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Original article

Complications of laser enucleation of the prostate: Results at two institutions

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ABSTRACT

Objective: Benign prostate hyperplasia (BPH) is a common disease with bothersome symptoms. Conventional transurethral resection of prostate is the gold standard surgical treatment. Recently, various laser enucleation techniques of the prostate for BPH have been adopted worldwide. We report perioperative and postoperative complications with the modified Clavien classification system at two institutions.
Materials and methods: We performed a retrospective analysis through chart review among patients who had undergone laser enucleation of the prostate for BPH in two tertiary referral centers between January, 2009 and December, 2012. The primary outcome was peri- and postoperative complications, whereas secondary outcome was duration of hospital stay and catheterization. The mean age of 271 patients was 72.1 years (range, 51–93 years). Their mean prostate volume was 62.8 mL (range, 22–270 mL). Fifty-seven (21%) patients had prostate volume > 80 mL. There were 101 patients and 169 patients in the diode and thulium groups, respectively.
Results: No patients had Grade 5 complications. There were Grade 4a complications in three (1.1%) patients, Grade 3a in 22 (8.1%) patients, Grade 2 in nine (3.3%) patients, and Grade 1 in 62 (22.9%) patients. The prostate volume > 80 mL was not significantly related to higher complication rate ($p = 0.456$). The average duration of hospital stay and catheterization were 3.05 ± 0.75 days and 2.25 ± 1.29 days. Four patients (1.5%) needed secondary resection for residual prostate tissue. The complication rate of acute urine retention (AUR; $p = 0.285$), urethral stricture ($p = 0.996$), minor ($p = 0.430$), major ($p = 0.371$), or all complications ($p = 0.105$) was not statistically different between diode and thulium groups.
Conclusion: Laser enucleation of the prostate was a safe treatment with low significant complication rate, even for large-volume prostates. The complication rates between diode and thulium lasers were not significantly different. The reoperation rate of laser enucleation was very low but patients with extremely large prostate volume may have higher risk.

1. Introduction

Benign prostate hyperplasia (BPH) is a common disease with bothersome symptoms. Conventional transurethral resection of prostate (TURP) is the gold standard surgical treatment. Recently, various laser enucleation treatments of the prostate for BPH have been adopted worldwide, including the Mackay Memorial Hospital, in Taipei and Tamshui Branches in Taiwan. The modified Clavien classification system has been used in TURP[1–3] and is regarded as a standard platform to compare surgical complications. We retrospectively reported peri- and postoperative complications among patients undergoing enucleation of prostate with various lasers in two institutions.

2. Materials and methods

We analyzed patients through chart review who had undergone laser enucleation of the prostate in two tertiary referral centers between January, 2009 and December, 2012. The follow-up of the patients was closed in December, 2013. The exclusion criteria were

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prostate volume < 20 mL, severe coagulopathy, and prostate adenocarcinoma. We included our 1st year experience of laser enucleation of prostate and concurrent surgeries, such as endoscopic cystolithotripsy. A total of 271 patients without prostate cancer were included, 18 of them with concurrent surgical procedures. There were 101 patients and 169 patients in the diode and thulium groups, respectively. Primary outcome was peri- and postoperative complications. Secondary outcome was duration of hospital stay and catheterization.

The preoperative assessment included digital rectal examination, transrectal ultrasound, and prostate-specific antigen assay. The mean age of all patients was 72.1 years (range, 51–93 years). Their mean prostate volume was 62.7 mL (range, 22–270 mL). Fifty-seven of them had prostate volume > 80 mL. The mean value of prostate specific antigen was 7.76 ng/mL.

We performed laser enucleation and used morcellator to remove prostate adenoma as the technique reported before.[4] Normal saline irrigation was used in surgeries and still needed all day after the operation. Six surgeons (S.Y., H.K.C., J.M.H., W.C.L., W.K.T., and P.K.C.) performed all the surgeries; one surgeon (S.Y.) performed 159 procedures (58.7%). Most patients received spinal anesthesia and prophylactic antibiotics. We used the modified Clavien classification system to categorize complications. Infection or acute urine retention (AUR) was only included during the 1st year after surgeries. The minor complications were defined as Grades 1 and 2 complications, and the major complications were Grades 3–5 complications.

Complication rates between different groups were compared using the Chi-square test. A two-tailed p value < 0.05 was considered statistically significant.

