Minimal Invasive and Invasive Therapy of BPH in the New Millennium

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BPH is the most frequent urologic problem in aging men, affecting 40–70% of men age 60–70 years, as judged by histopathological and clinical criteria. Over their life span nearly 80% of men will develop BPH, and nearly 30% will undergo surgery for their condition.

The pathophysiology of BPH is far from completely understood. Aging-associated proliferation of prostatic tissue leads to enlargement of the prostate gland, often causing obstruction of urine outflow and leading to clinical manifestations such as lower urinary tract symptoms (LUTS), detrusor instability, incomplete bladder emptying, urinary tract infection (UTI), and, in more advanced cases, acute urinary retention. Obstructive BPH is postulated to arise from two pathophysiologic components: a dynamic component mediated by smooth muscle tone in the prostate gland and a static component related to the enlargement of the gland.

In the more than 50 years since its introduction, transurethral resection of the prostate (TURP) has become well established as the standard definitive treatment for BPH, significantly ameliorating symptoms and improving voiding function. Nevertheless, this form of treatment is not successful in all patients, leading to unsatisfactory outcomes in up to 30% of cases. TURP-associated morbidity is not uncommon, including incontinence, erectile dysfunction, and retrograde ejaculation. Postoperative urinary retention requiring catheterization is also infrequent after prostatectomy, occurring in a reported 13% of patients. TURP is not a suitable form of treatment for some patients, either because they are poor surgical risks or are disinclined to undergo an invasive surgical procedure. In the U.S. the frequency with which TURP is performed appears to be decreasing, while use of alternative modalities is increasing.

Transurethral microwave thermotherapy (TUMT) has emerged as an attractive alternative to standard prostatectomy for benign prostatic hyperplasia (BPH). TUMT can be administered in a single 1 hr outpatient treatment session under local anesthesia. BPH patients experience significant improvements in their condition and quality of life, and treatment-associated morbidity is low.

The objective of TUMT is thermoablation of the obstructive prostatic tissue while maintaining innocuous temperatures in non-target tissues. Microwave radiation emitted from an intraprostatic antenna generates heat within the prostate gland, which if sufficient in magnitude and duration, leads to cell death. Circulation of coolant fluid through the treatment catheter during the TUMT session allows the procedure to be tolerated without general or regional anesthesia and also spares the urethra from thermoablation, as verified both by histopathologic examination and magnetic resonance imaging. The predominant pathologic findings after TUMT are uniform hemorrhagic necrosis and tissue devitalization without significant inflammation.

Significant differences exist between microwave treatment systems. These differences pertain to microwave antenna design, generated heating patterns and treatment protocol and need to be taken into account when evaluating results of various TUMT studies. TUMT was pioneered using the Prostatron microwave system (Technomed Medical Systems, Lyon, France), and this system has been by far the most extensively investigated. Recently, a “high-energy” modification of the Prostatron treatment protocol has been introduced, which is designed to provide enhanced treatment efficacy. This protocol is based upon a modification of the original Prostatron version 2.0 software to allow a maximum of 70 watts of microwave power to be applied during TUMT with use of the new Prostatron version 2.5. To date few studies have directly compared treatment responses between the high- and low-energy Prostatron protocols corresponding respectively to the version 2.5 and 2.0 software.

The more recently developed Targis microwave system (Urologix, Inc., Minneapolis, Minnesota, USA) and the Prostaland system (Lund Instruments AB, Lund, Sweden) have also been the subject of numerous investigations. Additional microwave treatment systems investigated in clinical trials to date include the Microthermer (Laser Electro Optics, London, UK), ECP (Comair, Stockholm, Sweden), Urowave (Dornier Medizintechnik GmbH, Germering, Germany), Prostarcare (Bruker Medical, Wissembourg, France), and Thermex-II (Direx, Petah Tiqva, Israel).

Certainly, TUMT has become a standard in the minimal invasive management of patients with lower urinary tract symptoms (LUTS) due to bladder outlet obstruction (BOO). Nevertheless, few issues remain controversial. Various technologies of microwave energy and delivery as well as the appropriate patient selection need to be defined. The purpose of the current issue is to allow the reader to compare various currently prominent TUMT systems and to be able to identify the optimal TUMT candidate. The authors are experts in the field and the data presented herein summarize the most current knowledge on TUMT and related issues.