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Transurethral resection of the prostate (TURP) and laparoscopic inguinal hernioplasty as combined versus separate procedures in the Era of COVID 19

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Abstract---Background: This study aimed to evaluate concurrent transurethral resection of the prostate (TURP) and laparoscopic totally extraperitoneal (TEP) inguinal hernia repair with determination of outcomes as combined versus separate procedures in the era of COVID 19.

Materials and Methods: This prospective randomized control study was conducted at Theodor Bilharz Research Institute hospital from 2021 to 2022. It included 52 patients with co-existing

uncomplicated unilateral or bilateral primary inguinal hernia and significant benign prostatic hypertrophy were operated in the same sitting in group A while in separate sessions in group B. The following outcomes were compared: duration of the surgery, conversion to open surgery (TURP or TEP), intraoperative and post-operative complications, duration of hospital stay, recurrence, patient satisfaction and pain scores, time taken to resume normal activity and cost of the treatment.

Results: This study included 52 patients with a mean age of 53 years (range of 45–80 years). The average time taken for the surgery was 126 min in group A while in group B was 140 min with no conversion to open prostatectomy or open hernia repair. The mean post-operative stay was 1.2 days in group A while in group B was 4.8 days. There were three patients (11.5%) with inguinal seromas identified one week post-operatively in group A versus one patient (3.8%) in group B; only two remained at 6 weeks and none at 12 weeks. None had significant bleeding intraoperatively or postoperatively. There was no superficial or deep wound infection (including mesh infection). There was no recurrence of inguinal hernia.

Conclusion: Concurrent TURP and TEP inguinal hernia repair is a practical, safe and cost-effective procedure in the era of COVID 2019.

Keywords---Benign prostatic hypertrophy, inguinal hernia, laparoscopic hernia repair, totally extraperitoneal repair, transurethral prostatic resection.

Introduction

The prevalence of inguinal hernia and Benign prostatic hyperplasia (BPH) in adult males increases with age (Wu *et al.*, 2020). The incidence of inguinal hernia in men undergoing prostatic surgery for BPH is 15–25% (Asefa, 2021); furthermore, 11–30% of patients undergoing hernia repair have symptoms of BPH which can precipitate postoperative urine retention requiring urological intervention (Walderich *et al.*, 2018). Uncorrected BPH may contribute to recurrence (Othman and Abdel-Maguid, 2010). The current trend of the treatment options for BPH is toward minimally invasive therapies, transurethral resection of the prostate (TURP) has become the 'gold standard' in the last half century (Anerson *et al.*, 2019).

Lichtenstein's mesh repair for the treatment of inguinal hernia is a well-documented technique with extremely low recurrence and complication rates (Ashrafi *et al.*, 2019). While Comparing laparoscopic totally extraperitoneal (TEP) and transabdominal preperitoneal (TAPP) hernioplasty with open repair found that the laparoscopic approaches were superior in terms of postoperative pain, numbness, hematoma formation, and surgical-site infection. Additionally, the laparoscopic approaches decreased the time required to return to normal activities by a mean of 7 days. However, they were also associated with higher cost, a longer operative time, higher incidence of seroma formation, and rare but serious visceral injuries (Thakur *et al.*, 2020). The results of simultaneous open

surgery for prostatic disease and inguinal hernia repair are well documented (Fernando *et al.*, 2019). However, despite the not infrequent practice of combining TURP with hernioplasty, there are few published results of their outcome (Reynard *et al.*, 2019).

Materials and Methods

This prospective randomized study included 52 patients complaining of inguinal hernia either unilateral or bilateral with symptomatic BPH. This study underwent in Theodor Bilharz Research Institute hospital through 2021 to 2022.

Patients were divided in two groups:

- Group A: included 26 patients operated by TURP and laparoscopic inguinal hernioplasty (TEP repair) in the same session.
- Group B: included 26 patients undergoing TURP alone followed by laparoscopic inguinal hernioplasty (TEP repair) in a separate session. Time lapse between 2 procedures was 3 months.

Inclusion criteria

Male patients from 40 to 70 years old with inguinal hernia either unilateral or bilateral with symptomatic BPH indicated for surgical treatment.

