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ORIGINAL ARTICLE

"All-in-one mesh" hernioplasty: A new procedure for primary inguinal hernia open repair

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Summary *Background:* We propose a new open mesh hernia repair procedure for the treatment of inguinal hernias in adults aiming to improve patients' comfort and to reduce the incidence of chronic neuralgia.
Methods: From September 2012 to August 2015, 250 consecutive patients were treated with "all in-one" mesh hernioplasty procedure in our Institution. According to the devised technique, a new smaller prosthesis was placed on the floor of the inguinal canal in order to strengthen all areas of weakness from which hernias may originate. The mesh was enveloped by a fibro-cremasteric sheath avoiding contact with neural structures. Follow-up was carried out at 3, 6, 12, 18 and 24 months for evaluation of postoperative pain using Visual Analogue Scale score, need of medication, patients' comfort and short or long-term complications.
Results: All patients were discharged within 24 h from surgery. Slight pain was reported by the majority of patients and 47.6% of them did not require pain medication at home. After the 1st postoperative week 96.8% reported no pain and no other symptoms. No relevant limitation of normal activities was reported. There has been no postoperative neuralgia. One recurrence was observed.

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Conclusions: This new hernioplasty technique respects the anatomy of the inguinal canal, uses a smaller mesh, and seems to avoid neuralgia with maximum comfort for the patients.

1. Background

Since the Seventies, when biocompatible meshes were introduced with the consequent decrease of recurrence, one of the priority in inguinal hernia surgery was that of minimizing postoperative chronic pain.[1–3] All technical variations, proposed during the past years in order to improve patient's comfort,[4–6] reported a variable incidence of chronic neuralgia.[1,3,7,8]

The procedure we describe, applicable to all cases of primary inguinal hernia, employs a smaller pre-cut single mesh that covers all weak areas of the inguinal canal and is enveloped in a fibro-cremasteric sheath, avoiding contact of the prosthesis with neural structures.

2. Methods

2.1. Population

We considered a cohort of patients suffering from primary unilateral inguinal hernia that underwent the "all-in-one" mesh hernioplasty technique consecutively, at our Institution. Hernias were divided according to the European Hernia Society classification.[9,10] The work described has been carried out in accordance with the code of ethics of the World Medical Association (Helsinki declaration). Written informed consent was obtained from each patient included in the study. All data of the cohort were registered in a specific database. Spinal anaesthesia was adopted, and 2.0 g Cefazolin was administrated intravenously over 30 min before the incision for all patients, and the procedure was performed on a one-day surgery basis. From September 2012 to August 2015, we treated 250 adult patients for primary inguinal hernia, 241 males and 9 females with an average age of 61.7 years (range: 22—90). Hernias were classified according to the European Hernia Society criteria (Table 1).

2.2. Surgical technique

The following procedure employs a specific shape of mesh. The prosthesis consists in 3 sections: section A — ring-shaped portion designed to surround the deep inguinal orifice; section C — trapezoidal-shaped part of the mesh studied to lay on the floor of the inguinal canal; and section B — thin connection of the prosthesis between the two previously described sections (Fig. 1). The semi-resorbable mesh (synthetic absorbable monofilament in 70% polyglycolide and 30% polypropylene) is shaped by means of a plastic sterile template directly at the operating table. Any kind of other material may used to manufacture the mesh.

The technique does not require the identification nor dissection of any nervous structure lying beneath the aponeurosis. The ilioinguinal nerve is adherent to the external surface of cremaster in its more lateral part and the iliohypogastric nerve runs medially on the internal oblique muscle. The above nerve structures do not takes contact with the site of mesh positioning. The ilioinguinal and iliohypogastric nerves must be avoided in case of anatomical variations and isolated only if they interfere with the operation.[11] An oblique or transverse inguinal incision is made. The fascia of the external oblique muscle is opened and the spermatic cord is identified. A medial longitudinal incision of the fibro-cremasteric sheath (comprising the muscle itself and the external-spermatic fascia) is made with a diathermocoagulator (Fig. 2). The margins of the incision are held back by forceps and bluntly dissected from the underlying cord elements (Fig. 3).

The opened fibro-cremasteric sheath (from the medial incision to the inguinal ligament) is exposed and the mesh will be later covered by this anatomic structure. An upward traction of the spermatic cord allows dissection of the postero-medial portion of the fibro-cremasteric sheath (the so called "funicular mesenterium") left on the transversalis fascia for protection of the neurovascular bundle comprising the external spermatic vessels and the genital branch of the genitofemoral nerve.

Then the hernia sac is dissected from the cord elements and tucked away into the abdominal cavity and, according

Table 1 Hernias were divided according to the European Hernia Society classification.

Type	N. of patients
P L1M0F0	53
P L2M0F0	53
P L3M0F0	33
P L2M2F0	24
P L1M1F0	20
P L0M2F0	16
P L0M1F0	12
P L3M3F0	12
P L1M2F0	12
P L0M3F0	8
P L1M3F0	3
P L2M1F0	2
P L2M3F0	1
P L3M2F0	1

EHS classification: P = primary hernia; R = recurrent hernia; 0 = no hernia detectable; L = lateral hernia; M = medial hernia; F = femoral hernia; 1 ≤ 1,5 cm (one finger); 2 ≤ 3 cm (two fingers); 3 ≥ 3 cm (more than two fingers).

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