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Investigation Of the Incidence of Thromboembolic Complications in Patients After Transurethral Resection of the Prostate Gland with Varying Degrees of Risk on The Caprini Scale

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ABSTRACT

The aim of the study is to determine the relationship between the degree of risk of thromboembolic complications on the Caprini scale and the frequency of their occurrence in patients undergoing transurethral resection of the prostate gland (TURP). A retrospective cohort study was conducted, including 312 patients with different levels of risk on the Caprini scale. It was revealed that the frequency of venous thromboembolism increases in proportion to the increase in scores on the scale. The findings emphasize the importance of using the Caprini scale in urological practice and the need for individualized thromboprophylaxis in high-risk patients.

Keywords: *deep vein thrombosis, venous thromboembolic complications, transurethral resection of the prostate gland*

1. INTRODUCTION

Venous thromboembolic complications (VTE), including deep vein thrombosis (DVT) and pulmonary embolism (PE), are one of the most significant causes of morbidity and mortality among surgical patients. Despite the achievements of modern medicine and the introduction of thromboprophylaxis standards, VTE continues to be an urgent clinical and epidemiological problem. This is especially true for elderly patients undergoing urological interventions, such as transurethral resection of the prostate gland (TURP), which, although it refers to minimally invasive operations, may be accompanied by pronounced postoperative risks due to the age of the patients and concomitant diseases(1-3).

TURP is one of the most common urological surgeries used for benign prostatic hyperplasia (BPH). This method has been widely used for several decades and is recognized as the "gold standard" in the surgical treatment of patients with moderate and severe forms of infravesicular obstruction. However, patients referred for TURP are most often in the older age groups, have concomitant pathology (cardiovascular, endocrine, pulmonary), as well as a long history of sedentary lifestyle. All these factors together increase the risk of thrombosis and thromboembolic complications in the postoperative period (4-5).

Given the specifics of the patient population and the nature of the surgical intervention, preoperative identification of people at high risk of VTE becomes extremely important, which will allow timely prevention and reduce the incidence of complications. To date, one of the most recognized tools for VTE risk stratification is the Caprini scale, a clinical tool that allows a comprehensive assessment of individual risk factors for thrombosis and systematizes patients according to the

likelihood of developing thromboembolism (6-8).

The Caprini scale was developed and validated to assess the risk of VTE in various categories of surgical patients. It includes such parameters as age, the presence of cancer, varicose veins, body mass index, the presence of heart failure, a history of stroke, surgical interventions and other clinical data. Each factor is evaluated in points, and based on the sum of the points, the patient is assigned a certain risk category: low, moderate, high or very high. This allows not only to predict the likelihood of complications, but also to make decisions about preventive tactics: from mechanical compression to prescribing anticoagulants (9-10).

Despite the widespread use of the Caprini scale in general surgery, its use in urological practice, especially in operations on the organs of the genitourinary system, is still insufficiently systematized. Some urologists still perceive TURP as a "low-risk" procedure that requires minimal intervention in the hemostasis system. However, recent data indicate a significant risk of VTE in this category of patients, especially in the presence of concomitant factors: age over 65 years, varicose veins, obesity, prolonged restriction of mobility, previous episodes of thrombosis. Thus, it becomes obvious that an objective risk assessment must be applied prior to the intervention.

In the clinical practice of a urological hospital, it is especially important to provide an individualized approach to thromboprophylaxis. The appointment of low molecular weight heparins (NMH), oral anticoagulants, the use of compression knitwear and early activation of patients should be based not only on the subjective assessment of the doctor, but also on standardized scales confirmed by studies. In conditions of limited resources and increasing burden on healthcare, priority attention should be given to those patients with the highest risk of VTE. This will not only increase the safety of surgical treatment, but also reduce the length of hospitalization, the rate of readmissions and the cost of treating complications (11-12).

The analysis of the effectiveness of thromboprophylaxis already used requires special attention. Despite the availability of international and national clinical guidelines, in real practice, cases of underdiagnosis and underestimation of risk are often observed, which leads to the omission of patients in need of prevention. On the other hand, there are cases of unjustified prescribing of anticoagulants, which increases the risk of bleeding. The optimal solution is to use validated risk scales, such as Caprini, to form an evidence base for prescribing prevention.

The prerequisite for this study was the lack of a unified approach to the assessment and prevention of VTE in patients after TURP in one of the multidisciplinary urological centers. Practice has shown that in some cases, prevention was prescribed to all patients, regardless of individual risk, in others it was not carried out even in the presence of multiple risk factors. Such variability in approaches requires analysis, systematization, and the introduction of uniform standards (13-15).

