

# Laparoscopic Mesh Hernioplasty: A Novel Method of Extraperitoneal Space Creation

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## ABSTRACT

**Introduction:** In the era of laparoscopic surgery, total extraperitoneal (TEP) hernia repair has become the standard procedure for treatment of inguinal hernias. While balloon is used to create extraperitoneal space in most Western countries, the financial burden of buying a balloon in a developing country like India is overwhelming. So, we present a case series of extraperitoneal space creation using a zero-degree telescope to reduce the cost of the surgery to a few thousand rupees (less than 100 dollars).

**Context:** Laparoscopic total extraperitoneal inguinal hernia repair.

**Aims:** To study the feasibility of creation of extraperitoneal space using a zero-degree telescope in laparoscopic total extraperitoneal hernia repair.

**Materials and methods:** It is a case series of 500 patients from June 2011 to July 2021. Furthermore, it is a single-surgeon experience.

**Results:** A Total of 500 laparoscopic TEP hernia surgeries were performed over a period of 10 years. Out of these, 485 patients were male and 15 patients were female. The age of patients ranged from 5 years to 85 years. Out of these, 50 patients (10%) were converted to transabdominal preperitoneal (TAPP) hernia repair. During the follow-up period, no hernia recurrence was found. No major complication was noted in any patients during this period. Seroma formation was noted in 25 patients (5%). Retention of urine was noted in 25 patients (5%). All patients returned to normal routine work within 2 weeks.

**Conclusion:** Zero-degree telescope is a feasible method of creating extraperitoneal space in laparoscopic total extraperitoneal repair.

**Key messages:** Slight changes in advanced laparoscopic methods can make these costly procedures accessible to a vast population of poor people in the world.

**Keywords:** Extraperitoneal space creation, Laparoscopic, Laparoscopic hernioplasty, Mesh hernioplasty, Total extraperitoneal repair.

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## INTRODUCTION

Inguinal hernioplasty has progressed from tissue-based repair of Bassini and mesh repair of Lichtenstein to laparoscopic hernia repair today which was reportedly first performed by Ger.<sup>1</sup> Initially, surgeons used the TAPP method for hernia repair.<sup>2</sup> But it was soon found out that entering peritoneal cavity for hernia repair has its own disadvantages such as inadequate closure of the peritoneum and injury to viscera from trocars and needles. To overcome these complications, total extraperitoneal (TEP) approach was developed. Total extraperitoneal approach eliminates complications related to entry into the peritoneal cavity and reduces operative time in bilateral hernias.<sup>2,3</sup>

Extraperitoneal space creation is most commonly done by balloon dissector as it simplifies the process.<sup>4</sup> The space creation can also be done without using balloon dissector. In this case, a zero-degree telescope (10 mm) is used to create the space by sweeping down fibrofatty tissues to the sides. But this may be difficult and time-consuming for inexperienced surgeons. Moreover, the surgeon may tear the peritoneum inadvertently leading to conversion of TEP to TAPP. So here we present a case series of TEP approach of laparoscopic hernia repair in which extraperitoneal space creation is done using a zero-degree telescope, thus reducing the cost of hernia surgery.

## MATERIALS AND METHODS

This is a case series of 500 patients from June 2011 to July 2021 with a follow-up period of at least 1 year. This study is a single surgeon

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experience which has been done in a premiere Government Institute in Eastern India.

