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Neodymion YAG Laser in the Treatment of Prostatic Cancer

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Summary. Laser treatment associated with TURP is a new and promising approach for the curative treatment of localised prostatic cancer. In a study of five patients photocoagulation of the prostatic cavity has been achieved. Serious complications have not occurred and sexual function was not disturbed. Long term results are not yet available. We intend to continue this course of treatment and plan to carry out a prospective, randomised trial.

Key words: YAG-laser, Prostatic cancer.

Introduction

The Neodymion YAG laser can produce a non-contact form of photocoagulation of tissue with an accurate, predictable, depth of lesion [2–4].

The laser beam can be conducted down a fibre cable of quartz which permits its use in endoscopic surgery. In urology, the laser treatment was initially intended for bladder tumour destruction. In prostatic cancer transurethral resection of the prostate (TURP) makes it possible to remove the bulk of prostatic tissue; However, remnants of cancer tissue will frequently be left close to the capsule.

The Neodymion YAG laser gives an area of tissue destruction in the shape of a truncated cone down to a depth of 5 mm (Fig. 1). When TURP is combined with laser treatment the procedure may radically destroy prostatic cancer stage T1 and T2 and thus represent an alternative to conventional radical prostatectomy.

Material and Methods

From July 1981 five patients with prostatic cancer (age 59–75) have been treated with the Neodymion YAG laser (Messerschmidt-Bölkow

Fig. 1. Photomicrograph showing tissue destruction by YAG laser (*arrows*) in a cystectomy specimen surgically removed 24 h after laser treatment. To the left normal mucosa and muscle tissue with submucosal oedema and thrombosis

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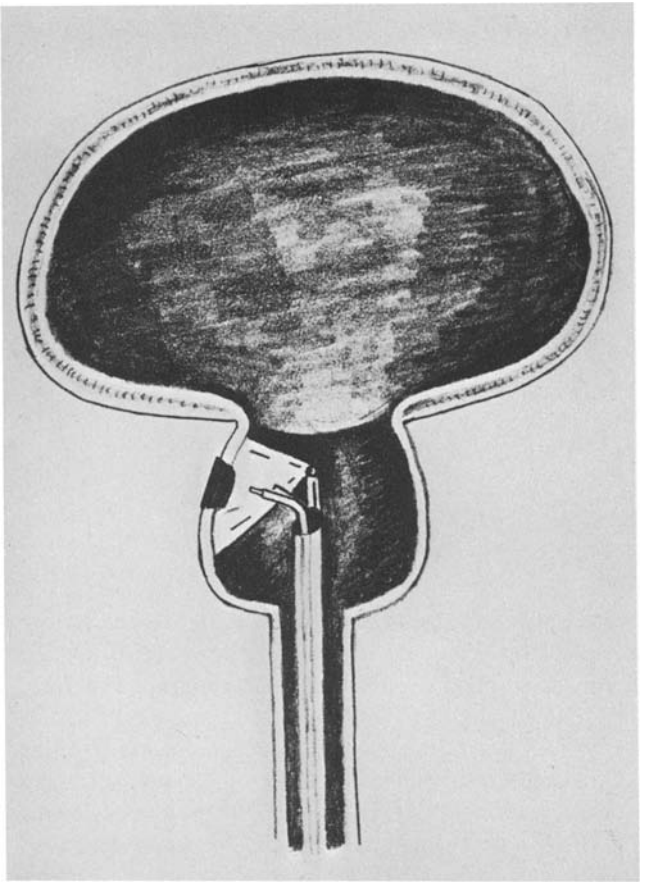

Fig. 2. Cytoscope with flexible laser light guide focused on the capsule wall of the prostatic cavity

and Blohm). Three patients were stage T1, two stage T2. All the patients had symptoms caused by enlargement of the prostate and objective signs of obstruction.

Initially, TURP was carried out extending to the capsule. Histologically, all five patients were classified as moderately differentiated adenocarcinomas. The laser treatment was carried out as a second step four to six weeks later. The operations were performed under spinal anaesthesia. The flexible laser light guide was introduced through a Wolf panendoscope size 21 Ch, with 70° telescope and an Alberran element that permits angulation of the laser light guide to 90° [1]. The laser is conducted by a red coloured pilot laser which was focused on the capsule wall (Fig. 2). Coagulation started at 6 o'clock at the bladder neck. Care was taken to avoid contact between the tip of the light guide and the prostatic cavity wall. The laser was activated intermittently by a foot pedal and the unit operated with 50–55 W and a duration of each pulse not exceeding 4 s.

The photocoagulation of the capsule area was achieved by slowly rotating the cable tip of the laser from 6 o'clock towards 12 o'clock on the right side and on the left side. Finally, the apical area was treated. The amount of energy required for photocoagulation of the whole cavity ranged from 7,000 up to 13,000 Joule, and the operating time was approximately 30 min.

Results

There was no bleeding during the laser procedure and no catheter was used postoperatively. The patients left hospital 1–3 days after the laser treatment. They had surprisingly little pain and only slight dysuria. Follow up includes: endoscopic forceps biopsy taken from the prostatic cavity, rectal examination and, if any mass is felt, thin needle biopsy, and finally investigations for possible metastases.

One patient had urinary retention the day after laser treatment and required catheterisation. We have so far not observed perforations, bleeding or infections.

Discussion

Radical prostatectomy is the only treatment generally accepted as curative in prostatic cancer stages T1 N0 M0 and T2 N0 M0. The fairly high incidence of complications and the loss of sexual function associated with the radical procedure makes it desirable to look for other methods of treatment.

The laser treatment combined with TURP represents a new approach which deserves further attention. This treatment seems so far not to have serious complications. Sexual function can be preserved and the period of hospital stay is drastically reduced when compared to radical prostatectomy. The procedure can be carried out also in patients of advanced age and even in the presence of concomitant diseases. Theoretically TURP and the laser treatment can be carried out in one operation. However, any bleeding caused by TURP will reduce the efficiency of the laser and make it difficult to be certain that the expected energy really penetrates into the deeper part of the tissue. This is the reason for introducing the treatment in two separate steps.

The first step, TURP, should preferably be done by an experienced "capsule hunter" and it is essential that the prostatic cavity is left with an even wall.

The second step, the laser treatment, must be performed under optimum vision and it is mandatory to have a working element that permits proper angulation of the laser light guide. If the prostatic cavity is narrow there is a smaller area to photocoagulate, but on the other hand it becomes more cumbersome to direct the laser beam without touching the wall.

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References

1. Hofstetter A, Frank F (1979) Ein neues Laser-Endoskop zur Bestrahlung von Blasentumoren. Fortschr Med 97:232
2. Halldórsson T, Langerholc J (1978) Thermodynamic analysis of laser irradiation of biological tissue. Applied Optics 17–24:3948
3. Staehler G, Hofstetter A, Schmiedt E, Keiditsch E, Gorisch W, Weinberg W (1978) Zerstörung von Blasentumoren durch endoskopische Laser-Bestrahlung. Dtsch Ärztebl 12:681
4. Staehler G, Halldórsson T, Langerholc J, Bilgram R (1981) Endoscopic applications of the Nd YAG laser in urology: Theory, results, dosimetry. Urol Res 9:45

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