Exclusion criteria

- Patients with recurrent hernia.
- Patients with inguino-scrotal hernia.
- Patients with prostate size more than 80 grams on ultrasound.
- A biopsy proven carcinoma of the prostate.

All patients underwent detailed medical history, clinical examination, CT chest to exclude COVID patients, urine analysis with urine culture, and sensitivity, in addition to routine hematological and biochemical investigations for the diagnosis of BPH. An appropriate course of antibiotics was given to patients with urinary tract infection. The urine cultures of all patients were sterile before surgery. Patients were hospitalized on the day of surgery. All procedures were performed under general or spinal anesthesia. In group A: All patients were positioned in a semi-lithotomy position for TURP and supine Trendelenburg position for TEP. All patients underwent TURP followed by TEP.

Prophylactic antibiotic of third-generation cephalosporin (ceftriaxone 1 gm) was administered intravenously to each patient just before the start of surgery. Separate trolleys are prepared for the two procedures and the scrub nurse changed between procedures or if the same nurse continues into the second procedure, she de-washes and then washes up again, to minimize cross-infection and contamination.

TURP was performed using resectoscope 24 Fr and bipolar diathermy generator (AUTOCON III 400) that's the reason for using normal saline as an irrigant fluid in order to perform TURP without electrolyte imbalance. We performed TURP by Nesbit technique and the intervention is shown in the following pictures.

The prostatic resection is performed using bipolar cautery and saline solution (fig.1-4)



Fig. 1: The standard resectoscope

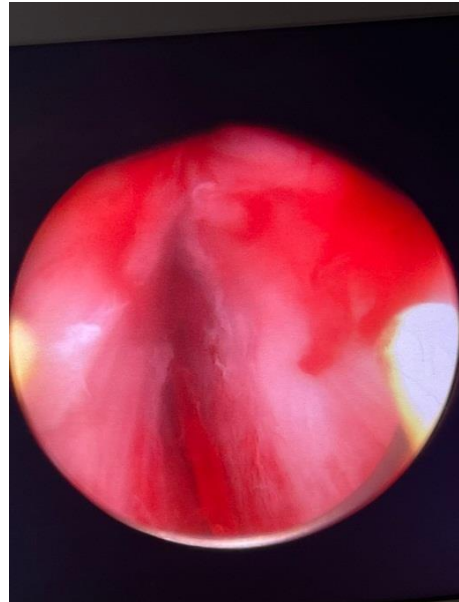


Fig. 2: Obstructing prostatic lobes

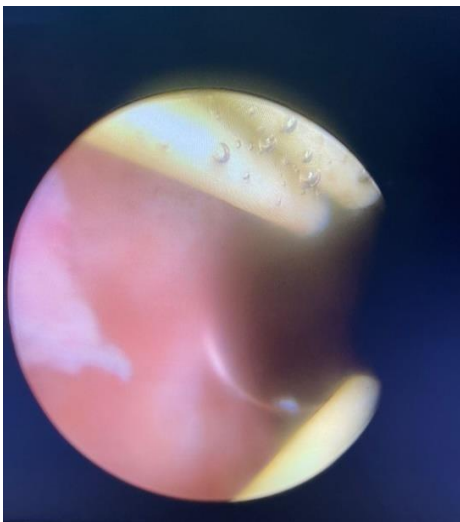


Fig. 3: Using bipolar resection



Fig. 4: After prostatic resection

A standard three-trocar technique was used for TEP. A blunt entry is made into the pre-peritoneal space via a sub-umbilical incision and a 10 mm trocar (the optic trocar) inserted therein. The pre-peritoneal space is then developed by telescopic dissection performed using a 0° telescope, under direct vision. Once the space is developed, we switch over to a 30° telescope and insert our working trocars. In unilateral or bilateral hernias, we insert the first 5 mm working trocar suprapubic before inserting the second 5 mm working trocar on the mid-point of the spino-umbilical line. In direct sacs, we dissect the sac and then reduce it completely after separating it from the pseudo-sac. Even in indirect sacs, we

attempt to reduce the sac completely. However, it is a challenge to reduce chronic, complete indirect sacs and in such cases, we the sac completely (fig. 5,6)

