—Report on Experiments and Clinical Cases—

Experience with Direct Kugel Patch Method for Repair of Adult Inguinal Hernia

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Abstract

The direct Kugel Patch method is a minimally invasive but nonlaparoscopic preperitoneal method of hernia repair which has various ideal characteristics including all the benefits of laparoscopic hernia repair without the risks of complications. In this retrospective study, we report our experience with this method for adult inguinal hernia repair. Forty-four hernias, including 35 indirect, 7 direct inguinal hernias, and 1 recurrent indirect inguinal hernia, in 41 patients were surgically repaired using the direct Kugel patch method. The average operation time was 45.6 ± 11.3 min, and the average hospitalization time was 6.2 ± 5.0 days. There were 5 complications of seroma and only 1 recurrence of hernia which were successfully managed. We concluded that the direct Kugel patch method provides an ideal approach to adult inguinal hernia repair with short operation time and hospital stay and a very low risk of complications or recurrence.
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Key words: hernia, direct Kugel patch, mesh

Introduction

The direct Kugel patch is made of a double layer of polypropylene monofilament mesh (**Fig. 1**). The patch also contains a memory recoil ring that allows it to spring open and maintain its shape during placement[1]. This construction creates a positioning pocket that is used to guide the patch into the proper location. The resulting procedure is an open, preperitoneal repair that offers all the benefits of a laparascopic hernia repair, without the risks of complications.

In this clinical report, we present our experience with the direct Kugel patch method for adult inguinal hernia repair with special reference to various clinical characteristics and outcome.

Patients and Method

Patients

From July 2005 through July 2007, we performed inguinal hernia repairs using the direct Kugel patch method in 41 patients at our hospitals. All patients

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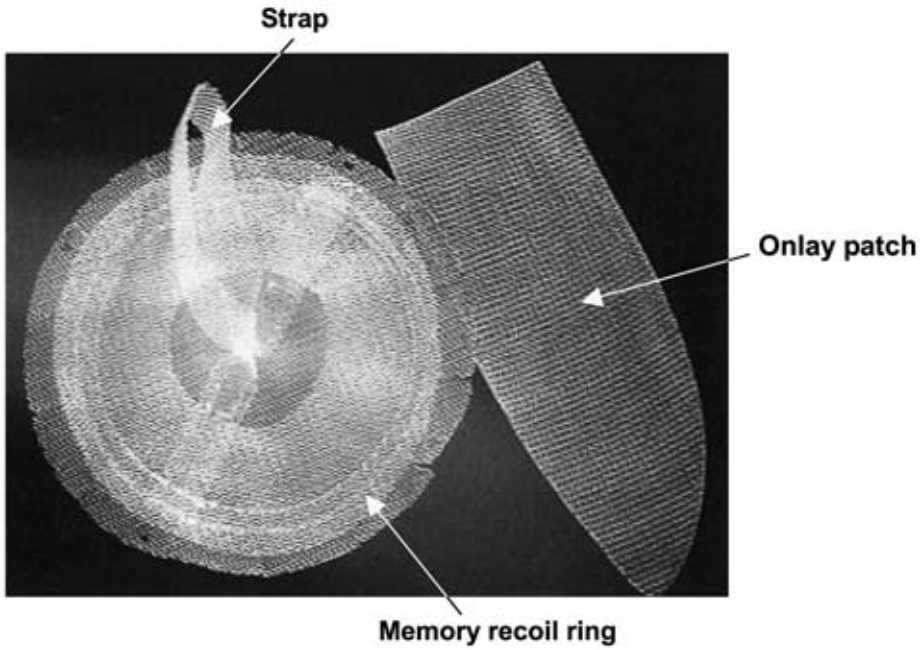

Fig. 1 The direct Kugel patch mesh.

Table 1 Clinical and surgical data of the adult inguinal hernia cases

Variable	No.
Hernia classification:	
External	35
Internal	7
Recurrence	1
Combined Internal/External	1
Femoral	—
Total	44*
Average operation time	45.6 ± 11.3 min
Average hospitalization	6.2 ± 5.0 days
Complications	
Seroma	5 cases
Recurrence	1 case

*From 41 cases.

were male. The clinical characteristics of the lesions are listed in **Table 1**. There were a total of 44 hernias, with, 16 on the right side and 18 on the left side. Forty-three hernias were primary and 1 was a recurrent. There were 35 indirect inguinal hernias, 7 direct inguinal hernias, and 1 recurrent indirect inguinal hernia. In addition, this series included 1 combined direct/indirect inguinal hernia but no femoral hernias. The mean age of the patients was 60.4 ± 10.2 years. The follow-up period ranged from 3 months to 2 years. The analysis of patients' records was done with reference to the classification of inguinal hernia, the operation time, the length of hospitalization, the occurrence of complications, and the recurrence rate.

Method

We performed all operations according to the routine hernial repair under direct vision. First, a small 3-to4-cm-long incision was made in the aponeurosis of the external oblique muscle, after which, the inguinal canal was opened, and the hernial sac was excised and finally ligated at a high position. In this process, it is better to return the hernial sac to the pneumopreperitoneal space. Next, an incision was made in the transversalis fascia to create an appropriate space to insert the direct Kugel patch (C.R. Bard, Inc. RI, U.S.A.; **Fig. 1**). At this stage, 2 pieces of gauze were inserted via the internal inguinal ring to prepare an appropriate space for insertion of the direct Kugel patch **(Fig. 2)**. Finally, the patch was introduced and adjusted, and the positioning strap was fixed to transversalis fascia and the inguinal ligament. An "onlay patch" was also included in the direct Kugel patch set and used to reinforce the potentially weakened indirect hernia. However, we have never used the "onlay patch" in our series.

