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Original Article

Study on safety of transurethral PKRP in the treatment of benign prostatic hyperplasia combined inguinal hernia in elderly patients

Yu Su, Yi Qin, Jie Liu, Yu Zheng, Xing Zhou

Department of Urology, The Second Affiliated Hospital of Guangzhou Medical University, Guangzhou Medical University, Guangzhou, China

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Abstract: Objective: To investigate the efficacy of transurethral plasmakinetic resection of the prostate (PKRP) in the treatment of benign prostatic hyperplasia with inguinal hernia. Methods: The retrospective analysis was carried out in 80 patients with benign prostatic hyperplasia combined inguinal hernia in our hospital from May 2014 to 2016. There were 32 cases in PKRP, the other 48 cases in transurethral vaporization of the prostate (TUVP). Statistical analysis was performed based on the operation time, intraoperative bleeding volumes, postoperative indwelling catheter time, hospitalization time, intraoperative blood transfusion and postoperative complications of the patients respectively in the two groups. Results: The average operative time of PKRP vs that of TUVP was (106.6±36.2) min vs (124.4±40.2) min; the intraoperative bleeding volume of PKRP vs that of TUVP was (335.4±80.2) ml vs (428.8±82.9) ml; indwelling time of urinary catheter of PKRP vs that of TUVP was (4.8±1.2) d vs (7.2±2.0) d; postoperative hospital stay of PKRP vs that of TUVP was (5.4±1.8) d vs (7.2±2.0) d. There were 2 cases with postoperative blood transfusion and postoperative dysuria in PKRP, and 5 in TUVP; no postoperative hernia recurrence in PKRP group, and 2 cases in TUVP. The differences of the operation time, intraoperative bleeding volume, postoperative indwelling catheter time, hospitalization time, intraoperative blood transfusionin the two groups were statistically significant ($P<0.05$). However, the difference of two groups' postoperative complications of the patientswas no statistical significance ($P>0.05$). Conclusion: Transurethral PKRP is safer in the treatment of benign prostatic hyperplasia combined inguinal hernia.

Keywords: Transurethral PKRP, benign prostatic hyperplasia combined inguinal hernia, safety

Introduction

Both benign prostatic hyperplasia, a surgical urinary disease, and inguinal hernia, a general surgical disease, are commonly seen in clinic, which have extremely bad effects on the life quality of the elderly male patients [1]. The prostates of elderly men are characterized by the loose and weak abdominal wall muscle, transverse fascia, as well as low strength of abdominal wall, which hence makes the normal entrapment mechanisms easily weakened or lost [2]. Benign prostatic hyperplasia is the most common benign disease that causes the urination disorders of the middle-aged and elderly men, and it can also cause the elongating and stricture of the posterior urethra under the gland function of hyperplastic prostate. In this case, benign prostatic hyperplasia patients are easily invaded with inguinal hernia. Therefore, before the inguinal hernia operation, if the surgeon only performs the operation without effectively handling the benign prostatic hyperplasia, the recurrence rate of mesh plug tension-free herniorrhaphy will rise [3]. Recently, many methods were adopted clinically to treat the benign prostatic hyperplasia, such as traditional open operation, transurethral vaporization of the prostate (TUVP), transurethral resection prostate (TURP), transurethral plasmakinetic resection of prostate (PKRP), laser therapy and so on. The traditional open operations represented by suprapubic transvesical prostatectomyhave become the classic operation method to treat the benign prostatic hyperplasia with the continuous progress [4]. In the recent years, due to the rapid development of transurethral surgery and increasingly matured technologies such as TURP and PKRP, the transurethral surgery has replaced traditional open operation [5]. Therefore, this study analyzes the effect of PKRP combined with mesh plug tension-free herniorrhaphy in the treatment of benign prostatic hyperplasia combined inguinal hernia, and reports are as follows.

Materials and methods

General information

The retrospective analysis was carried out in 80 patients with benign prostatic hyperplasia combined inguinal hernia in our hospital from May 2014 to 2016. There were 32 cases in PKRP, the other 48 cases in TUVP. The selected clinical data were performed with retrospective analysis. Inclusion criteria: Patients diagnosed as benign prostatic hyperplasia by rectal examination and B-ultrasound before operation and confirmed by pathological sections of prostate after operation; patients provided informed consents. Exclusion criterion: Patients had neurogenic bladder dysfunction (NBD), carcinoma of prostate or other diseases; patients aged from 65 to 77 years old with the average age of 71.4±5.4 years old and their international prostate symptom scores (IPSS) ranged from 11 to 35 with the mean score of 23.5±3.6. In the light of prostate proliferative indexes, there were 9 cases in degree I, 14 in degree II, and 9 in degree III. In terms of hernia classifications, 7 cases belonged to type I, 9 cases type II, 12 cases type III, and 4 cases type IV. This study was approved by the Ethics Committee of our hospital.

