Concurrent laparoscopic totally extraperitoneal inguinal hernia repair and transurethral resection of prostate: Breaking with convention – A retrospective study

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Abstract

Aim: This study aimed to evaluate concurrent laparoscopic totally extraperitoneal (TEP) inguinal hernia repair and transurethral resection of the prostate (TURP) with determination of outcomes.

Materials and Methods: This retrospective study was conducted at our hospital, from June 2011 to June 2020. Over 9 years, 17 patients with co-existing uncomplicated unilateral or bilateral inguinal hernia (primary/recurrent) and significant benign prostatic hypertrophy were operated in the same sitting. The following outcomes were compared: duration of the surgery, conversion to open hernia surgery, intraoperative and post-operative complications, duration of hospital stay, recurrence, time taken to resume normal activity and cost of the treatment.

Results: This study included 17 patients with a mean age of 65 years (range of 50–87 years). The average time taken for the surgery was 115 min with no conversion to open hernia repair. The mean post-operative stay was 3.7 days. There were four patients (23.5%) with seromas identified at day 10, 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. Two patients (11.7%) developed post-TURP urethral stricture and underwent cystoscopic stricturoplasty, 3 and 2.5 months after the initial procedure.

The time taken to resume normal activity was 7 (± 1) days. The hospital cost is reduced by 25% as compared to the sum of costs when both the operations are done separately.

Conclusion: Concurrent TEP inguinal hernia repair and TURP is a practical, safe and cost-effective procedure.

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

INTRODUCTION

The incidence of inguinal hernia and bladder outlet obstruction (BOO) due to benign prostatic hypertrophy (BPH) increases with age.[1,2] The overall prevalence of inguinal hernia in men undergoing...
transurethral resection of the prostate (TURP) for BOO is 12%–25%.\textsuperscript{[3‑5]} Only a few publications are available in the literature that have studied the surgical treatment of both these conditions simultaneously. However, all these have studied the concurrent performance of TURP and open inguinal hernia repair. None have ever studied the concurrent performance of totally extraperitoneal inguinal hernia repair (TEP) and TURP. In a retrospective analysis, González-Ojeda et al. concluded that the amalgamation of two procedures (TURP and open inguinal hernia repair) was practical, safe and effective.\textsuperscript{[6]}

At our institute, TEP and TURP in the same sitting is the treatment of choice in patients who have concurrent inguinal hernia and BPH, provided they satisfy our selection criteria. The current retrospective study aims to evaluate the early and long-term results in men who underwent concurrent TEP and TURP.

This case series, to the best of our knowledge, is the first to study the concurrent performance of TEP and TURP.

**MATERIALS AND METHODS**

Seventeen patients were included in this study [Table 1]. Intra and immediate post-operative data were collected from the hospital inpatient records of all 17 patients who underwent concurrent TEP and TURP between June 2011 and June 2020 at our hospital. For study purpose, all the patients who were past their last post-operative outpatient department (OPD) follow-up visit were interviewed telephonically with a standard questionnaire. Ours was a retrospective study of hospital inpatient records, OPD data and information obtained from the telephonic questionnaire. Two patients have died, 5 and 9 years after our surgery, both due to myocardial infarction.

All patients were prepared for the surgery on an outpatient basis. Relevant pre-operative investigations included urine analysis, urine culture, prostate-specific antigen assay (PSA) and ultrasonography (USG) of the prostate in addition to routine haematological and biochemical investigations.

Few patients had co-morbid conditions such as hypertension ($N = 12$), ischaemic heart disease ($N = 2$), diabetes mellitus ($N = 8$), hypothyroidism ($N = 3$) and chronic obstructive pulmonary disease ($N = 2$).

Only patients who satisfy the following criteria are subjected to concurrent TEP and TURP in our institute:

1. Patients with pus cells <5/high-power field of the microscope
2. Negative urine culture report
3. Normal serum PSA levels
4. <80 g of the prostate weight as estimated on USG
5. Uncomplicated and unilateral/bilateral inguinal hernia
6. Medically fit and stable patients (ASA I, controlled ASA II and ASA III).

