

INITIAL EXPERIENCE AND OUTCOMES OF SINGLE-PORT LAPAROSCOPIC TRANSABDOMINAL PREPERITONEAL REPAIR FOR INGUINAL HERNIAS, BIHAR, INDIA: A CLINICAL STUDY.

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ABSTRACT

Introduction

Inguinal hernia repair is the most common surgery worldwide. Laparoscopic inguinal hernia repair has many advantages over open treatment. Single-incision laparoscopic surgery (SILS) reduces the invasiveness of laparoscopy. This innovative approach has garnered considerable success and has been effectively executed by numerous skilled surgeons.

Methods

The present study was conducted over a duration of twelve months, within the Department of General Surgery in a tertiary care centre. This study was conducted on a cohort of 40 patients who presented with uncomplicated inguinal hernia. Among this group, 20 patients underwent single port laparoscopic transabdominal preperitoneal (TAPP) repair, while the remaining 20 patients underwent conventional TAPP repair.

Results

The average age, weight, and height were 43.45 years, 58.46 kilograms, and 156.1 centimeters, respectively. These measurements were found to be nearly identical for both conventional TAPP procedures, indicating no statistically significant differences. In the present study, a total of 24 participants (51%) were diagnosed with indirect inguinal hernia, while 22 participants (47%) were diagnosed with direct inguinal hernia. Notably, the observed disparity between the two groups was found to be statistically insignificant. There was a notable increase in postoperative complications observed in patients who underwent the conventional transabdominal preperitoneal (TAPP) procedure. The duration of hospitalization following single port TAPP surgery was observed to be significantly shorter compared to conventional TAPP surgery.

Conclusion

Therefore, in comparison to the conventional technique, single port TAPP surgery demonstrates a reduced duration of the procedure and administration of general anesthesia. Additionally, it presents a decreased incidence of postoperative complications, a shorter hospitalization period, and an expedited recovery process.

Recommendations

The study recommends single-port laparoscopic transabdominal preperitoneal (TAPP) repair for simple inguinal hernias. It decreases process time, postoperative issues, hospitalization, and recovery time compared to normal TAPP repair. Surgeons considering inguinal hernia surgery should consider these benefits.

KEYWORDS: *Single port laparoscopic repair, Transabdominal Preperitoneal, Inguinal Hernia, Totally Extraperitoneal*
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INTRODUCTION

Inguinal herniorrhaphy is a widely practiced surgical intervention that is frequently conducted on a global scale [1]. Laparoscopic methodologies employed in the repair of inguinal hernias, namely the transabdominal preperitoneal

(TAPP) and totally extraperitoneal (TEP) approaches, present a multitude of benefits in contrast to conventional open repair techniques [2]. When juxtaposing the TAPP and TEP approaches, it is frequently acknowledged that TAPP is commonly perceived as more facile to acquire proficiency

in and may exhibit a comparatively abbreviated learning trajectory [3]. Current studies have primarily concentrated on the continued advancement of laparoscopic procedures with the aim of diminishing invasiveness. This is achieved through the reduction of incisions and the minimization of port dimensions. The objective of this approach is to mitigate postoperative pain and minimize the occurrence of complications related to incisions. Single-incision laparoscopic surgery (SILS) has been devised with the intention of attaining these objectives and has been effectively executed by a multitude of surgeons [4]. The aim of this study is to evaluate the initial experience and outcomes of single-port laparoscopic transabdominal preperitoneal (TAPP) repair as a surgical technique for uncomplicated inguinal hernias, with a focus on comparing its advantages and outcomes to conventional TAPP repair.

METHODOLOGY

Study design

An observational clinical cohort study was conducted.

Study setting

The present investigation was carried out at the esteemed Department of General Surgery in a tertiary care centre, spanning a duration of one calendar year (1st January 2022 to 31st December 2022).

Participants

The study encompassed a cohort of 40 individuals who exhibited uncomplicated inguinal hernias. Within this cohort, a total of 20 patients were subjected to single-port laparoscopic TAPP surgery, while the remaining 20 patients underwent conventional TAPP surgery.

Inclusion criteria

1. Individuals presenting with uncomplicated symptomatic inguinal hernia.
2. Unilateral inguinal hernias refer to the presence of hernias in the inguinal region on one side of the body.
3. The present case pertains to a primary hernia or an initial recurrence.

Exclusion criteria

The study excluded individuals who were immobilized as a result of cancer. Subjects who exhibited remission of prostate and other malignancies were likewise excluded from the study cohort. Furthermore, individuals who fulfilled any of the subsequent criteria were deemed ineligible for inclusion in the study:

1. The patient presented with comorbid conditions that rendered them unsuitable for the administration of general anesthesia (GA).

