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Clinical study of acupuncture combined with solinaxin in the intervention of bladder spasm after TURP in the elderly

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Abstract: *In this study, 60 cases were selected from the Department of Urology of the Affiliated Hospital of Shaanxi University of Traditional Chinese Medicine from January 2019 to June 2021 for TURP treatment of prostatic hyperplasia, and were randomly divided into the control group and the experimental group, 30 cases in each group; the control group took oral Solinasin succinate tablets 5mg/times for 1 time/d on the same day of the postoperative period, and the drugs were stopped after the catheter was removed for 3d; the experimental group used millipercentre needles to stab jointly on the basis of the control group. The experimental group used millipercentre needling based on the control group to stab the acupoints such as Secondos, Zhongyi, Guanyuan, Sanyinjiao, etc., and the needles were left in place for 30 min after getting qi for 5 min. The results showed that the experimental group was lower than the control group in terms of the number of bladder spasms, duration, bladder flushing time, and bladder flushing fluid turn clear time in the 24h, 24-48h, and 48-72 h postoperative period ($p<0.05$). It was finally concluded that acupuncture combined with solinacin could more effectively relieve the symptoms of bladder spasm after TURP.*

Keywords: *Solinazine succinate; Transurethral resection of prostate; Bladder spasm; acupuncture*

1. Introduction

Benign prostatic hyperplasia (BPH) is one of the more common causes of lower urinary tract symptoms (LUTS) in middle-aged and elderly men[1]. In the early stage of the disease, compensatory hypertrophy of local bladder muscles may occur to compensate for the weakness of contraction, so the clinical manifestations are not enough to prompt the patients to seek medical treatment; however, with the increasing size of the prostate and the loss of compensation of bladder muscles, the clinical manifestations of its dysfunction in the urinary storage phase (urinary frequency, urgency, etc.) are more and more prominent, and usually accompanied by the symptoms of the voiding phase (progressive difficulty in urination, thin and weak urine, etc.) and the symptoms of the postvoiding phase (incomplete discharge, etc.), and some patients may be accompanied by the symptoms of small bowel movements, which may be associated with the symptoms of the lower urinary tract.), some patients may be accompanied by abdominal swelling or lumbosacral pain and other manifestations, and in severe cases, acute urinary retention may occur due to sympathetic excitation caused by cold, prolonged urinary holding[2]. The incidence of prostatic hyperplasia and its lower urinary tract symptoms increases with age; according to statistics, there are nearly 210 million prostatic hyperplasia patients in the world, of which more than half are men over 50 years of age, and when the patient reaches 80 years of age, about 80% of the patients may have lower urinary tract symptoms[3].

At present, transurethral resection of prostate (TURP) is still recognized as the "gold standard" in the treatment of benign prostatic hyperplasia (BPH)[4] , and it is suitable for most BPH patients; however, long-term clinical observation has revealed that the probability of postoperative complications is high, and bladder spasm is the main symptom, which seriously affects patients' quality of life. However, long-term clinical observation shows that postoperative complications are more likely to occur, and bladder spasm is the main symptom, which seriously affects patients' postoperative quality of life. Therefore, the present study proposes to utilize acupuncture combined with solifenacin succinate for the treatment of postoperative bladder spasm after TURP and observe its clinical efficacy, with the aim of providing patients with safer and more effective therapeutic measures.

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1.1 General information

60 cases of TURP-treated elderly patients with benign prostatic hyperplasia admitted to the Department of Urology at the Affiliated Hospital of Shaanxi University of Traditional Chinese Medicine from January 2019 to June 2021 were selected for clinical observation and treatment. Before the beginning of this study, the patients and their families were fully communicated with and informed of the possible adverse reactions, and all of them indicated that they were informed of the program and content of this study and signed the consent form. In this study, the patients were randomly divided into: (1) control group, (2) observation group (n=30) using the randomized numerical table method. After analyzing, there was no statistical difference between the patients in the control group and the experimental group in the following aspects (p>0.05). See Table 1 for details.