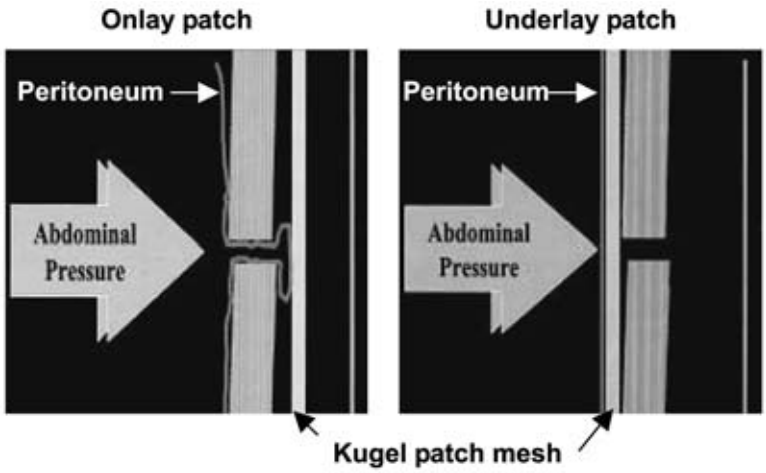

Fig. 2 Periperitoneal repair. Schematic representations of the traditional open approach (onlay patch) and direct Kugel patch method (underlay patch) for inguinal hernia repair. Unlike onlay patch, the underlay patch (blue line) unfolds flat on the peritoneum (red line) and adheres to the inner surface by abdominal pressure to covers the defect.

Results

We performed inguinal hernia repair for 41 patients with 44 hernias. The average operation time was 45.6 ± 11.3 min and the average hospital stay was 6.25 ± 5.0 days. There were 5 cases of seroma developing at the site of operation and only 1 case of recurrence.

Discussion

Inguinal hernia repair procedures have been traditionally divided into 2 categories. The first and more orthodox approach is open surgery through an incision in the groin or hernial region. In this approach, the surgeon chooses to use a small piece of a surgical mesh to repair the defect under local or general anesthesia. The second approach utilizes a laparoscope and a series of trocars introduced through small incisions to repair the defect from the inside. A piece of a surgical mesh is also used. However, an alternative approach developed by Kugel[1,2] and termed the direct kugel patch method, makes use of the advantages of laparoscopy by placing the patch beneath the defect (underlay patch) rather than sewing it on top of the defect as in the traditional open approach (onlay patch; **Fig. 2**). This method does not require insertion of a laparoscope or trocar. In fact, the patch design allows for an open preperitoneal repair that offers all the benefits of a laparoscopic hernia repair without the possible complications. The direct kugel patch is a surgically designed, sterile woven material, specifically used to repair hernias. These mesh patches are very thin, soft, pliable, and flexible so that they, easily conform to body's movement, position, and size and lays flat to prevent the peritoneum and its content from protruding through the defect by their resisting unique "memory-recoil ring springs."

The Kugel method of hernia repair is designed for use in a tension-free surgical manner and requires only one anchoring stitch to hold the mesh in place, thus preventing unnecessary swelling or pain. Yet, the method is safe and effective. It is an ideal therapeutic method because of the low recurrence rate and the significant effects of the reinforcement of the sites of the hernial sac such the Hesselbach triangle, internal inguinal ring, and annulus femoralis.

During the operation care should be exercised not to damage the inferior epigastric artery or vein or the ilioinguinal, iliohypogastric, and genitofemoral nerves. If these nerves are damaged, patients may lose sensation in the lower abdominal, groin and

genital regions.

In a prospective multicenter study of 450 consecutive Kugel patch repairs, Van Nieuwenhove et al[3] reported a 1.9% recurrence rate, a 3.5% rate of persisting inguinal pain, a mean operation time of 20 ± 9 minutes and a mean hospital stay of 19 ± 1.3 hours. In another prospective randomized clinical study, Dogru et al[4] compared the Lichtenstein method of hernia repair with Kugel's patch hernia repair method. A total of 139 patients (134 men, 5 women) were randomly, assigned to treatment groups. No significant differences were observed in the duration of the operation or the complication rates between the 2 methods during the same follow-up time. Together, these studies indicate that Kugel herniorraphy is a minimally invasive method with low complication rates.

In our series, the most important reason for performing the direct Kugel patch method was that it allows an open preperitoneal approach through unique "memory-recoil ring" springs and offers the benefit of reinforcing all kinds of weakened hernial lesions. Furthermore, the method carries lower risk of recurrence and is easy to learn. A hernia has recurred in only 1patient, in our 2 years of using the direct Kugel patch method. In our hospital, a laparoscopic surgery is generally performed for cases of recurrent inguinal hernia in adults that had been repaired using the direct Kugel patch mesh and the present single case of recurrence was also repaired with laparoscopic surgery. It is impossible to perform open surgery for such recurrent cases because of severe postoperative adhesions and scar formation. In principle, we perform laparoscopic surgery for recurrent cases after obtaining informed consent from the patients.

This hernia recurred 21 days postoperatively because of the weakness of surrounding tissues. Other reasons for recurrence may include (including: 1 the same surgeon not performing the operation and 2) insufficient technical skill of surgeon.

In our series, because critical pass measures had not been introduced, the hospital stay was somewhat extended. At present, with the introduction of critical pass measures the hospital stay has become as short as 3 days.

In conclusion, in our series severe vascular or nerve damage did not occur Open surgery using mesh for inguinal hernias recurring after repair is associated with many difficulties, and to how reduce the rate of recurrence is an important problem. Considering these points, the direct Kugel patch method has lower rates of recurrence and complications and is thus a very efficient method.

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