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ORIGINAL ARTICLE

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A new tension-free technique for the repair of umbilical hernia, using the Prolene Hernia System — early results from 48 cases

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Abstract Tension-free repair using the Prolene Hernia System (PHS) has been widely adopted for inguinal hernias with excellent results. In our department, a new technique for umbilical hernia repair, using the PHS, has been developed. Between 2000 and 2002, 48 patients underwent tension-free umbilical hernia repair, using the PHS. There were 20 male and 28 female patients, with a mean age of 54 years. The preperitoneal space was dissected to accumulate the underlay patch of the PHS. The onlay patch was placed on the anterior rectus sheath and the connector in the umbilical ring. The median operating time was 35 min (range, 28–40). Postoperative pain was minimal, and there were no complications associated with the mesh, except a seroma, which required needle aspiration. There were no recurrences after a median follow-up of 13 months (1–24). Our early results indicate that the described tension-free technique could become the standard treatment for umbilical hernia repair, but long-term results are required to establish the efficacy of the procedure.

Keywords Umbilical hernia · Prolene Hernia System · Tension-free repair

Introduction

The use of a mesh to repair inguinal hernias has gained wide acceptance and has replaced sutured hernia repair. The tension-free mesh repair is associated with a short hospital stay, minimal patient discomfort, rapid return to normal activities, and a low recurrence rate [1, 2].

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The Prolene Hernia System (PHS) (Ethicon, Hellas) has been used for the repair of inguinal hernias [1, 2]. It is a polypropylene mesh that consists of three parts: an onlay patch, a connector, and an underlay patch. It is easy to use, requires minimal or no suturing, and it permits posterior repair with the added security of the onlay patch, which reduces the likelihood of recurrence.

The well-established advantages of tension-free hernia repair led to the development of a new technique for umbilical hernia repair in our department. This technique utilises the PHS for a tension-free repair of the umbilical hernia.

Materials and methods

Between September 2000 and October 2002, 48 consecutive patients (m/f, 20/28) underwent umbilical hernia repair using the PHS (Table 1). All the procedures were performed by the same surgical team. An incarcerated or not reducible umbilical hernia was not a contraindication for the procedure. Patients with omphalitis or periumbilical fistulas were excluded, as well as patients with American Society of Anesthesiology score IV. The mean age of the patients was 54 years (range 34–76). Forty-five patients had a primary hernia, and three had a recurrent hernia after a Mayo procedure. Three had an incarcerated hernia. Two of them underwent an acute operation, and the third patient had an operation 2 days later, after reduction of the hernia. Three patients had a simultaneous laparoscopic cholecystectomy, and three an inguinal hernia repair. Epidural anaesthesia was used in all cases, except the three patients who underwent laparoscopic cholecystectomy. In these patients, hernia repair was performed after completion of the cholecystectomy.

Either a midline or a transverse incision was used. After dissection of the sac, it was opened, and its contents were reduced into the peritoneal cavity, and the peritoneum was closed. The linea alba was incised above and below the umbilical ring to facilitate the dissection of the preperitoneal space (Fig. 1). Any lacerations of the peritoneum were closed to avoid any contact of the mesh with the contents of the peritoneal cavity. The underlay patch of the PHS was placed in the preperitoneal space, just underneath the posterior rectus sheath, without any suturing (Fig. 2). The linea alba was closed above the underlay patch, with interrupted absorbable sutures, leaving a hole at the umbilical ring, where the connector was passed through (Fig. 3). The onlay patch was left to lie on the anterior rectus sheath (Fig. 4). It is not necessary to suture it. The umbilicus was sutured on the connector. The exact positioning of the PHS is shown schematically in Fig. 5. A closed suction drain

Table 1 Details of the patients

m/f	20/28	
mean age	54 years (range 34–76)	
primary hernia	45	reducible 42 incarcerated 3
recurrent hernia	3	

