

Comparison of Blood Loss in Holmium Laser Enucleation of the Prostate (HoLEP) Versus Transurethral Resection of Prostate (TURP)

Compare the Efficacy of HoLEP VS TURP

Muhammad Maqsood Zahid¹, Khalid Farouk³, Khaleel Ahmad², Liaquat Ali², Hafiz Muhammad Javed⁴ and Muhammad Afzal Ch⁴

ABSTRACT

Objective: To assess the amount of blood lost by BPH patients receiving holmium laser prostate enucleation (HoLEP) surgery vs transurethral prostate resection (TURP).

Study Design: Observational / experimental study.

Place and Duration of Study: This study was conducted at the Foundation University Medical College, Rawalpindi from June 2022 and November 2022.

Materials and Methods: Two groups of forty BPH patients each were prospectively divided into Groups I and Group II. Patients in group I underwent HoLEP, while those in group II underwent TURP. Hemoglobin (Hb) measurements were made before to surgery and on the first postoperative day to gauge blood loss.

Results: Forty patients from the HoLEP group I and TURP group II were considered in this study. The hemoglobin loss was 0.26 ± 0.05 in group I and 0.71 ± 0.124 in group II. Hemoglobin levels dropped substantially less in the group I than in the group II.

Conclusion: Hemoglobin (Hb) level dropped after prostate surgery was substantially less in HoLEP than in TURP. We come to the conclusion that HoLEP is a very effective with low complications operation in patients with prostate enlargement in light of the elevated risk of bleeding.

Key Words: benign prostatic hyperplasia; fibrinolysis; holmium laser enucleation of the prostate; thrombin generation; transurethral resection of the prostate

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INTRODUCTION

The most popular uro-surgical procedures utilised in various surgical techniques around the world is benign prostate hyperplasia. Among these procedures, TURP has historically been a widely used surgical technique (Reich et al., 2008)¹. One potentially excellent method is transurethral holmium laser enucleation of the prostate (HoLEP), although it has encountered controversy (Reich et al., 2006)².

Some of the risk factors that put BPH patients at risk for bleeding include ageing, immobility, surgical trauma, comorbidities (including hypertension and diabetes), as well as extra problems like deep vein thrombosis (DVT), pulmonary thrombosis embolism (PTE), and even in ischemic heart disease or CVA due to infarction (Goldhaber et al., 2012)³.

The most common issue after prostate surgery is bleeding. HoLEP shortens hospital stays and catheterization times while reducing blood loss and the requirement for transfusions. HoLEP is a size-independent procedure in patient LUTS (BPH) treatment with an average weight of 36–300 g. HoLEP is a safe procedure that has no discernible effects on hemoglobin levels in individuals taking anticoagulants. It is hard to estimate postoperative thromboembolic events in both procedures. Prothrombin fragment (PF) 1+2 and thrombin-antithrombin complex (TAT) have been described as valid markers of thrombin generation, although tissue plasminogen activator (t-PA) and plasminogen activator inhibitor-1 (PAI-1) are well-known indicators of fibrinolysis (Chamouard et al., 1995)⁴. By assessing the perioperative stimulation of thrombin generation and fibrinolysis, it is feasible to

¹. Department of Urology and Kidney Transplantation / Anesthesia, ICU and Pain Medicine², Fauji Foundation Hospital, Rawalpindi.

³. Department of Urology, Foundation University Medical College, Rawalpindi.

⁴. Nawaz Sharif Medical College Gujrat.

Correspondence: Muhammad Maqsood Zahid, Department of Urology and kidney Transplantation, Fauji Foundation Hospital, Rawalpindi.

Contact No: 0300 8720258

Email: drmaqsoodzahid@yahoo.com

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estimate the risk of thromboembolic events (Schneiderman et al., 1991)⁵.

