

# Transrectal Ultrasound- and Fluoroscopic-Assisted Transurethral Incision of Ejaculatory Ducts: A Problem-Solving Approach to Nonmalignant Hematospermia Due to Ejaculatory Duct Obstruction

T. Manohar, Arvind Ganpule, and Mahesh Desai

## Abstract

**Purpose:** Ejaculatory duct obstruction (EJDO) has traditionally been managed with transurethral resection of ejaculatory ducts (TURED). However, wide resection has potential complications and risk of postoperative morbidity. We demonstrate a technique using transrectal ultrasonography (TRUS) and fluoroscopy to assist with transurethral incision of the ejaculatory duct (TUIED) to treat hematospermia due to obstruction by either a stone or a prostatic cyst.

**Materials and Methods:** Twenty-five patients with ejaculatory disorders including hematospermia underwent TUIED between 1997 and 2005. Diagnosis, the cause of hematospermia, and the level of EJDO was confirmed by semen analysis, semen culture, and TRUS. All patients were subjected to TRUS-guided seminal vesicle aspiration followed by seminal vesiculography using methylene blue mixed with contrast under biplanar TRUS guidance and fluoroscopic monitoring. After confirming the cause and level of obstruction, the ejaculatory duct was opened using endoscissors until the obstruction was relieved as confirmed by free flow of methylene blue. Stones were removed if any were present. A Foley catheter was kept in place for 24 hours.

**Results:** Improvement of symptoms was noted in 96% of patients with ejaculatory disorders. All patients with painful ejaculation and hematospermia had complete remission of symptoms at 3 months postoperatively; three patients had transient epididymo-orchitis, and none had retrograde ejaculation or incontinence.

**Conclusion:** TUIED is a viable and minimally-invasive option for treating EJDO causing ejaculatory disorders including hematospermia with minimal morbidity and early recovery.

## Introduction

PROSTATIC CALCULI ARE A WELL-KNOWN PHENOMENON THAT USUALLY HAVE LITTLE CLINICAL SIGNIFICANCE.<sup>1</sup> Occasionally they may cause symptoms due to obstruction of the ejaculatory duct or hematospermia when present in a seminal vesicle for a long period of time. Etherington and colleagues assessed the role of transrectal ultrasound in investigation of hematuria.<sup>2</sup> Furuya and Kato reported on hematospermia in men who had a midline cyst of the prostate.<sup>3</sup>

Transrectal ultrasonography (TRUS) has revolutionized the imaging of the prostate, seminal vesicle, and distal vas deferens. Ejaculatory duct obstruction (EJDO), or the presence of stones, can be suspected on TRUS (Figs. 1 and 2) if

the seminal vesicles are dilated (>1.5 cm diameter on TRUS imaging) or if the ejaculatory duct is dilated (>2–3 mm).

Ejaculatory duct obstruction has traditionally been managed with transurethral resection of ejaculatory ducts (TURED).<sup>4–7</sup> This involves resection near the verumontanum. This resection is usually uncontrolled, as it is impossible to determine the depth of resection needed to reach the dilated ejaculatory ducts. Moreover, wide resection can lead to reflux of urine,<sup>5</sup> resulting in epididymitis (chemical or infectious) and its sequelae. Apart from causing recurrent obstruction, it can impair the quality of sperm due to reflux of urine into these fibrotic openings created by the wide resection. Furthermore, damage to bladder neck and periprostatic sphincter can lead to retrograde ejaculation, and rarely incontinence<sup>5</sup> in these young patients.