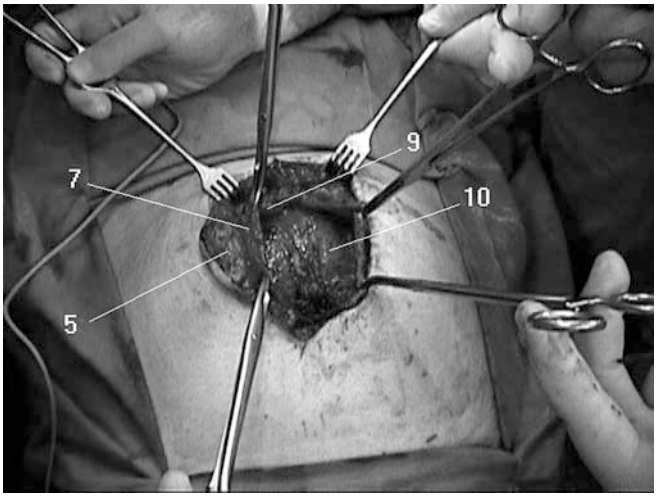

Fig. 1 The preperitoneal space after dissection

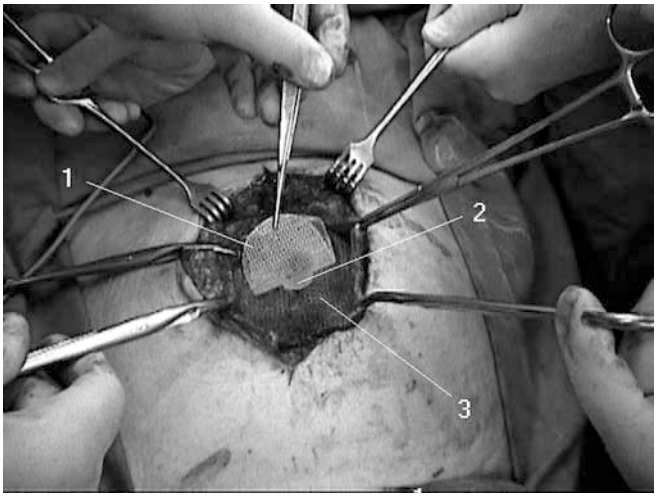

Fig. 2 Placement of the underlay patch into the preperitoneal space

was placed subcutaneously in all patients, and it was removed after 24 h. All patients received perioperative antibiotics. They were mobilised and started liquids orally on the day of the procedure.

Results

The median operating time was 35 min (range 28–40). A nasogastric tube was not inserted in any patient. Nausea was treated conservatively, and vomiting did not develop in any patient. Postoperative pain was minimal, and only nonsteroidal anti-inflammatory drugs were required. There were no complications associated with the epidural anaesthesia. The 1st postoperative day the patients had a free diet. There were no wound infections, but a seroma developed in one patient, which required

