

Open Pre-peritoneal Mesh Repair for Groin Hernia-Experience from a Rural Regional Hospital in Western Australia

Abdallah Elsabagh¹, Chang Mien-Chew¹ and Thomas Bowles²

¹Department of Surgery, Albany Regional Hospital, Albany, Western Australia

²Rural Clinical School, University of Western Australia, WA, Australia

*Corresponding author: Abdallah Elsabagh, Department of Surgery, Albany Regional Hospital, Albany, Western Australia, Tel: +61420643128; E-mail: Elsabagh76@hotmail.com

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Abstract

Background: Pre-peritoneal mesh repair for inguinal hernia is a minimally invasive open technique that has become an alternative to laparoscopic groin hernia repair. It mimics the laparoscopic repair for tension-free, preperitoneal herniorrhaphy, but does not require specialized equipment, thereby decreasing cost. In our study, we evaluated the immediate and long-term outcomes of the preperitoneal mesh repair of inguinal hernia in Albany Regional Hospital Western Australia

Methods: All patients who had pre-peritoneal mesh repair for inguinal hernia by the local two surgeons between 2010 and 2015 were identified and included in the study. The data included patients' demographics, length of hospital stay, complications; including hematoma, seroma, wound infection, recurrence; and chronic groin pain. All patients were reviewed 4-6 weeks post-operatively in the outpatient clinic. Patients with symptoms or an apparent groin swelling were reassessed by one of the two primary operators. Patients who developed complications were offered longer follow up appointments, otherwise discharged back to GP care. Patients who developed late complications were referred back by the GP.

Result: A total of 435 cases were operated, recorded, analyzed and included in the study. 93% were males, mean age 59 and mean operative time 35 minutes. Patients were seen in the clinic 4 weeks postoperatively, patients with late complications were referred by the GP. Complication were acute urinary retention 3.9%, hematoma 3%, seroma 2.7%, infection was 0.9%, recurrence 2.7%, chronic pain 0.2%.

Conclusion: The open pre-peritoneal inguinal hernia repair is a safe minimally invasive approach and is associated with a low rate of postoperative chronic pain or recurrence.

Keywords: Pre-peritoneal mesh repair; Inguinal hernia; Laparoscopic surgery

Introduction

Inguinal hernia repair is one of the most commonly performed operations in general surgery [1]. It represents one of the core skills set in operative surgery for the general surgeon and comprises a significant workload in both urban and rural surgical practice [1,2]. A plethora of different repair techniques have been described to date [3]. However, the basic variations of techniques changed little for over a hundred years until synthetic mesh was introduced [4]. The long-established techniques have been open methods through an inguinal incision. The hernia is either reduced or the sac excised and the defect repaired. There are tissue to tissue repair techniques with sutures such as Bassini, McVay, Halsted, and Canadian Shouldice; mesh repairs in front of the fascia transversalis-Lichtenstein; mesh repairs in the pre-peritoneal space-Stoppa; mesh plugs-Bard; flat mesh converting to plug-Atrium; double disc mesh. The Lichtenstein procedure is currently accepted as the one with the lowest recurrence rate and hence it enjoys a high level of popularity.

Recent innovations in inguinal herniorrhaphy have developed techniques that produce significantly less postoperative pain and site the mesh between the defect and peritoneum while maintaining a sound repair [1].

The Lichtenstein tension-free open mesh repair continues to be the standard technique of choice for many surgeons across the globe because of its consistent and reproducible result [5]. A recent advance in laparoscopic surgery offers a wider range of options, with the laparoscopic pre-peritoneal approach (TEPP) gaining increasing popularity [6]. The laparoscopic approach is currently recommended by the European Hernia Society for recurrent and bilateral groin hernia [7]. One of the techniques that combine the open approach and pre-peritoneal mesh placement was first described by Kugel [8-10]. This offered the advantage of a small incision along with the pre-peritoneal mesh which was believed to provide a more robust repair [8-10]. Although this is generally not the most common technique in Australian surgical practice, a selected group of surgeons prefer the open pre-peritoneal technique over the traditional Lichtenstein repair. Current literature suggests that an open pre-peritoneal approach may offer a reduction in chronic pain, recurrence and allow earlier return to

work [8-14]. However, this has never been subjected to any formal review within the Western Australian setting and how this compares with currently published data from other local or international centers. The objective of this study is to review our own experience with the pre-peritoneal repair technique in a rural Western Australian setting.

