A New Algorithm For Management Of Ejaculatory Duct Obstruction Due To Prostatic Cyst In Infertile Males

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Citation

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Abstract

Ejaculatory duct obstruction (EDO) is diagnosed in approximately 5% of azoospermic men. EDO is considered in patients with low semen volume, azoospermia or oligospermia and evidence of obstruction on transrectal ultrasonography. Theoretically, prostatic cysts may cause EDO either by compression or only displacement of ejaculatory ducts.
The aim of the present study is to establish a protocol for management of cases of cystic ejaculatory duct obstruction presenting with azoospermia or oligozoospermia.
Patients and Methods:
Nineteen patients with diagnosed EDO due to prostatic cyst were included in the present study. TRUS guided aspiration of prostatic cyst with analysis of cyst contents together with TRUS guided seminal vesiculography was done to all patients. Follow up semen analysis was done after 1 month. If no improvement in semen, TURED was performed. If sperm appear in semen post-aspiration, follow up semen was done every month for 3 months. If deterioration in semen parameters was found, TURED was performed. Follow up semen was done one month after TURED.
Results:
The seminal vesicle was found to be communicating with ED in 7 patients (Group I) and was not communicating with the cyst in 12 patients (Group II). In group I, post-aspiration semen analysis did not show any improvement in all patients so TURED was done for all of them. Post-TURED semen analysis showed improvement in semen in 6/7 patients while one remained azoospermic. In Group II, post-aspiration semen analysis showed improvement in 9/12 cases but semen deteriorated in 6/9 patients with initial improvement. TURED was done for the 9 patients (3+6). Post-TURED semen showed improvement in semen in 6/9 cases.
Conclusion:
We concluded that the best management in case of cystic EDO is to do seminal vesiculography. If the seminal vesicles are communicating with the cyst, go for TURED directly. If there is no communication, TRUS guided aspiration may be offered to the patient.

INTRODUCTION

Ejaculatory duct obstruction (EDO) is diagnosed in approximately 5% of azoospermic men (1). Ejaculatory duct obstruction is considered in patients with low to normal ejaculate volume, azoospermia or oligospermia, decreased motility, normal serum gonadotropin and testosterone levels, absent or low fructose in the ejaculate and evidence of obstruction on transrectal ultrasonography (2,3).
Theoretically, prostatic cysts may cause EDO either by compression or only displacement of ejaculatory ducts (4). Clinically, anatomically and embryologically, there are different types of prostatic cysts mainly prostatic utricle cyst, Mullerian duct cyst and Wolfian duct cyst (5,6). Prostatic utricle cyst and Wolfian duct cysts are usually associated with other congenital anomalies in the urogenital system (6). The vasa deferentia and the seminal vesicles may open in the Mullerian or the Wolfian duct cysts so sperm could be found in the aspirated cyst fluid but they never communicate with the prostatic utricle cysts. There are also prostatic retention cysts that are usually located laterally, contain no sperm and usually asymptomatic(6,7).
TRUS is useful in detecting the various prostatic cysts that may cause ejaculatory duct obstruction or stenosis. Sonographically, prostatic utricle cyst and Mullerian duct cyst appear as midline cystic structure in the prostate while Wolfian duct cysts appear to be more lateral in position (6,8,9).
Transurethral incision or resection of ejaculatory ducts is the usual treatment for EDO. After transurethral incision or resection of ejaculatory duct, semen quality improvement is

reported in 38-65% of patients(1,10,11) and pregnancy occurs in 22-31% of patients.

Although ejaculatory duct obstruction is a rare cause of male infertility its diagnosis and treatment is very important. Many studies confirm that patients with midline prostatic cysts have the best prognosis after transurethral unroofing. However, it is extremely difficult to draw a valid conclusion regarding management due to the rarity of this disorder(10). The aim of the present study is to establish a protocol for management of cases of cystic ejaculatory duct obstruction presenting with azoospermia or oligozoospermia.

PATIENTS AND METHODS

Nineteen patients were included in the present study. The patient's age ranged from 29 to 45 years (mean 37years).