Methods

With continuous epidural anesthesia, patients were firstly treated with mesh plug tension-free herniorrhaphy, and the polypropylene mesh produced by Bard Company (the USA) was used. Patients lay in a supine position, and a parallel incision about 5 cm was made in inguinal region. The skin and hypodermia were cut, the external inguinal ring found, the external oblique aponeurosis cut and separated. Then, hernial sac was found to highly free and returned afterwards. In principle, it was not necessary to open the hernial sac, and we only needed to fill mesh plug in the internal ring, which was then sutured interruptedly and fixed. Then the plain film was placed below the spermatic cord and was fixed around by interrupted suture, and all the layers of the incision were sutured in sequence.

PKRP: To protect the incision, patients were changed into lithotomy position. Then they were given the transurethral PKRP treatment, and the plasma resect scope with F27 outer sheath (Gyrus Company, the U.K) was adopted, whose power of electric resection and electrocoagulation were set to 160 W. The flushing fluid was 0.9% of normal saline. After placement of resect scope, it was the time to observe the oppression of hyperplasia on urethra and when the resect scope entered bladder cavity, the formation of the trabecular meshwork and chamber in the bladder wall and bilateral ureteral orifice were observed. The excision mark was set in the neck of bladder and caput gallinaginis. The middle lobe and the left and right lateral lobes of prostate were removed in order, and the prostatic apex was trimmed. Prostate was repaired with the surgical prostate capsule before thorough hemostasis, and the prostate tissue fragments were aspirated. During this procedure, with the Ellik emptying apparatus fully employed, the F22 Foley catheter placed, the air sac injected with 30-80 mL of water, the three-cavity catheter was finally fixed to the inner side of the thigh and the surgery was finished.

TUVP: WOLF electric mirror (Germany) was adopted, whose power of electric resection and electrocoagulation were set to 250 W and 75 W respectively. The flushing fluid was 0.5% of glucose. The following method steps were the same as PKRP.

Observation indicators

Operation time, intraoperative bleeding volumes, postoperative indwelling catheter time and hospitalization time of all patients were observed and recorded. Meanwhile, information concerning intraoperative blood transfusion, infection of wounds, dysuresia, recurrence of hernia and other postoperative complications of patients was gathered.

Statistical methods

SPSS statistical software version 20.0 was used in the study. The measurement data

Table 1. Analysis of general information in patients

Project	Classification	PKRP	TUVP
Age (years old)		71.4±5.4	70.3±4.5
IPSS		23.5±3.6	21.4±3.7
Prostate proliferative index	I	9 (27.5%)	13 (27.1%)
	II	14 (45.0%)	22 (45.8%)
	III	9 (27.5%)	13 (27.1%)
Hernia classification	I	7 (22.5%)	11 (22.9%)
	II	9 (30.0%)	15 (31.3%)
	III	12 (35.0%)	16 (33.3%)
	IV	4 (12.5%)	6 (12.5%)

Table 2. Comparison of the operation time and the intraoperative bleeding volumes in patients ($\bar{x}\pm S$)

Group	Case	Operation time (min)	Intraoperative bleeding volumes (ml)
PKRP	32	106.6±36.2	335.4±80.2
TUVP	48	124.4±40.2	428.8±82.9
P		0.034	0.025

Table 3. Analysis of the postoperative indwelling catheter time and hospitalization time in32 patients ($\bar{x}\pm S$)

Group	Case	Postoperative indwelling catheter time (d)	Hospitalization time (d)
PKRP	32	5.4±1.8	6.5±1.7
TUVP	48	7.2±2.0	8.3±2.2
P		0.045	0.032

Table 4. Analysis of the intraoperative blood transfusion and postoperative complications in patients (case/%)

Group	Cases	Blood transfusion in the operation	
		Yes	No
PKRP	32	2 (6.25%)	30 (93.75%)
TUVP	48	5 (10.4%)	43 (89.6%)
P		<0.01	

including operation time, intraoperative bleeding volumes, postoperative indwelling catheter time and hospitalization time were expressed as mean ± standard deviation and the t-test was performed. The enumeration data on intraoperative blood transfusion and postoperative complications were expressed as percentage (%) and the χ^2 test was performed. The test criterion was a=0.05.

Results

Analysis of the general information in patients

Two groups' patients had no statistical differences in age, IPSS, prostate proliferative index and hernia classification. Specific information is shown in **Table 1**.

Analysis of the operation time and the intraoperative bleeding volumes in patients

The operation time and the intraoperative bleeding volumes of patients in PKRP group were significantly less than those in TUVP group. See **Table 2**.