Materials and Methods

Clinical setting

Western Australia (WA) is one of the largest states of Australia that comprises of the western third of the country, Albany Regional Hospital (ARH), which forms part of the Western Australia County Hospital Services (WACHS) is one of the largest rural health campuses, with a population of over 30,479, of whom 3.5% are indigenous Aboriginal people [15,16]. ARH is a training hospital, and the department of surgery comprises of three senior general surgeons.

The study

This was a retrospective study based at the surgical unit at ARH. All patients who underwent a pre-peritoneal repair with polypropylene mesh material over a five year period from 2010 to 2015 were included. These were performed exclusively by two senior general surgeons. Only patients with the first presentation of groin hernia were included. Recurrent hernias were excluded. Patients were routinely followed up at six weeks at the surgical clinic and were discharged to a general practitioner for follow up. Being a regional center with a small community, all late complication managed by GP was generally referred back to the surgical clinic for further management. The electronic hospital records were retrieved for review. Data include the following: Basic demographics, length of hospital stay, early complications (hematoma, seroma, wound infection, urine retention) and late (hernia recurrence; and chronic groin pain). Late complications were notified by the GP and referred back to the surgical clinic for management.

Results

The cohort

A total of 435 pre-peritoneal repairs were performed on 378 patients (321 unilateral, 57 bilateral). Ninety-three percent were male and the mean age was 59 years. The mean operating time was 35 minutes. Eighty-three percent of all cases were performed as a day case in the ambulatory unit. The remaining cases required overnight hospital stay due to logistics issues (traveled from other rural areas within the catchment). All hernias were a first presentation (none recurrent). The types of hernia were as follows: Direct: 49%, Indirect: 41.6%, Pantaloon: 5.7%, Inguinoscrotal: 3.3%, Femoral: 0.2%.

Complications

The most common complication (Table I) was acute urinary retention, which occurred in 15 cases (3.9%). Thirteen cases (3%) developed a haematoma, 2 of which required operative intervention for evacuation. Twelve cases (2.7%) developed a seroma, 6 of which required aspirations. The rate of surgical site infection was 0.9%. Twelve cases (2.7%) developed clinically detected recurrence and were referred back to the surgical clinic. The mean time from repair to recurrence was 5 years. One case (0.2%) developed chronic pain and were referred to as chronic pain service. There was no mortality directly related to the hernia repair.

Table I: Complications.

Outcome	Number of Cases	%
Retention	15	3.50%
Seroma	12	2.70%
Hematoma	13	3%
Infection	4	0.90%
Chronic pain	1	1.50%
Recurrence	12	2.70%