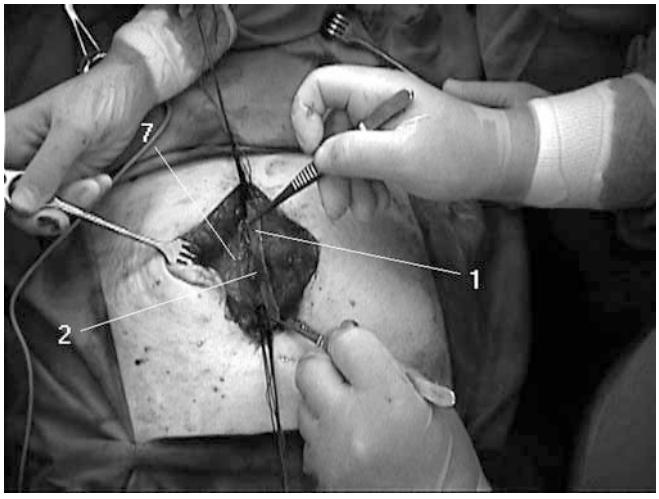

Fig. 3 The connector placed into the umbilical ring

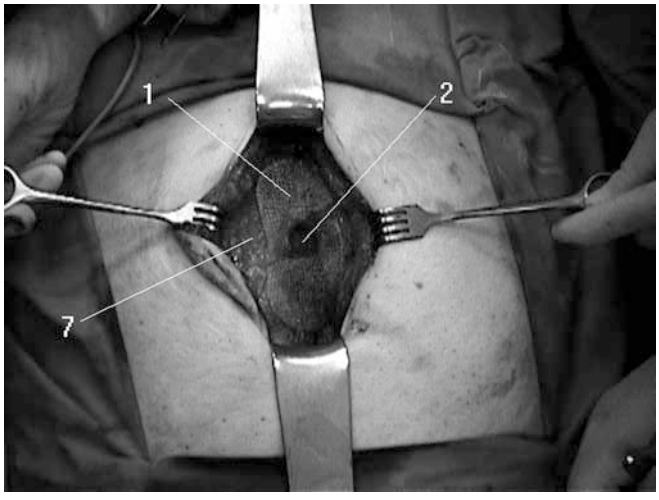

Fig. 4 The onlay patch placed on the anterior rectus sheath

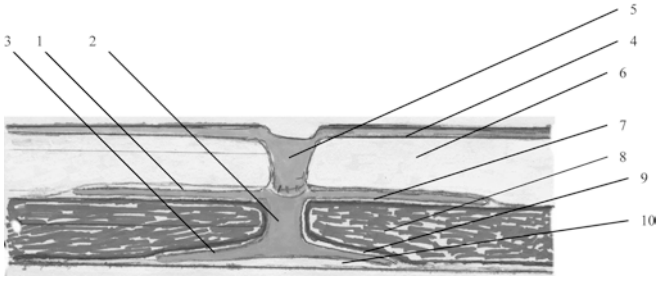

Fig. 5 Schematic diagram of the positioning of the PHS. **1** onlay patch, **2** connector, **3** underlay patch, **4** skin, **5** umbilicus, **6** subcutaneous fat, **7** anterior rectus sheath, **8** rectus abdominis, **9** posterior rectus sheath, **10** peritoneum

needle aspiration. Patients were discharged home the 1st or 2nd postoperative day. There was not any recurrence or any other complication associated with the mesh after a median follow-up of 13 months (range 1–24).

Discussion

Umbilical hernia represents 6% of all abdominal wall hernias in adults. It is due to a gradual yielding of the cicatricial tissue closing the umbilical ring. Predisposing factors associated with an increased intra-abdominal pressure include pregnancy, obesity, ascites, and large intra-abdominal tumours [3, 4, 5].

Surgical repair should always be carried out due to possible complications. For many years, Mayo repair was established as the procedure of choice for umbilical hernia repair, although recurrence was thought to be a common event. There was a tendency to use mesh in recurrent hernias or hernias due to ascites. In recent years, several tension-free techniques have been developed. The extent to which the popular sutured repair of Mayo has given way to mesh-based repairs is unknown. The mesh can be placed either laparoscopically or by the open technique (H-technique, plug technique). Despite the introduction of new techniques, recurrences still occur with an incidence of between 1–11% [6, 7, 8, 5].

The wide acceptance of the PHS for the repair of inguinal hernias led us to the use of the same mesh for umbilical hernia repair. The innovative three-in-one design, especially the connector, makes it ideal for umbilical hernia repair. The combination of three techniques of Stoppa-plug-onlay protects against recurrences. The crucial points of our technique are the dissection of the preperitoneal space, the integrity of the peritoneum, and the placement of the connector into the umbilical ring. Although the follow-up of our patients is short, results seem encouraging. At the present time, there is neither recurrence nor complications associated with the mesh. Long-term results are required to establish the safety and efficacy of the procedure.

We believe that the described non-tension technique lowers the recurrences to a rate similar to that of inguinal hernia repair using the PHS and could become the standard treatment for umbilical hernia repair in adults. Controlled studies with long follow-up are required to establish evidence-based umbilical surgery.

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