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TRANSURETHRAL RESECTION OR INCISION OF THE PROSTATE AS DEDICATED TREATMENT FOR BENIGN PROSTATIC HYPERPLASIA - A REVIEW ARTICLE BASED ON COMPARISON OF SCIENTIFIC RESEARCH

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ABSTRACT

Introduction and objective: The prostate is a single glandular organ found only in men. Anatomically it is located below the urinary bladder, with the prostatic urethra passing through it. The function of the gland is to secrete fluid, which forms up to 30% of the semen. Physiologically, the dimensions of the organ are approximately 3 cm x 4 cm x 2.5 cm and the weight is 20-25 g. Due to its location, prostate enlargement can lead to constriction of the urethra, which in turn can lead to disturbances in micturition and sexual function.

Benign prostatic hyperplasia (BPH) is a common condition affecting men, whose prevalence increases with age. It often leads to lower urinary tract symptoms (LUST) - a group of urinary issues affecting storage (frequency, urgency, incontinence) and voiding (weak stream, hesitancy, straining). For many years, transurethral resection of the prostate (TURP) has remained the gold standard for BPH treatment. However, it is not the only available treatment method. Transurethral incision of the prostate gland (TUIP) is a less invasive method dedicated for less advanced prostatic hyperplasia.

This study aims to compare the efficacy and safety of TURP and TUIP based on literature review and comparison of scientific research.

Materials and methodology: The article was written based on a thorough analysis of scientific papers available on PubMed and Google Scholar, which serve as verified sources of information.

KEYWORDS

Benign Prostatic Hyperplasia (BPH); Benign Prostatic Enlargement (BPE); Transurethral Resection of The Prostate (TURP); Transurethral Incision of The Prostate Gland (TUIP); International Prostate Symptom Score (IPSS); Lower Urinary Tract Symptoms (LUTS); Retrograde Ejaculation; TURP Syndrome

CITATION

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Introduction

Benign prostatic hyperplasia (BPH) is a histopathological condition characterized by the nonmalignant proliferation of epithelial and stromal components of the prostate gland [1]. This condition is common in aging men. Depending on the research, it is estimated that 40-50% of men over 60 will suffer from it, and 90% will become ill by the age of 80. The pathophysiology of BPH involves hormonal changes, chronic inflammation, and growth factor imbalances that result in prostatic enlargement and subsequent bladder outlet obstruction (BOO) [1]. BPH is a leading cause of lower urinary tract symptoms (LUTS), which include urinary frequency, urgency, hesitancy, decreased urinary stream, and nocturia [2]. Ultimately LUST significantly worsens patients' quality of life.

Despite advanced pharmacotherapy, many patients require operation as therapy. The development of TURP and TUIP techniques allows for the surgical treatment of even slightly enlarged glands, improving the comfort of patients suffering from the LUST symptoms.

The aim of this article is to compare these two methods by their clinical effectiveness and side effects based on literature review and comparison of scientific research.

Benign Prostatic Hyperplasia (BPH), Benign Prostatic Enlargement (BPE)

Prostate gland is a single glandular organ located below the urinary bladder with the urethra passing through it. Physiologically, its dimensions are 3cm x 4cm x 2,5cm, and its volume in an adult male is estimated at 20-30 ml on average. Functionally, the prostate produces seminal fluid, which constitutes approximately 20-30% of semen. It provides nourishment for sperm, facilitates their transport, and increases their motility.

Benign Prostatic Hyperplasia (BPH) also known as Benign Prostatic Enlargement (BPE) is a common, noncancerous enlargement of the prostate gland. It is estimated to occur in 40-50% of men after the age of 60

and in more than 50% after 65. It probably occurs in about 90% of men over the age of 80. Statistics show that incidence increases with age. It usually results from the hyperplasia of glandular cells and prostatic stromal cells. The cause of the disease is not fully known, but the main role is attributed to the production of sex hormones: estrogens and androgens, which stimulate the prostate stromal cells to grow. Additionally, with age, proliferation begins to dominate over apoptosis, which explains the increased incidence of the disease in seniors.

BPH is often manifested by symptoms of the LUTS (Lower Urinary Tract Symptoms) group, which are divided into three categories. First one, associated with storage of urine is expressed as increased daytime frequency (more than 8 times per day), nocturia (more than 1 urination per night), urgency, urinary incontinence and after bladder sensation (normal, increased, reduced, reduced, absent, non-specific). Second one, called voiding symptoms, contains slow or weak stream, splitting or spraying, intermittent stream, hesitancy, straining and terminal dribble. Last one, post-micturition symptoms include feeling of incomplete emptying and post-micturition dribble.