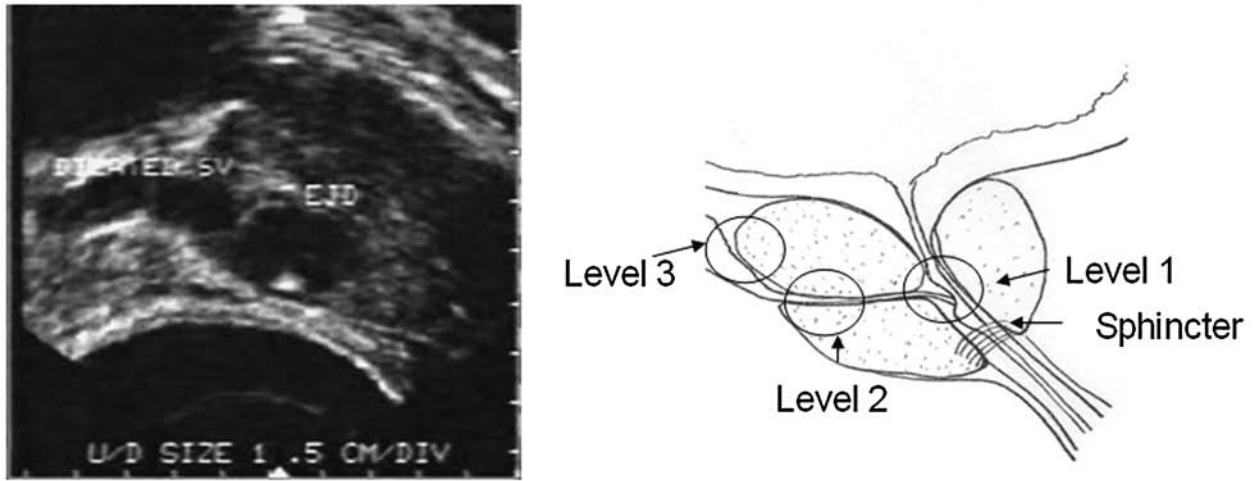


FIG. 1. Three levels of obstruction in the ejaculatory duct.

We describe a technique of TRUS and fluoroscopic-assisted transurethral incision of the ejaculatory duct (TUIED), in which seminal vesiculography is done with radiopaque contrast medium mixed with methylene blue. A single-center prospective initial clinical study was planned for patients with EJDO, in order to evaluate the tolerability and safety of TUIED.

**Materials and Methods**

Prospective analysis of 25 patients with EJDO secondary to calculi or with ejaculatory disorders and hematospermia underwent TRUS and fluoroscopic-assisted TUIED between January 1997 and December 2005.