Our exclusion criteria for the concurrent performance of TEP and TURP:

1. Patients with acute urinary tract infection
2. Acute urinary retention
3. Complicated inguinal hernias
4. Patients with coagulative disorders
5. Patients with the previous history of TEP or TURP.

The mean age of the patients was 65 years (50–87 years). All the patients were operated under general anaesthesia. The patients were positioned in a semi-lithotomy position for TURP and supine position for TEP repair. Ten patients underwent TURP followed by TEP and seven underwent TEP followed by TURP. Prophylactic antibiotic of third-generation cephalosporin (ceftriaxone 1 g + sulbactam 500 mg) was administered intravenously to each patient just before the start of surgery. Separate trolleys are prepared for the two procedures and the scrub nurse either changes between procedures or if the same nurse continues into the second procedure, he/she de-washes and then washes up again afresh, to minimise cross-infection and contamination. A standard three-trocar technique (with optimum triangulation) is 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.

| Table 1: Clinical characteristics of patients studied |
|-----------------------------------------------------|
| Characteristics of patients                        |
| n (%)                                               |
| Total number of patients                            | 17 |
| Age (range)                                         | 56-87 years old |
| Hernia side                                         |
| Unilateral                                         | 8 (47) |
| Right side                                         | 5 (29) |
| Left side                                          | 3 (17.4) |
| Bilateral                                          | 9 (52.4) |
| Operating time (min)                               |
| Hernia                                             | 50 |
| TURP                                               | 55 |
| Prostate volume-range (cc)                         | 40-80 |
| Primary hernia                                     |
| 13 patients (76.4)                                  |
| Recurrent hernia (open repair done previously)     | 4 patients (23.5) |
| Co-morbidities                                     |
| HTN                                                | 12 patients (70.5) |
| IHD                                                | 2 patients (11.7) |
| DM                                                 | 8 patients (47) |
| Hypothyroidism                                     | 3 patients (17.4) |
| COPD                                               | 2 patients (11.7) |

HTN: Hypertension, IHD: Ischaemic heart disease, DM: Diabetes mellitus, COPD: Chronic obstructive pulmonary disease, TURP: Transurethral resection of prostate.
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 hernias, we insert the contralateral 5 mm working trocar first and perform sharp dissection in the ipsilateral space to develop it some more, before inserting the ipsilateral 5 mm working trocar on the mid-point of the spino-umbilical line. The contralateral trocar is always inserted at a lower level (1–2 finger breadths below the mid-point spino-umbilical line) than the ipsilateral one so as to avoid “sword fighting” with the telescope. In direct sacs, we skeletonise 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 skeletonise, ligate and transect the sac. In bilateral hernias, we insert the 5 mm working trocar on the side of the smaller sac first and then follow the same steps as mentioned above. Once the sac has been dealt with, adequate medial, lateral and proximal dissection is performed and the vas deference is parietalised, without directly handling it. A standard polypropylene mesh (weight 80 g/m² square, pore size 0.8 mm, size 15 cm × 12 cm) is used as a prosthesis, placed optimally over the defect and fixed at safe points, to the Cooper’s ligament and the parietes using titanium tacks. For bilateral hernias, two such mesh pieces are placed (one on either side) with a slight central overlap. The prostatic resection is performed with standard cystoscopic techniques using monopolar cautery and glycine solution. In all the patients, a blood sample is collected and sent to the laboratory to check for serum electrolyte levels and hyponatraemia 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 g + sulbactam 500 mg) postoperatively, as per the hospital’s antibiotic policy. Catheter-free trial is given on day 3/day 4. The patients are discharged on day 3/day 4 of the surgery on oral quinolone (ciprofloxacin) for 2 weeks. The operative wounds are inspected on the follow-up visit on post-operative day 10.

RESULTS

The mean age of our patients was 65 years (50–87 years). The duration of the hernia varied from 6 to 15 months (mean 8.6 months). Nine (52.9%) patients had bilateral hernia, whereas eight patients (47%) had a unilateral hernia (five right sided/three left sided). Out of these 17 patients, four patients (23.5%) had a recurrent hernia (post previous open inguinal hernia repair).