Diagnostics is based on a detailed medical interview with the patient, a physical examination, imaging tests and additional tests if necessary. Firstly during the patient's medical interview, emphasis should be placed on the severity of the symptoms. The IPSS is a helpful diagnostic tool for this purpose. The IPSS (International Prostate Symptom Score) questionnaire is the international scale used for assessment of symptoms intensity. It is based on the answers to seven questions referring to manifestations of the LUST group. The interpretation depends on the sum of points obtained and suggests further clinical treatment in accordance with them. During the physical examination of the patient, attention should be paid to the assessment of the abdominal organs and genital organs, as well as a rectal examination. When it comes to imaging tests useful in BPH diagnostics, these include genitourinary and transrectal ultrasound. Cystoscopy can also be a useful test, but it is not performed routinely. Examples of additional tests used in prostatic hyperplasia diagnostics are biopsy and urodynamic testing.

The diagnosis of the disease is made on the basis of a medical interview (taking into account the result obtained on the IPSS questionnaire) and the outcomes of tests confirming the disease entity. The recognition of prostate enlargement is made based on three features: a gland mass greater than 20 g, impaired urethral flow and an IPSS score of more than 7 points.

Complications of BPH arise from urinary obstruction. Untreated leads to severe issues such as acute or chronic urinary retention, urinary tract infections (UTIs), bladder stones, kidney damage, incontinence, and damage to the bladder wall.

Treatment of BPH depends on severity of symptoms. Patients with a score below seven on the IPSS scale may be retained for observation. This group is recommended to focus on healthy lifestyle and diet, as well as an annual urological check-up. Pharmacological treatment of BPH is indicated for patients with mild or moderate intensity of LUST symptoms and IPSS above 7 points. It is used in the absence of absolute indications or when there are contraindications to surgical treatment. Examples of BPH manifestations, which may qualify for surgery are recurrent symptoms such as complete urinary retention, hematuria or UTI and bladder stones or kidney failure. The criterion for selecting the surgical method is the size of the prostate gland. The methods discussed in this paper are intended for prostate sizes below 30 cm^3 for TUIP, and up to 100 cm^3 for TURP.

BPH as a common male urological disease

Based on *Global, regional, and national burden of benign prostatic hyperplasia from 1990 to 2021 and projection to 2035* [3] - showed that in years 1990 to 2021, the age-standardized incidence rate (ASIR), age-standardized prevalence rate (ASPR), and age-standardized DALYs rate (ASDR) of BPH were stable. In conclusion of data analyzed by the authors, the global incidence and prevalence are expected to increase from 962.42 to 7878.68 per 100,000 populations in 2022 to 998.55 and 8620.60 per 100,000 populations in 2035, respectively. It is worth noting that between 1990 and 2021, the population has aged, and consequently, the likelihood of developing BPH has increased.

Considering the continued aging of society and the associated increase in life expectancy, the above-mentioned prognoses show how common BPH is and will be in the future.

TURP

Transurethral resection of the prostate (TURP) is a common surgical procedure used in treatment of urinary symptoms caused by benign prostatic hyperplasia (BPH). It is also dedicated for patients with prostate cancer. Conventionally the date of commencement of this treatment method is 1909. This urological operation has been perfected for over many years and now, for almost a century, is considered the gold standard in the BPH treatment.

TURP is performed under general anesthesia or a spinal anaesthetic and usually takes around an hour. In this procedure a surgeon removes the inner portion of the prostate with a resectoscope inserted through the urethra, improving urine flow and reducing bladder obstruction. This method has two types of modalities: monopolar and bipolar TURP. The difference between these two methods is the type of current used and the need for an electrosurgical (ESU) grounding pad. In monopolar TURP a grounding ESU pad and irrigation by a non conducting fluid is required to prevent this current from disturbing surrounding tissues. The liquid usually used in this method is glycine, which can cause damage to surrounding tissue after prolonged exposure, resulting in TUR syndrome (post-TURP hyponatremia). With this in mind the operation time is limited. A newer method is bipolar TURP, which allows for saline irrigation and does not require an ESU grounding pad, thus preventing TUR syndrome.