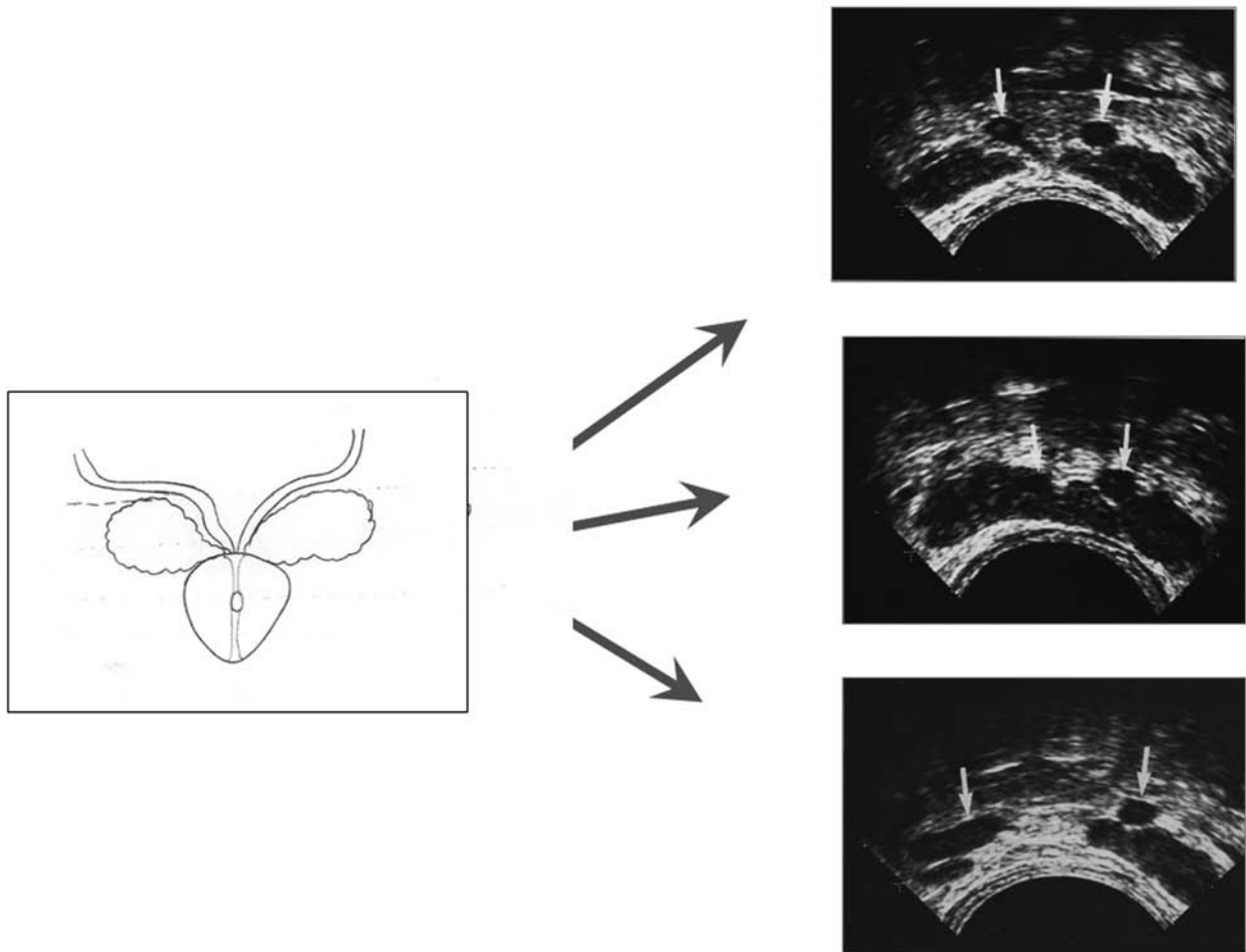


FIG. 2. TRUS images showing the levels of ejaculatory duct obstruction.

TABLE 1. PRESENTING FEATURES AND OPERATIVE DETAILS

<i>Patient data</i>	<i>Parameters</i>
Mean patient age	30.5 years (range 24–44 years)
Mean operative time	52 minutes (37–110 minutes)
Mean body mass index (kg/m <sup>2</sup> )	24.1
Operative details	
Nephroscope used with endoscissors	23
Cystoscope used with hook	2
Ejaculatory disorders	25
Hemospermia (patients with stones)	16 (3)
Painful ejaculation	4
Severe perineal discomfort	5

The inclusion and exclusion criteria were as follows. The procedure (TUIED) was carried out only if the ejaculatory dysfunction and hemospermia were associated with ejaculatory duct obstruction. EJDOs associated with infertility were not analyzed in the present study. Those cases with high-level obstruction (Fig. 1), those with non-dilated intraprostatic ejaculatory ducts, and those with active urinary tract infections were excluded from the study.

Dilatation of the intraprostatic ejaculatory duct and the level of ejaculatory duct obstruction were ascertained. The presence of stones and the level of seminal vesicle obstruction were initially assessed by clinical parameters, semen analysis, and abdominal sonography. The presence of obstruction was confirmed by demonstrating the presence of sperm in the TRUS-guided seminal vesicular aspirate, and the level of obstruction was demonstrated by TRUS and fluoroscopy-monitored seminal vesiculography. The procedure was monitored by TRUS as well as fluoroscopy to enhance the accuracy of the procedure. However, it must be noted that not all cases of EJDO have dilated seminal vesicles on TRUS.<sup>8</sup>

### Technique

The procedure was performed under general anesthesia under aseptic conditions. The operating room was arranged in such a way that the fluoroscopy C-arm and monitor were on one side of the patient, while the TRUS and endovision monitor were on the other side. Initially the patient was placed in the left lateral position and TRUS was done with a 7.5/10 MHz biplanar probe. TRUS-guided aspiration of the dilated seminal vesicle was done using a 20-gauge 25-cm needle under fluoroscopic control. After seminal vesicle aspiration, contrast mixed with methylene blue was instilled. The patient was placed in lithotomy position and cystourethroscopy was performed. Careful examination was made of the areas lateral to the verumontanum within the prostatic urethra to evaluate both ejaculatory duct orifices. The bladder was scanned for the presence of methylene blue, the absence of which suggested complete ejaculatory duct obstruction, and flow of some contrast into the bladder suggested a partially obstructed ejaculatory duct. A nephroscope (24F/20F) and hook electrode (3.5 mm) were inserted transurethrally and the ejaculatory duct opening was engaged with the hook electrode and the mouth widened. Further down the ejaculatory duct (as monitored using TRUS and fluoroscopy) endoscissors (2-mm mini-shears) were