Table 1 Comparison of basic clinical data between the two groups(x±s,n-30)

Items	Experimental Group (30 cases)	Control group(30 cases)
Age (years)	69.50±6.34	68.60±8.32
Preoperative Quality of life score (score)	4.51±1.46	4.92±0.58
Preoperative international Prostate symptomatology score (score)	24.40±4.69	25.84±4.47
Preoperative indwelling urinary catheter (%)	25.0	30.0
Unstable bladder before surgery (%)	20.0	15.0

Note:experimental group compared with control group,p>0.05.

1.2 Inclusion criteria

The relevant diagnostic criteria in the 2019 edition of "Surgical Management of Lower Urinary Tract Symptoms Caused by Benign Prostatic Hyperplasia (Revised)"[5] and the 2014 edition of the "China Diagnostic and Therapeutic Guidelines for Urological Diseases"[6] were met: (1) Elderly male patients in the age range of 63-80 years old; (2) Patients who had already been diagnosed with benign prostatic hyperplasia (BPH); (3) recurring symptoms of bladder irritation in the storage phase such as urinary frequency and urgency, which were not satisfactorily treated with medication and had been treated with TURP; (4) informed consent and signing of a consent form for the surgery; (5) informed consent to the study protocol and its contents and other contents; (6) the ability to carry out the treatment program in accordance with the doctor's instructions and to provide timely feedback on the effectiveness of the treatment, and good adherence.

1.3 Exclusion criteria

(1) patients with contraindications to anticholinergic drugs and psychiatric disorders, serious allergic reactions; (2) urodynamic suggestive of forced urethral muscle weakness; (3) the presence of obvious abnormalities in liver and renal function or the combination of other serious diseases; (4) the combination of prostate tumors[7] ; (5) the presence of serious preoperative urinary tract infections; (6) the patients with the combination of neurogenic urinary diseases; (7) patients who can't complete the follow-up treatment in accordance with the established protocols. Patients who completed the follow-up treatment.

1.4 Methods

(1) The control group was given oral (Vesicare) Solynasin Succinate Tablets [Astellas Pharma (China) Co. Ltd., National Pharmaceutical Standard J20140096, Specification: 5 mg] for treatment on the day of postoperative as the first day of treatment, 5mg/times, 1 time/day in the morning after meal; the catheter was left in place for 3-6d postoperatively, and the medication was taken until the urinary catheter was removed; (2) The experimental group was given acupuncture and moxibustion combined treatment on the basis of the control group. Acupuncture points were selected to be subsinosus, zhongji, guanyuan, and sanyinjiao; patients were instructed to take the sitting position, and the skin around the site of acupuncture was routinely sterilized; zhongji and guanyuan were needled with 1.5-3cm millimillimeter needles tilted to the lower abdomen at a 30°-45° angle, and the qi was obtained, then the needles were twisted and rowed to the extent that the needle sensation was transmitted to the perineum, bladder, or urethra, etc., and the needles were left in place for 30min, once/d; subsinosus and

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sanyinjiao were straightly needled for 1-1.5cm, and the qi was obtained. After the qi is gained, the needle is tonified and cathartic for 5min, and the needle is left for 30min, 1 time/d; 7d/course of treatment.

1.5 Observation indexes

(1) In the three time intervals of 24h, 24-48h and 48-72h after the operation, compare the control group and the experimental group in the number of bladder spasms and the average duration of episodes, the time of bladder flushing fluid clearing, and the time of catheter removal, which are the four main indexes of the study. (2) During the postoperative treatment period, the occurrence of adverse reactions in the control group and the experimental group were compared, mainly including an increase in the number of urination, suprapubic region (lower abdomen) pain, sudden deepening of the flushing fluid or accompanied by bloody flushing fluid, leakage or reflux of the flushing fluid (catheter obstruction should be ruled out first).

1.6 Statistical methods

Data processing and statistical analysis were carried out at the end of the study using SPSS25.0 statistical software introduced by IBM, and the measurement data were expressed by ($\bar{x} \pm s$) and t-test was used, and the comparison of the count data between the groups was carried out using the$\chi 2$ test, and the final result of the difference was taken to be statistically significant at $p<0.05$.