Analysis of the postoperative indwelling catheter time and hospitalization time in patients

Compared with TUVP group, the postoperative indwelling catheter time and hospitalization time of patients in PKRP group were significantly less. See **Table 3**.

Analysis of the intraoperative blood transfusion in patients

The cases of intraoperative blood transfusion in PKRP group were obviously less than those in TUVP group. See **Table 4**.

Analysis of the occurrence of postoperative complications in patients

There was no significant difference in the postoperative complications of patients in PKRP and TUVP groups. See **Table 5**.

Discussion

This study aims to verify that transurethral PKRP in the treatment of benign prostatic hyperplasia combinedinguinal hernia is safer than the traditional suprapubic transvesical prostatectomy. Traditional operation frequently separates the wounds and has the characteristics of greater damages and longer operation time. The tension of the operation results in the longer postoperative bed rest time and the slower postoperative recovery speed; therefore, patients will feel a remarkable chronic pain and dragging sensation. Especially in

Table 5. Analysis of the postoperative complications in patients (case/%)

Group	Cases	Postoperative complications			
		Incisional wound infection	Dysuresia	Recurrence of hernia	Total occurrence
PKRP	32	0 (0)	2 (6.25%)	0 (0)	2 (6.25%)
TUVP	48	0 (0)	5 (10.4%)	1 (2.1%)	6 (12.5%)

elderly patients, the incidence of postoperative complications and short-term recurrence rate increase extremely easily through traditional operation [6-10]. Related medical studies have shown that the short-term recurrence rates of traditional open operations on direct inguinal hernia and indirect hernia are respectively up to 19.05% and 5.46%. From physiological and biomechanical point of view, mesh plug tension-free herniorrhaphy could solve the surgical problems and reduce recurrence rate to 0.2%-2.0% [11-13]. No tension in the repairmen process, which met the physiological needs of anatomy, providing a good prerequisite for the recovery of body functions, and materials that mesh plug tension-free herniorrhaphy adopted now have great histocompatibility which could promote the reduction of postoperative recurrence rates of patients. In addition, it also has advantages such as smaller surgical trauma, wider range of applications, faster postoperative recovery speed, lower recurrence rate, higher safety, etc.

TURP has a higher incidence rate of surgical complications, such as poor incision hemostatic effects, relatively more surgical bleeding, the higher incidence rate of transurethral resection syndrome which is cause by the fact that the rinse solution was non-electrolyte and could be easily absorbed, bladder neck contracture, etc. Especially for the large prostate, the incidence rate of surgical complications will be significantly enhanced even up to 15%, which can also trigger severe resection syndrome and intraoperative bleeding, posing a serious threat on the safety of patients [14-16]. TUVP, to a great extent, improves the hemostatic effects by increasing the electrical cut power and changing the electrode geometry. However, the efficacy and long-term complications with the rinse solution as 0.9% mannitol or glucose are similar to those of TURP [17]. In the treatment of benign prostatic hyperplasia, transurethral surgery has the best curative effects, so the gold standard is still the transurethral resection of the prostate.

Compared with TUVP, PKRP has the following advantages: (1) It can prolong the operation time, avoid the occurrence of TURS. PKRP improves surgical safety and tissue resection rate, has less prostate volume size limitation, then relatively prolongs surgical cutting time, expands indications of surgery correspondingly, reduces the risk of surgery and facilitates a more thorough resection of prostate hyperplasia tissues. (2) It can shorten hospitalization time. Due to the limited heat penetration of plasmakinetic resection, there is less carbonization of sections, less damage to the surrounding tissues, and reduced postoperative bladder irritation. The time of indwelling catheter after operation is significantly shorter than that of TUVP, which shortens the recovery time of patients. (3) There are less intraoperative bleeding volumes. As a result of the bipolar circuit and low cut, 40-70°C of cutting surface, coupled with very limited heat transfer, white electric coagulation of tissues, and rarely carbonization, reduces the intraoperative and postoperative bleeding caused by focal loss. It is generally believed that, as for significant arterial hemorrhage, electric coagulation hemostasis should be the first step in the process of transurethral resection. However, little bleeding can be not handled temporarily while prostate capsule was quickly resected and a thorough hemostasis followed. On the one hand, it can accelerate the progress of surgery with a good hemostatic effect, and on the other hand, it can also promote the reduction of surgical risks and improve surgical safety [18-20]. However, the sample size in this study is not large enough and the results need further studies with larger sample volume to verify.

Disclosure of conflict of interest

None.

Address correspondence to: Xing Zhou, Department of Urology, The Second Affiliated Hospital of Guangzhou Medical University, Guangzhou Medical University, No. 250 Changgang East Road, Zhuhai District, Guangzhou 510260, Guangdong, China. Tel: +86-18926298146; E-mail: 13924182072@163.com

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