Discussion

An inguinal hernia is one of the most common operations in general surgery, with rates ranging from 10 per 1,00,000 of the population in the United Kingdom to 28 per 1,00,000 in the United States [17]. Inguinal hernias account for over 75% of all abdominal wall hernias, with a lifetime risk of 27% for men and 3% for women [18]. In 2001 to 2002 alone, over 70,000 inguinal hernia repairs were carried out in England [1,19]. Many different repair techniques have been proposed, but in general, the Lichtenstein tension-free open mesh repair remains the gold standard for many surgeons especially within Australian surgical practice. One variation of the open approach was described by Robert Kugel in Washington [8-10]. This is a type of posterior (pre-peritoneal) repair that is thought to have a mechanical advantage over the more common anterior repair as the mesh is placed to the same side of the abdominal wall that exerts higher pressure. The intra-abdominal pressure is proposed to contribute to the integrity of the repair, as opposed to being counter-productive in anterior repair [20,21]. The open pre-peritoneal repair involves a small oblique incision one-third lateral and two thirds medial to the imaginary line between the anterior superior iliac spine and the pubic tubercle. Further dissection is aimed to expose the pre-peritoneal space and placement of a monofilament polypropylene mesh material. The procedure is simple to perform provided that the anatomy is well understood. It allows a combination of the utility of the open operation with advantages of minimal access procedures, with a smaller incision, peritoneal mesh placement and potential reduction in chronic pain [8-10]. A recent systematic review by Andresen et al. [22] demonstrated that open pre-peritoneal repair yield similar outcome compared with the standard anterior approach. A recurrence rate of approximately 2% has generally been reported in the literature.

Our current study has demonstrated that this procedure is associated with short operating time and with low complication rates. This compares favorably with published literature from international centers. Table II summarises the complication rates reported by various groups with Kugel repair.

Our complication rates in regards to recurrence was 2.7% which was lower than that published by Dasari et al. [12] (6.2%) and Reddy et al. [11] (3.7%), however it was higher than Nienhuijs et al. [13] (2.3%), Ceriniani et al. [14] (0.8%) and Kugel who reported (0.4%). We reported the incidence of chronic pain to be (0.2%) which is lower than Dasari et al. [12] (1.5%), Nienhuiji et al. [13] (19.7%) and Reddy et al. [11] who reported (2.8%). Our wound-related complications like a seroma, hematoma, and wound sepsis were comparable to that published by Dasari et al. [12], Ceriani et al. [14] and Reddy et al. [11].

Table II: Comparative data on the outcome of Kugel repair (2003-2018).

Author(s)	Year	Country	No.	Seroma	Hematoma	Wound Sepsis	Retention	Recurrence	Chronic Pain
Current Study	2018	Australia	435	2.76%	3%	0.90%	3.90%	2.70%	0.20%
Dasari et al. [12]	2009	Northern Ireland	1262	1.50%	0.80%	0.80%	NA	6.20%	1.50%
Nienhuijs [13]	2007	Netherlands	127	NA	NA	NA	1%	2.30%	19.70%
Ceriani et al. [14]	2005	Italy	620	0.80%	0.16%	NA	1.90%	0.80%	0%
Reddy et al. [11]	2005	Australia	107	14%	3.70%	NA	2%	3.70%	2.80%
Kugel [10]	2003	United States	1468	NA	NA	0.60%	NA	0.40%	NA

The main limitation of our study was the limited information in regards to the time needed to return to work. Historically, patients were advised to avoid heavy physical activities for six weeks, as evidence suggest that tensile forces sufficient to cause an early repair failure can be caused by lifting more than 10 kg, in which the risk can persist up until 6 weeks after surgery [23]. Our usual practice is to allow patients to return to activities that they were able to tolerate provided that they abide by the above recommendation. Our recurrence rate remains similar to other published studies. In our experience, this technique is simple and the learning curve is acceptable and well within the capability of rural general surgeons. In our rural setting, a significant proportion of these procedures were able to be performed as a day case, which is likely to contribute to the potential cost-effectiveness.

Conclusion

Open pre-peritoneal mesh repair is in the rural Western Australian setting appeared to be safe with a low complication rate similar to published studies. It also considered as a minimally invasive approach without the need for specialist laparoscopic equipment and lower cost.

It may provide additional mechanical advantage and is a simple technique to perform with good postoperative outcome.

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Patient data used to support the findings of this study are restricted by the ethics committee in order to protect patient privacy. Data are available after approval of the Hospital ethics committee for researchers who meet the criteria for access to confidential data.

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Conflict of Interests

Thomas Bowles, Chang Chow-Mein and Abdallah Elsabagh have no conflict of interests or financial ties to disclose regarding the publication of this paper.

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