used to cut the entire length of the ejaculatory ducts until the cavity was entered, which was identified by the presence of methylene blue. In some cases the hydrophilic guidewire was passed across the opening to assist in the direction of incision of the ejaculatory duct. The entire procedure was conducted with out applying any current. Bleeders at the end of the procedure were point coagulated. In two cases we used a flexible hook electrode that could be passed through the cystoscope instead of the resectoscope. Once the obstruction was relieved, any stones were either retrieved with forceps or fragmented using a lithotripter. After completion of the procedure a 16F Foley catheter was left in place for 24 hours. Patients were discharged on oral antibiotics and analgesics for 7 days.

All patients were evaluated for intraoperative complications, postoperative incontinence, relief of symptoms, and cessation of hemospermia. Follow-up included a 1-month postoperative visit to the outpatient department. On follow-up, apart from physical examination and ultrasound scan, transrectal sonography and pain assessment were per-

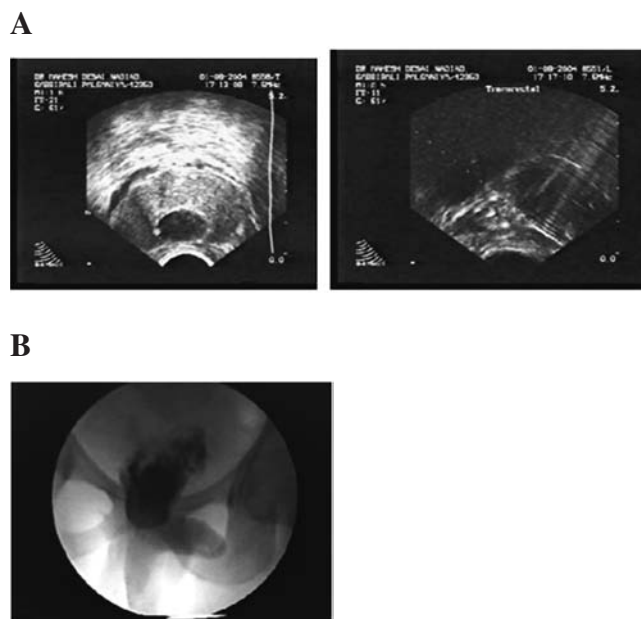
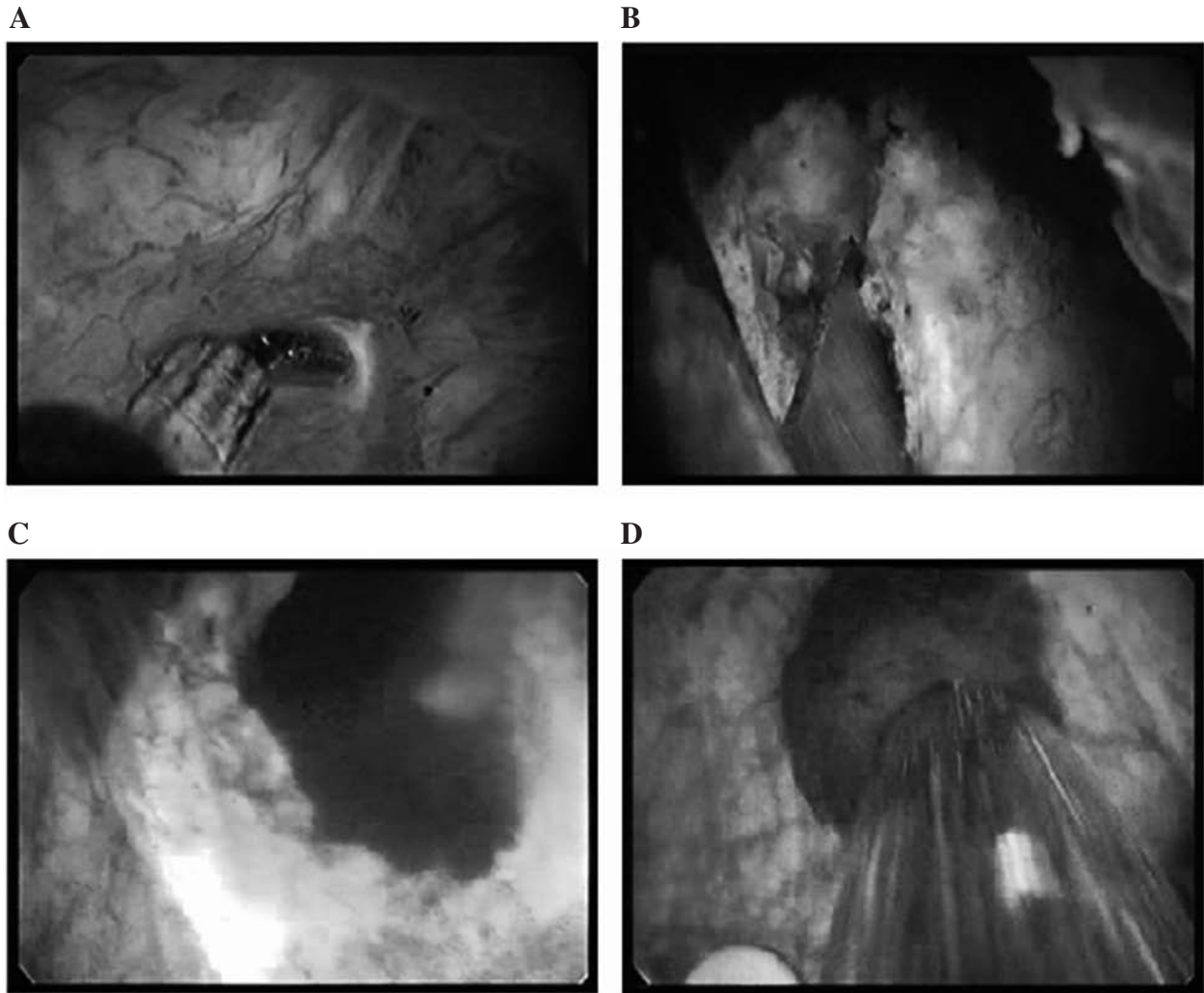