2. Results

2.1 Comparison of the number of postoperative bladder spasms and the average duration of episodes According to the data

The number of bladder spasms in the experimental group was less than that in the control group in the three postoperative time intervals of 24 h, 24-48 h, and 48-72 h. The average duration of episodes of bladder spasms in the experimental group was shorter than that in the control group during all the time intervals. The differences between the data of the above two groups were statistically significant ($p<0.05$). For details, see Table 2.

Table 2 Comparison of the frequency and duration of postoperativebladder spasm between the two groups(x±s,n=30)

Postoperative duration	Experimental group(n=30)		Control group(n=30)	
	Number of spasms (times)	Duration(h)	Number of spasms (times)	Duration(h)
24h	1.08±0.42	0.16±0.05	2.54±0.68	0.20±0.15
24-48h	0.96±0.73	0.13±0.08	2.98±0.32	0.65±0.21
48-72h	0.71±0.65	0.13±0.11	1.94±0.43	0.47±0.23

Note:Compared with the control group,the experimental group was $p<0.05$.

2.2 Comparison of postoperative bladder flushing fluid turn clear time and catheter removal time According to the data

The experimental group's postoperative bladder flushing fluid turn clear earlier than the control group; the experimental group's postoperative catheter removal earlier than the control group. The differences between the above two groups of data are statistically significant ($p<0.05$). See Table 3 for details.

Table 3 Comparison of the time of bladderflushingfluid transfer and the time of catheterremoval between the two groups(X±s,n=30)

items		Experimental Group(30 cases)	Control group(30 cases)
Bladder flushing	time(d)	2.81±0.42	3.85±0.93
Catheter removal	time(d)	3.95±0.56	4.28±0.35

Note:The comparison between the experimental group and the control group was $p<0.05$.

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3. Discussion

At present, BPH is an extremely common disease in urology clinical diagnosis and treatment, and has gradually become a common problem in the social life of middle-aged and old-aged men, and therefore has been highly concerned by social families and urologists. Modern medical research on the pathogenesis of BPH has not yet reached a clear conclusion, and it is currently believed that its etiology is closely related to poor blood pressure control, lipid metabolism disorders, insulin resistance, sex hormone metabolism abnormality, chronic prostatitis, high expression of local growth factors and other pathological factors and bad lifestyle habits such as smoking and drinking[8]. Based on the above etiological studies, the current medical treatment of BPH is mainly directed at treating the cause of the disease and relieving bladder irritation, but the drug treatment has the shortcomings such as large side effects, difficult to individualize the therapeutic dosage, and unsatisfactory long-term efficacy, etc.[9] , therefore, the current clinical medical treatment needs to be comprehensively evaluated in order to avoid delaying the timing of the surgery.

TURP is still the "gold standard" in the treatment of BPH[10] , which is widely used in clinical practice and its efficacy has been recognized by the academic community, and can effectively relieve the symptoms of bladder outlet obstruction, but its postoperative complications should not be ignored, and cystinosis is one of the common and obvious postoperative complications[11]. According to the statistics, the incidence of bladder spasm after TURP without drug and physical therapy intervention can reach 40%-60%[12] , and its clinical manifestations are mainly the persistent swelling and pain in the suprapubic area, frequent urge to urinate, urinary drainage, etc., and in severe cases, even hematuria, accelerated heart rate, fatigue, cold and clammy skin and other manifestations of hypovolemic shock[13]. At present, for the study of TURP postoperative bladder spasm, the following points of view have been put forward: ① continuous and frequent mechanical stimulation during the operation to damage the local mucosa prompted the contraction of the bladder muscle contraction; ② postoperative retention of the balloon or catheter compression of the bladder neck, caused by sympathetic excitation; ③ postoperative flushing of the bladder temperature, pressure changes induced by the contraction of the local muscle contraction; ④ postoperative patients with difficulty in urination to aggravate the psychological burden, and at the same time, bladder spasm caused by severe pain, gradually forming a vicious circle. Intense pain, gradually forming a vicious circle[14]. At present, clinical treatment for bladder spasm after TURP is mostly symptomatic, i.e., timely release of local muscle involuntary contraction, and the use of drugs such as dulcolax (pethidine hydrochloride injection) and ghrelin (diazoxide injection) to block the local sympathetic nerves, which can provide some relief of spasm, but cannot effectively improve the frequency and duration of bladder spasm.[15]. Several studies have confirmed that the occurrence of bladder spasms is closely related to the excitation of cholinergic receptors in the bladder sphincter[16] , and solifenacin, as a highly selective blocker of muscarinic type 3 cholinergic receptors, can rapidly relieve the excessive contraction of the smooth muscle and achieve the effect of relieving bladder spasms after the application of solifenacin[17-20]. However, its efficacy still has individual variability, and anticholinergic reactions such as dry mouth, constipation, blurred vision, etc. occur to varying degrees[21] , and there is an urgent need to find a therapeutic tool with good efficacy and fewer adverse reactions. Therefore, exploring the application of acupuncture therapy for the treatment of bladder spasms has been gradually emphasized by the Chinese and Western medical communities.