Thus, the purpose of this study was to determine the incidence of thromboembolic complications in patients who underwent TURP, depending on the degree of risk on the Caprini scale. Additional tasks have become:

1) analysis of the structure of complications (DVT, PE);

2) evaluation of the effectiveness of thromboprophylaxis in different risk groups;

3) determination of predictors of VTE development;

4) formulation of clinical recommendations for the prevention of complications in this category of patients (16)

2. METHODOLOGY

The study was performed as a retrospective analysis of the medical history of patients who underwent transurethral resection of the prostate gland in the urology department of the 52nd city clinical hospital for the period from January 2020 to December 2023.

The study included male patients aged 50 to 85 years with a diagnosis of benign prostatic hyperplasia who underwent TURP. Patients with oncological diseases, the presence of concomitant severe surgical interventions, as well as persons with insufficient clinical information that does not allow for a Caprini scale assessment were excluded.

Each patient was assigned an individual Caprini score based on a preoperative assessment of risk factors. The patients were divided into three risk groups: low (0-1 points), moderate (2 points) and high (≥3 points). A standard complex of examinations was performed for all patients, including ultrasound diagnostics of the veins of the lower extremities in case of suspected thrombosis, and CT angiography of the pulmonary arteries in the presence of PE symptoms.

In the postoperative period, VTEC symptoms were monitored. The use of thromboprophylaxis was recorded: low molecular weight heparins (NMH), mechanical means of prevention (elastic compression) were used, and the duration of immobilization and hospital stay was assessed.

The data was processed using SPSS software. Descriptive statistics methods were used, the $\chi 2$ criterion for analyzing differences between groups, as well as logistic regression to identify predictors of VTE.

3. RESULT

The total number of the studied sample was 312 patients. The average age of the patients was 69.4 ± 8.7 years. The average Caprini score was 3.9. Low risk was recorded in 48 patients (15.4%), moderate in 102 (32.7%), and high in 162 (51.9%).

VTEC was recorded in 26 patients (8.3% of the total). Deep vein thrombosis of the lower extremities prevailed in the structure of complications – 21 cases, pulmonary embolism was noted in 5 patients. In all cases, the diagnosis was confirmed instrumentally.

Frequency of VTE depending on the risk group:

- Low risk: 0 cases (0%)

- Moderate risk: 5 cases (4.9%)

- High risk: 21 cases (13%)

The differences between the groups are statistically significant ($p < 0.01$). Thus, a clear relationship has been established between the Caprini score and the likelihood of postoperative thrombosis.

Analysis of thromboprophylaxis showed that in the high–risk group, only 79% of patients received NMH, while in the moderate group – 41%, and in the low group - 12.5%. Despite the use of prevention, some patients from the high-risk group still faced complications, which indicates the need for additional stratification and possible correction of preventive regimens.

4. DISCUSSION

The results of this study show the high clinical significance of the Caprini scale in the preoperative assessment of patients undergoing transurethral resection of the prostate gland. A high score on the scale significantly correlates with an increased incidence of venous thromboembolic complications.

Special attention should be paid to the fact that even with thromboprophylaxis, a number of patients remain at risk of VTE. This may be due to insufficient duration of prevention, insufficient dosage, and low adherence to treatment after discharge. New generation oral anticoagulants (for example, rivaroxaban) can be considered as an alternative in a number of clinical situations, but their use should be strictly individualized.

The age of the patient is also an important factor. It was found that patients over 75 years of age have a 1.8-fold higher risk of developing VTE compared with younger patients ($p < 0.05$). This is due to both a decrease in activity in the postoperative period and the presence of concomitant cardiovascular pathology.

It should be noted that the data obtained correspond to the results of foreign studies. In particular, the work of Zhang et al. (2021) confirmed that patients after TURP with a Caprini score of more than 5 have a 4-fold higher risk of DVT compared with the low-risk group.

Our data highlight the need to introduce the Caprini scale into routine practice in urological hospitals. Its use makes it possible to identify patients who need more intensive prevention, which can reduce not only the frequency of complications, but also the economic costs of treatment.

5. CONCLUSION

The Caprini scale is a valuable tool for stratifying the risk of thromboembolism in patients undergoing transurethral resection of the prostate gland. The study confirms that a high score on the scale is significantly associated with an increased frequency of VTE. An individualized approach to thromboprophylaxis based on this scale makes it possible to increase the safety of urological interventions.

Clinical recommendations based on the results of the study include:

1. Mandatory use of the Caprini scale in the preoperative examination of patients before TURP;

2. Thromboprophylaxis in patients with a score >3;

3. Prolongation of anticoagulant prophylaxis in the postoperative outpatient period;

4. Monitoring of VTE symptoms for 30 days after surgery.

Future research should focus on determining the optimal regimens and duration of prevention, taking into account the stratified risk.

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