TUNA of the Prostate in an Office Setting: Nursing Implications

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Transurethral needle ablation (TUNA) of the prostate is a minimally invasive procedure for treating benign prostatic hyperplasia (BPH). It is an FDA-approved modality and now Medicare reimbursable in all states as an office or clinic procedure. Implementing the procedure in the office setting requires thorough training of the nursing staff to provide for a successful and safe treatment. The purpose of this article is to provide an overview of the nursing role in patient care of those undergoing a TUNA procedure. The content is based on the experiences at one institution that treated approximately 30 patients in the past year. Other sites may adapt the general principles outlined here to meet their own circumstances.

What Is TUNA?

Transurethral needle ablation is a BPH treatment option, which uses radio-frequency (RF) waves to create thermal effects inside the prostate gland. It is based on the principle that heating the adenoma causes necrosis of obstructing tissue and leads to relief of prostatic obstruction (Naslund, 1997). The RF signal is carried into the prostate via needle electrodes. The length of the needles, which is set individually for each patient’s prostate size, energy wattage, and duration of treatment determine the amount of thermal ablation. It allows tissue ablation to occur only in the region directly targeted while preserving adjacent tissues and organs, especially the urethra and rectum (Issa, Myrick, & Symbas, 1998a & b).

Urethral preservation is a significant benefit of TUNA. The procedure avoids destruction of the urethra, which is a painful component of other techniques that precludes treatment under local anesthesia in a clinic setting. In addition, it decreases postoperative morbidity of hematuria, urinary retention, tissue sloughing, and retrograde ejaculation (Issa et al., 1998a & b). After a TUNA procedure, the necrotic tissue subsequently undergoes absorption, contraction, and scar formation over the ensuing 8 weeks (Naslund, 1997).

Equipment

The equipment used at our site is the Precision® TUNA system by VidaMed, Inc. It is portable and fits well on a Lakeside cart (see Figure 1). It consists of a computer generator, rigid cystoscope, 0-degree lens, reusable hand piece, disposable cartridge with irrigation tubing, foot pedal, and cables (see Figure 2).

Following the appropriate sterilization guidelines, the reusable pieces of equipment (the lens and hand piece) can be disinfected or steam sterilized prior to use and between patients. All other equipment, the cartridge and tubing, is one-time use only. The hand piece is oiled after the final disinfection of the day to maintain smooth operation of the gears.

How the Precision TUNA System Works

Two needles protrude from the distal end of the scope at 90-degree angles and heat the prostatic tissue. Temperature rises quickly within 30 seconds to 110 degrees C and is held there for a 4-minute treatment period (see Figure 3). Retractable shields cover the needles to allow for placement at the subsequent...
treatment sites. The right and left sides of the prostate are treated at several planes. There are most commonly three or four planes treated, depending upon the distance from the bladder neck to the vera montanum. Each plane treated is approximately 0.75 to 1 centimeter apart, working out from 1 cm distal to the bladder neck out to the apex of the prostate, 1 cm proximal to the vera montanum (see Figure 4). Sensors at the distal tip of the shields constantly monitor urethral temperatures. Additionally, sensors within the needle tips constantly monitor the intraprostatic tissue temperature at 50 times a second. A slow constant drip of normal saline solution is usually adequate to keep urethral temperatures below 43 degrees C. Additional spurts of saline can be given via a spring syringe if the urethral temperature continues to rise. At 43 degrees an alarm will sound, and if uncorrected, will abort the treatment at 47 degrees.

**Benefits of TUNA over TURP**

Transurethral resection of the prostate (TURP) is the gold standard to which all new treatment modalities are compared (see

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**Figure 1.** The Precision TUNA Computer Generator Is Portable and Can Be Carried in its Own Case

**Figure 2.** The Completely Assembled Precision TUNA Instrument Includes the Hand Piece, Lens, and Disposable Black Cartridge Portion

**Figure 3.** A Magnified View of the Distal Tip of the Instrument Shows the Needles Extended

**Figure 4.** Right and Left Sides of the Prostate Are Treated at Several Planes

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Figure 5). TUNA is a less-expensive modality associated with greater patient comfort and less morbidity. Naslund (1997) estimates the overall expense associated with TUNA to be approximately 40% to 50% less than with TURP. In addition, there is less time lost from the workforce, as most patients can return to normal activities in 1 to 2 days.

Who Are Good TUNA Candidates?