The efficacy of acupuncture in treating bladder spasms has been effectively proven. Acupuncture therapy has a bi-directional regulating effect on the peripheral nerves of the bladder as well as the related regulatory center. Acupuncture can effectively inhibit the contraction of the bladder sphincter muscle through acupuncture points corresponding to the nerve segments, so that it tends to restore the normal function of the activity[22]. Chinese medicine believes that the physiological functions of the bladder include the storage and excretion of urine, which belongs to the kidneys through the meridians and veins, and are mutually exclusive[23]. During TURP, the local area needs to be filled with a large amount of saline to ensure that the surgical field is clear, and after the operation, it is still necessary to resort to bladder flushing to locally stop bleeding, expel clots, and prevent the catheter from re-obstructing, and the process can take away a large amount of heat, which is equivalent to the "impaired yang qi" in Chinese medicine. This process can take away a lot of heat energy, which is equivalent to the concept of "damaged yang qi" in traditional Chinese medicine. Damaged yang qi, yang deficiency is cold, cold stagnation and blockage of local meridians will be pain[24]. It can be seen that postoperative bladder spasms are mainly located in the bladder, which is closely related to the kidney, and the pathogenesis is based on deficiency of kidney yang and failure of bladder qi, so in the process of clinical treatment, the acupoints of Jiosioso, Zhongji, Guanyuan, and Sanyinjiao are selected

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for acupuncture[25]. The first principle of acupuncture treatment is "where the acupoints are located, where the main treatment can be applied". Zhongji and Guanyuan are located in the lower abdomen in front of the body, belonging to the Ren vein and locally close to the bladder. The acupoints themselves are capable of cultivating the vital energy and tonifying the lower jiao, warming the bladder and facilitating bladder qi to promote the discharge of urine; furthermore, Zhongji is the recruitment point of the bladder, which is the place where the qi and blood of the bladder converge, and has an outstanding therapeutic effect on bladder disorders. The point is located in the lumbosacral region behind the body (the second post-sacral foramen) and belongs to the bladder meridian and can communicate with the bladder in the forward direction, thus helping the bladder to restore qi; at the same time, acupuncture on the point can stimulate the lumbosacral nerves to regulate the activity of the sphincter muscle of the bladder. Sanyinjiao is a meeting point of the three meridians, Taiyin, Syncope and Shaoyin, which can regulate the liver and kidney, tonify qi and blood, and regulate the water channel. The points are combined to relieve symptoms of bladder spasm[26-27].

4. Conclusions

In this study, the effectiveness and safety of acupuncture combined with solinacin succinate in intervening in postoperative bladder spasm after TURP was strongly demonstrated through long-term clinical observation, and the frequency of postoperative bladder spasm of patients in the experimental group was significantly reduced compared with that of the control group, and fewer adverse reactions appeared, which was more obvious than the effect of solinacin succinate applied alone. At the same time, acupuncture therapy can improve the function of urination-related nerves and restore the physiological function of urination-related muscle tissues to a certain extent, which effectively reduces the pain of patients and improves the clinical efficacy. Although the mechanism of action of acupuncture therapy still requires in-depth study, the combined treatment proposed in this study is still worth affirming and promoting.

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