

Use of barbed suture for peritoneal closure in transabdominal preperitoneal hernia repair

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Abstract

AIM: To investigate the use of the V-Loc wound closure device for transabdominal preperitoneal hernia repair.

METHODS: We performed conventional transabdominal preperitoneal hernia repair in 19 patients, including one single incisional case using V-Loc. Except for the use of V-Loc for peritoneal closure, the procedures were the same as those used in conventional techniques.

RESULTS: Although the operators included 2 residents who have no experience in laparoscopic herniorrhaphy and intracorporeal suture, the operations were completed. We believe that V-Loc is especially suitable for inexperienced surgeons and the use of V-Loc reduces the operative time by a small amount but reduces operator stress significantly.

CONCLUSION: We conclude that V-Loc is the ideal peritoneal closure device for transabdominal preperitoneal hernia repair.

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INTRODUCTION

In 1991, Corbitt^[1] first reported the technique of laparoscopic herniorrhaphy. Subsequently, transabdominal preperitoneal approach (TAPP) and totally extraperitoneal approach (TEP) have become the most commonly used approaches. However, TAPP requires peritoneal closure, which necessitates intracorporeal suturing, and knotting is technically demanding, especially for residents. To address this problem, we investigated the use of the V-Loc™ 180 absorbable wound closure device (Covidien, USA), which is a skin closure device with self-anchoring barbs and loops that obviate the need for knot tying. In some cases, we used it for residents as the initiation device for TAPP.

MATERIALS AND METHODS

We performed TAPP in 16 unilateral and 3 bilateral inguinal hernia cases (16 males, 3 females) and investigated retrospectively. We excluded patients with a history of lower abdominal surgery and severe risks for general anesthesia. The operations were performed by one staff with one resident. In 11 cases, the operators were residents who had no experience of laparoscopic hernia repair and in-

Table 1 Number of patients for each type of herniorrhaphy and mean operative time of residents and consultants

		Unilateral				Bilateral	Total	Mean operative time (min)
		Adhesion ¹	SILS	Invagination ²	Recurrence			
Residents	7	-	-	-	1	3	11	158
Consultants	4	1	1	1	1	-	8	104
Total	11	1	1	1	2	3	19	135

¹Post status of appendectomy; ²Invagination of sigmoid colon. SILS: Single Incision laparoscopic surgery.

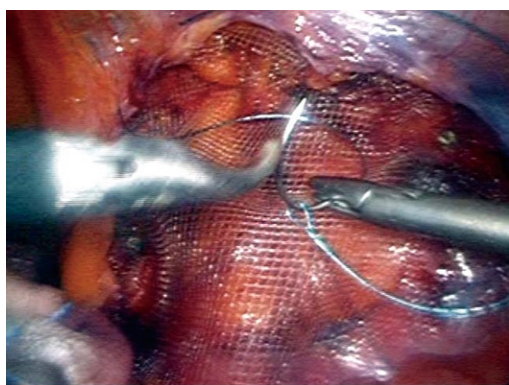


Figure 1 The first suture is locked by passing the needle through the end loop of V-Loc.



Figure 2 The closed peritoneum does not loosen after continuous suturing.

tracorporeal suture. After induction of general anesthesia with intravenous cefazolin, we made a 12 mm incision at the umbilicus and two 5 mm trocars were inserted into the left and right flanks, except for one case of single incision surgery with supine position without tilt, and the preperitoneal space was then dissected using a dissecting forceps with electrocoagulation under 5 or 10 mm, 0 degree laparoscopic view. After adequate preperitoneal dissection, either a 3D MAX, 3D MAX light (Bard, USA) or lightweight polypropylene mesh (TiMesh; Biomet Biologics, USA) was fixed in the preperitoneal region using Protack (Covidien, USA). After that, V-Loc was used for peritoneum closure. The peritoneum was closed from the left to the right edge. The first suture was locked by a loop at the edge (Figure 1) and then a continuous suture was placed (Figure 2). Finally, after complete closure, a return

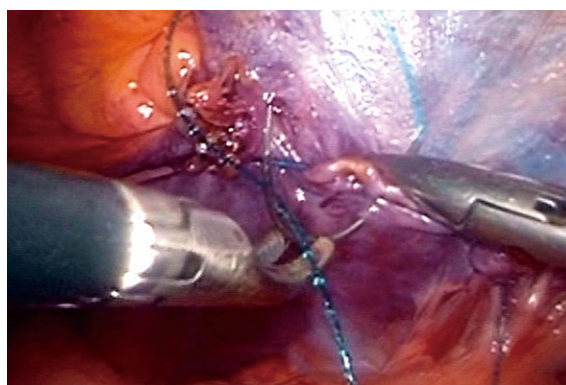


Figure 3 A return suture was placed to prevent suture loosening.

suture was placed in a manner similar to the subcutaneous suture to prevent loosening (Figure 3). The skin incisions were then closed by subcutaneous sutures. In the case of single incision laparoscopic surgery, we made a 15 mm incision at umbilicus and fixed the single incision laparoscopic surgery port (Covidien, USA), then dissected by flexible forceps with a cross method and finally closed the peritoneum with V-Loc by straight needle holder.

