

Transrectal Ultrasound in Male Infertility With Low Volume Ejaculate

Düşük Ejakülât Volümlü Erkek İnfertilitesinde Transrektal Ultrason

Orhan YALÇIN¹, Hanefi YILDIRIM²

¹ Department of Urology, Fırat University School of Medicine, Elazığ, Turkey

² Department of Radiology, Fırat University School of Medicine, Elazığ, Turkey

ÖZET: *Amaç:* düşük ejakülât volümlü infertil erkek hastaların tanısında transrektal ultrason (TRUS) un rolünün değerlendirilmesi.

Gereç ve Yöntem: Beş yıllık bir süre içerisinde azospermi veya ciddi oligospermi (< 1 milyon sperm /cc) si olan 50 erkek infertil hasta TRUS ile muayene edildi.

Sonuçlar: 50 hastanın 18'inde (%36) ejakülâtör kanallar ile ilgili bir anomali yoktu. Geri kalan hastalardan 14 ünde (%28) ejakülâtör kanal tıkanıklığı, 12'sinde (%24) seminal vezikül dilatasyonu, ve 6'sında (%12) seminal vezikül hipoplazisi, aplazisi ya da atrofisi vardı. Düşük ejakülât volümü ve anormal TRUS bulgusu olan 32 hastanın tamamında FSH seviyeleri ve testis biyopsisi bulguları normaldi, semende früktoz ya da negatif ya da düşük seviyelerde idi. TRUS sadece tanıda yardımcı olmakla kalmadı aynı zamanda kanalın tıkalı olan bölümünün ebatlarını belirlemede de yardımcı oldu.

Sonuç: TRUS un özellikle düşük ejakülât volümüne sahip azospermi olgularının tanısında daha invaziv yöntemlerin kullanılması gerekliliğini en aza indiren önemli ve invaziv olmayan bir yöntem olduğu sonucuna vardık.

Anahtar Kelimeler: İnfertilite, ejakülât volüm azlığı, transrektal ultrason (TRUS), ejakülâtör kanallar

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 dilatation and had 6 (12%) 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.

INTRODUCTION

Over the past several years, minimally invasive technology has become important in the evaluation and treatment of the infertile male (1). Ultrasonography, MR imaging and other radiologic and diagnostic modalities help the urologist to identify anatomic abnormalities related to male infertility (2). The most useful new tools for identification of pathology relating of male infertility are scrotal and transrectal ultrasonography (3,4). As the resolution of ultrasound images has improved, greater number

of pathologic processes with the testicle, paratesticular structures, genital ducts and prostate have been identified. Post-testicular causes of infertility have become more readily diagnosed in recent years with the comprehensive use of transrectal ultrasound (5,6). Currently, the foremost indication for transrectal ultrasound in the infertile patient is low ejaculate volume (7). Congenital anomalies and complications of previous transurethral instrumentation that until now had gone undetected can be found during routine evaluation of patients with low ejaculate volume (8,9). We present our experience with transrectal ultrasound in the evaluation of patients with low ejaculate volume.

MATERIALS AND METHODS

From January 1999 to July 2004, 50 men 21 to 37 years old (mean age 29years 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 hyospermatogenesis 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 or atrophy (6 patients) (Figure 4)

Fourteen patients with low volume and abnormal ultrasound had low fructose levels, normal FSH and testicular biopsy findings. Eighteen patients had

abnormal biopsy findings. The exact cause of the ejaculatory duct obstruction was 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.



Figure 1. Ejaculator ductal stones.



Figure 2. Ejakulator duktus kisti.

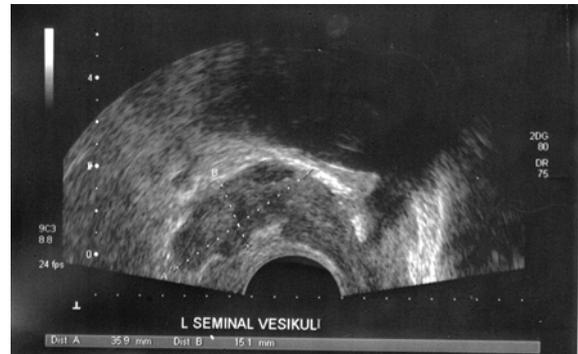


Figure 3. Seminal vesicle dilatation.



Figure 4. Seminal vesicle hypoplasia.

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, vasography 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 in to 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 im-

aging 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. Fourteen 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

1. Kulligowska E, Baker CE, Oates RD. Male Infertility. Role of transrectal ultrasonography in diagnosis and management. *Radiology*, 1992; 185: 353-7.
2. Jorow JP, Espeland MA, Cipshultz LI. Evaluation of the azoospermic patient. *J Urol*, 1989;142:62-5.
3. Petel PJ, Pareek SS, Scrotal ultrasound in male infertility. *Eur Urol*, 1989; 16: 423-6.

4. Jorow JP. Transrectal ultrasonography of infertile men. *Fertile Sterile*, 1993; 60: 1035-1038.
5. Smith G, Ercole C, Hulbert JC and at all. Transrectal sonography and the seminal vesicles. *J Endourol*, 1989; 3:219-223.
6. Potterson L and Jarow JP. Transrectal ultrasonography in the evaluation of infertile man, a report of three cases. *J Urol*, 1990; 149: 1469-1472.
7. Worischec JH and Parna RO. Transrectal ultrasound in the evaluation of man with low volume azoospermia. *J Urol*, 1993; 149:134-137.
8. Hellenstein OK, Meachom RB, Lipshultz LI. Transrectal ultrasound and partial ejaculatory duct obstruction in male infertility. *Fertile Sterile*, 1992; 34:449-451.
9. Meachom RB, Hellenstein OK, Lipshultz LI. Evaluation and treatment of ejaculatory duct obstruction in the infertile male. *Fertile Sterile*, 1993; 51:393-396.
10. Carter S st C, Shirohora K and Lipsultz LI. Transrectal ultrasonography in disorders of the seminal vesicles and ejaculatory ducts. *Urol Clin N Amer*, 1989;16: 773-779.
11. Jorow JP. Evaluation and treatment of the azoospermic patient. *Curr Prob Urol*, 1992; 2:4-6.
12. Paulson DF, Lindsoy CM and Anderson EE. Simplified technique for vasography. *Fertile Sterile*,1974; 25:463-466.
13. Belker AM, and Steinbeck GS. Transrectal prostate ultrasonography as a diagnostic and therapeutic aid for ejaculatory duct obstruction. *J Urol*, 1990; 144:356-360.
14. Shabsigh R, Lennen S, Fishman IJ, and Kadman D. The role of transrectal ultrasonography in the diagnosis and management of prostatic and seminal vesicle cysts. *J Urol*, 1989;141:1206-1209.
15. Rubio JC, Gonzales IF, Barrozo PO, Payo JA, and Sanchez AB. The value of transrectal ultrasonography in the diagnosis and treatment of partial obstruction of the seminal duct system. *J Urol*, 1995;153:453-457.
16. Gordon Z, Monga M. Endoscopic extraction of an ejaculatory duct calculus to treat obstructive azoospermia. *J Endour*. 2001 Nov, 15(9);949-50.
17. Fish H, Kang YM, Johnson CW, Goluboff ET. Ejaculatory duct obstruction. *Curr Opin Urol* 2002 Nov; 12(6);509-15.