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Paper

Immediate and long-term outcomes of Lichtenstein and Kugel patch operations for inguinal hernia repair.

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ABSTRACT

Aim: The aim of this retrospective study is to compare the immediate and long-term postoperative outcomes of Lichtenstein and Kugel repair of inguinal hernia.

Methods: From 1996 to 2006, 219 consecutive patients underwent inguinal hernia repair - 92 using a standard Lichtenstein repair and 127 with a Kugel patch. Patient characteristics, length of postoperative hospital stay and complication rates were assessed by retrospective review of the notes. Recurrence and chronic groin pain were assessed by postal questionnaire (with a follow up by telephone interview for non-responders). Patients with symptoms or an apparent groin swelling were reassessed by one of the authors (BD).

Results: There were 214 men and 5 women. Patients ranged from 18 to 87 years of age (mean 54 years). Seventy two percent of postal questionnaires were returned. Following telephone calls the overall response rate was 80%. The mean follow up period was 60 months (range: 9 – 132 months). Immediate complications were similar in both groups. The recurrence rates were 1.1% for Lichtenstein repair and 6.3% for Kugel patch (p= 0.09). None of the patients in the Lichtenstein group and 1.6% of patients in Kugel patch group complained of severe chronic pain in inguinal region.

Conclusion: There was no significant difference in the immediate complication rates between the two groups. Although recurrence and chronic groin pain rates are higher with Kugel repair, this was not statistically significant.

Key Words: Inguinal hernia, Lichtenstein, Kugel.

INTRODUCTION

Inguinal hernia repair is one of the most commonly performed general surgical procedures. Edoardo Bassini described the first true anatomical repair of inguinal hernia that reduced both the mortality and recurrence rates of hernia repair to less than 2%[1]. More recently, the operation has been simplified and the recurrence rate is further reduced by the adoption of tension free repair using synthetic prosthetic materials.

Lichtenstein tension free repair has gained wide acceptance because of its simplicity and consistent results. Kugel described a pro-peritoneal tension-free technique that aimed to combine the utility of the open operation with advantages of minimal access procedures (smaller incision, pro-peritoneal mesh placement, avoidance of neuropathic pain)[2].

The aim of this retrospective study is to compare the immediate and long-term outcomes of Lichtenstein and Kugel methods of inguinal hernia repairs in a single surgeon's practice.

MATERIALS AND METHODS

From 1996 to 2006, 219 patients underwent elective hernia repairs. Twenty-three of these were for recurrent and 196 for primary hernias. Operations were performed at the Royal Victoria Hospital Belfast, and at the Ulster Independent Clinic, a private hospital. All cases operated on by the consultant during this period were included, except where a Stoppa procedure was deemed appropriate (eight patients with giant, bilateral or multiple recurrent hernias).

A Lichtenstein repair was performed in 92 patients and a Kugel patch was used in 127 patients by a single consultant surgeon; although junior surgeons operated under supervision in those cases performed at the Royal Victoria Hospital (Consultant 83, Registrar 29, Senior House Officer 9 repairs). Patients ranged from 18 to 87 years of age (mean: 54 years).

The Lichtenstein tension free repair is performed using a polypropylene mesh placed over the posterior wall of the inguinal canal secured with 2/0 polypropylene sutures after reduction of the hernia sac. The choice of mesh evolved during the study period, to lighter weight meshes with absorbable components. The hernial sac was not transfixed or excised.

The Kugel patch repair involves making a 2.5 cm incision immediately above the deep ring. A self-expanding two-layered mesh with an extruded monofilament polymer ring is

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then placed in pro-peritoneal space, deep to the transversalis fascia covering the inguinal and femoral hernial orifices from "the inside" (Fig 1). The transversalis fascia is usually closed with a single interrupted stitch that also includes the anterior layer of the mesh to prevent its migration. In latter years, the mesh was also secured to the back of the pubis with an endoscopic tacker ("tacked").

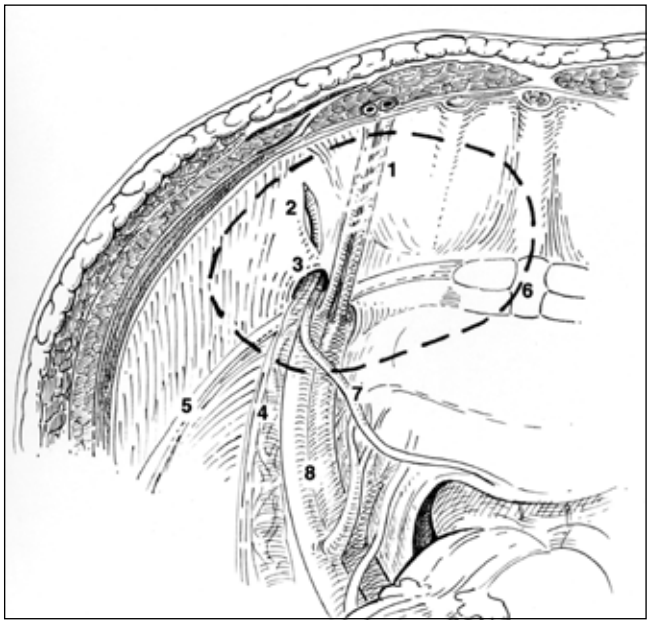

Fig 1. Preperitoneal view of groin: 1. inferior epigastric vessels 2. position of transversalis incision made to enter the preperitoneal space 3. internal ring 4. testicular vessels 5. inguinal ligament 6. symphysis pubis 7. vas deferens 8. external iliac vessels. Dotted line represents the preperitoneal position of Kugel patch from inside.

