

Full Length Research Paper

Transurethral photoselective vaporization: A safe and effective treatment for glandular cystitis

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To evaluate the clinical efficacy and safety of transurethral photoselective vaporization in the treatment of glandular cystitis, 125 cases with glandular cystitis were treated with transurethral photoselective vaporization from 2004 to 2010. The patients' hospital records were reviewed to obtain pre-operative, intra-operative and post-operative data. All the patients were diagnosed with glandular cystitis through pathological biopsy before or during their operation. All the patients were also operated on successfully. Mean operating time was 22 min and mean post-operative hospital stay was 4 days. Obturator nerve reflux, vesical perforation or transurethral resection syndrome were not found. After vaporization, every patient had a urethral catheter indwelling for 1 to 5 days without the need for bladder irrigation. All cases were followed up for 6 to 24 months, of which 123/125 (98.4%) cases were cured and 2/125 (1.6%) cases showed recurrence during this follow-up period. Therefore, transurethral photoselective vaporization is a safe and effective strategy for the treatment of glandular cystitis.

Key words: Transurethral photoselective vaporization of prostate (PVP), glandular cystitis (GC).

INTRODUCTION

Glandular cystitis (GC) is a special type of inflammation in the urinary system with the tendency to malignant change (Lancelin et al., 2000). It is the most common disease in the trigone region of the bladder, but may be extensive. GC may cause irritative symptoms, hematuria and rarely hydronephrosis, and it may be associated with chronic irritation of the bladder following catheterization, stones or inflammation. Widespread GC is seen in bladder extrophy, neurogenic bladder and in association with pelvic lipomatosis. At present, several clinical treatment options are available for patients with varying clinical outcomes. Currently, photoselective vaporization of prostate (PVP) is widely applied to treat benign prostatic hyperplasia (BPH) both in China and abroad, but it is seldom applied in the clinical practice for glandular cystitis and no record exists in the literature to guide its use in patients of glandular cystitis.

Since August 2004, Professor Shan Yuxi et al. (Shan et

al., 2006) began to use the green light laser for treatment of benign prostatic hyperplasia in our hospital and achieved favorable results. Meanwhile, Yang et al. (2008) treated superficial bladder tumor by using this technology and also achieved satisfactory curative efficacy. Based on these results, we tried to use green light laser in the treatment for glandular cystitis. Since 2004, we have been trying a novel treatment of glandular cystitis by means of transurethral photoselective vaporization technology, which is reported herein.

PATIENTS AND METHODS

The group of patients included a total of 125 (50 males and 75 females) with the age range from 35 to 70 years (42.4 on average) and the course from 1 to 24 months (6 months on average) from January 2004 to January 2009 (Table 1). Glandular cystitis was clinically characterized by urinary irritation (70 patients) and hematuria (55 patients) with the urine routine showing WBC++~++++ and RBC++~++++, and it failed to respond to the anti-infection therapy; gross and microscopic hematuria occurred in 55 patients and superpubic discomfort in 35 patients among whom 16 patients had been found with bladder masses through B-

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Table 1. Baseline characteristics of patients.

Characteristic	Number (Average)	Characteristic	Number	
Patients	Male	50	Classification	125
	Female	75	Nipple type	18
Age	35 – 70 years (42.4y)	Edema type	65	
Course of disease	1 - 24 m(6m)	Chronic inflammation type	42	
Clinical symptoms		Location	125	
		Trigone	80	
Urinary irritation	70	Later Wall	30	
Hematuria	55	Ureteral orifice	15	
Superpubic discomfort	35			
Recurrent	20			

ultrasound diagnosis, while 20 patients with recurrent symptoms after transurethral resection of bladder tumor (TUR-BT); 80 patients had lesions located in the trigone of bladder, 30 in the lateral wall of the bladder and 15 around the ureteral orifice. As for endocystitis, 18 patients had lesions of nipple type, 65 of edema type and 42 of chronic inflammation type. All patients were diagnosed with glandular cystitis through pathological biopsy before or during an operation excluding bladder carcinoma. This study has been approved by ethics committee in our hospital and has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

Operative technique

All patients were placed in the dorsal lithotomy position under spinal anesthesia, and gentle cystoscopy with a 22-F laser cystoscopy was undertaken before introducing the laser fibre (Green light laser system). The green light laser therapy system (American Laserscope Company) was used with an adjustment of vaporization power of 30~50W. Sterilized, distilled water was used to rinse the bladder under the low pressure with the side-glowing optical fiber inserted into the specific side hole for photovaporization glass with 1 to 2 cm out of the glass.