The TUNA procedure is best suited for men who have moderate obstructive and irritative symptoms such as frequency, urgency, nocturia, weak stream, and feeling of incomplete emptying. Usually the patient has had a trial of medical therapy first using medications such as tamsulosin, terazosin, or doxazosin. However, the drawbacks with medical therapy can be three-fold. First, it may not relieve symptoms adequately. Second, there may be intolerable side effects, such as light headedness, dizziness, or drowsiness. Third, some men just do not like the idea of taking a pill every day for the rest of their lives. These men make excellent candidates for a one-time outpatient surgery.

Another group of men who are ideal candidates for TUNA are those with significant medical problems for whom general anesthesia or major surgery with its inherent risks is an unwar- ranted procedure. At the other end of the spectrum, some men are better suited for other types of prostatectomy. These are men with very large glands, those with long-term urinary retention, those with a large obstructing median lobe that enters into the bladder, or those who are unable to tolerate local anesthesia and/or sedation.

Preoperative Preparation

Careful patient selection can help ensure a successful treatment. Therefore, the preoperative evaluation is an important method for selecting a good candidate. First, a complete medical history and physical examination are performed. Digital rectal examination and prostate-specific antigen are performed to rule out prostatic cancer. Both urinalysis and urine culture are obtained to rule out any infection. The International Prostate Symptom Score (IPSS) will provide information as to the specific level of symptomatology of the patient. Uroflow and bladder scan are helpful tools to determine the degree of obstruction and amount of residual urine left in the bladder.

The most important piece of information is gleaned from a trans-rectal ultrasound of the prostate. This will provide the physician with the exact dimensions of the gland, as well as its configuration. This information determines the proper selection of needle length to be used during the treatment. Needle length in a TUNA procedure can vary from 12 to 22 mm in length.

Cystoscopy should then be performed for several reasons. It allows for visualization of the obstructing prostatic lobes, which is helpful in planning the course of treatment and treatment time. In addition, it will rule out other diagnoses, such as urethral stricture, bladder mass, or a large obstructive prostatic median lobe. Some physicians perform rigid cystoscopy preoperatively as this informs them of the patient’s ability to tolerate the TUNA procedure (Heaton, 1997). This is because the sensation of rigid cystoscopy is the major discomfort felt during TUNA procedure. At our site, the cystoscopy is performed immediately before the TUNA procedure, thereby eliminating the discomfort of two separate insertions of a cystoscope.

The patient is provided with a written sheet of general instructions prior to surgery. All medications containing aspirin, ibuprofen (such as Advil®), or vitamin E products are stopped 2 weeks prior to the procedure. Coumadin is stopped approximately 5 days preoperatively with the cardiologist’s approval. The patient is instructed not to eat or drink after midnight the night before,
although some physicians may prefer for the patient to eat a light meal early in the morning of the procedure. Regular medications may be taken as necessary with a sip of water, unless otherwise directed. Specific instructions are given to the diabetic patient who is taking insulin. Perhaps he will take half his normal dosage, or eat a light meal, depending on physician preference and time of the procedure. Patients are encouraged to wear comfortable clothing the day of the procedure, and may bring a favorite tape or CD to which to listen. It is also recommended to decrease alcohol and caffeine intake and tobacco use for 48 hours prior to the procedure. Finally, each patient must arrange for someone to drive him home.

Preoperative patient education is important in that it will provide the patient with realistic expectations of the procedure and recovery period. Research has shown that well-prepared patients experience less difficulty during surgery and have fewer problems postoperatively (LaFollette, Wettlauffer, & Karłowicz, 1995). It is vital that the patient understands what to expect in the ensuing weeks. Initially, voiding symptoms may even be slightly worse, possibly due to edema at the prostatic fossa. Improvement is gradual, so that by about 2 weeks postoperatively most patients have reported that their BPH symptoms are beginning to decrease. Improvement usually continues for up to several months, and in some cases, longer.

**Nursing Role During the Procedure**

A calm, thoroughly prepared patient will make for a more comfortable treatment. Heaton (1997) states that keeping the patient informed and relaxed can often be the determining factor between a successful treatment and one that must be aborted. Reviewing the preparation steps and the procedure itself, as well as allowing the patient to ask questions and verbalize his concerns, will assist in allaying his fears. He should understand that there is some discomfort involved, but that it is usually tolerable. It may seem to be a strange analogy, but by questioning the patient as to how he tolerates the discomfort of dental procedures the nurse can obtain a good indication of his pain threshold. Explain that he may feel urgency at times during the procedure, and reassure him that this is a common and normal sensation due to the instrumentation. The physician will periodically empty the patient’s bladder to help reduce this sensation. Reassure him that the procedure can be stopped if it is intolerable to him. A room with soft lights and soft music is provided to create a relaxing environment.

