Microlithiasis of the Epididymis in an Infertile Hemodialysis Patient with End-Stage Renal Disease

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ABSTRACT

We report a case of epididymal calcification that was diagnosed sonographically in a hemodialysis patient. Epididymal head calcification was an incidental finding in an infertile 28-year-old man undergoing scrotal sonographic examination to investigate infertility. The testes had normal appearance. Semen parameters were abnormal which included oligospermia (few spermatozoa in semen), and asthenospermia (reduced sperm motility). Here, we discussed microlithiasis of the epididymis related to hemodialysis or end-stage renal disease and accompanying the sperm abnormalities that caused infertility. Hemodialysis is one of the reasons of the epididymal calcification via abnormalities of the calcium/phosphate metabolism.

KEY WORDS: Calcification, End-stage renal disease, Epididymis, Hemodialysis, Microlithiasis, Ultrasonography

INTRODUCTION

Although the incidence of calcifications in various organs of patients with end-stage renal disease is extremely high, epididymal microlithiasis is a rare ultrasound finding in the general population (1). Epididymal calcifications may be seen on ultrasound as multiple comet-shaped foci of microcalcification in both of the epididymides, with associated comet-tail artifacts. There is no associated acoustic shadow (2). Epididymal microcalcification is a completely separate entity from testicular microlithiasis. This condition usually implies chronic epididymitis. Conditions to be considered in the differential diagnosis are chronic epididymitis [e.g. bacterial, granulomatous (tuberculosis) or genital filariasis], trauma [in extreme mountain bikers and equestrians], calcium/phosphate metabolism abnormalities [e.g. secondary to hemodialysis]. Here, we present a case of an epididymal microlithiasis secondary to hemodialysis or end-stage renal disease with semen abnormalities in an infertile patient. To our knowledge, this is the first study reporting semen abnormalities in a hemodialysis patient.
CASE REPORT

A 28-year-old hemodialysis patient, who did not have any complaints about the scrotum, underwent a scrotal ultrasonographic (US) examination to investigate the probable cause of infertility. Clinical examination was fully normal with no evidence of inflammatory findings.

The medical history of the patient included ten years of hemodialysis due to end-stage renal disease and male infertility known for a year. There was no history of scrotal microtrauma, previous scrotal surgery or epididymo-orchitis.

In the semen analysis, the parameters were abnormal with a sperm concentration of 5 million/mL (oligospermia), the total motile sperm percentage of 0.2% (asthenospermia). The second analysis confirmed oligo-astheno-teratozoospermia. Hormonal parameters FSH, LH, PTH, beta-HCG, total testosterone, alpha-fetoprotein and plasma concentrations of calcium and phosphorous were normal in range.

US examination was performed with a Logiq S7 Expert (GE Healthcare, Milwaukee, WI) equipped with a 9L-D linear-array probe. At that time, epididymal calcification was diagnosed incidentally. Multiple 1-2 mm hyperechoic foci and comet-tail artifacts were identified in both epididymal heads (Figure 1A,B). There was no associated acoustic shadow. In US examination the testes were of normal appearance (Figure 2A,B). There were no cryptorchidism, scrotal fluid (hydrocele), epididymal thickening or significant increase in epididymal vascularity and varicocele on color and power Doppler imaging.

DISCUSSION

Testicular microlithiasis is seen in 1–2% of the patients referred for scrotal sonography (3). It is usually an incidental finding, but it has been associated with a variety of pathologic conditions such as Klinefelter’s syndrome, pulmonary alveolar microlithiasis, Down’s syndrome, cryptorchidism, epididymo-orchitis, varicocele, tumors, and subfertility (4,5).

Epididymal microcalcification is a completely separate entity from testicular microlithiasis. This condition usually implies chronic epididymitis. There are several causes of calcifications within the epididymis, including chronic epididymitis (6)
bacterial, granulomatous (TB) or genital filariasis (7)), trauma [e.g. equestrians (8), extreme mountain bikers (9)], hemotoma, calcification of the appendix epididymis, and calcium/phosphate metabolism abnormalities [e.g. secondary to hemodialysis (10)]. In the present case report, semen abnormalities in an infertile hemodialysis patient with epididymal microlithiasis were reported. To our knowledge, this is the first study reporting semen abnormalities in a hemodialysis patient.