MATERIALS AND METHODS

Forty patients who received surgical treatment for BPH between June 2022 and November 2022 presented at Fouji Foundation Hospital, a partner of Foundation University Medical College. The patients were matched 1:1 with either TURP or HoLEP. Acute urinary retention and post-void residual urine (PVR) of greater than 100 millilitres were required for inclusion. Resistance to alpha-blocker and/or 5-alpha reductase inhibitor medication, and severe lower urinary tract symptoms (LUTS). Patients who refused treatment, had neurogenic bladders, thromboembolic disorders of the heart and/or brain, DVTs, PEs, malignancy, coagulopathies, or were using antiplatelet or anticoagulant drugs were not included in the study. All patients provided their free and informed consent, which the regional ethical committee authorised. All patients received medical history, physical examination, ultrasonography, studies into the prostate volume, maximal urine flow rate (Qmax), and post-void residual volume (PVR).

All of the procedures were carried out by the same surgeon while under spinal anesthetic. A typical Wolf (26FR) and a typical loop were utilized for TURP. The conventional loop employed 5% dextrose as the irrigation fluid, 120 W of cutting power, and 80 W of coagulation power. HoLEP was conducted using a Storz 26F, continuous fluid irrigation with laser resectoscope with saline 0.9% as the irrigation fluid and a Jena surgical Multipulse HoPlus Holmium laser 100 watts: YAG laser (fibre size 550 m; Coherent Corp., Palo Alto) set to 2 J/40-50 Hz power. At the conclusion of the process, a 22Fr three-way catheter was inserted for 24 to 48 hours. It was documented how long the procedure took, how much tissue was removed, how long the catheter was in place, and how long the patient stayed in the hospital.

Antecubital fossa vein blood samples were obtained before to surgery and on the first postoperative day for a quantitative evaluation of hemoglobin (Hb). Using SPSS, the data were displayed in tabular and graphical form and reported as mean standard error of mean (SEM) (student t-test and correlation). A result of p 0.01 was considered highly significant, and p 0.05 was considered significant.

RESULTS

Forty patients above age group (50 years) from the HoLEP group A and TURP group B were considered in this study. The hemoglobin loss was 0.26 ± 0.05 g/dL in group A and 0.71 ± 0.124 g/dL in group B, respectively ($P=0.005$). Hemoglobin levels dropped substantially less in the HoLEP group than in the TURP group.

Student t-test showed that the prostate size of HoLEP group A 77.4 ± 2.974 g/dL was significantly higher as compared to the TURP group B 73.75 ± 2.58 g/dL, respectively ($p=0.1$).

The duration of hospital stay and catheterization, tended to be longer in the group I when contrast to the group II. The HoLEP group was operational for longer. The removed tissue in the group I significantly more than it did in the group II.

Table No.1: Comparison of blood loss in HoLEP and TURP groups

Variables	HoLEP n= 20	TURP n=20	P= value
Post and pre procedure of HB	0.26 ± 0.05 g/dL	0.71 ± 0.124 g/dL	0.005
Prostate Size	77.4 ± 2.974 g/dL	73.75 ± 2.58 g/dL	0.1

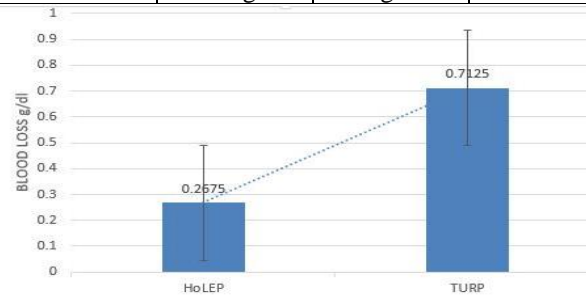


Figure No.1: Comparison of Blood loss between two group HoLEP and TURP

DISCUSSION

TURP has historically been a well-accepted operation for Benign Prostate Hyperplasia (BPH) among urologists because to minimal equipment and short learning of curve. TURP is not advised for very big prostates due to the frequent adverse effects of TURP syndrome and bleeding from this procedure. HoLEP, in comparison, has the benefit of minimizing blood loss, requiring less time in the hospital, and working for virtually all prostate sizes. It is not surprising that there is a hypercoagulable state during TURP or HoLEP, similar to previous surgical procedures, and it appears to be a natural response to keep hemostasis (Bai et al., 2019)⁶.

