



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Surgical technique of laparoscopic hybrid approach for recurrent inguinal hernia: Report a case

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ARTICLE INFO

Article history:

Received 15 May 2018

Received in revised form 27 June 2018

Accepted 2 July 2018

Available online 7 July 2018

Keywords:

Inguinal hernia

Hybrid technique TAP

TEP

ABSTRACT

INTRODUCTION: Currently, laparoscopic surgery (LS) is a widely accepted surgical treatment for inguinal hernias, and it has major advantages, especially for recurrent cases.

PRESENTATION OF CASE: We diagnosed the recurrent inguinal hernia after wound infection and performed the laparoscopic approach. We would like to introduce our method.

<① **First step: TAPP part**> We distinguished between the presence and absence of bilateral inguinal hernia with an intra-abdominal scope using the transabdominal preperitoneal inguinal hernia repair (TAPP) technique, which we call laparoscopic examination. Thus, we can distinguish between the types of inguinal hernias and whether they are bilateral or not.

<② **Second step: totally extraperitoneal (TEP) part**> We dissected the Retzius space on the inside of an epigastric arteriovenous fistula as part of TEP part A, and dissection was performed without a balloon. We separated and dissected the Retzius space. We also performed lateral dissection of the preperitoneal space.

<③ **Third step: TAPP part**> We made an incision in the peritoneum at the inner groin ring (hernia sac). We isolated the cord structures (parietalization) using TAPP.

<④ **Final step: TAPP part**> We finally checked this operation from the abdominal space (TAPP filed) and determined whether the repair was satisfactorily completed or not.

DISCUSSION: Our hybrid method is not special but the conventional laparoscopic approach adapted each merits both TAPP and TEP.

CONCLUSION: Our method is effective for difficult recurrent inguinal hernias.

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1. Introduction

Laparoscopic surgery (LS) is currently a widely accepted surgical treatment for inguinal hernia, and it is the standard treatment for bilateral inguinal hernias. The laparoscopic approach (transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP)) is an especially effective option for the treatment of bilateral hernias [1]. Furthermore, we believe that LS has major advantages for the treatment of recurrent inguinal hernias. If the laparoscopic approach for recurrent inguinal hernia is performed after an anterior approach has been performed, the rational choice is to adopt a posterior approach with almost no adhesions. Herein, we successfully performed a laparoscopic transabdominal approach after

performing the extraperitoneal approach for recurrent infectious inguinal hernia. We would introduce our surgical technique for difficult cases of recurrent inguinal hernia.

Our case report was based on the SCARE Guidelines [2].

2. Presentation of case

An 68-year-old man was admitted to local hospital in New Zealand because he presenting with a strangulated inguinal hernia. Strangulation of the small intestine was observed in the right inguinal region on abdominal computed tomography, and reposition was impossible; Therefore, an emergency surgery was performed.

Since the strangulated small intestine appeared dark red and necrosed, partial resection of the small intestine was performed with incision of the anterior approach.

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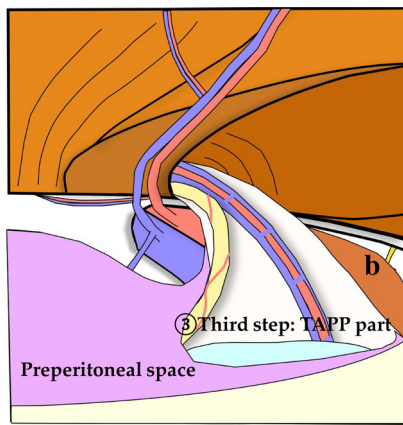
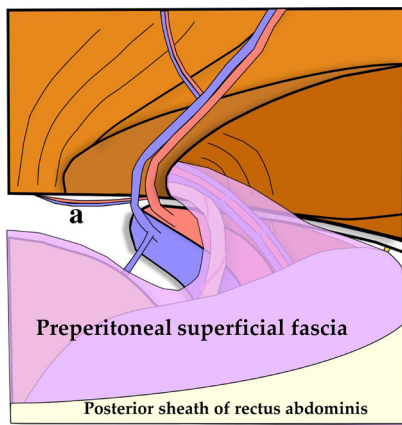


Fig. 1. Operation approach.

(a) TEP field. (b) TAPP part from TEP field.