All patients had to undergo pre-anesthesia checkup and fit patients were taken up for surgery. All patients were catheterized during the procedure, and the catheter was removed within few hours after surgery. A 10 mm incision was given just below the umbilicus. Anterior rectus sheath was identified and incised to expose rectus muscle. Two right-angled retractors were used to retract rectus muscle laterally to expose the posterior rectus sheath. A 10 mm trocar is pushed through the posterior rectus sheath to enter the extraperitoneal space. A zero-degree telescope is then introduced, and the space creation is done with gentle vertical and horizontal motion and plane achieved by identification of Cooper's ligament. Two 5 mm ports are created under vision, one



Fig. 1: 10 mm trocar being placed behind the rectus muscle



Fig. 3: Extraperitoneal space creation being done with zero-degree telescope

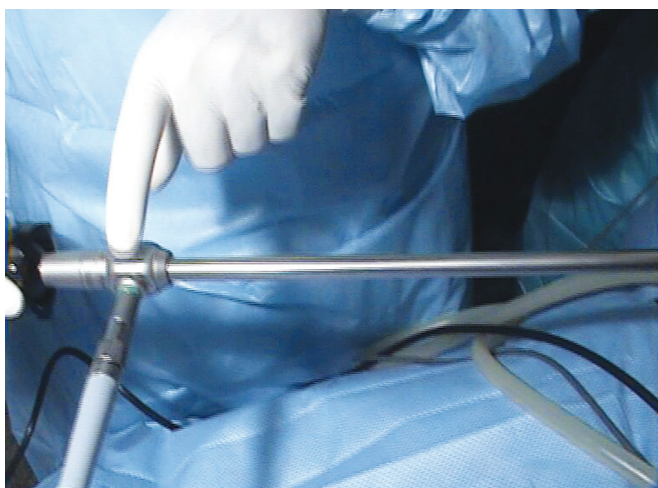


Fig. 2: Zero-degree telescope being used



Fig. 4: Mesh being sutured to Cooper's ligament

4–5 cm above the pubis and another in the middle. Hernial sac is identified, separated from cord structures, and pushed cephalad. The edge of the peritoneum is freed from vas deferens and testicular vessels and pushed downward. Now, a 15 × 15 cm prolene mesh is introduced through the 10 mm port and is positioned medially to overlap the pubic bone and laterally 2 cm beyond the deep ring. The mesh is fixed using prolene suture to the Cooper's ligament using single intracorporeal prolene suture. The abdomen is deflated under vision, so as to ensure no wrinkling of the mesh. All ports are closed and pressure bandage is given over the deep ring. All patients were given intravenous antibiotics for 1 day and analgesics for 2 days. Patients were discharged on the third day and follow-up was done after 1 month. Subsequent follow-up was done on yearly basis (Figs 1 to 4).

## RESULTS

A total of 500 laparoscopic TEP hernia surgeries were performed over a period of 10 years. The follow-up period was minimum of 1 year. Out of these, 485 patients (97%) were male and 15 patients (3%) were female. All patients had undergone pre-anesthetic checkup, and only fit patients were included in the study. Age of patients ranged from 5 years to 85 years. All patients were operated

laparoscopically with no conversion. Out of these, 50 patients (10%) were converted to TAPP due to either the inability to create a space due to previous surgery or due to inadvertent creation of bigger-size rent in the peritoneum. During the follow-up period, no hernia recurrence was found. No major complication was noted in any patients during this period. Few minor complications were noted. Seroma formation was noted in 25 patients (5%), which got resolved within 6 months with conservative treatment. Retention of urine was noted in 25 patients (5%). In these patients, recatheterization was done. No other complications were noted. All patients returned to normal routine work within 2 weeks.

## DISCUSSION

This single-surgeon experience supports extraperitoneal space creation using a zero-degree telescope to reduce the cost of laparoscopic hernia surgery in developing countries like India. Most commonly, balloons are used to create the extraperitoneal space. The cost of a balloon in India is around 20,000 rupees (~300 dollars), which is almost five times the total cost of hernia surgery. Also, intracorporeal suturing eliminates the need of tacker, which saves another 25,000 rupees (~400 dollars). The incidence of seroma formation in TEP is reported to be around 7%<sup>5</sup> in other

studies as compared with 5% in this study. Using only zero-degree telescope resulted in conversion to TAPP in 10% patients, which is an acceptable rate, keeping in mind the reduction of economic load on poor patients.

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