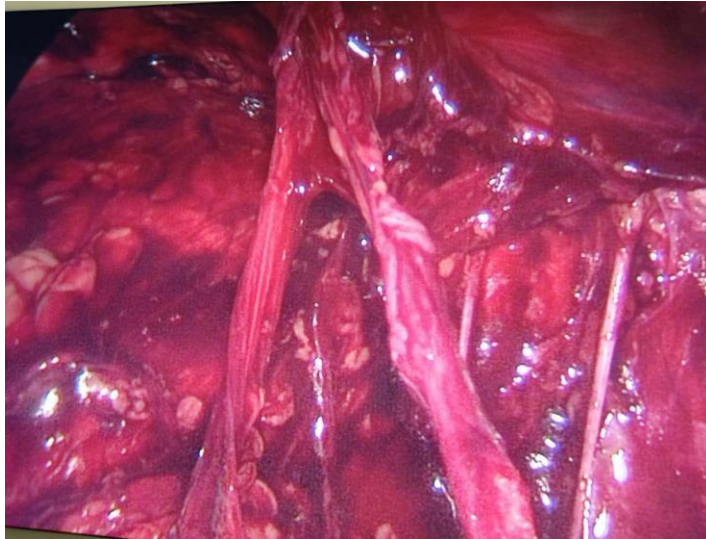


Fig. 5: Dissection of the sac, Triangle of Dome

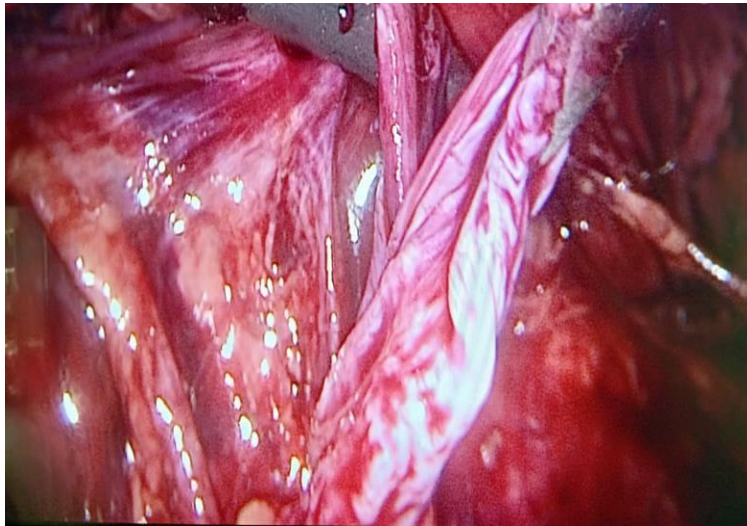


Fig. 6: Sac after completing dissection

Once the sac has been dealt with, adequate medial, lateral and proximal dissection is performed and the vas deference is dissected from the sac, without directly handling it. A standard polypropylene mesh (weight 80 g/m square, pore size 0.8 mm, size 15 cm × 12 cm) is used as a prosthesis, placed optimally over the defect without fixation (fig.7). For bilateral hernias, two such mesh pieces are placed (one on either side) with a slight central overlap.



Fig. 7: Placement of the mesh

In all the patients, a blood sample is collected and sent to the laboratory to check for serum electrolyte levels and hyponatremia in particular, in the immediate post-operative period. Diet is resumed 6 h post procedure. Patients are administered intravenous antibiotic (third-generation cephalosporin, ceftriaxone 1 gm) postoperatively, as per the hospital's antibiotic. Patients are discharged after 24 hours post-operative with urinary catheter on oral quinolone (ciprofloxacin) for 2 weeks. The operative wounds are inspected on the follow-up visit after one-week post-operative with removal of urinary catheter (fig.8).



Fig. 8: The operative wounds

In group B: we started with semi-lithotomy position for TURP then in the next session we use supine Trendelenburg position for TEP further steps of each operation as group A.