Male factor infertility plays an important role in approximately 50% of infertile couples (11). The investigation of the male partner should include a full medical history and physical examination according to the standardized scheme published by WHO (12). After a detailed medical history, semen analysis should be the first laboratory investigation to evaluate a couple’s infertility. In all infertile men, hormonal studies (follicle-stimulating hormone (FSH), luteinizing hormone (LH), and testosterone levels) should also be performed. Microbiologic assessment should be added when abnormal urine sample, urinary tract infections, prostatitis, epididymitis, male accessory gland infection or sexually transmitted diseases are found, but its role in male infertility is minimal. The main factors associated with male infertility are maldescended testes, varicocele, autoantibodies against sperm, testicular tumor, idiopathic infertility, reasons of hypogonadism, Kallmann syndrome, systemic diseases, disturbance of erection/ejaculation, obstruction (vasectomy, cystic fibrosis), and chromosomal aberrations (13). In our patient, all etiologic factors that can be associated with his abnormal semen analysis reports were evaluated, and no abnormality to explain the cause for male infertility was detected.

There are some abnormalities in the human male genitourinary tract that can be detected sonographically, such as testicular microlithiasis, testicular cancer, cryptorchidism, varicocele, hydrocele, and epididymal abnormalities (14). Ultrasound is compulsory for the assessment of scrotal findings. Transrectal ultrasound (TRUS) can be performed for evaluation of prostate and seminal vesicles. Testicular biopsy can be performed for diagnostic and therapeutic reasons. Contrary to all these data, the cause for abnormal semen parameters may not be identified in 30-45% of patients suffering from male infertility (idiopathic male infertility). Chromosomal studies can be performed if necessary (13). With the lack of other causes, the evidence presented thus far supports the idea that epididymal microlithiasis may have played a vital role in our patient.

The pathogenesis of soft-tissue calcification in uremic patients is not clear. The main factor associated with extra-skeletal calcifications, especially non-visceral localizations, is an increase of serum phosphate and/or Ca x P product in serum. Another important factor is severe secondary hyperparathyroidism of chronic uremia. It favors the mobilization of calcium, magnesium and phosphate from bone, leading to an increase of these ions in the plasma and to their deposition in soft tissues. Soft tissue calcification may be seen in dialysis patients in the absence of severe secondary hyperparathyroidism. Other factors including age, aluminum overload, hypoparathyroidism, adynamic bone disease, vitamin D intoxication, increased plasma magnesium may play role in soft tissue calcification (15).

Epididymal microlithiasis can be found in three different locations: subepithelial, intraluminal, and interstitial. The microliths in the wall and the lumen of epididymis could be related to changes of the lining epithelium or tubular fluid composition. These alterations would lead to changes of the epididymal phase of spermatogenesis, which physiologically occurs in the epididymis (1,16,17).

Previous studies have reported that the epididymis is not a common site of calcium deposition and this condition has been generally associated with elderly patients on dialysis (10). Also, epididymal microlithiasis in young adult kidney transplant recipients has been reported in a current study (1). In the light of these data, our case differed from other cases as far as the age of the patient. Ours was a young patient, with an age of 28.

In conclusion, semen analysis is an easy and important initial step in the evaluation of male infertility. When semen analysis gives uncertain results, additional evaluations are required to define the causing pathology. Ultrasonographic examination is often suggested, and the method may detect several pathologies including testicular microlithiasis, testicular cancer, cryptorchidism, varicocele, hydrocele, and epididymal abnormalities (4). Epididymal microlithiasis may explain the cause of infertility in patients with end-stage renal disease or on maintenance hemodialysis when other etiologic factors are excluded.

REFERENCES
Altınbaş NK et al: Microlithiasis of the Epididymis in an Infertile Hemodialysis Patient