FIG. 3. TRUS-guided instillation of contrast media. (A) TRUS-guided needle aspiration. (B) Fluoroscopic confirmation.



**FIG. 4.** Surgical steps. (A) Cannulating the ejaculatory duct opening. (B) Opening the ejaculatory duct with endoscissors. (C) Enlarged ejaculatory duct opening. (D) Stone inside the seminal vesicle.

formed. Semen analysis was also done at 1 month follow-up. Telephone interviews were conducted by one of the authors (T.M.) to augment data obtained from follow-up visits.

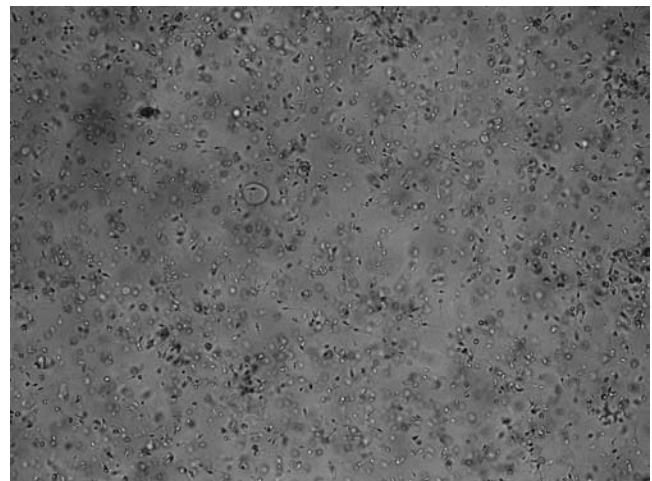
### Results

The patients characteristics and instrument details are as shown in Table 1. Long-term relief of pain (at 3 months' follow-up) after TUIED was seen in 96% of the patients. In all patients with ejaculatory duct stones ( $n = 3$ ), symptoms related to ejaculation disappeared after removal of the obstructing stones. Three patients had transient epididymo-orchitis that required conservative management with antibiotics and anti-inflammatory medication. None of the patients had incontinence or retrograde ejaculation.