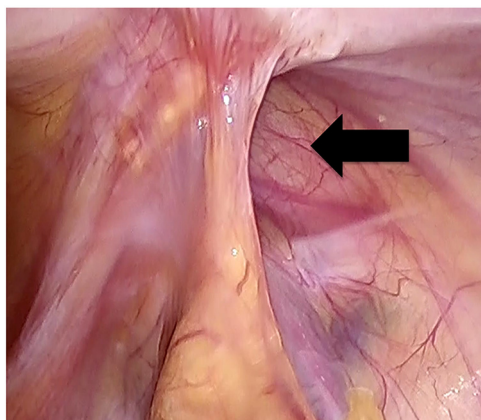


Fig. 2. Laparoscopic examination (TAPP part). We diagnose whether bilateral hernia was present or not. In this case the right side is a recurrent indirect hernia (black arrow).

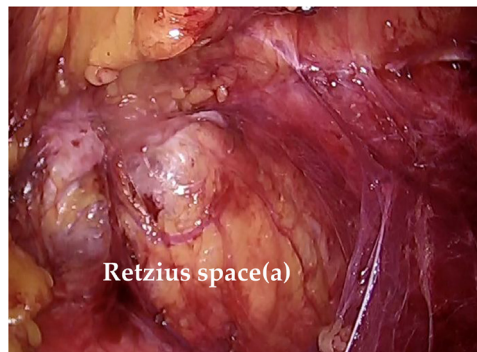


Fig. 3. Hybrid method (TEP part). We separated and dissected Retzius space (a) and lateral preperitoneal space (b). Adhesion of the recurrent hernia was strong and severe.

Wound infection after this surgery seemed to be healed by use of a vacuum-assisted closure system. About three months later, this patient attended our hospital in Japan because of bulging and discomfort in the right inguinal region. We diagnosed the recurrent inguinal hernia after wound infection.

We performed the laparoscopic approach because the previous operation method is unknown in details. Our procedural approach is shown in (Fig. 1b, posterior approach). Operations were performed with the patient under general anesthesia and in the supine position. A port was placed 12 mm below the umbilicus at midline. Two 5-mm ports were inserted in the midline. Two working ports were placed in the midline between the umbilicus and the pubis. The lower port was placed 2 finger breadths above the pubis symphysis (3-port method).

We diagnosed whether bilateral inguinal hernia was present or not thorough the intra-abdominal scope using transabdominal preperitoneal inguinal hernia repair (TAPP), which is laparoscopic examination. In this case, findings on the left side pertain to direct hernia and findings on the right side pertain to recurrent indirect hernia. Thus, we can diagnose the type of inguinal hernia as bilateral or not. (Fig. 2) <① First step: TAPP part>.

We dissected the Retzius space in the inside of epigastric arteriovenous (Fig. 1a) as part of TEP because of the severely strong adhesion to the right inside region. A dissection was made through a subumbilical incision without a balloon. We separated and dissected the Retzius space. The lateral dissection of the preperitoneal space was performed following the insertion of 5-mm trocars on

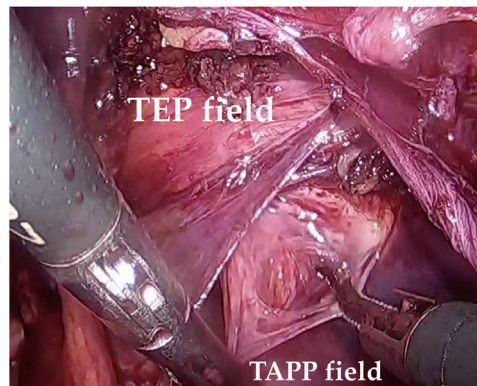


Fig. 4. Hybrid method (TAPP part). We started peritoneotomy at the inner groin ring (hernia sac).

the midline, midway between the symphysis pubis and the umbilicus. (Fig. 1b). The adhesion of recurrent hernia was very strong. (Fig. 3) <② Second step: TEP part>.

We made an incision in the peritoneum using Sonosurg (Olympus) at the inner groin ring (hernia sac) (Fig. 4). We isolated cord structures (parietalization) as part of TAPP because the adhesion of the right inside region extremely strong. Moreover, the hernia sac was big. Subsequently, 3DMAX™ (3D Mesh: BRAD) was placed in the preperitoneal space and tacking was accomplished by AbsorbaTack™ (COVIDIEN) (TEP filed) <③ Third step: TAPP part>.

We reviewed the results of the operation from the abdominal space after the procedure (TAPP filed) and determined whether the repair is satisfactory or not <④ **Final step: TAPP part**>.

