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Inguinal hernia repair with Parietex ProGrip mesh causes minimal discomfort and allows early return to normal activities

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Inguinal hernia repair;
Ambulatory;
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Abstract

BACKGROUND: The type of inguinal hernia repair used depends on many factors but predominantly the surgeon's training, interpretation of the literature, and personal preference. This prospective cohort study describes a consecutive series of open mesh inguinal hernia repairs (modified Lichtenstein technique) performed as an outpatient procedure using 2 different mesh types.

METHODS: Analysis was undertaken on 540 consecutive patients who underwent inguinal hernia repair between January 2007 and December 2012. Short-term outcomes were compared between those repaired with conventional polypropylene mesh and those with Parietex ProGrip mesh.

RESULTS: Most patients were male (89%) and the mean age was 63 years. The median operative time was 50 minutes for unilateral hernias and 90 minutes for bilateral hernias. The use of Parietex ProGrip mesh reduced the operative time to 40 minutes for unilateral hernias ($P < .01$) and 75 minutes for bilateral hernias ($P < .01$). After unilateral hernia repair, 88% of the patients were discharged home within 4 hours of operation. There was no mortality and the overall complication rate was 7.4%. One patient developed a pulmonary embolus but the remainder of the complications were minor. Twenty-four hours postoperatively, 74% of the patients were either totally pain free or had minimal discomfort. At 4 weeks, 97% of the patients were either pain free or had minimal discomfort. Patients who underwent unilateral inguinal hernia repair with Parietex ProGrip mesh had the most rapid return to normal activities (10 vs 14 days, $P < .04$).

CONCLUSIONS: Open anterior inlay mesh repair is safe and results in minimal postoperative pain and early return to normal activities. ProGrip mesh resulted in a shorter operative time and more rapid return to normal activities compared with polypropylene mesh (10 vs 14 days).

Approximately 42,000 inguinal hernia repairs are performed annually in Australia. However, only 22% of these are carried out as short stay or day-only procedures.[1,2] Internationally, ambulatory hernia repair rates range from

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20% up to as high as 92%.[3] The low ambulatory figures in Australia are unsatisfactory as there are clear evidence-based guidelines supporting this approach for most patients.[4] Several factors may be responsible including lack of financial incentive in the Australian healthcare system as well as entrenched surgical attitudes. An increase in the number of laparoscopic hernia repairs over the past decade has also likely contributed to the low rates of ambulatory surgery as most of these cases remain in hospital overnight postoperatively.

Purported advantages of ambulatory surgery include lower wound infection rates, increased patient satisfaction, and reduced overall hospital costs compared with in-patient surgery.[5] Pain is the most frequently reported adverse symptom following ambulatory hernia repair and often leads to delayed discharge or unanticipated overnight hospital admission.[5,6]

Single-center studies report variable rates of significant pain in ambulatory patients ranging from 8% to 81%.[5–8] It is likely that improved postoperative pain control might promote wider use of a day-only model for hernia repair. Most studies describe a multimodal regimen of opioid and nonopioid analgesics to synergistically reduce side effects and hasten recovery.[8–10]

This prospective cohort study describes a consecutive series of open mesh inguinal hernia repairs (modified Lichtenstein technique) performed as an outpatient procedure using 2 different mesh types. We tested the hypothesis that return to normal activities would be shortest after inguinal hernia repair when there were no permanent sutures fixing the mesh. Variables assessed included postoperative pain profiles, postoperative complications, time to return to normal activities, and the proportion of patients undergoing a successful short stay procedure. Comparisons were made between patients who had repair using standard polypropylene mesh fixed with polypropylene sutures and those repaired with a lightweight, hydrophilic polyester mesh (Parietex ProGrip; Covidien, Mansfield, OH) without permanent suture fixation.

Methods

Patients greater than or equal to 18 years of age who underwent an inguinal hernia repair (primary, recurrent, unilateral, or bilateral) on the North Shore hospital campus between 2007 and 2012 were included in this study. All procedures were deemed "elective" although this series included large sliding, irreducible, and recurrent hernias. Data were collected prospectively and analyzed retrospectively. Ethics approval was obtained from the local Human Research Ethics Committee (1301-005M).

Inguinal hernia repair was performed under either local anesthesia with intravenous sedation or under general anesthesia. The choice of anesthesia was dependent on patient preference and American Society of Anaesthesiologists (ASA) status. All patients received a single dose of intravenous cephalosporin, and thromboprophylaxis was provided only for patients who remained in hospital. Anticoagulation medications such as clopidogrel or warfarin were ceased preoperatively and alternative short-term agents used as appropriate. Patients were free to take aspirin throughout the perioperative period.

Operative technique

A modified Lichtenstein repair was performed using the following standardized steps: (a) pre-emptive skin and subcutaneous infiltration with 8 to 10 mls of .75% Ropivacaine (Astra-Zeneca, Cambridge, UK); (b) 4 to 5 cm groin incision; (c) routine identification and preservation of the ilioinguinal nerve and any associated branches; (d) pre-emptive intraoperative perineural infiltration with 1 to 2 mls .75% Ropivacaine (Astra-Zeneca); (e) fashioning of an inferior slit in the mesh to accommodate the spermatic cord; (f) excision of the round ligament in women; and (g) fixation of the mesh inferiorly to the inguinal ligament with 3 interrupted sutures, and superiorly to the conjoined area with 2 interrupted sutures.

Polypropylene mesh was fixed with permanent sutures (2/0 polypropylene; Ethicon, Cincinnati, OH) during the period January 2007 to September 2010. Parietex ProGrip mesh was fixed with absorbable sutures (2/0 polydioxanone suture; Johnson & Johnson/Ethicon) from October 2010 to December 2012.

Parietex ProGrip mesh is a lightweight, hydrophilic polyester mesh engineered with polylactic acid "grippers" for self-fixation. However, we elected to fix the Parietex ProGrip mesh as described but with absorbable rather than permanent sutures. In our experience, this mesh attaches well to muscle and fat but does not "self-grip" well to tendinous structures.

In all patients and after mesh placement, the ON-Q PainBuster fine-bore soaker catheter was laid beneath the external oblique adjacent to the preserved nerves and then passed externally through the skin 2 to 3 cm below the groin incision. This device costs approximately USD$200. It is an elastomeric infusion pump which was filled with 100 mL of .75% Ropivacaine (Astra-Zeneca) allowing a constant flow of anesthetic agent into the wound at 2 mL/hour for 48 hours postoperatively (Fig. 1).

Detailed information brochures were provided postoperatively to all patients, with specific self-care instructions about removal of the PainBuster catheter at home on the second postoperative day. Those who underwent unilateral hernia repair were discharged within 4 hours of operation unless kept in hospital for specific medical or social reasons. Patients who underwent bilateral hernia repair were kept in hospital overnight. Discharge criteria included the ability to mobilize freely, the ability to void, and being pain free. An analgesic pack containing paracetamol and a nonsteroidal anti-inflammatory agent (Meloxicam; Apotex, Toronto, ON, or Ibuprofen) was provided on discharge with a recommendation to take pain relief on a regular basis for