Results

The mean age of our patients was 53 years (45–80 years). The duration of the hernia varied from 3 to 26 months (mean 12.6 months). Seven (13.4%) patients had bilateral hernia, whereas forty five patients (86.6%) had a unilateral hernia (thirty right sided/fifteen left sided). The duration of prostatic symptoms varied from 9 to 24 months (mean: 16.2 months).

Table 1: Clinical characteristics of patients studied

HTN: Hypertension, IHD: Ischaemic heart disease, DM: Diabetes mellitus, COPD

	Group A	Group B	P value
Age (range)	45-75 years old	55-80 years old	0.174
Hernia side			
• Right	16	14	0.273
• Left	7	8	
• Bilateral	3	4	
Prostate volume-range (cc)	40-57 cc	45-80 cc	0.165
Co-morbidities			
• HTN	11	14	0.126
• IHD	2	3	0.354
• DM	9	10	0.434
• COPD	1	1	0
• Hypothyroidism	4	2	0.298

Chronic obstructive pulmonary disease, TURP: Transurethral resection of prostate.

Few patients had co-morbid conditions such as hypertension ($N = 25$), ischaemic heart disease ($N = 5$), diabetes mellitus ($N = 19$), hypothyroidism ($N = 2$) and chronic obstructive pulmonary disease ($N = 6$). In group A: the mean operative time for both the procedures was 126 min, while in group B: the mean operating time was 80 min for TURP and 60 min for TEP repair with significant difference between the both groups. The mean post-operative stay was 1.2 days in group A, while in group B was 3.6 for TURP and 1.2 for TEP repair with highly significant difference between the both groups.

Three patients (11.5%) developed inguinal seromas in group A versus one patient in group B (3.8%) [Table 2] which were identified one week post-operative. Both these seromas resolved spontaneously by 6 weeks. None of the patients had significant post-operative bleeding or haematoma. There was no wound or mesh infection. Three patients (11.5%) developed clot retention in the immediate post-operative period in group A versus one patient in group B (3.8%) and were treated with a bedside bladder wash with clot evacuation. No patients developed post-TURP urethral stricture in both groups.

There was no electrolyte imbalance (hyponatremia) in the intra-operative and immediate post-operative periods in any of the patients. The time taken to resume normal activities was 7 days. The hospital cost was reduced on an average by

35% in group A (6000 pounds) as compared to group B (9000 pounds) at our institute. Catheter-free trial was successful in all the patients. The patient satisfaction in group A was 9 while in group B was 6 with significant difference between the both groups P value = 0.02. The final histopathological report was negative for prostate cancer in all the patients.

Table 2: Perioperative, early and late post-operative complications

	Group A	Group B	P value
Mean operating time (min)	Hernia 51 min TURP 75 min	Hernia 60 min TURP 80 min	0.02
Mean postoperative hospital stay (day)	1.2 days	4.8 days	0.001
The hospital cost (pound)	6000 pounds	9000 pounds	
The patient satisfaction score	9	6	0.02
Pain score	7.3	8.1	0.198
Early post-operative complications			
• Significant haemorrhage	0	0	0
• Hyponatraemia	0	0	0
• Hypotension	0	0	0
• Wound/Mesh infection	0	0	0
• Clot retention	3 (11.5%)	1 (3.8%)	0.153
Late complications			
• Recurrence	0	0	0
• Seroma	3 (11.5%)	1 (3.8%)	0.153
• Urethral stricture	0	0	0
• Repeat TURP	0	0	0

Discussion

A significant association between inguinal hernia and BPH may be expected because they are two disorders with a higher rate of occurrence among elderly patients. The prevalence of inguinal hernia in men undergoing prostate surgery is 12%–23%, whereas 12%–25% of patients undergoing hernioplasty have the symptoms of BPH (Cimentepe *et al.*, 2006, Simons *et al.*, 2009 and Miserez *et al.*, 2014) Age-related muscular degeneration and increased intra-abdominal pressure secondary to BOO due to BPH may precipitate hernias.