Selection Criteria:

All patients were complaining of primary infertility and were diagnosed to have obstructive azoospermia with cystic ejaculatory duct obstruction according to the following criteria: 1) normal sized testes and epididymes with palpable vasa differentia on one or both sides during clinical examination, 2) repeated low semen volume and azoospermia in at least 3 semen analyses, 3) low seminal fructose, 4) normal hormonal profile (FSH, LH, Testosterone and Prolactin), 5) normal testicular histopathology, 6) TRUS findings of EDO with prostatic cyst. Transrectal ultrasound findings in suspected ejaculatory duct obstruction include prostatic cysts (figure 1 &2), dilated seminal vesicles or ejaculatory ducts, and hyperechoic regions suggestive of calcifications (4,12-14).

In all patients, aplasia of the vas deferens was excluded by careful palpation of the scrotum.

In addition, a post-ejaculate urine sample was analyzed to exclude retrograde ejaculation in patients with a low seminal volume (<1 mL).

The Management Protocol:

First the patients were submitted to TRUS-guided cyst aspiration and TRUS-guided seminal vesiculography. The cyst aspirate was analyzed. The semen analysis was then repeated after one month. If the semen analysis revealed azoospermia, TUR with deroofing of the prostatic cyst was done. If sperm appear in the semen specimen follow up semen analysis was repeated every month for another 3 months. If the semen analysis deteriorated to azoospermia in the follow up, TUR with deroofing of prostatic cyst; if present; was then done (Appendix 1)

TRUS_Guided Seminal Vesiculography:

The procedure was performed using ultrasound unit with a 7 MHz high frequency end firing monoplanar transducer with a needle guide for per-rectal examination (Soncaid 9900, Medison, Korea). The patient received antibiotic (Cifobid 1gm, I.V.) and enema prior to the procedure. At first TRUS examination was performed with the patient in the lithomy position. The exact location of the seminal vesicle is detected. A Sheba biopsy needle with a caliber 18G and 20 cm length was used for injection of the contrast material using the needle guide on the ultrasound transducer. A non-ionic contrast material (omnipaque) was injected gently through the needle to fill the seminal vesicle. Serial X-ray images of the pelvis were taken. The course of the dye was traced through the vas and the ejaculatory duct (Figure 3).

Aspiration of Prostatic Cyst:

The procedure is similar to that of TRUS-guided seminal vesiculography, except for that the patient is lying in the lateral position. The exact location of the prostatic cyst was then determined. The Sheba biopsy needle was then introduced using the needle guide on the ultrasound transducer. The cyst was aspirated till it completely empties.

Transurethral Resection of Ejaculatory Duct with/without Deroofing of Prostatic

Transuretheral resection (TUR) of the cyst was performed under general anaethesia with the patient in the lithotomy position. The roof of the cyst was resected, under TRUS guidance and under direct vision through a standard resecting loop (Karl Storz Co., Germany). Minimal coagulation was used. A16 Ch transuretheral catheter was introduced in the bladder and removed 24 h postopertively. Patients were discharged the day after the procedure. There were no complications after transuretheral resection of the midline cyst and this procedure was well tolerated by all patients.

Data collection and analysis were done with approval of the hospital ethics committee, and written informed consent was obtained from each patient after the nature of the procedures had been fully explained.

Figure 1

Transrectal ultrasound transverse scan shows well defined echolucent lesion at median lobe 5 mm in diameter within median lobe.

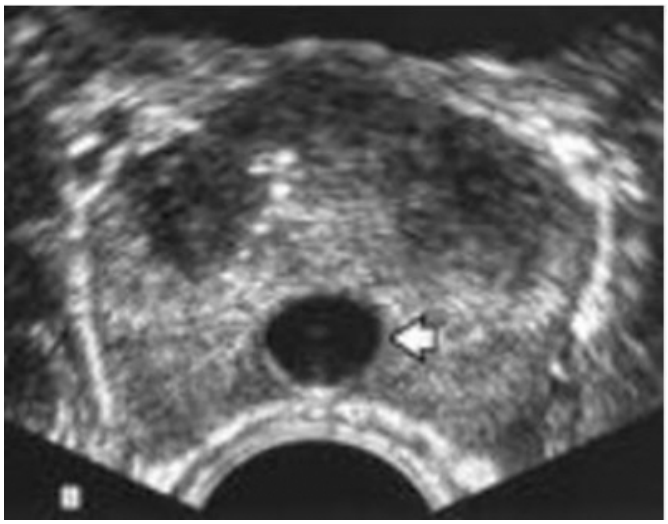


Figure 2

Transrectal ultrasound transverse scan shows well defined echolucent lesion at median lobe 4 mm in diameter lie in the central zone.

