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ASSESSMENT OF COMPLICATIONS OF TRANSURETHRAL RESECTION OF THE PROSTATE USING THE CLAVIEN-DINDO CLASSIFICATION

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Abstract: From 2020 to 2024, transurethral resection of the prostate was performed in 124 men with benign prostatic hyperplasia, the average age of patients was 67.8 ± 6.1 years. The volume of adenoma before surgery was 94.25 ± 2.83 ml3. The overall complication rate was 19.4%. Additional interventions after adenoma removal were performed in 4 (3.2%) men due to bleeding from the prostate bed (vascular coagulation) and bladder neck sclerosis (transurethral resection).

Keywords: Clavien-Dindo, complications, transurethral resection of the prostate

ОЦЕНКА ОСЛОЖНЕНИЙ ТРАНСУРЕТРАЛЬНОЙ РЕЗЕКЦИИ ПРОСТАТЫ С ИСПОЛЬЗОВАНИЕМ КЛАССИФИКАЦИИ CLAVIEN-DINDO

Аннотация: За период с 2020 по 2024 года выполнена трансуретральная резекция простаты 124 мужчинам с доброкачественной гиперплазией простаты, средний возраст пациентов был 67,8± 6,1 лет. Объем аденомы до операции составил 94,25±2,83 мл3. Общая частота осложнений составила 19,4%. Дополнительные вмешательства после удаления аденомы выполнены у 4 (3,2%) мужчин в связи с кровотечением из ложа простаты (коагуляция сосудов) и склероза шейки мочевого пузыря (трансуретральная резекция).

Ключевые слова: Clavien- Dindo, осложнения, трансуретральная резекция простаты.

Introduction

According to the European Association of Urology (EAU), benign prostatic hyperplasia (BPH) is one of the most common diseases in elderly men [1]. After the age of 50, BPH is diagnosed in 30%-40% of men, and its prevalence increases to 70%-80% in individuals over 80 years old.

Lower urinary tract symptoms (LUTS) are the main complaints in men with prostate pathology, causing discomfort and negatively impacting quality of life. Organic infravesical

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obstruction caused by BPH leads to benign neurogenic bladder dysfunction, particularly detrusor overactivity. If left untreated for a long time, obstruction often results in complications such as recurrent urinary tract infections (UTIs), hematuria, bladder stone formation, and acute or chronic urinary retention [2].

Watchful waiting (careful observation) is one of the treatment options, except in patients with BPH complications. A decrease in urinary flow rate, the presence of residual urine, hematuria, and upper urinary tract dysfunction are absolute indications for surgical intervention. Transurethral resection of the prostate (TURP) remains the gold standard for treating men with a prostate volume of 30-80 cm^3 [1]. Following this procedure, patients experience improved lower urinary tract function and a corresponding improvement in quality of life in more than 70% of cases [3].

Despite advances in innovative technologies and the use of bipolar resectoscopes, surgical intervention is still associated with intra- and postoperative complications. Although the mortality and postoperative complication rates have decreased in recent years, they remain significant, ranging from 0.1% to 11.1% [4]. Therefore, an analysis of the causes and structure of postoperative complications is necessary to prevent their occurrence in the future.

The Clavien-Dindo classification, proposed by Clavien P.A. and Dindo D., is the most widely used tool for systematizing postoperative complications of TURP in surgery [5]. Mamoulakis C. et al. modified this classification to assess the severity of surgical interventions performed for prostate pathology [6].

Objective

This study aims to assess post-TURP complications based on the Clavien-Dindo classification, performed in a private clinic setting.

Materials and Methods

A retrospective analysis was conducted on 124 men with BPH who underwent TURP between January 2020 and December 2024.

The mean age of the patients was 67.8±6.1 years (range: 57 to 80 years).

Preoperative assessments included:

Clinical and laboratory tests of blood and urine

Measurement of prostate-specific antigen (PSA) levels

Evaluation of LUTS severity using the International Prostate Symptom Score (IPSS)

Uroflowmetry to determine lower urinary tract dysfunction

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The surgical procedure was performed using a bipolar resectoscope (26Fr, Karl Storz, Germany) following a standard technique.

A urethral catheter was inserted postoperatively and removed 2-3 days after surgery.

Patients were monitored for 90 days postoperatively.

To determine complications based on the Clavien-Dindo classification, we developed the concept of "standard" postoperative course.

Criteria for a "standard" postoperative course:

Slight hematuria in urine flowing through the urethral catheter or cystostomy drainage is allowed, but without blood clots or a decrease in serum hemoglobin levels.

Criteria for a "standard" postoperative course (continued):

Subfebrile fever or hyperthermia above 38°C, without chills, of short duration (no more than one day) and easily controlled with antipyretics, without clinical or laboratory signs of pyelonephritis exacerbation or sepsis.

Absence of inflammatory complications in scrotal organs.

No drainage dysfunction that leads to bladder emptying disorders or an increase in serum creatinine due to upper urinary tract dysfunction.