He had an unremarkable postoperative course and was discharged in remission from our hospital 5 days after surgery. The patient was no recurrence has been noted after 2 years.

3. Discussion

Open peritoneal repair (anterior approach) is a tension-free method for inguinal hernia that was first described in the late 1990s. In particular, the mesh plug operation was performed as described by Robbins and Rutkow [3]. The mesh plug method is a tension-free method that has been popular in Japan since the 1990s.

The only aim of the anterior approach is to close the external oblique and Sarpa's fascia, termed as the onlay patch. Meanwhile, the posterior approach, such as the use of Kugel patches, is to close the whole internal and external oblique, as well as the femoral and obturator foramen. This Kugel posterior herniorrhaphy was introduced in 1999 [4] and is known as a reasonable method. However, the Kugel posterior approach is associated with a steep learning curve and a high recurrence rate during the early learning time [5,6]. As a result, the posterior approach is not widely used and only about 10% of inguinal herniorrhaphy in Japan utilizes this method because of its unusual, complicated anatomy [7].

Recently, laparoscopic inguinal hernia repair was introduced and the two laparoscopic approaches include transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP).

Moreover, the cost for these operations considering Japanese insurance is high and the laparoscopic approach is rapidly increasing in our country.

Each laparoscopic approach has its own complication profile and learning curve. The learning curve of the laparoscopic approach seems to be especially steeper compared with the anterior approach. However, according to Feliu et al. [8] the laparoscopic approach has several advantages, such as the reduction of postoperative pain and disability; mesh placement in the preperitoneal space where the hernia is produced; bilateral repair by single access; and the possibility that unexpected contralateral hernias can be simultaneously repaired [9,10].

The laparoscopic approach (posterior approach) adapted the advantages of Kugel hernioplasty making it possible to perform at the new layer even if the inguinal hernia is recurrent following the anterior approach, producing a high level of completion as a result.

The laparoscopic approach can be performed transabdominally (TAPP) or totally extraperitoneal (TEP). Choosing one or the other will depend on the laparoscopic skill and preferences of surgeons. In addition, most surgeons discuss the pros and cons associated with TAPP versus TEP. It does not make sense. Both methods (TAPP and TEP) are the same laparoscopic approach. We should only perform both approaches to acquire the advantages associated with each. Our hybrid method is not special. It is a conventional laparoscopic approach which adapted the advantages of both TAPP and TEP.

Our hybrid method can be performed in order to quickly master TAPP and TEP and to combine the merits of each.

Our method is simple, as we stated in the Surgical Technique (4 steps).

First, we determine whether the inguinal hernia is bilateral or not. Second, Retzius space is dissected by TEP and we performed the parietalization in the outside of epigastric arteriovenous by TAPP. Finally, we confirmed the last check by looking at factors such as mesh size and position.

We surmise that it is difficult to perform only the anterior approach in this case. In cases of recurrent inguinal hernias where

the adhesion is deep, our hybrid method is especially useful and should be performed.

The World Guidelines for Groin Hernia Management [11] recommended that surgeons/surgical services provide both types of approach.

We believe that we should perform the anterior approach, such as the Mesh Plug method, and also the posterior approach, such as the Kugel Method in addition to the laparoscopic approach, such as TAPP and TEP, to treat any inguinal hernia.

If the laparoscopic approach for recurrent inguinal hernia is performed after an anterior approach has been performed, the rational choice is to adopt a posterior approach with almost no adhesions as we described the introduction. It is easier to understand in anatomical terms and also offers the prospect of mechanically strong recovery, decreasing the likelihood of recurrences. Our hybrid method (mixed TAPP and TEP) is effective for difficult recurrent inguinal hernias.

Conflicts of interest

None of the authors has any conflict of interest to declare.

Funding

None.

Ethical approval

We have gotten the ethical approval of this study by ethics committee.

This method is covered by Japanese insurance.

And ethical approval by **SHIROYMA OP2 2017**.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

We believe that this surgical technique is unique and effective. Toshikatsu Nitta is Author myself. Takashi Kinoshita and Takashi Ishibashi, is my supervisor to check my operation and this paper Jun Kataoka, Masato Ohta, Kensuke Fujii, they are working under my division of surgery to help me. This team combination of our hospital could perform these therapies.

Research registry

researchregistry4091.

Guarantor

Toshikatsu Nitta.

Acknowledgements

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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