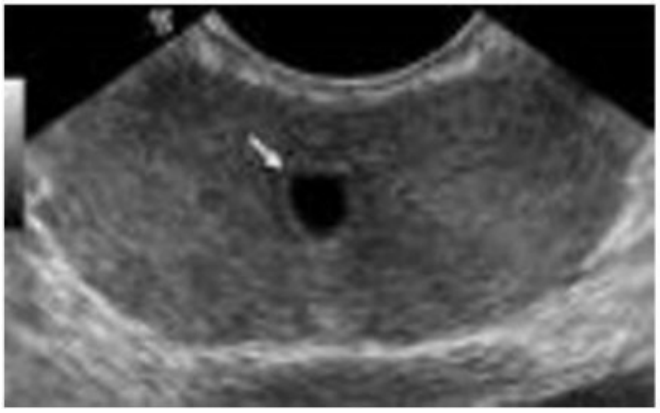


Figure 3

Transrectal ultrasound guided seminovesiculography reveal normal seminal vesicle and ejaculatory duct. (venous and lymphatic permeation seen on right side).

Statistical Analysis:
Descriptive statistics is presented as means ± standard deviations, median and number and percentage (frequency distribution).

RESULTS

TRUS-guided seminal vesiculography was done to all patients at the beginning of the study and revealed ejaculatory duct obstruction in the 19 patients evidenced by dilatation of the seminal vesicles and stoppage of contrast material before entering the urethra. Seven patients were found to have communicating cyst with seminal vesicle (figure 4) and 12 patients had non-communicating cysts (figure 5) according to TRUS-guided seminal vesiculography. They were grouped as Group I and Group II respectively. Table 1 revealed the patients Demographics of both groups. Appendix (2) shows the results of the study.

Figure 4

Transrectal ultrasound guided seminovesiculography reveal ejaculatory duct obstruction, right side seminal vesicle and ejaculatory duct communicating with prostatic cyst with aberrant tract communicating with cyst on left side

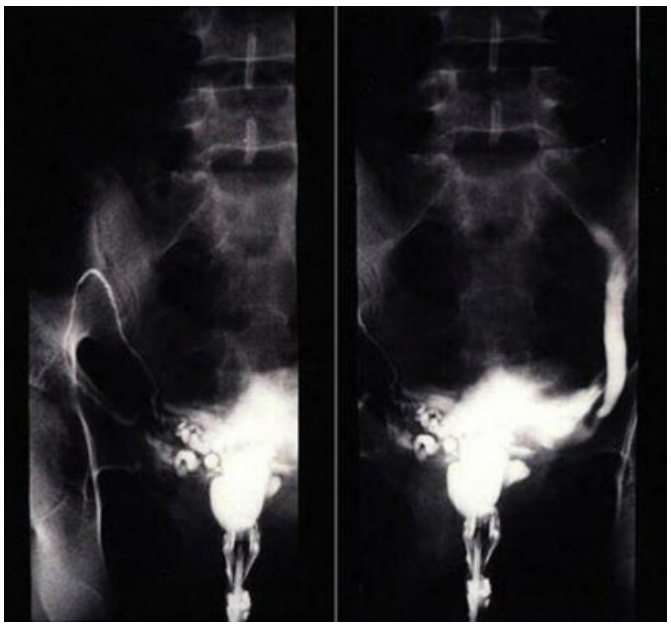


Figure 5

Transrectal ultrasound guided seminovesiculography for patient with prostatic cyst showing dilatation of the right seminal vesicle with non-visualization of right ejaculatory duct or prostatic cyst denoting ejaculatory duct obstruction (non-communicating).