3. Results

Laser TURP caused various complications among these patients. None had Grade 5 complications, three patients had Grade 4a, and 22 patients had Grade 3a. Grade 2 surgical complications occurred in nine patients, and Grade 1 in 62 patients. Detailed complications and further treatments are listed in Table 1.

The most common complications were AUR. Among 45 patients with AUR, six received intermittent catheterization but the others underwent recatheterization. On the other aspect, one patient with persistent urine retention for 43 days received cystostomy. Patients mentioned above all voided well after those procedures.

Three patients had Grade 4a complications. One patient with poor controlled hypertension had sudden ischemic infarction 6 hours after surgery. Another with bilateral pulmonary edema and shock received blood transfusion because of severe intraoperative bleeding. The other with chronic stable angina had perioperative chest pain and shock. Acute myocardial infarction was first suspected and we performed residual procedure as soon as possible. However, the myocardial perfusion scan and coronary angiography implied acute coronary vasospasm rather than myocardial infarction.

Four cases received conventional TURP in 1 week for residual prostate tissue. Their prostate volume was 123 mL, 166 mL, 183 mL, and 193 mL, respectively. Prostate volumes > 80 mL did not significantly lead to higher complication rates ($p = 0.456$). Blood transfusion was reported in two other cases during our 1st year. The average duration of hospital stay and catheterization were 3.05 ± 0.75 days and 2.25 ± 1.29 days.

One patient developing moderate abdominal ascites immediately after the surgery received abdominal percutaneous pigtail catheter for 7 days. Perforation of the prostate or bladder and ascites caused by irrigation fluid were suspected.

Seven patients had urethral stricture. Two of them only needed urethral sounding, and the other five received visual incision of urethra. Moreover, eight patients received transurethral bladder neck incision for bladder neck contracture (BNC).

There were 101 patients and 169 patients in the diode and thulium groups, respectively. No significant difference in minor ($p = 0.430$), major ($p = 0.371$), or all complications ($p = 0.105$) between the two groups were revealed (Table 2). Twenty cases had AUR in the diode group and 25 cases had AUR in the thulium group. Three cases in the diode group and four cases in the thulium group had urethral stricture. The incidence of urethral stricture or AUR was not significantly different between the two groups ($p = 0.996$, $p = 0.285$).

The complication rate was not significantly different between Group 1–100 and 101–200 ($p = 0.067$), Group 1–100 and Group 201–271 ($p = 0.506$), or Group 101–200 and Group 201–271 ($p = 0.312$).

4. Discussion

This study showed low incidence of significantly perioperative and postoperative complications (≥ Grade 3) of laser enucleation of the prostate. Only 25 patients (9.2%) had complications more than Grade 3 but none had Grade 5. Our complication rate was

Table 1
The modified Clavien classification of surgical complications and treatment.

Grade	Complication	Treatment	No. (%)	Remark
1	Acute urine retention	Recatheterization	39 (14.4)	
		Intermittent catheterization once	6 (2.2)	
	Blood clot retention	Bladder irrigation	13 (4.8)	
	Bladder injury	Prolong Foley insertion	2	Morcellation (1)
	Abdominal ascites	Percutaneous catheter	1	For 7 d
	Delirium	Supportive care	1	Normal electrolyte
2	Transient urge incontinence	Anticholinergics	1	
	Anemia	Blood transfusion	2	
	Urinary tract infection	Oral antibiotics	2	
	Sepsis	Parenteral antibiotics	4 (1.5)	Epididymitis, pneumonia, and UTI (2)
3a	Blood clot retention	Surgical evacuation	2	
	Residual prostate tissue	Secondary resection	4 (1.5)	
	Persistent urine retention	Cystostomy	1	For 43 d
	Bladder neck contracture	TURBNI	8 (3.0)	Median 7.5(5–39) mo
	Urethral stricture	VIU	5 (1.8)	Median 9 (5–50) mo
		Sounding	2 (0.7)	
4a	Acute coronary vasospasm	Intensive care unit	1	Perioperative chest pain and shock
	Stroke	Transfer to neurologist	1	Postoperative D 1
	Pulmonary edema & shock	Intensive care unit	1	

TURBNI = transurethral bladder neck incision; UTI = urinary tract infection; VIU = visual incision of urethra.

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