Thermotherapy - An Alternate Minimally Invasive Treatment for BPH

Pages with reference to book, From 94 To 95

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Itis estimated that about one-third of all men will require treatment for the relief of symptoms due to benign prostatic hyperplasia (BPH)[1]. Surgical treatment of the prostate is effective and relatively safe. Although the mortality rate is low[2], morbidity is considerable[3-6] and this has given impetus to the search for a less mothid but effective treatment[7,8].

The management of BPH is in a state of transition. Transurethral resection of the prostate and open prostatectomy are no longer the only options available. Today, a variety of medical, minimally invasive and surgical approaches exist for the man with symptomatic BPH. In recent years, however, several less invasive treatments have emerged such as balloon dilatation, lasers, trans urethral micro-wave thermotherapy (TUMT) and trans-urethral needle ablation (TUNA), as well as non-invasive pharmacotherapy including alpha blockers and 5 alpha reductase inhibitor. Because the indications for treating men with BPH are relative rather than absolute, it is important to consult the patient. Those seeking treatment must be infonned of the potential benefits and, harms associated with each treatment. As for the range of therapies available, most are suitable for any person with moderate prostatism[9]. In 1866, Busch showed that malignant tissue was especially susceptible to heat[10]. Micro-waves have successfully been applied for cooking and in cellular phone technology. Now they are being used equally effectively for the treatment of BPH. The use of heat in the treatment of prostatic diseases has been advocated for over a century. In prostatic tissue there are several temperature thresholds; below 40°C cells are affected little, between 41 and 50°C malignant cells are more susceptible to permanent damage than benign tissue and this effect is termed hyperthermia, in the range 45-60°C cell death can occur and is defined as thermotherapy. Thermal treatment in excess of 70°C destroys all living human tissue and is termed as thermoablation[11].

Transurethral microwave thermotherapy (TUMT) is a highly-promising non-surgical alternative for the treatment of bladder out-flow obstruction in patients with BPH. TUMT has been studied by several investigators and the results are generally good[12]. One of the most widely used machines, the Prostatron (Technomed International), is used at 124 centers all over the World. TUMT can be performed as an in-office procedure in a single one hour session with the patient under topical anaesthesia only. The system is computer driven. It has two softwares: Prostasoft 2.0 and Prostasoft 2.5.

Prostasoft 2.0 raises the intra-prostatic temperatures to 45-50°C on average leading to significant improvements in BPH symptoms but with a limited impact on flow rate and relief of out-flow obstruction due to the limited extent of tissue destruction.

Prostasoft 2.5 raises the temperature of the transition zone of the prostate beyond 50°C. The high level of temperature reached combined with the large extent of tissue destruction in both the transition zone and the bladder neck area explain the significant objective improvement as measured in terms of flow rate and relief of obstruction.

The treatment applicator that is inserted into the patient contains microwave antenna, urethral cooling system, urethral fiberoptic temperature sensor and a rectal temperature probe. The micro-wave power is delivered in the range of 5-70 watts by means of a flexible antenna. The antenna is mounted ma 20 French urethral catheter which is surrounded by a jacket that has got cooling fluid in circulation. The

end of antenna catheter abuts on a known position in relation to a Foley - type balloon self retaining device. The system combines trans-urethrally administered radiating heat energy and conductive cooling also administered via urethra. This arrangement prevents damage to the urethral epithelium. The computer regulates the whole process and automatically reduces the energy applied when temperatures approach a pre-determined damage threshold.

Microscopic examination of tissue taken from suprapubic adenectomy specimens orTURP specimens obtained after TUMT has shown that soon alter treatment, a coagulation necrosis is produced in the center of the lesion and glandular and smooth muscle cells are destroyed. They are replaced by a network cellular pattern and the urethra is well preserved with a sharp transition from the treated to untreated area. From 1-2 months after treatment, scar formation is evident and there is no regeneration of the acini or smooth muscle cells in the center of the lesion. At that point bands of collagen and fibroblasts replace the treated area[13].

In all of the TUMT studies so far, 20-25% of the patients had urinaiy retention developed soon after treatment but it resolved within a period of 7-21 days. This happened because of transient edema of the prostate. There was also a low level of hematuria. Devonec13 has demonstrated that patients will tolerate trans- urethral thermal energy upto 45°C. Above this, thermal threshold patients experience treatment limiting discomfort. Baert et al[14] reported a 13% incidence of power limiting acute perineal pain in connectionwithhypertherniaof the prostate[15]. The cooling system is expected to reduce pain and bleeding by preserving urethral mucosal temperatures, whereas deeper within the prôstatic tissue high temperatures upto 80°C can be achieved which are actually tissue ablative.

A small number of patients have noticed transient alteration in ejaculatory function but these changes generally resolve by six months and there have been no reported cases of impotence after TUMT. Improvement both subjectively as well as objectively after TUMT was presented by Devonec to AUA in 1990[16]. Other studies have shown a significant and sustained response[17]. Symptoms in patients with BPH may improve (a) without any explanation of the underlying mechanism[18], (b) due to the placebo effect as shown inpharmacologic studies[19], (c) temporary effect of catheterisation[20]. The data is accumulating with the passage of time and this helps in defining and elaborating the selection criteria of patients for this treatment. Now it is possible to objectively identify which patient will respond best with this treatment. The attractiveness of this treatment remains as it is a single session, out patient office based procedure without the requirement of general anaesthesia. Indeed given the safety of this device and its effectiveness in select group of patients, its place is confirmed between medical and surgical alternatives for BPH[21].

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