When patients with BPH undergo hernia repair before relieving an obstruction, they become candidates for post-operative urinary retention and an increased rate of urinary tract infection, post catheterization (Eubanks *et al.*, 1997). The widely accepted standard procedures for BPH and inguinal hernia are TURP and Lichtenstein's operation, respectively (Farmer, 2009). However, since the early 1990s, relatively newer minimally invasive techniques for hernia repair (TEP/TAPP) have been added to the surgeon's armamentarium. In both the

methods (TEP and TAPP), a mesh prosthesis is placed in the pre-peritoneal space dorsal to the transversalis fascia, optimally covering the defect (Swadia, 2011). In several clinical studies and meta-analyses, TEP repair shows reduced post-operative pain, lower requirement of analgesia, early return to daily activities, fewer complications and low recurrence in experienced hands, as compared to open inguinal hernia repair (Cavazzola, Rosen, 2013 and Bittner *et al.*, 2015).

It has been preferred as on surgical teaching not to combine clean and clean-contaminated procedures. Hence, for a patient with an uncomplicated inguinal hernia who required a TURP as well, the dictum was to refer to the urologist for TURP first and then after complete recovery from the same, to subject him to hernia surgery at a later date. After extensively reviewing the available literature, we could identify only a few series which have studied concurrent open hernia repair and TURP. A study conducted by Bawa *et al.* on patients undergoing TURP and open hernia repair simultaneously has concluded that they did not find any increase in infection rate in the combined procedure group (Bawa *et al.*, 2003). This could be because the Lichtenstein's operation (open hernia repair) is an onlay meshplasty, i.e., the mesh is placed anterior to the muscle layer. This is where it differs from TEP, wherein the mesh is placed in the pre-peritoneal space. It is a well-known fact that aggressive resection of a large volume prostate gland, in some patients, causes micro-injuries and micro-perforations to the prostatic capsule at the bladder neck, which leads to extravasation of the fluid into the pre-peritoneal space (Salmela *et al.*, 1993 and Teo *et al.*, 2017) This has a strong theoretical potential to cause significant infection in the pre-peritoneally placed mesh of a concurrently performed TEP. This is probably the reason why concurrent TEP and TURP have never been studied, till date. However, a review of the literature does identify few papers that have studied concurrent performance of laparoscopic cholecystectomy (LC) and TAPP (another combination of clean and clean-contaminated surgeries). Quezada *et al.*, in their case series of 21 such patients, conclude that concurrent performance of LC and TAPP was not associated with an increase in the infection of the mesh (Quezada *et al.*, 2019)

Sarli *et al.* (2001) in their comparative study of 64 patients between LC + TAPP versus LC + open inguinal meshplasty have concluded that there was no difference between the two groups in terms of mesh infection and other post-operative complications. We encounter significant collection in the pre-peritoneal space in some patients in whom TEP was performed immediately after TURP. However, in five of these patients, we did encounter a small quantity of minimally blood-tinged clear fluid. This was sucked out and a sterile saline wash was given before continuing with the rest of the surgery.

The most important advantage of combining both the procedures together is single and short hospital stay especially in era of COVID-19 to minimize the risk of spreading infection. Other advantages as single session of anaesthesia, a shortened recuperation period and reduced costs; the theoretical risk of higher mesh infection was not evident in our study.

Conclusion

We believe that with appropriate case selection, concurrent TURP and TEP is a practical, cost-effective and safe procedure in the era of COVID 19. Optimum surgical techniques, the surgeon's experience with the procedures and meticulous pre-operative patient selection take us a long way in establishing the same results.

Ethical approval

The study's protocol was approved by the TBRI institutional review board under Federal Wide Assurance (FWA 00010609), with protocol number 655 and the research was conducted in accordance with the World Medical Association's Code of Ethics for Human Experiments (Declaration of Helsinki) and its Later Amendments (GCP guidelines) or comparable ethical standards.

Patient consent

Written informed consent was obtained from the patients for publication of this prospective study.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Abbreviation list:

TURP: Transurethral resection of the prostate.

TEP: Laparoscopic totally extraperitoneal.

BPH: Benign prostatic hyperplasia.

TAPP: Transabdominal preperitoneal.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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