### Discussion

EJDO is a complex problem with variable etiologies. In their review of 52 patients Etherington and associates<sup>2</sup> found that none was proven to have prostatic malignancy in those with hematospermia. Transrectal ultrasonography may re-

veal the cause of hematospermia in the majority of patients and can help exclude underlying prostatic malignancy. It is recommended as the first-line radiologic investigation in patients presenting with hematospermia.<sup>2</sup>



**FIG. 5.** Semen examination.

In 1980, Weintraub recommended seminal vesicle drainage by independent incision and resection of ejaculatory ducts as a method of avoiding complications.<sup>9</sup> Dunetz and Krane described a similar procedure in 1986. Instead of the Colling's knife they used an urethrotome. Gaboardi and associates have reported using an Nd:YAG laser to accomplish the same goal.<sup>10</sup> Cystic obstruction responds best to TURED.<sup>11,12</sup>

The drawbacks of TURED are that if resection is performed too proximally, damage to the bladder neck can result in retrograde ejaculation postoperatively, and resection too distally can cause damage to the external sphincter with subsequent urinary incontinence. Excessive postoperative fibrosis may result in scarring and subsequent azoospermia, implying re-occlusion of the ejaculatory ducts. Because the area of resection is at the prostatic apex, near to both the external urethral sphincter and the rectum, careful positioning of the resectoscope is essential. Often several passes of the cutting loop are required to visualize the ejaculatory duct openings within the prostatic tissue. After resection, large bleeding blood vessels are cauterized, which may be detrimental to the adjoining duct openings.

TRUS along with dynamic procedures (vasography and seminal chromotubation) should be performed prior to definitive surgical intervention.<sup>13</sup> Netto and colleagues showed that the etiology of ejaculatory duct obstruction was a significant predictor of success after TURED.<sup>14</sup>

In our technique (TUIED), resection of the ejaculatory duct has been replaced by incision under simultaneous ultrasonographic monitoring and fluoroscopic guidance (Fig. 3), in order to make it more precise and less invasive. In addition, cold cutting of the ejaculatory duct (Fig. 4) without disturbing the vital anatomic structures seems to be least invasive method for cases with simple ejaculatory dysfunction arising from EJDO. TUIED should not be attempted for those with non-dilated ejaculatory ducts (intraprostatic), as it tends to fail in such patients. Those with dilated seminal vesicles and non-visible intraprostatic dilatation (level II) can be TRUS-aspirated for further evaluation for infection, and treated accordingly.

According to the various literature reviews the expected complication rate for TURED surgery is approximately 20%. Common complications include hematospermia, hematuria requiring re-catheterization, urinary tract infection, and watery ejaculate (Fig. 5). Watery ejaculate may be due to urine reflux retrograde through the ejaculatory ducts and into the seminal vesicles, as suggested by the finding of creatinine in the ejaculate of TURED patients. Several other potentially major but rarely reported complications include retrograde ejaculation, rectal perforation, urinary incontinence, and recurrent seminal vesicle infection.

## Conclusion

TUIED is a viable and minimally-invasive option for treating EJDO causing ejaculatory disorders including hematospermia, and it carries minimal morbidity with early patient recovery.

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Address reprint requests to:

*Mahesh Desai*  
*Department of Urology*  
*Muljibhai Patel Urological Hospital*  
*Dr. Virendra Desai Road*  
*Nadiad, Gujarat, India 387001*

*E-mail: mrdesai@mpuh.org*

## Abbreviations Used

EJDO = ejaculatory duct obstruction  
 TRUS = transrectal ultrasonography  
 TUIED = transurethral incision of the ejaculatory duct  
 TURED = transurethral resection of ejaculatory ducts.