### TUNA Preoperative Guidelines

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<thead>
<tr>
<th>30 Minutes Pre-TUNA</th>
<th>Administer sedatives of choice. Administer quinolone and Cox-2 inhibitor.</th>
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<tr>
<td>20 Minutes Pre-TUNA</td>
<td>Catheterize patient and empty the bladder. Instill 50 cc cold liquid lidocaine 2% into the bladder via catheter. Slowly pull catheter out while continuing to instill the last 10 cc of lidocaine. Instill 10 cc cold lidocaine gel into urethra. Clamp penis for a minimum of 20 minutes.</td>
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### 30 Minutes Pre-TUNA

A 30-minute period of preparation prior to the treatment allows for adequate conscious sedation and infiltration of local anesthetic (see Figure 6). There are a number of different options available for relaxation or sedation, including meperidine, midazolam, or diazepam. At our institution, we have found that meperidine 50 to 75 mg with hydroxyzine 25 to 50 mg given intramuscularly provides good relaxation for most men, with minimal side effects. The lower dose is used for the slightly built men, more elderly, or those with significant medical problems. Younger men, and especially larger ones, often require the maximum dose. In addition to the sedatives, we administer a Cox 2 inhibitor, such as rofecoxib, to help decrease inflammation and a quinolone antibiotic, such as ciprofloxacin to prevent infection.

### 20 Minutes Pre-TUNA

The patient is catheterized with a 14 or 16 Fr catheter for the purpose of emptying the bladder and instilling 60 cc of chilled 2% liquid lidocaine (kept in the refrigerator). For maximum benefit of anesthetizing the prostatic fossa, the patient is placed in the Trendelenberg position, and the catheter is slowly withdrawn as the anesthetic is being instilled. Immediately following this procedure, 10 cc of chilled 2% lidocaine jelly is instilled intraurethrally. A penile clamp is then placed in position. The return electrode pad is then applied to the lumbar region of the back. The patient is allowed to doze and relax for approximately 20 minutes, at which time the physician can begin the treatment. It is important to allow the full 20 minutes after the lidocaine instillations as this allows for superior pain reduction (Goldfischer, Cromie, Karrison, Naszkiewicz, & Gerber, 1997).
Treatment

During the treatment phase, the nurse’s function is primarily to ensure the patient’s safety and comfort. Frequent patient assessments should be made with blood pressure and pulse monitoring, as well as use of pulse oximetry (to measure PO₂ levels). Rousing him to take deep breaths for a few seconds can usually reverse a decrease in the patient’s PO₂ level. If this is not effective, he can then be given oxygen by nasal cannula at approximately 2 liters per minute, although this is rarely necessary. Since the patient is placed in a dorsal lithotomy position with the legs in padded knee crutches during the procedure itself, often for 30 to 40 minutes in duration, it is important to check circulation of the lower extremities. One way of doing this is to encourage the patient to move his toes and feet between treatment periods.

The nurse should be carefully observing the patient’s response to the sedative measures and local anesthesia both prior to and during the procedure. Toxic reactions to either can occur after administration. The nurse should be alert for signs of hypotension, pallor, nausea, twitching, excitability, elevated heart rate, or respiratory difficulty and be prepared to intervene appropriately and quickly (LaFollette et al., 1995).

Nursing measures can be a vital tool to maintaining patient comfort. As mentioned before, soft music and a darkened room are helpful in creating a relaxing atmosphere. Depending on the patient’s level of alertness, distraction can be very useful. Talking with him about family, work, hobbies, vacations, etc. can help divert his attention away from the treatment, and can decrease the irritative symptoms he may experience. This discomfort is most noticeable as the plane nearest the bladder neck is being ablated.

The nurse is furthermore functioning as assistant to the physician and is responsible for establishing all connections with the treatment equipment and ascertaining that the lines are patent and functioning. Troubleshooting by the nurse can be done when necessary. In addition, there is a “hot line,” a 24-hour phone number at which technical support for the TUNA system is available to troubleshoot problems or questions that might arise.

Finally, the nurse maintains necessary documentation as required at the institution. This includes documenting preoperative and intra-operative medications, vital signs, number and location of treatment sites, needle lengths used, and treatment times. In addition, patient response should be noted.