During surgery, samples are collected for histopathological examination. There is a possibility of detection of prostate or bladder cancer during surgery or after obtaining the test results. In this case, the surgical procedure also becomes a diagnostic procedure.

The outcome of TURP is estimated to be excellent in 80–90% of patients with BPH. Most patients have to stay in hospital around 1 to 4 days after this treatment method. It is recommended to return to daily activities around 2 to 4 weeks afterwards, but it can take up to 6 weeks to fully heal. With this in mind, patients are advised against lifting heavy objects and engaging in intense physical activity for the first 6 weeks after the procedure.

However, as with every surgical operation, TURP carries risk of side effects. This procedure carries a minimal risk of erectile dysfunction, a moderate risk of bleeding, and a high risk of retrograde ejaculation.

TUIP

In the 60s, a less invasive therapeutic method began to develop - transurethral incision of the prostate gland (TUIP). It also uses a combined visual and surgical instrument (resectoscope) inserted through the urethra. In contrast to TURP, this less traumatic procedure involves making an incision using a Colling's knife, in the bladder neck and prostate without removing tissue. The incisions are made in two positions: at 5 and 7 o'clock. Incision starts just distal to the urethral orifice and ends just proximal to the verumontanum. Incisions are deepened until the prostatic capsule is divided [4].

The low invasiveness of the method results in shorter hospital stay, lower risk of bleeding and dry orgasms. Although due to the minimally invasive nature of the procedure, it has therapeutic limitations - it is mainly dedicated to patients with smaller glands (below 30-35 ml). It is also statistically associated with a higher reoperation rate.

In conclusion TUIP seems to be an effective alternative to TURP in the treatment of LUST caused by small prostate enlargements.

TURP syndrome in clinical trials

Transurethral resection of the prostate (TURP) syndrome is a rare but severe TURP complication occurring in approximately 0.78% to 1.4% of conventional monopolar procedures. The syndrome involves different severity of manifestations - from asymptomatic hyponatremia even to convulsions, coma or even death due to absorption of irrigation fluid during TURP. Probability of the TURP syndrome appears to be related to the amount of fluid that enters the circulation via the blood vessels in the resection area. TURP syndrome is associated with monopolar, but not bipolar TURP. In the bipolar method, the use of saline as an irrigation fluid practically reduced the risk closer to zero.

The treatment is mainly supportive and is the most successful if the diagnosis and interventions are made before systemic complications occur.

In the case report from 2012 [5] authors characterized thoroughly the entire procedure of the treatment. This study describes the case of a 78-year-old patient who developed TURP syndrome during the surgery. Symptoms began in the 155th minute of surgery, including cyanosis (SpO2: 88), bradycardia (HR 38/min), and hypotension (blood pressure 68/35 mm Hg). The patient was immediately administered atropine and

epinephrine, and the decision was made to terminate the procedure. Due to developing dyspnea, aminophylline and methylprednisolone were also administered, and bronchospasm was considered. Due to lack of response to treatment, 0.5 mg of epinephrine was administered, and norepinephrine infusion (0.5 μg/kg/min) was started. Simultaneous blood gas analysis results were as follows: Na 90 mmol/l, K 5.2 mmol/l, pH 7.125, pO2 70.5 mm Hg, pCO2 33.2 mm Hg, HCO3 11.3 mmol/l, base excess (BE) −17.0 mmol/l, osmolality 192 mmol/kg, haematocrit 20.1%. The patient was diagnosed with TURP syndrome and was administered diuretics as furosemide 20mg. The decision was made to transfer the still intubated patient to the intensive care unit. Mechanical ventilation (SIMV mode) was maintained within the unit. The unconscious patient's arterial blood pressure was 190/100 mmHg, so a decision was made to administer nitroglycerin infusion. A constant infusion of 0.9% NaCl was maintained. The patient regained consciousness after 4 hours and was extubated. Laboratory tests performed at that time showed a pH 7.22, PCO2 32.20 mmHg, PO2 141.00 mmHg, Hct 48.40%, K+ 4.50 mmol/l, and Na+ 110.00 mmol/l, glucose 151.00 mg/dl, osmolality 227.00 mmol/kg, lactate 3.20 mmol/l, HCO3 14.40 mmol/l, BE −13.10 mmol/l. Next day after surgery condition of the patient was stable, and the laboratory findings were Na 127 mmol/l and K 3.8 mmol/l. The patient was discharged from the intensive care unit. On the third day after surgery, the laboratory findings were Na 143 mmol/l and K 3.6 mmol/l. The patient remained under observation in the hospital. The patient was discharged a week after surgery, without a problem such as neurological damage and fluid-electrolyte imbalance.