The marker and aiming light on the optical fiber head adjusts the position of light spots, thus aligning them with the lesion location to start the laser. The surface of the lesion from its base to the submucosa is vaporized; for patients with wide and severe lesions, vaporization reaches deep into the shallow muscular layer and the bladder mucosa with a distance of 2 cm to the lesion margin, and the bleeding will cease completely. For patients with lesions around the ureteral orifice, insert the ureteral catheter or double J tubes, vaporize the lesions, and remove the ureteral catheter or double J tubes after 24 h or 1 month of the operation. Then, dilute 20 mg mitomycin or hydroxycamptothecin (HCPT) to 40 ml, and inject it under the wound surface fundus and mucosa on the margin of lesions. Catheterize the patients for bladder irrigation once a week (Total: eight times), and then once a month (Total: ten times). After three months of the operation, re-examine the cystoscope (once every three months) and take biopsies from multiple points randomly.

Curative criteria

If the symptom disappears, the bladder mucosa becomes smooth or "Normal" is marked in the biopsy report; this indicates that the patient is cured completely (Valid); if the symptom disappears

basically with an occasional urinary irritation, the mucosa becomes normal or inflammatory disease occurs, it indicates that the patient has recovered adequately (Valid); if the symptom shows no improvement or reappears after a continuous change, or no improvement occurs with the cystoscope reexamination and biopsy, it indicates that the patient is not cured (Invalid).

RESULTS

Green laser surgery was performed on 125 patients with the procedure taking 15 to 40 min for completion. The mean operating time was 22 min, with operating time recorded from the time of cystoscope insertion to urinary catheter placement. The laser time as recorded by console, refer to the cumulative time spent with the foot depressed on the pedal to activate the laser. The average laser time was 18 min (range 10 to 35 min) (Table 2) and the mean applied energy was 40 kJ (range 33 to 56 kJ). The total patients required a fibre to complete the operation respectively. In this group, none had suffered from vesical perforation, obturator nerve reflex, transurethral ureterorenoscopy (TURS) and damaged ureteral orifice.

The patients were catheterized for 1 to 5 days after the operation with 18-20Ch Foley catheter and no patient needed bladder irrigation. Their symptoms should improve or disappear after the removal of the catheter. The complication was mild: 3 cases (2.4%) appeared frequency and urgency but it was better than their condition before operation. Their symptoms disappeared after the removal of the double J tubes. No patient showed discomfort symptoms such as hematuria. Moreover, it took us 6 to 24 months to follow up 125 cases among whom 117 cases (93.6%) were cured completely with 6 cases (4.8%) cured adequately and 2 cases (1.6%) with recurrent symptoms because of the failure in bladder irrigation on a regular procedure. One hundred and three patients achieved a satisfactory therapeutic effect and no symptom recurred. However, 2 recurred cases underwent operation with PVP again and

Table 2. Intra and postoperative data of patients.

Data	Number (Average)
Operative time	15 – 40 m(22 m)
Laser time	10 – 35 m(18 m)
Energy consumption	33 - 56 kJ(40 kJ)
Catheterization time	1 – 5 days (2.6 days)
Hospitalization time	3 – 7 days (4.5 days)
Follow time	6 – 24 m
Complication case	3/125 (2.4%)
Cure rate	123/125 (98.4%)
Recurrence rate	2/125 (1.6%)

no recurrence is found at present.

DISCUSSION

Glandular cystitis is a unique form of inflammation in the urinary system. Although the etiology of glandular cystitis remains unknown, a cause has been postulated that chronic stimulation of the bladder mucosa and chronic inflammation due to urinary tract infection may lead to the over productive changes in the mucosal cells and glandular metaplasia of transitional epithelial cells (Semins and Schoenberg 2007). Why and how is it different from other types of urinary inflammation? At present, its pathogenesis has not been established. Previous studies (Ma, 2001; Zhang et al., 1995; Young and Livac, 1996) have suggested GC may be a mucosal proliferative lesion and antibiotic treatment is typically ineffective. The occurrence of GC may be related with chronic stimulation such as bladder infection, obstruction, virus (Wu et al., 2005), calculus, some obstetrics and gynecology factors (Delnay KM et al., 1999) and it has malignant change tendency and so it is usually deemed as the precancerous lesion to the bladder cancer (Lancelin et al., 2005; Hochberg et al., 2001; Pantuck et al., 2002; Bryan et al., 2003). In view of this, it must be paid more attention in the clinical field (Pantuck et al., 1997; Zhou et al., 1997; Liu et al., 2003).