2. Complex hernias.
3. Intrabdominal or pelvic malignancy refers to the presence of cancerous growths within the abdominal or pelvic regions.
4. Maternal gestation at an advanced stage.
5. The patient presents with a condition characterized by either morbid obesity or ascites.

Study size

The study's cohort consisted of 40 patients with chronic groin edema lasting for one month or more, excluding pediatric patients. To arrive at this final cohort size, we meticulously applied a set of inclusion and exclusion criteria. Inclusion criteria were designed to include individuals with uncomplicated symptomatic inguinal hernias, specifically those with unilateral primary hernias or initial recurrences. On the other hand, exclusion criteria were applied to rule out patients immobilized by cancer conditions, including those in remission from prostate and other malignancies. Additionally, individuals unsuitable for general anesthesia due to comorbid conditions, those with complex hernias, intrabdominal or pelvic malignancies, advanced-stage maternal gestation, or conditions involving morbid obesity or ascites were also excluded from the study. This thorough selection process ensured that the study cohort exclusively comprised individuals with uncomplicated inguinal hernias who were suitable candidates for the selected surgical techniques.

Bias

There was a chance that bias would arise when the study first started, but we avoided it by giving all participants the identical information and hiding the group allocation from the nurses who collected the data.

Data collections and analysis

The patients underwent comprehensive evaluation encompassing a range of variables, such as demographic characteristics, duration of surgical procedure, requirement for conversion to either traditional TAPP or open surgery, occurrence of postoperative complications, and duration of hospitalization following the surgical intervention.

Equipment used in the study included

- A 30-degree telescope.
- CO₂ insufflator.
- Endoscopic video CCD chip camera.
- High-resolution color monitor.
- Halogen xenon light source.
- Universal light guide cable.
- Videocassette recorder.
- CO₂ cylinder and connecting pipe to insufflators.
- Electric cautery.
- Suction apparatus.

Basic surgical instruments used:

- Verres needle.
- Reduction tube.
- Grasping forceps.
- Dissecting forceps.
- Scissors.
- Laparoscopic Babcock forceps.
- Spatula dissector.
- Single port with trochars 10mm and 5mm.

The equipment utilized for Single Port Repair (SPL) can be classified into two distinct categories, namely the access port and hand instruments. The access ports utilized in the study encompassed GelPOINT, manufactured by Applied Medical, and SILS, developed by Covidien. Hand-held instruments were found to be available in two distinct configurations, namely standard or articulating.

The laparoscopic Single Port Access (SPA) procedure was executed utilizing a singular trochar, housing a solitary instrument equipped with an optical lens and a channel designed for grasping purposes. The procedural maneuvers encompassed:

1. Incising the peritoneum.
2. Raising the peritoneal flap.
3. Dissection of the medial peritoneum and direct sac.
4. Lateral dissection.
5. Dissection of the indirect inguinal hernia sac and peritoneum within the cord.

6. Preparation and placement of the mesh.
7. Retroperitonealization.

Statistical analysis

IBM SPSS version 26 was used for all analyses. The information is provided as the number, number (%), or mean ± SD. P values less than 0.05 were regarded as statistically significant.

Ethical considerations

The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

RESULT

The mean age, weight, and height of the participants were 43.45 years, 58.46 kg, and 156.1 cm for single port TAPP and 43.06 years, 60.46 kg, and 158.49 cm for conventional TAPP, respectively. These values were found to be similar for both conventional TAPP procedures, indicating no statistically significant differences. In the present investigation, a total of 24 individuals (51%) were diagnosed with an indirect inguinal hernia, while 22 individuals (47%) exhibited a direct inguinal hernia. Notably, the observed disparity between these two groups did not reach statistical significance. All patients included in the study exhibited a unilateral inguinal hernia, accounting for a total of 100% of the observed cases.

Table 1: Patient demographics

Demography	Conventional TAPP	Single port TAPP	p-value
Mean age	43.06	43.45	0.26
Mean weight (kg)	60.46	58.46	0.31
Mean height (cm)	158.49	156.1	0.11

The incidence of postoperative complications was found to be significantly higher in patients who underwent conventional TAPP surgery compared to other surgical approaches. Notably, none of the patients who underwent conventional TAPP or open surgery required conversion to another surgical technique.

Table 2: Post-operative complications.