The major risk factors for TURP syndrome include the size of the opened venous sinuses, the amount of the irrigation fluid used, using excess amounts of hypotonic intravenous fluids and most importantly, the duration of the resection. The risk is increased if the duration of the resection is longer than 60 min. [5]

In order to investigate the risk and the percentage of patients exposed to TURP syndrome, a study described in 2007 [6] observed 120 patients undergoing TURP with 1% ethanol in 1.5% glycine solution. Then, every 10 minutes, the alcohol content in the air they exhaled was tested. The results included observations of 112 study participants. More than half of them absorbed the irrigation fluid and had a significantly lower postoperative serum sodium concentration. Fourteen patients, representing 12.5% of the study participants, absorbed more than 500 ml of fluid. Clinical signs of TURP syndrome were observed in two of the operated patients.

This study did not take into account factors such as surgeon experience, operative time, or resection size. The study shows that although the complication rate for TURP syndrome is low, it remains greater than 0%. Despite years of refinement of the surgical method, the risk of this potentially severe complication remains.

Comparison of TURP and TUIP in clinical trials

In "*The clinical effectiveness of transurethral incision of the prostate: a systematic review of randomised controlled trials*" published in 2009 in World Journal of Urology [7] researchers compared TURP and TUIP using systematic review and meta-analysis of short- and long-term data from randomised controlled trials. The data from 795 randomised participants (including 8 of them defined the upper limit of prostate size) was taken into account in their review.

Surprisingly there was no big difference observed in the degree of symptomatic improvement between these two methods of treatment. Comparing the improvement in peak urine flow, for TUIP was lower than for TURP. However TURP turned out to carry greater risks, as exemplified by higher rate of blood transfusion and TUR syndrome.

In this study TUIP turned out to be associated with shorter operative time and longer hospital stay, but with a higher reoperation rate.

In another scientific work titled "*Transurethral resection versus incision of the prostate: a randomized, prospective study*" published in 1995 [8] the focus was on a comparison of longer term effects of TURP and TUIP in a randomised group of patients. This study included evaluation preoperatively and postoperatively of manifestations of symptoms associated with urinary system, uroflowmetry and sexual function. A total of 120 patients were enrolled in the study group, but three declined participation after randomization. Ultimately, 117 patients participated in the study, of whom 56 received a TURP and 61 a TUIP. Another five patients were lost to or excluded from follow-up. Therefore, 112 patients were eligible for postoperative evaluation with a mean follow-up time of 34 months (1 to 82 months). The examination showed improvement in mean urinary peak flow rates in both groups throughout the study period. In the TURP group the peak flow rates were generally higher, but the difference was not statistically significant. Postoperative irritative, obstructive, as well as total symptom scores decreased significantly at all followup visits after both TURP and TUIP (P

≤0.034). Preoperatively and at all postoperative follow-up there was no statistically significant difference in irritative, obstructive, or total symptom scores between TURP and TUIP.

In the results patients indicated an overall subjective improvement at all follow-ups in both groups, with no statistically significant difference between the treatment groups.

In "*A Comparative Study of Transurethral Resection of the Prostate (TURP) Versus Transurethral Incision of the Prostate (TUIP) in Small-Sized Prostate Glands With Benign Prostatic Hyperplasia"* [9] an attempt was made to compare the efficacy and safety of TURP and TUIP in patients with small prostate hyperplasia (<30 mL) using a prospective cohort study. The study took place from August 2024 to January 2025 at the Urology Department of the Sindh Institute of Urology and Transplantation, Karachi, and included 70 patients. Participants were men over 45 years old presenting with LUTS caused by the BPH. When qualifying patients for the study, the following criteria were used: a prostate volume of less than 30 mL (confirmed by transrectal ultrasound - TRUS), an IPSS greater than 21, a maximum urinary flow rate (Qmax) below 10 mL/s, and failure of prior medical therapy. The exclusion criteria included: urethral stricture, enlarged median lobe, neurogenic bladder, active urinary tract infection, suspected malignancy [elevated prostate-specific antigen (PSA) or abnormal digital rectal examination(DRE)], or previous prostate or urethral surgery.