GROUP I:

Analysis of the aspirate of the prostatic cyst by TRUS-Guided aspiration revealed sperm in 4 cases only while in the other cases the fluid was either clear or contained RBCs and tissue debris. Semen analysis done one month after aspiration revealed no improvement of semen (azoospermia) in all patients. Semen fructose remained negative and seminal pH remained acidic after aspiration in all the 7 men. Transurethral resection of ED with/without Deroofing of Prostatic was done for all patients in Group I. Semen analysis done one month after TUR revealed sperm in 3 cases and 4 patients showed no improvement. Semen fructose was positive and seminal pH was alkaline in all the seven patients post-operatively. The patient with persistent azoospermia post-operatively did scrotal exploration after 3 months from TURED. Epididymal obstruction was found and epididymovasostomy was done bilaterally but unfortunately failed. Semen analysis of Group I patients pre-treatment and post-TUR are shown in Table (2).

GROUP II:

Analysis of the aspirate of the prostatic cyst revealed clear or turbid fluid containing RBCs and tissue debris and no sperm were detected in any patient. Semen analysis done one month after aspiration revealed sperm in semen in 9 patients and azoospermia in 3 patients. Semen analysis done in the following 3 months revealed persistence of the improvement of semen parameters in 3 patients and the semen analysis was reverted back to azoospermia with low semen volume in the other 6 patients.

Transurethral resection of ED with/without Deroofing of Prostatic was done for 9 patients in Group II (the 3 patients that did not show improvement after aspiration and the 6 patients that showed azoospermia again in the follow up semen after begin initially improved). Semen analysis done one month after TUR revealed sperm in 6 cases and 3 patients showed no improvement. Semen parameters of Group II patients post-aspiration (1 month visit and 3 months follow up visit) are listed in Table (3) while Table (4) shows the post-operative semen parameters of patients of Group II who underwent TURED. No complications were detected post-TURED except for transient hemospermia and dysuria that were found in 5 patients and resolved spontaneously within 2 weeks.

Table 1

Patients demographics

	Group I	Group II
Age (years)	35.4 ± 6.9	35.7 ± 4.7
Infertility Duration (years)	3.7 ± 3.1	5 ± 2.7
Smoker (n)	3	7

Table 2

Semen parameters in Group I patients pre-treatment and post-TUR (n=7)

Patients	Pre-treatment			Post-TUR					
	Vol. (ml)	Count (Mil/ml)	Pus (cells/HPF)	Vol. (ml)	Count (Mil/ml)	Mot. (%)	Vit. (%)	Abf (%)	Pus (cells/HPF)
1	0.5	0	0.8	2.4	0	0	0	0	0.9
2	0.9	0	0.4	3	82	55	55	75	0.7
3	1.2	0	0.1	1.5	0	0	0	0	0.9
4	0.6	0	0.4	4.5	45	75	80	80	1
5	1.4	0	0.9	3	11	50	60	70	1.8
6	0.7	0	1	2.1	0	0	0	0	0.7
7	1	0	0.7	2	0	0	0	0	1.4

Table 3

Semen parameters of Group II patients Post-aspiration (one month and 3 months follow up (n=12)

Patients	1 month Post-aspiration						3 months Post-aspiration					
	Vol. (ml)	Count (Mil/ml)	Mot. (%)	Vit. (%)	Abf (%)	Pus (cells/HPF)	Vol. (ml)	Count (Mil/ml)	Mot. (%)	Vit. (%)	Abf (%)	Pus (cells/HPF)
1	3.2	120	50	55	65	0.9	2.8	110	65	85	60	0.7
2	4.5	20	40	55	75	0.8	1	0	0	0	0	0.4
3	0.9	0	0	0	0	0.9	0.7	0	0	0	0	1
4	2.2	35	45	50	60	1.2	0.7	0	0	0	0	0.6
5	3	45	50	50	70	0.4	3.2	65	75	80	70	0.3
6	3	63	60	70	70	0.3	0.4	0	0	0	0	0.5
7	2.5	81	65	70	70	0.7	1.1	0	0	0	0	0.8
8	1	0	0	0	0	0.6	0.8	0	0	0	0	0.9
9	2.9	65	55	55	70	1	3.5	80	70	80	70	1
10	4.5	85	45	50	60	0.8	5	0	0	0	0	0.6
11	0.2	0	0	0	0	0.4	0.3	0	0	0	0	0.7
12	2.4	60	60	65	75	1.2	2	0	0	0	0	0.6