RESULTS

The mean age was 68.6 years (range 36 to 87 years), mean BMI was 23.8 (range 16.9 to 30.1) and mean operative time was 135.5 min (range 73 to 197 min). The unilateral cases consisted of 11 indirect, 2 direct and 2 supravesical hernias, and 1 single incision laparoscopic surgery (indirect) case and there were 3 bilateral (all indirect) cases. These cases included complicated patients, even for residents, such as recurrence (Table 1). All the cases which were performed by residents were completed independently without changing operator under supervision of the consultants. After the operation, no complications were observed prior to discharge in any of the patients. The mean hospital stay was 3 d postoperatively, which was the same as that in conventional TAPP. No recurrence or complications were observed during the follow-up of up to 2 years maximum.

DISCUSSION

TAPP has various technical difficulties and new devices have been developed that solve some of these problems. However, intracorporeal suturing is still considered to

be difficult, thereby restricting the indications for TAPP. Since 1995, the EndoStitch device (Covidien, USA) has been used for laparoscopic suturing^[2,3]. Although the use of this device in TAPP has been reported^[4], it is not commonly used in herniorrhaphy. To date, there have been no suitable devices for peritoneal closure for beginners. V-Loc has been available only recently; therefore, only a few reports on intra-abdominal usage are available^[5]. In the present study, we investigated the use of V-Loc to assess the potential simplification of the technically difficult peritoneal closure in herniorrhaphy. Using V-Loc, we found that the peritoneal flaps can be maintained tautly, thus minimizing the distance between the upper and lower peritoneal edges, which enables placement of the next single twist suture. In addition, a significant advantage is that there is no need to tie knots at any point. Hence, barbed sutures are more advantageous. We also used this device in single incision laparoscopic surgery cases. Currently, single incision laparoscopic surgery is widely used for appendectomy^[6], cholecystectomy^[7], prostatectomy single incision laparoscopic surgery^[8] and TEP^[9]. However, single incision laparoscopic TAPP is rarely performed. Especially in cases of single incision laparoscopic surgery, knot tying is difficult and time consuming. We believe that V-Loc is ideal even for single incision laparoscopic TAPP. Although one study reported reduced operative time using V-Loc^[10], the reduction was not significant compared to the total operative time. We observed that the V-Loc gave very easy sutures even when performed by inexperienced surgeons. According to the guidelines for laparoscopic TAPP and TEP treatment of inguinal hernia by the International Endohernia Society, sufficient data does not exist to draw any significant conclusions regarding whether TAPP or TEP is the superior technique^[11]. In our experience, the technical difficulty and operative time were reduced using V-Loc, which could result in more frequent use of TAPP than TEP.

We thus conclude that V-Loc is ideal, not only for skin closure but also for laparoscopic peritoneal closure. However, it is difficult to conclude that this device is better than the usual sutures. Long-term usage of V-Loc for peritoneal closure on a larger number of patients will be required to statistically assess the potential advantages.

COMMENTS

Background

Transabdominal preperitoneal approach (TAPP) is widely performed as a standard procedure in laparoscopic herniorrhaphy for inguinal hernia. However, TAPP involves intracorporeal peritoneal suturing, which is difficult to perform and stressful, especially for inexperienced surgeons. Therefore, some surgeons do not wish to discontinue the conventional open method. To reduce this stress, the authors investigated the use of the V-Loc™ 180 absorbable wound closure

device, self-anchoring barbs and loop-type suture device that obviate the need for knot tying for conventional TAPP repair.

Research frontiers

Since V-Loc is a device for skin closure, the reports which revealed feasibility of intra-abdominal usage are still rare. The aim of this study was to show the results that even inexperienced surgeons can complete the TAPP.

Innovations and breakthroughs

The authors think V-Loc is more suitable for laparoscopic usage than subcutaneous usage from the point of technical demand. Therefore, V-Loc may be suitable for all kinds of laparoscopic peritoneal closure.

Applications

V-Loc may be applicable, not only to laparoscopic peritoneal closure but also to laparoscopic bowel closure and so on, due to the simplified method.

Peer review

This is a clinical study which was successful in laparoscopic intracorporeal suturing using V-Loc on TAPP. Hence, V-Loc could be considered an alternative suture device for use in TAPP.

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