Transrectal Ultrasound in Male Infertility With Low Volume Ejaculate

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ABSTRACT: Aim of the study: To evaluate the role of transrectal ultrasonography (TRUS) in the diagnosis of male infertility with low ejaculate volume.

Materials and methods: Fifty infertile men with azoospermia or severe oligospermia (less than 1 million sperm per cc) and low ejaculate volume were examined with transrectal ultrasonography during a five year period.

Results: Of the 50 men, 18 (36%) had no anatomic ejaculatory duct abnormalities. Of the remaining patients; 14 (28%) had ejaculatory duct obstruction, 12 (%24) had seminal vesicle hypoplasia, aplasia or atrophy. All 32 patients with low volume (consistently less than 1.0 cc) ejaculate and abnormal ultrasound had normal follicle stimulating hormone levels, testicular biopsy findings and no or low fructose levels in the seminal fluid. TRUS was not only helpful in establishing the diagnosis but also in determining the distal extent of the obstruction.

Conclusion: We concluded that, transrectal ultrasound is an important non-invasive diagnostic tool that minimizes the need for more invasive studies in the evaluation of azoospermia, particularly when associated with low ejaculate volume.

Key Words: Infertility, low volume ejaculate, transrectal ultrasound (TRUS), ejaculatory ducts.
MATERIALS AND METHODS

From January 1999 to July 2004, 50 men 21 to 37 years old (mean age 29 years old) were referred for investigation of azoospermia or severe oligospermia (less than 1 million sperm per cc.). In addition to a careful history and physical examination, standard evaluation at presentation included semen analysis, fructose levels in the seminal fluid, post-ejaculatory urine, serum follicle stimulating hormone (FSH) level measurement and TRUS of the seminal vesicles and prostate. The patient collected a semen specimen after the bladder had been emptied. Following ejaculation the first urine obtained was centrifuged and examined for the presence of spermatozoa. Transrectal ultrasound was performed with the patient in the knee-chest position using multiplanar 7.5 MHz, high resolution transducer (Toshiba SSA 140A Tokyo, Japan). Normal values were defined as:

- Vas Deferens diameter: 4.0 ± 0.7 mm
- Ejaculatory Duct diameter: 0.6 ± 0.1 mm
- Seminal Vesicle Width: 0.9 ± 0.2 cm
- Seminal Vesicle Length: 3.0 ± 0.6 cm

Semen fructose content and pH were routinely obtained on the first specimen. A low ejaculate volume was defined as less than 1.0 cc seminal fluid on 3 separate occasions.

Three consecutive semen specimens were analyzed and median values were obtained for the study.

RESULTS

Of the 50 men evaluated for azoospermia or severe oligospermia a post-testicular etiology was noted in 32, varicocele in 10, maturation arrest and hypospermatogenesis in 8. All of the patients had not retrograde ejaculation.

Transrectal ultrasound revealed:

1) Ejaculatory duct obstruction (14 patients) (Figures 1 and 2)
2) Seminal vesicle dilatation (12 patients) (Figure 3)
3) Seminal vesicle hypoplasia, aplasia oratrophy (6 patients) (Figure 4)
4) Ejaculatory ductal calculi in 3 cases (Figure 1) and ductal cyst in 4 patients (Figure 2). The remaining 7 cases of ejaculatory duct obstruction merely demonstrated the appearance of distal ductal stenosis.
DISCUSSION

Infertile men with a reduced ejaculate volume have either ejaculatory dysfunction, congenital anomalies of the accessory sex organs or ejaculatory duct obstruction (7,10). The differentiation can be made based on post-ejaculatory urine analysis and transrectal ultrasonography (11). Previously, vaso- graphy had been used the definitive method of determining ductal patency but the risks of anesthesia, radiation exposure and post-operative obstruction inherent with this procedure can not be ignored (12). Transrectal ultrasound is essentially risk-free and inexpensive, and it has proved reliable in diagnostic scheme of the infertile patient.

The finding of dilated seminal vesicles with or without dilation of the ejaculatory ducts establishes the diagnosis of ejaculatory obstruction in 14 patients in this study. A less invasive alternative to confirm the diagnosis of ejaculatory duct obstruction is seminal vesicle aspiration, which can be performed under TRUS guidance (13). The finding of numerous sperm in the seminal vesicle confirms the presence of ejaculatory duct obstruction in the azoospermic patient and rules out concomitant ipsilateral epididymal obstruction (13,14). In addition, methylene blue can be injected into the seminal vesicle after aspiration to assist in identifying the level of obstruction and the adequacy of the resection during surgical therapy (15). The distally obstructed ejaculatory duct appears clearly on sagittal and transverse sonogram images as a hypo echoic tubular structure (7,8,9). Calculous obstruction of an ejaculatory duct is an uncommon cause of azoospermia or low-volume oligospermia in the infertile man (16). An ejaculatory duct calculus should be included in the differential diagnosis of obstructive azoospermia or low-volume oligospermia. Magnetic resonance imaging or TRUS may be advisable to identify ductal calculi (16). We observed the distally obstructed ejaculatory ducts in 14 patients and three of them we observed ejaculatory duct calculi. But it remained uncertain, whether the calculi primarily cause the obstruction and resulting dilation or they arise from an already obstructed system due to inflammatory and iatrogenic causes like venereal diseases and genitourinary tuberculosis. Other causes, above mentioned of obstruction were suggested in the other 11 with ejaculatory duct obstruction and no calculi. Atrophic seminal vesicles and aplasia or hypoplasia were found in six patients. Because of the 80% incidence of ipsilateral renal agenesis reported to be presented in this group of patients, a concomitant renal sonogram was performed to rule out such an anomaly (15). No, additional pathology was seen. In these patients surgical reconstruction was unlikely to be successful and after documentation with transrectal ultrasound, epididymal aspiration and ICSI were offered to the patients.

Eighteen patients had abnormal biopsy findings. Seventeen patients with low volume and an abnormal ultrasound had normal FSH and testicular biopsy findings.

Ejaculatory duct obstruction is a rare but surgically correctable cause of male infertility. Although there are no pathognomonic findings associated with ejaculatory duct obstruction, the diagnosis should be suspected in an infertile male with oligospermia or azoospermia with low ejaculate volume, normal secondary sex characteristics, testes, and hormonal profile, and dilated seminal vesicles, midline cyst, or calcifications on TRUS (17).

In the 7 patients with distal ductal stenosis and normal biopsy findings, transurethral surgery (TURED) was suggested. As a conclusion, transrectal ultrasound is important noninvasive diagnostic tool that minimizes the need for more invasive studies in the evaluation of azoospermia with low volume ejaculate and can give more information for patients with abnormal testicular biopsy findings.

REFERENCES