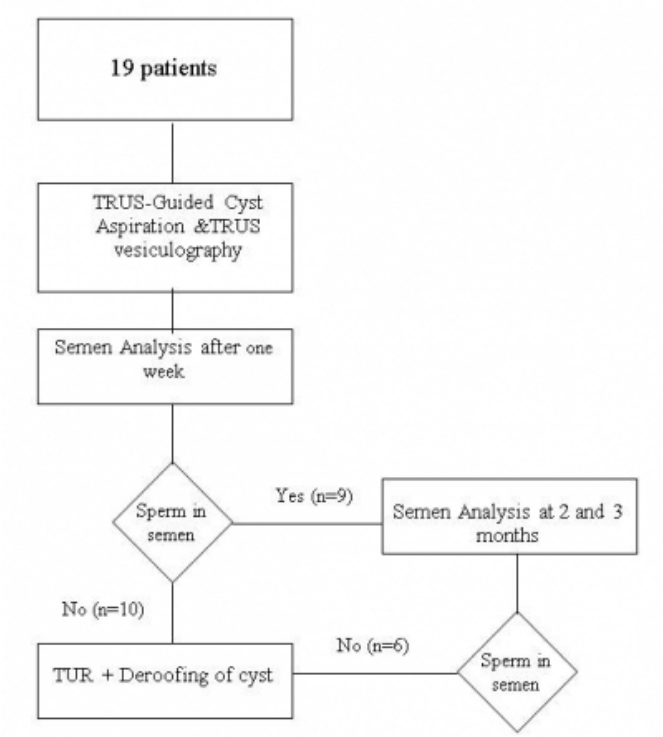
Table 4

Semen analysis of Group II patients after TUR (n=9)

Patients	Vol. (ml)	Count (Mil/ml)	Mot. (%)	Vit. (%)	Abf (%)	Pus (cells/HPF)
1	3	65	40	50	70	1.2
2	3.2	0	0	0	0	0.6
3	2.5	0	0	0	0	0.5
4	3	40	45	50	55	1.4
5	6	60	60	70	70	0.9
6	2.5	0	0	0	0	1.2
7	3	75	65	70	70	0.9
8	2.5	34	55	70	75	0.1
9	4	48	50	65	70	0.2

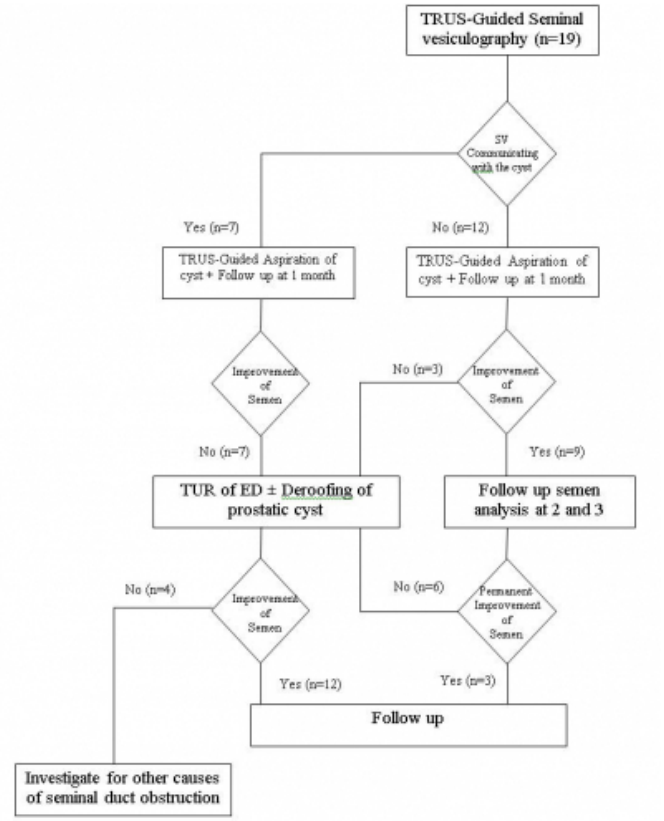
Appendix 1

Algorithm showing the management protocol for patients included in the study:



