Transumbilical single-incision laparoscopic inguinal hernia repair – feasibility study on anatomical specimens

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Abstract

Laparoscopic inguinal hernia has replaced open surgery in recent years. For transabdominal preperitoneal mesh placement, 3 incisions have to be made to prepare the inguinal region, place the mesh and adapt the peritoneum with a suture. We describe the feasibility of a single incision transumbilical hernia repair. For this, we operated on 3 anatomical specimens (2 male, 1 female), which had been conserved using alcohol-glycerol fixation. A subumbilical 1.5 cm incision was performed, and three 5 mm trocars were inserted. The preparation and procedure steps conformed to conventional laparoscopic transabdominal preperitoneal hernia repair (TAPP). In the right port we used a 5 mm 30 degree laparoscope, for preparation a grasper and scissors with optional flexure. Mean procedure time was 45.5 min (35-55 min, ±7 min). The left and right inguinal region was prepared. Adaptation in handling and ergonomics needs familiarization.

Key words: single-incision surgery, natural orifice transluminal endoscopic surgery, inguinal hernia repair.

Introduction

With the beginning of the natural orifice transluminal endoscopic surgery (NOTES) era, a new spirit came into the scientific world, inventing new approaches to the abdominal cavity and reducing incisions through the abdominal wall. With this technique it is assumed that less postoperative pain, faster recovery and reduced abdominal scarring can be achieved [1]. For this, organs such as the vagina [2-4], the colon [5] or the stomach [6, 7] are penetrated. However, development in this area remains static. Only transvaginal cholecystectomy seems to be entering clinical practice. Reasons for this are damage to healthy hollow organs, deficit of sufficient and secure closure of the lesions, contamination of the abdominal cavity and geometrical and mechanical problems. These seem to be the reasons why newer reports deal with laparoscopic single incision procedures, reducing the skin lesions to one scar sub- or transumbilically.

In the literature different surgical procedures for different indications are described. First of all, cholecystectomy was established. After that, some reports described sigmoid resections, sleeve gastrectomies, appendicectomies, adrenalectomies and other procedures. Concerning single incision inguinal hernia repair, the first clinical cases could be found which describe a single incision total extraperitoneal hernia repair [8-13]. Two clinical case reports could be found...
which describe transabdominal laparoscopic hernia repair using a special port system [14, 15].

We describe the technical feasibility of laparoscopic single incision transabdominal preperitoneal hernioplasty (TAPP) using one 15 mm subumbilical skin incision and three 5 mm trocars. This study was performed on anatomical specimens.

**Case report**

With respect to ethical considerations we prepared three human cadavers (79-95 years, 2 male, 1 female) donated for research and medical education to the Institute of Anatomy, University of Tuebingen. The cadavers were preserved with alcohol-glyc-
Discussion

Single incision laparoscopic hernia repair seems to be possible and feasible using available laparoscopic instruments. However, from an ergonomic point of view, there is need for improvement for it to become established in clinical practice.

The anatomical specimen, apart from computer simulation, is the only model for simulating procedures in the inguinal region. However, the prepared specimen had no relevant inguinal hernia and the results must be interpreted from this point of view.

Using only one skin incision for laparoscopic surgery, one has to distance oneself from the triangulation idea. The instruments are inserted parallel to the abdominal cavity. In our opinion, the arcuated instruments help in preparation.

Different accesses are described in the literature. Most single incision procedures are performed using a single port with three separate trocars. We used three 5 mm trocars inserted separately through the fascia into the abdominal cavity. At the end of the procedure we changed one 5 mm trocar to a 10 mm port for inserting the mesh. With this procedure, only small lesions into the fascia are necessary. A large fascia lesion is avoided.

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References