The duration of prostatism varied from 7 to 18 months (mean: 11.8 months).

The mean operating time for both the procedures was 115 min. The mean post-operative stay was 3.7 days. Out of eight patients who underwent unilateral TEP, two developed seromas which were identified on their post-operative day 10 OPD visit. Both these seromas resolved spontaneously by 6 weeks. Out of the nine patients who underwent bilateral TEP, two developed seromas which were identified on their post-operative day 10 OPD visit. Out of these, one developed bilateral seroma and the other, a unilateral seroma (right sided) which resolved spontaneously in 12 weeks. In the patient who developed bilateral seromas, the right seroma resolved spontaneously in 6 weeks and the left in 12 weeks. None of the patients had significant post-operative bleeding or haematoma. There was no wound or mesh infection. One patient had an optic trocar site minor bleed during insertion, which was easily controlled. Two patients (11.7%) developed clot retention in the immediate post-operative period and were treated with a bedside bladder wash with clot evacuation. Two patients (11.7%) developed post-TURP urethral stricture [Table 2]. Both underwent cystoscopic stricturoplasty, one after 3 months and the other after 2.5 months from the first surgery.

There was no Electrolyte imbalance (hyponatraemia) in the immediate post-operative period in any of the patients. The time taken to resume normal activities was 7 days. The hospital cost was reduced on an average by 25% as

| Table 2: Perioperative, early and late post-operative complications |
|---------------------------------------------------------------|
| **Intraoperative complications** | **TEP, n (%)** | **TURP, n (%)** |
| Port site bleeding | 1 (5.8) | NA |
| Significant haemorrhage | 0 | 0 |
| Major vascular injury | 0 | NA |
| Spermatic cord injury | 0 | NA |
| Injury to urinary bladder | 0 | 0 |
| **Early post-operative complications** | | |
| Significant haemorrhage | 0 | 0 |
| Hyponatraemia | 0 | 0 |
| Hypotension | 0 | 0 |
| Wound/Mesh infection | 0 | 0 |
| Clot retention | NA | 2 (11.7) |
| **Late complications** | | |
| Recurrence | 0 | 0 |
| Seroma | 4 (23.5) | NA |
| Urethral stricture | NA | 2 (11.7) |
| Repeat TURP | NA | 0 |

TEP: Totally extraperitoneal, NA: Not available, TURP: Transurethral resection of prostate
compared to if the two surgeries were to be performed separately on two different occasions, at our institute. Catheter-free trial was successful in all the patients.

The final histopathological report was negative for prostate cancer in all the patients.

**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.\[^{7,9}\] Age-related muscular degeneration and increased intra-abdominal pressure secondary to BOO due to BPH may precipitate hernias.

When patients with BOO undergo hernia repair before relieving an obstruction, they become candidates for post-operative urinary retention and an increased rate of urinary tract infection, post catheterisation.\[^{10}\]

The widely accepted standard procedures for BPH and inguinal hernia are TURP and Lichtenstein's operation, respectively.\[^{11}\] 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.\[^{12}\] 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.\[^{4,13,14}\]

It has been a time-honoured 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.\[^{15}\] 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.\[^{16-18}\] 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.\[^{19}\] Sarli et al. 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.\[^{20}\]

We did not encounter significant collection in the pre-peritoneal space in those patients in whom TEP was performed immediately after TURP. However, in two 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.

To the best of our knowledge, this article is the first to study the concurrent performance of TEP and TURP. Apart from the obvious advantages of combining both the procedures together such as a single hospital stay, a single session of anaesthesia, a shortened recuperation period and reduced costs; the theoretical risk of higher mesh infection was not evident in our study, although larger studies are required to further confirm and establish this.

**CONCLUSION**

We believe that with appropriate case selection, concurrent TEP and TURP is a practical, cost-effective and safe procedure. 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. Follow-up periods of up to 9 years provided long-term information on mesh infection and hernia recurrence rates, in our study. We believe that in the future, larger studies on this topic will further validate our conclusions.
Patient consent
Written informed consent was obtained from the patients for publication of this retrospective 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.

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Conflicts of interest
There are no conflicts of interest.

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