most reported cases, the correct diagnosis was not made pre-operatively, but during operation [1]. Non-operative diagnostic modalities, such as arteriography, venography, CT, MRI and US [7], have been used to locate an impalpable testis. Arteriography and venography require general anaesthesia and are invasive and difficult to perform on infants.

US helps avoid the use of ionising radiation and permits evaluation without sedation, but it can be difficult to perform in uncooperative or very young patients. Moreover, it is difficult to use US to scan a testis cephalic to the internal inguinal ring. Komine et al. [8] found US to have a sensitivity of 82.6%, specificity of 100% and accuracy of 84.6%. Graif et al. [9] reported the sensitivity of US as 75%. Wolverson et al. [10] demonstrated 94% sensitivity with CT, 88% sensitivity with US, and 100% specificity with both modalities.

Lai et al. [11] suggested US could not serve as a stand-alone screening method in the management because of its limited sensitivity and accuracy. They suggested that thermography could play a role in locating high undescended testes which were impalpable and not detected by US. Maghnie et al. [12] reported that neither US nor MRI was currently sensitive enough to stand alone as a screening modality for impalpable testes since the two techniques used separately gave a useful result of 76%. Their combined specificity compared with surgical findings was 95%. Kier et al. [13] reported that MRI was not sensitive enough to allow complete exclusion of a diagnosis of undescended testis, and failure to localise a testis with MRI should not defer laparoscopy or surgical exploration. According to Hrebinko et al. [14], the overall accuracy of radiological testing was 44%. They reported that imaging techniques including US, CT and MRI had a limited role in the preoperative management, and thus were neither necessary nor helpful.

On MRI, the ectopic testis is identified by the presence of characteristic bright signal on T2-W images and a linear low-signal structure which may represent the remnant of the gubernaculum testis. The use of dynamic post-contrast MRV to locate undescended testis had been reported [15, 16]. The sensitivities of MRI and MRV were 82.4% and 100%, respectively. A further study [17] reported the sensitivity and specificity of MRA as 96% and 100%, respectively. They reported that, based on MRA and US findings, 78% of laparoscopies could be avoided. The purpose of gadolinium-infusion MRV is to localise the testicular vessel instead of imaging the testis itself. In our case, although MRI could detect the two testes in the groin, MRV confirmed the findings by the identification of two testicular vessels. It also provided more information as it demonstrated that the two vessels were both draining to the right side of the abdomen, instead of draining separately to the left and right sides.

In comparison with Komine et al. [8], the studies of Wolverson et al. [10] and our own studies [15, 16] have shown the sensitivity of MRI (84%) to be comparable to US (82–88%). In our opinion, if testicular tissue is present, MRI or US may give similar results. As US is easily available and without radiation, it is suitable as the first line of investigation. However, in cases of a vanishing testis, because the testicular tissue is not present, MRV is clearly better than MRI or US in identifying the testis. In conclusion, in the imaging work-up of undescended testis, we recommend US be performed first. If US findings are negative, MRI is recommended as the next investigation, followed by MRV when MRI findings are negative.

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