Participants were divided into two equal groups of 35 participants: Group I receiving a TURP and Group II in which a TUIP was performed. All procedures were fulfilled under spinal anesthesia by a team of experienced urologists. Preoperative evaluation of patients including IPSS, uroflowmetry (Qmax, average flow, voided volume), and PVR urine was achieved using ultrasound. Postoperative evaluation was performed 6 months after surgery. In addition to measurements for comparison with preoperative results, attention was paid to evaluation for retrograde ejaculation and the need for reoperation.

When comparing demographic and preoperative characteristics, some similarities can be seen in the data collected from both groups. The groups did not differ significantly in age - the average age in Group I was 62.3 years, while in Group II it was 61.4. The preoperative IPSS value was similar - in Group I it was 22.7 and in Group II 23.These similarities allow for a reliable comparison of the results obtained in these study groups.

When comparing the parameters regarding the duration of surgery and hospitalization, differences between the methods can be seen. TURP procedures had a longer mean operative time of 60.2 minutes compared to 31.5 minutes in the TUIP group. This result means that the time needed to perform TURP is statistically twice the duration of TUIP. Similarly, catheterization duration was longer in the TURP group, averaging 3.1 days, whereas patients in the TUIP group required a mean of 1.7 days. Hospital stay was consistent across both groups, with a mean duration of one day. Blood transfusion was required in one patient (2.9%) in the TURP group, while no transfusions were needed in the TUIP group. [9]

However, the most important thing for this study is to compare the long-term effects of both methods. Both surgical groups demonstrated substantial postoperative improvements in urinary symptoms and flow dynamics at the six-month follow-up. Both groups showed improvement in IPSS values; in Group I from 22.7 to 11.9 and in Group II from 23.1 to 12.2. The average urinary flow rate also improved after the procedures. Measurements showed an increase in Group I from 7.2 mL/s to 12.6 mL/s and in Group II from 7.3 mL/s to 12.4 mL/s. Comparing the maximum flow rate, an increase can also be seen, from 12.8 mL/s to 17.4 mL/s in Group I and from 13.1 mL/s to 17.5 mL/s in Group II. Post-void residual urine volume showed a marked reduction in both groups, with Group I decreasing from 89.1 mL to 23.5 mL and Group II from 82.4 mL to 25.2 mL. [9]

Postoperative complications were minimal in both groups. The most noticeable difference in the participant-reported complications is the incidence of retrograde ejaculation. The incidence in Group I (TURP) was marked at 40%, significantly higher than the 12% observed in Group II (TUIP).

The study demonstrated the effectiveness of treatment for patients with small-volume BPH, including relieving LUTS. The improvements in IPSS, maximum urinary flow rate (Qmax), and PVR at six months were statistically significant and comparable between both surgical groups. The results may indicate some advantages of TUIP over TURP, such as shorter operative time, reduced hospital stay, lower complication rates, and better preservation of sexual function. The data obtained indicate that this less technically demanding and less time-consuming method is a valuable option, particularly in settings with limited surgical resources or high patient volume. The most significant difference between the methods remains the incidence of retrograde ejaculation. This more common complication after TURP impacts patient satisfaction and quality of life postoperatively. The anatomical rationale lies in the minimally invasive nature of TUIP, which preserves the ejaculatory ducts and neurovascular bundles by avoiding extensive resection and thermal injury to the

prostatic tissue [10]. Cited study did not focus on the reoperation rate, which, according to other studies, is higher in patients after TUIP.

In a prospective, randomised study titled: "*Transurethral Resection (TURP) Versus Transurethral Incision (TUIP) of the Prostate for Small Sized Benign Prostatic Hyperplasia: A Prospective Randomized Study*" [11], 80 patients divided equally into two groups of 40 participants with LUST caused by small prostate gland (estimated weight <30gm) had undergo TURP or TUIP. This prospective clinical study took place from January 2001 up to December 2005. This scientific work aimed to evaluate the efficacy of TUIP as a treatment modality for small size obstructive BPH and to compare its outcome with that of TURP. In order to compare both surgical techniques, patients were monitored at 3 to 4 months postoperatively. Sexual functions were included in the pre- and postoperative medical interview. In this study voiding symptoms were grated according to the American Urological Association (AUA) scoring system.

Comparing the preoperative data obtained from both groups reveals similarities, allowing for solid comparison of results of the study. Comparable data contains the average age, which in the TURP Group was 62.64 years, while in the TUIP Group it was 61.06. The preoperative total symptoms score (AUA) value was also alike - in the TURP Group it was 17.5 and in the TUIP Group 17.3.

