Ultrasound findings in male hypofertility and impotence

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Introduction

Ultrasonography of the male genital tract is routinely performed to assess several diseases in man. A major field is prostate transrectal sonography combined with US-guided biopsies used to improve, in combination with PSA assay, early detection and staging of prostate cancer. Two other fields have gained clinical importance. The first is male hypofertility. Improvement of in vitro fertilization techniques has led to a huge increase in pretreatment investigation by imaging of hypofertile men, with emphasis on azoospermic patients, to try to find the cause of infertility, before contemplating invasive techniques for only diagnostic purposes, such as testicular biopsy or surgical deferentography. It also concerns non-azoospermic patients in whom the search for a deleterious factor is more and more routinely conducted to improve the quality of the semen. Scrotal and transrectal ultrasonography with high-frequency probes and use of color Doppler imaging have proved to be very reliable adjuncts to clinical examination to assess the presence of an obstruction (total or partial) of the seminal tract, to detect inflammatory changes in the deep genital tract and to detect and quantify a venous reflux in the spermatic veins. The second field is male sexual impotence. Initial enthusiasm concerning non-invasive investigation of impotent men by color Doppler sonography to detect a vascular abnormality (arterial or venous) of the penile vasculature has been tempered by the fact that surgical or interventional treatments used to treat penile artery stenoses or incompetence of the veno-occlusive system were found to give poor results, and now these treatments have been superseded by the advent of medical treatments based on intracavernosal injection of vasoactive drugs and more recently by the possibility of circumventing vasculogenic impotence by a peroral treatment, namely Viagra. US has thus become useful in only highly selected patients presenting with sexual impotence.
US findings in hypofertile men

Scrotal US

Testicular volume

Using the ellipsoid formula, US is a very reliable means to measure testicular volume. The normal value is 16 cc. Atrophic or hypotrophic testis often have a heterogeneous pattern, with hypoechoic bands traversing the parenchyma and joining the mediastinum testis. These bands are thought to represent testicular fibrosis and should not be confused with testicular neoplasms. On color Doppler scanning, they are hypovascular.

Undescended testis

History of undescended testis is a recognized cause of hypofertility. Relationship between this affection and occurrence of a testicular tumor has been definitely established [1]. From 7 to 10 % of patients with a testicular tumor have an history of undescended testis. From 2 to 8 % of patients with undescended testis have an in situ carcinoma, and 50 % of them will develop a testicular tumor. Patients with unilateral treated undescended testis have an increased rate of in situ carcinoma in the contralateral testis [1]. Lastly, patients with bilateral treated undescended testis and unilateral testicular carcinoma, have, in the follow-up, an increased risk of testicular tumor in the remaining testis [1]. Early detection of a testicular tumor is the goal of scrotal US in these patients (Fig. 1a).

Testicular micro lithiasis

Frequency. Testicular micro lithiasis (TML) is an uncommon disease, observed in 1/2100 cases in autopsy series [2]. In testicular biopsies, its frequency ranges from 1/125 [2] to 1/168 [3]. On US, it is observed in 0.6–0.68 % of cases in populations referred for scrotal US [4, 5]. It is ten times more frequent in patients with history of undescended testis [6, 7].

US features (Fig. 1b, c). On scrotal US, small echogenic foci (1–2 mm large) are observed, uniformly distributed in the testis (Fig. 1b), bilaterally in most cases [7]. Most of them show no acoustic shadowing. In 29 % of cases, microliths can be predominantly clustered peripherally in the testis (Fig. 1c) [7]. According to the number of microliths per testis (5–10, 10–20, > 20), TML has been classified in three grades.

Tumor risk. The frequency of germ cell tumors in patients with TML has been estimated in several series between 21 % [5] and 45 % [4, 7, 8]. However, these series are biased either by the fact that many patients presented with a scrotal mass, which artificially increases the rate of TML associated malignancy, or because the presence of a concomitant history of undescended testis, which could be the underlying predisposing factor for malignancy, is not reported. A direct relationship between TML and subsequent development of a testic-