Appendix 2

Results Algorithm



DISCUSSION

In infertile men, obstruction of the seminal pathways at the prostatic level due to prostatic cyst is one major cause of azoospermia or severe oligozoospermia. Ejaculate volumes <1.5 ml(15), acid pH and absent or low fructose contents in seminal plasma are indicative of the condition (15-17). In our series, all these conditions were present and after scrotal palpation and exclusion of retrograde ejaculation, ejaculatory duct obstruction became the clinical diagnosis (16,18).

It is reported that not all the patients with EDO have dilated seminal vesicles and, conversely, not all patients with dilated seminal vesicles have EDO (19). Moreover, the functional implication of prostatic cyst or prostatic calcification cannot be determined by TRUS. It provides only circumstantial evidence for obstruction (20). So we based our study on seminal-vesiculography together with cyst aspiration guided by TRUS to diagnose EDO although the main drawback is the invasiveness of the technique. We adopted a more practical classification in our management protocol of cases of cystic EDO based on seminal vesiculography; cyst communicating (Group 1) or not communicating (Group 2) with seminal vesicles irrespective of its anatomical or

embryological type. This classification was not reported before in literature. This classification was chosen on clinical basis on the hypothesis that if the cyst is communicating with the seminal vesicle then it is a wolfian duct cyst and the ejaculatory ducts are blocked and involved in the cyst and not compressed. Therefore, aspiration of the cyst will not open the ejaculatory duct. On the other hand, if the cyst is not communicating with the seminal vesicles, then the ejaculatory ducts are obstructed due to compression. Hence aspiration of the cyst will lead to release of compression and the ejaculatory ducts can be opened again. As regards the success rate of the intervention for treating EDO in the present study, TRUS guided aspiration of seminal vesicles was successful 47.4% (9 out of 19 patients) manifested by appearance of sperm in semen and increase in semen volume following the procedure. This success was maintained in only 15.8% (3 out of 19 patients) at 3 months follow up. The other four patients reverted back to low volume azoospermia. All cases were aspiration was successful were in Group II with the prostatic cyst not communicating with the seminal vesicles on seminal vesiculography. As for TURED the success rate was 56.3% (9 out of 16 patients).

It is important to mention that during TURED procedure in the present study, the resectoscope, with the 24-Fr cutting loop, is engaged with a finger placed in the rectum providing anterior displacement of the posterior lobe of the prostate. The ejaculatory ducts course is between the bladder neck and the verumontanum and exit at the level of and along the lateral aspect of the verumontanum. Resection was carried out in this region with great care taken to preserve the bladder neck proximally, the striated sphincter distally, and the rectal mucosa posteriorly.

The expected complication rate from TURED surgery is approximately 20%. Most common among them are self-limited hematospermia, hematuria requiring recatheterization and urinary tract infection. More concerning, but less frequent, are epididymitis and a “watery” ejaculate. Watery ejaculate may be from the reflux of urine retrograde through the ejaculatory ducts and into the seminal vesicles, as suggested by the finding of creatinine in the ejaculates of TURED patients. In addition to the social implications of this complication, the exposure of sperm to urine may significantly impair fertility potential. Several potentially major but rarely reported complications include retrograde ejaculation, rectal perforation, urinary incontinence and recurrent seminal vesicle infection. In the present work, complications post TURED was faced in only 2 patients. It was in the form of hematuria and hematospermia that persisted for 1 month and resolved spontaneously.

From the present study, we propose a treatment protocol for cases of male infertility with EDO and prostatic cysts. In such cases seminal vesiculography should be done. If the cyst is found to be communicating with the seminal vesicle then the patients should be offered TURED directly. If the cyst is not communicating with the seminal vesicles, then he may be offered TRUS guided aspiration of the cyst or TURED. TRUS guided aspiration has the virtue of being relatively non-invasive with minimal complications. Also the success rate of aspiration is reasonable. A further study with larger number of patients is recommended to further validate our results.

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