At present, there are various treatment options for glandular cystitis, including bladder mucosa dissection, partial cystectomy and bladder irrigation. In recent years, along with the renovation of surgical methods, innovation of minimally invasive surgery and endourology as well as clinical application of various advanced facilities, some surgical methods are widely used in glandular cystitis, such as transurethral resection, vaporization resection, Nd:YAG laser and holmium laser burning of cervix. With a wavelength of 532 nm, KTP laser is a green light in the visible portion, it is colloquially called green light laser. Since KTP laser can be selectively absorbed by hemoglobin in tissue, it is also called selective light. Generated by extracorporeal laser and imported to treated position through special optical fiber, KTP laser

has a vaporization depth of only 0.8 mm and can close blood vessels instantly. With favorable curative efficacy in treatment for prostate hyperplasia, it has been widely applied to minimal invasive treatment of prostate hyperplasia (Sarica et al., 2005; Sandhu et al., 2004; Te et al., 2004).

In BPH patients, many studies (Tugcu et al., 2008; Tasci et al., 2008; Rajbabu et al., 2007; Ruszat R et al., 2006; Bouchier-Hayes et al., 2010; Skolarikos et al., 2008) indicated that PVP has been shown in every comparison so far to be superior to TURP or open prostatectomy with regard to blood loss, shorter catheter indwelling time and hospital stay. At present, although many publications are available reporting on PVP treatment in patients with BPH, the present study may be the first to deal solely with patients with glandular cystitis. The research proved that compared with other treatments, PVP has the advantages of short operation time, simple usage, few bleeding, no obturator nerve reflex, no bladder perforation and no TURP, so it largely reduces the operation risks for patients with cardiovascular disease and diabetes and the patients of oral anticoagulation. In addition, short indwelling urethral catheterization time, no bladder irrigation and quick recovery after operation shorten the length of hospital stay. For patients with a wide range of pathologic changes, green light laser forms a frozen layer in the tissue surface while vaporizing, which effectively restricts tissue bleeding, creates a bloodless environment for operators, decreases pathologic change residues and reduces recurrence rate after operation. Besides, due to its slight degree of tissue penetration and vaporization, the operated position heals fast and the rate of bladder irritation symptoms after operation is tremendously reduced. In the group of patients treated, nobody had irritation symptom of bladder or secondary bleeding after the catheter removal.

For diffuse glandular cystitis involving ureteral orifice, transurethral resection is frequently used now. However, this method is difficult to learn and has many complications, including bleeding, damage to the obturator nerve reflex and bladder perforation. Thus, for the lesion with wider range, recurrent and invade ureteral orifice accompanied by unilateral or bilateral hydronephrosis, the effect of transurethral resection is not very satisfactory, which limits its application in the treatment of glandular cystitis (Malek RS et al., 2000). Green light laser has the features of slight tissue penetration (0.8 mm), reducing heat injury to surrounding tissues and resection of disease tissues. Additionally, there is minimal injury to the ureteral orifice, and reduction of vesico-ureteral reflux and hydronephrosis rate. To avoid ureteral injury during operation, double J tubes can be indwelled in advance to resect sick tissues through vaporization along this catheter, which can effectively prevent ureter injury and markedly reduce occurrence of hydronephrosis. In 15 patients in this group, there was no ureter injury, positive postoperative recovery and no

reported recurrence during the follow-up period.

The present study has shown that for patients with glandular cystitis, PVP is very safe, gives excellent relief from symptoms and provides a new treatment method for glandular cystitis. As a safe and efficient minimal invasive treatment, it has simple operation, reduced bleeding, slight tissue penetration and no perforation. Moreover, periodic bladder instillation after operation can effectively prevent pathologic changes and recurrence, restrain malignant changes and improve life quality.

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