Statistical Analysis

Simple descriptive statistics were performed using IBM SPSS Statistics for Windows, version 20.0.

Results

Mean prostate/adenoma volume before surgery, measured by transrectal sonography: 94.25±2.83 cm^3

Mean weight of removed tissue during TURP: 84.25±4.22 g

Mean duration of the surgical procedure: 74.53±6.80 min

Mean hospital stay: 4.38±1.19 days

A total of 24 patients (19.4%) experienced complications after TURP, deviating from the standard postoperative course (see table).

Five patients (I degree) required increased urethral catheter tension due to hematuria, without blood clots or drainage dysfunction.

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In two of these patients, catheter replacement and blood transfusion were additionally performed (II degree).

Five patients (4.0%) developed urinary tract infections (UTIs) (I degree), confirmed by clinical and laboratory data.

Two patients (1.6%) developed acute orchiepididymitis (I degree).

Enhanced antibacterial therapy successfully managed the infectious-inflammatory complications of TURP.

Two patients (2.4%) experienced urinary incontinence, treated with a comprehensive approach including anticholinergics, nonsteroidal anti-inflammatory drugs (NSAIDs), and physiotherapy (II degree).

Two patients (4.4%) developed postoperative bleeding from the adenoma bed, leading to blood clot formation in the bladder and tamponade (IIIb degree).

These patients underwent coagulation of bleeding vessels, blood transfusion, and subsequently had no further bleeding episodes.

Table.

Complications of TURP from the perspective of the modified classification Clavien-Dindo (n=124).

Degree	Complication	Therapy	Number of patients (%)
I	Intense blood staining of urine through catheter	Infusion therapy, increasing catheter tension	5 (4,0)
	Acute pyelonephritis	Correction of antibacterial therapy	5 (4,0)
	Acute orchiepididymitis		2 (1,6)
II	Bleeding from the bed of the removed prostate, impaired drainage function due to blood clots	Blood transfusion, bedside catheter replacement	2 (4,4%)
	Urinary incontinence	Cholinolytics, physiotherapy	

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			3 (2,4)
IIIb	Bleeding from the bed of the removed prostate, bladder tamponade Postoperative sclerosis of the neck of the bladder	Cystoscopy, coagulation of bleeding vessels of the bed of the removed adenoma TUR of sclerosis	2 (1,6) 2 (1,6)
IVb	TUR syndrome	Treatment in the intensive care unit (diuretics, infusion therapy)	3(2,4)
Total			24 (19,4)

Syndrome after Transurethral Resection of the Prostate (TURP)

The syndrome after TURP was observed in three patients (2.4%), who were transferred to the intensive care unit for appropriate treatment. After therapy, the patients were moved back to the ward, the urethral catheter was removed, and the rehabilitation period proceeded without complications. After 4 months, two patients developed bladder neck sclerosis, as shown by urethrogram, and they underwent TURP of the narrowed section, with subsequent good results.

Discussion

In our study, the incidence of postoperative complications was 24.74%, which is consistent with the results of other authors who used the Clavien-Dindo classification of complications (9.1%-34.4%) [7].

Agrawal M. et al. identified 9.1% complications after TURP, a lower rate than in our study [8]. This difference is attributed to the fact that patients with urinary incontinence were treated by a general practitioner. Bladder neck stricture typically develops after three to four months following TURP, whereas the authors observed patients for only two months.

According to Mamoulakis C. et al. [6], the overall complication rate was 15.7%, though more patients had urethral catheters before the operation (70.1%) compared to our study (19.7%). Additionally, the average prostate size before surgery in our study was larger than in the study by these authors (94.25±2.83 cm^3 vs 80.88±12.02 cm^3, $p<0.004$). These factors are thought to negatively affect the complication rates.

The overall complication rate reported by Agrawal M. et al. was 34.4%, which is higher than the rate in our study [7]. However, it is notable that these authors considered transitory postoperative hematuria as a complication. We believe that hematuria that does not require

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medical treatment occurs in all patients after TURP and should not be classified as a complication unless it necessitates blood transfusion or interventions for clot evacuation and/or vascular coagulation. Additionally, urethral catheter dysfunction due to blood clots should not be regarded as a complication, as this is usually resolved by flushing the catheter.

Stress urinary incontinence was observed in three patients (2.4%). One patient regained bladder control after 6 months, while the other two showed significant improvement, though some degree of stress incontinence persisted.

Bladder neck sclerosis developed in two patients (4.4%), who underwent TURP of the sclerosis tissue. After this procedure, their urination became satisfactory. Some authors report the incidence of bladder neck sclerosis or posterior urethral stricture as 2.2%-9.8% [4,5]. In our study, the incidence of bladder neck sclerosis was lower due to the use of a resectoscope with continuous irrigation flow, which avoids the need for frequent instrument removal to decompress the bladder, as well as the larger prostate/adenoma volume.

Conclusion

TURP is an effective treatment method for patients with prostatic adenoma, associated with minimal life-threatening complications that can be easily managed.

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