All of the participants of this study have had LUST for more than three months. Some of them have received BPH treatment already. During examination all of the patients undergo an ultrasound examination, and necessary other investigations such as urinalysis, CBC, blood urea and serum creatinine level estimations. In all cases uroflowmetry was done pre- and postoperatively, however PSA level was estimated only in suspected patients. Cardiac, respiratory, metabolic functions were worked up.

Every patient was followed up at three to four months postoperatively, including subjective evaluation of outcome of operation and detailed symptoms score - AUA score. Due examination sexual stories, especially od ejaculation were taken. Dry coitus was considered as retrograde ejaculation. To evaluate maximum and average flow rate and post void residual volume of urine respectively, each patient underwent ultrasonography and uroflowmetry.

According to the comparison of different variables between TURP and TUIP group pre- and 3-months postoperatively, TURP and TUIP are both equally effective in relieving symptoms and improving urinary flow rates.

However some differences during comparison of operative and postoperative parameters between these two surgical methods of BPH treatment were pointed out. Starting from operative duration, for TURP it was mean 56,43 minutes (range 30-100 minutes) and mean 20,23 minutes (range 10-35 minutes) for TUIP. Comparing these results TURP takes twice the operative time than TUIP. Amount of irrigation fluid was (mean) 16,06 l (range 9-28 l) for TURP and mean 5,76 l (range 3-10 l) for TUIP. Half of patients (20; 50%) from the TURP Group needed blood transfusion while in TUIP Group only 5% (2 patients).

The cited study clearly indicated that TUIP is as effective as TURP for the treatment of small sized obstructive BPH. Both methods showed similar results in terms of sexual functions. The differences between the procedures are: operating time, requirement of irrigation fluid and blood transfusion, postoperative catheterization period and hospital stay, which are significantly (P>0.001) less in TUIP group than that of TURP.

In the author's conclusion TUIP was recommended for the treatment of LUTS caused by small size obstructing benign prostatic hyperplasia.

Discussion

Transurethral resection of the prostate (TURP) and transurethral incision of the prostate gland (TUIP) are both methods used in the BPH therapy. Comparing the data presented in the cited studies, both methods appear to have similar therapeutic efficacy in treatment of BPH with mild prostatic hyperplasia (<30 ml). TURP and TUIP seem to have similar effectiveness in treatment of small sized obstructing BPH. Both methods significantly improve urinary symptoms and flow metrics. Main difference is the enlargement of procedure and possibility of use in a larger number of patients when it comes to TURP. Another significant difference is rates of retrograde ejaculation, which is lower in TUIP than in TURP. Results obtained by the researchers seem to indicate the superiority of TUIP over TURP, which is also manifested by shorter operative and recovery times, statistically lower postoperative transfusion requirements.

Due to clinical effects the American Urological Association (AUA), Canadian Urological Association (CUA), and European Association of Urology (EAU) all endorse TUIP as a first-line option in patients with prostate volumes under 30 mL and without a prominent median lobe [2].

However, TURP remains the gold standard of treatment, which is influenced by several factors. Among them is undoubtedly the long-standing use of this method, and the resulting variability in surgical training, and limited awareness of current guideline recommendations. Taking into account the higher reoperation rate for TUIP indicated in the cited study [7], one can deduce why TURP remains the gold standard. Of course, the possibility of using it in a much larger group of patients is an expression of its versatility. To sum up, it seems that the limitations of TUIP application prevent this method from replacing the more traumatic therapeutic method, TURP.

Conclusions

Cited studies have shown that TUIP is as effective treatment method as TURP of relieving LUST caused by small sized obstructing prostate. This less traumatic operation also requires reduced operative and hospitalization time, little intraoperative haemorrhage and less irrigation fluid volume. Based on clinical effects TUIP is endorsed in some countries as a dedicated method of treatment of small prostate hyperplasia (<30 mL).

TURP remains the gold standard in BPH treatment regardless of several reports presenting TUIP to be as effective as TURP in relieving LUST symptoms Of course TURP can be chosen as surgical treatment on a larger group of patients with BPH because of the possibility of performing it on more enlarged prostates. Despite many years of improvement of the method, as shown in the studies cited, there is still a risk of TURP syndrome.

The versatility of the method, the possibility of its application to a larger group of patients and a lower percentage of the need for reoperation place TURP as the gold standard for the treatment of BPH.

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