Group	No. Of Patients	Complications	Hospital Stay
Conventional	20	5	2.8
Single Port TAPP	20	1	1.65

DISCUSSION

In the present study, a total of 20 patients were enrolled in each group, namely the single-port TAPP group and the conventional TAPP group. The mean age of patients in the single-port TAPP group was determined to be 43.86 years, while in the conventional TAPP group, it was found to be 43.06 years. These findings align closely with the results

reported in prior studies conducted by Tai HC *et al.* [5] (46.5 years) and Ertem M *et al.* [6] (53 years).

In the present study, the average duration of the single-port TAPP procedure was found to be 80.5 minutes, which was observed to be significantly lesser compared to the conventional TAPP technique. This finding aligns with the study conducted by Tai HC *et al.*, [5] wherein they successfully performed the single-port TAPP procedure on

a cohort of 22 patients, with an average operative time of 81.5 minutes. Importantly, none of the patients required conversion to the conventional TAPP technique during the course of the procedure. In a study conducted by Sato *et al.*, [7] a cohort of 35 patients was subjected to treatment, with an average operative duration of 91.2 minutes. In a study conducted by Etem M *et al.*, [6] the authors reported a mean operative time of 96.48 minutes among a cohort of 47 patients. The average duration of the surgical procedure in the cohort of 20 patients who underwent conventional TAPP hernia repair was found to be 94.5 minutes. In a separate investigation conducted by Sato H *et al.*, [7] the mean operative time was reported to be 86.1 minutes.

In the present study, a cohort of 20 patients was subjected to single-port TAPP procedure. Following the surgical intervention, a total of 1 patient (5%) experienced postoperative complications, specifically the development of seroma. However, it is noteworthy that the aforementioned complication was effectively managed through the implementation of repeated aspiration. In a study conducted by Tai H *et al.*, [5] it was observed that a total of 2 patients, accounting for 12.5% of the study population, encountered postoperative complications. In the investigation involving a cohort of 20 patients, the conventional TAPP procedure was employed. Out of these patients, 5 individuals (23%) experienced postoperative complications. Specifically, 4 patients (19%) encountered urinary retention, while 1 patient (5%) developed a postoperative umbilical hernia originating from the umbilical port. The latter case necessitated surgical intervention after a period of six months. Hawasli *et al.*, [8] conducted a study wherein they employed the conventional TAPP technique for the management of recurrent inguinal hernia. The researchers observed postoperative complications in a total of 18 patients, corresponding to an incidence rate of 13%. These complications encompassed 15 cases of hematoma formation, two instances of seroma development, and one occurrence of urinary retention. A single instance (0.7%) of recurrence was observed in a patient who did not undergo the utilization of staples during their surgical intervention.

In the present investigation encompassing a cohort of 20 individuals who underwent single-port TAPP procedure, it was observed that the average duration of hospitalization following the surgical intervention was determined to be 1.65 days. This duration was found to be significantly reduced in comparison to the conventional TAPP approach, which exhibited an average postoperative hospital stay of 2.8 days. These results are consistent with the findings of studies conducted by JiHoon Kim *et al.* [9] and Lee YS *et al.*, [10] which documented average durations of hospitalization as 2.15 days and 2 days, correspondingly. Henceforth, in comparison to the traditional approach, single-port TAPP procedure presents numerous benefits:

1. Decreased duration of surgical intervention and administration of general anesthesia.
2. A reduction in postoperative complications.
3. The implementation of a reduced duration of hospitalization and expedited recuperation.
4. There is a negligible likelihood of recurrence.

The primary drawback associated with single-port TAPP surgery is the constrained range of motion resulting from the close proximity of the operative ports and the restricted ability to achieve optimal triangulation.

CONCLUSION

The utilization of a singular port TAPP approach, employing identical techniques and instruments as those employed in traditional TAPP procedures, demonstrates a propensity for enhanced safety and efficiency, resulting in reduced instances of recurrence and shorter durations of hospitalization.

Limitations

The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

Recommendation

Based on the study's findings, we recommend considering single port laparoscopic transabdominal preperitoneal (TAPP) repair as a preferred surgical technique for uncomplicated inguinal hernia cases. This approach offers benefits such as shorter procedure duration, reduced postoperative complications, shorter hospitalization, and faster recovery compared to conventional TAPP repair. Surgeons should weigh these advantages when selecting the surgical method for inguinal hernia patients.

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List of abbreviations

TAPP- Transabdominal preperitoneal
TEP- Totally Extraperitoneal
SILS- Single-incision laparoscopic surgery
GA- General anesthesia
SPL- Single Port Repair
SPA-Single Port Access

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Conflict of interest

The authors report no conflicts of interest in this work.

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