Significantly less blood is lost with HoLEP than during TURP, that due to coagulation effect of the holmium laser (van Rij et al., 2012)⁷. According to previous researches a substantial correlation among intraoperative bleeding loss and postoperative thrombin production. (Tuman et al., 1987)⁸. In our study, Postoperative hemoglobin levels declined significantly less in the group I than in the group II. These observations could be the result of less intraoperative trauma. (Ajib et al., 2018)⁹. Nielsen et al¹⁰ discovered that an increase in postoperative prothrombin fragment

(PF) and thrombin-antithrombin complex was related to PSA released during prostatectomy (TAT) (Nielsen et al., 1999)¹⁰.

As they are from serine protease family (Stenman et al., 1999)¹¹. The PSA shares many structural and functional similarities with the protein that initiates the clotting response, this may be the cause, albeit the exact mechanism is unknown. Technology advancements with the introduction of advanced instruments, such as the bipolar energy resectoscope and holmium laser, have significantly decreased complications in addition to enabling the operation of patients with high comorbidities who cannot avoid antiplatelet/anticoagulant medications. HoLEP is associated with a variety of advantages, including a reduction in blood loss and requirement of blood transfusions, the main cause of TURP-related morbidity and a potentially fatal condition (Elshal et al., 2020)¹².

HoLEP has a higher safety profile than TURP, as evidenced by less bleeding (lower blood transfusion rates and lower clot retention rates) and a considerably smaller reduction in haemoglobin level, which are consistent with our findings and the data from other clinical investigations. A shorter post-operative hospital stay results from HoLEP's bleeding advantage over TURP; in fact, Current research proves that HoLEP group had shorter catheter insertion time. When comparing the two techniques, our findings support what has already been written about in the literature. However, it should be mentioned that elderly BPH surgery patients have also validated these findings. HoLEP is an intriguing approach that, even in older patients with several comorbidities, may assure functional results on par with TURP (Shvero et al., 2021)¹³.

The benefits in terms of decreased intra-postoperative bleeding, independent of anticoagulant/antiplatelet medication, and decreased prostate size in BPH surgery patients. HoLEP is also associated with shorter hospital stays and catheterizations, which have an indirect and positive impact on socioeconomic characteristics. TURP and HoLEP are safe to perform for treating BPH in middle-aged patients. We found significant differences in this study favoring the HoLEP group with respect to post-operative bleeding, post-operative Qmax, prostate tissue removal, shorter catheterization times, and hospital stay. The reliability and safety of the HoLEP procedure to TURP in middle-aged patients are being evaluated for the first time in this study (Ahyai et al., 2010)¹⁴.

CONCLUSION

TURP and HoLEP appear to be safe and effective surgical options for treating BPH in middle-aged patients. We found significant differences in this study favoring the HoLEP group in terms of post-operative bleeding, post-operative Qmax, prostate tissue removal,

shorter catheterization times, and length of hospitalization. The decrease in hemoglobin (Hb) after prostate surgery was substantially less in HoLEP than in TURP. We come to the conclusion that HoLEP is safe to execute in patients with prostate enlargement in light of the elevated risk of bleeding. The reliability and safety of the HoLEP procedure to TURP in middle-aged patients are being evaluated for the first time in this study.

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Abbreviations

BPH benign prostatic hyperplasia

LUTS lower urinary tract symptoms

BPO benign prostate obstruction

UR urinary retention

TURP trans-urethral resection of the prostate

HoLEP holmium laser enucleation of the prostate

HB hemoglobin

PF prothrombin fragment

PTE pulmonary thrombosis embolism

SEM standard error of mean

DVT deep vein thrombosis

Author's Contribution:

Concept & Design of Study: Muhammad Maqsood Zahid

Drafting: Khalid Farouk, Khaleel Ahmad

Data Analysis: Liaquat Ali, Hafiz Muhammad Javed, Muhammad Afzal Ch

Revisiting Critically: Muhammad Maqsood Zahid, Khalid Farouk

Final Approval of version: Muhammad Maqsood Zahid

Conflict of Interest: The study has no conflict of interest to declare by any author.

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