Immediate Postoperative Care

The patient’s bladder is left full of irrigating fluid upon completion of the final two treatment sites. This affords him the opportunity to void spontaneously. The patient who can void and who has minimal hematuria can be discharged without a catheter, with instructions on how to proceed if urinary retention should occur. However, it has been our experience that with the Precision generator many of the patients require a Foley catheter for 2 or 3
The International Prostate Symptom Score (I-PSS) is based on the answers to seven questions concerning urinary symptoms. Each question allows the patient to choose one of five answers indicating increasing severity of the particular symptom. The answers are assigned points from 0 to 5. The total score can therefore range from 0 to 35 (asymptomatic to very symptomatic). Furthermore, the International Concensus Committee (ICC) recommends the use of only a single question to assess the quality of life. The answers to this question range from “delighted” to “terrible” or 0 to 5. Although this single question may or may not capture the global impact of BPH symptoms or quality of life, it may serve as a valuable starting point for a doctor-patient conversation. The ICC strongly recommends that all physicians who counsel patients suffering from symptoms of prostatism utilize these measures not only during the initial interview, but also during and after treatment in order to monitor treatment response.

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The ICC under the patronage of the World Health Organization (WHO) has agreed to use the symptom index for benign prostatic hyperplasia (BPH), which has been developed by the American Urological Association (AUA) Measurement Committee, as the official worldwide symptoms assessment tool for patients suffering from prostatism.

**Editor's Note:** The IPPS form (formerly known as the AUA Symptom Index) may be found at: Plowman, B.K. (2000). Pharmacologic treatment of benign prostatic hyperplasia. Urologic Nursing, 20(6), 403-405, 409.
days. The reason for this is uncertain, but may be due to the rapid rise time of the temperature to 110 degrees C, with treatment being sustained at that temperature for 4 minutes.

Patient safety remains a nursing concern after the treatment is completed. It is important that the patient’s level of consciousness is assessed. Vital signs must be monitored until stable and the patient is thoroughly awake. The nurse should assist circulation of the lower extremities after removing them from the stirrups by having the patient exercise his legs and feet prior to sitting up. A nurse should remain with the patient as he sits and subsequently stands to void. Fluids, such as water or juice, can be given. Once the patient is alert and dressed, written postoperative instructions should be reviewed with him (see Figure 7). Review again the expectations with him. Remind the patient that symptom improvement will be gradual over several weeks and months, and symptoms may be no better for the first week or 2. This is secondary to edema or inflammation at the treatment sites. If the patient understands this, he will be less anxious during the healing period and happier with the treatment results.

Finally, if a Foley catheter is inserted, written catheter care instructions are provided, as well as verbal instructions on how to care for the catheter while in place. An appointment is made for 2 to 3 days later, at which time the bladder is filled with normal saline prior to catheter removal. The patient then is provided with the opportunity to void immediately prior to leaving the office. Catheter removals are done in the morning preferably, so that the patient can return later that day if urinary retention should occur. This happens rarely, but is a possibility.

Followup Patient Assessments
As part of a clinical research protocol, the patient is assessed four times during the first year following the TUNA procedure. At approximately 4 to 6 weeks postoperatively he is first seen to assess improvement level and rule out any infection. This is done by completion of an IPSS sheet and routine urinalysis (see Figure 8). At this time he may need reassurance that further improvement will still occur. At 3, 6, and 12 months he is evaluated more fully with a uroflow, post-void residual by bladder scan, as well as an IPSS and urinalysis.

Treatment Results
At the 2001 American Urological Association national meeting Zlotta, Giannakopoulos, and Schulman presented an abstract, which revealed 5-year followup data on 162 patients undergoing the TUNA procedure at two centers. Results of the study at 63 months indicated that mean urinary peak flows increased from 8.6 to 12.1 ml/second. IPSS decreased from 20.8 to 8.6. In addition, mean post-void residual volume decreased from 197 to 155 ml. Based on these findings, these authors concluded that TUNA is safe and effective and provides good long-term clinical improvement at 5-year followup. It stands the test of time with low and acceptable failure rates.

Summary
Transurethral needle ablation is one of the newer treatment alternatives to the traditional TURP. Because it can be performed under local anesthesia, with or without mild sedation, in an office or clinic, the nurse working in that setting should become knowledgeable about this new technique and the changing role and responsibilities it brings to office nursing. Office-based procedures such as this one provide an office nurse with the opportunity and challenge of providing a safe and comfortable environment. As more treatment modalities move to the office or clinic setting the office-nursing role will expand to meet these new needs.

References

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