All procedures were performed under general anaesthesia. The ilio-inguinal nerve and wound were infiltrated with a long acting local anaesthetic during the procedure in all the patients. Although our current practice is to perform all hernia repairs under local anaesthesia (with a concomitant increase in day surgery rates), this study predates that change in practice. Prophylactic intravenous antibiotics (1.5 gm Cefuroxime at induction) were used routinely. Immediate complications were assessed by retrospective review of hospital records. To assess the long-term complications, questionnaires were mailed to patients with pre-paid return envelopes. Those who did not respond to the postal questionnaire were contacted by telephone. Patients who described a recurrent swelling or pain were reviewed. Patients who missed an appointment were given a second appointment. Any swelling associated with cough impulse was considered a recurrence. Outcomes were compared between the two types of procedures in the SPSS statistical analysis software using the chi-squared test for contingency tables or Fisher's exact probability test, as appropriate.

RESULTS

There was no significant difference in the immediate postoperative complication rates between the two groups (Table I). Duration of hospital stay was similar in the two groups (Table II). Only 46% of the patients were managed as day cases, even though most were admitted with this intention. Hospital stay was significantly longer in patients operated at the Royal Victoria Hospital compared to the Ulster Independent Clinic. Seventy five percent of Ulster Independent Clinic patients but only 22 percent of the Royal Victoria Hospital group were discharged within 24 hours of operation (odds ratio: 10.7; 95% CI: 5.5-21.2)(Table III).

Long-term complications were assessed by postal questionnaire that was mailed along with a pre-paid return envelope. Seventy-two percent of patients returned the questionnaire. This was followed by telephone interview for the non-responders giving an overall response rate of 80%. The median follow up was 60 months (9 – 132 months). Among the respondents 71 had Lichtenstein and 101 had Kugel patch repairs. In those with persistent pain, the severity was graded as mild, moderate or severe (Table IV). No patients in the Lichtenstein group and 1.6% in Kugel patch group graded their pain as severe.

TABLE I:

Immediate postoperative complications - Lichtenstein group vs. Kugel group

Immediate Complications	Lichtenstein group n=92	Kugel group n=127
No complications	87 (94.6%)	118 (92.9%)
Haematoma*	0	1 (0.8%)
Seroma*	1 (1.1%)	2 (1.6%)
Cord thickening	1 (1.1%)	1 (0.8%)
Haematoma and cord thickening	0	1 (0.8%)
Wound infection	0	1 (0.8%)
Testicular pain	0	1 (0.8%)
Hydrocele	0	1 (0.8%)
Chest infection, cardiac events, urinary retention	3 (3.3%)	1 (0.8%)
*requiring intervention		

TABLE II:

Postoperative hospital stay - Lichtenstein group vs. Kugel group

	Lichtenstein group n=92	Kugel group n=127
Day case	37 (40.2 %)	64 (50.4 %)
Overnight	15 (16.3 %)	30 (23.6 %)
2 days or more	40 (43.5 %)	33 (26 ,0%)

TABLE III:

Postoperative hospital stay - RVH group vs. UIC group

	RVH group n=121 patients	UIC group n=98 patients
Day case	27 (22.3%)	74 (75.5%)
Overnight	31 (25.6%)	14 (14.3%)
2 days or more	63 (52.1%)	10 (10.2%)

TABLE IV:

Persistent postoperative pain - Lichtenstein group vs. Kugel group

Chronic Pain	Lichtenstein group n=92	Kugel group n=127
None	40 (43.5%)	68 (53.5%)
Mild	22 (23.9%)	19 (15%)
Moderate	9 (9.8%)	12 (9.4%)
Severe	0	2 (1.6%)
Non responders	21 (22.8%)	26 (20.5%)

Eight of the Lichtenstein group and eighteen from the Kugel group indicated that they noticed a swelling in the inguinal region. All were requested to attend a surgical clinic for assessment of recurrence. Three of the Lichtenstein group and two of the Kugel group did not attend despite a reminder. Of the remaining patients who did attend, one of the Lichtenstein patients (1.1%) and eight of the Kugel patients (6.3%) were confirmed to have clinical recurrence. The difference in the recurrence rates is not statistically significant (p = 0.09). The remaining patients had soft tissue prominence at the wound site but no recurrence. Lichtenstein repair was performed in 14 of the 23 patients with recurrent hernias and Kugel repair was performed in the remaining nine. None of them had a recurrence. In the Kugel group, 22 hernias were tacked and 105 were not tacked. There were two recurrences in the tacked group and six recurrences in the untacked group (p=0.5 Fisher's Exact test; OR=1.2, 95% CI: 0.2 - 7.5).

DISCUSSION

The Lichtenstein anterior tension free mesh repair is widely regarded as the gold-standard hernia operation. It is easy to learn, reproducible and carries a low complication rate. The Kugel patch operation employs a 2.5 cm incision immediately above the deep ring, through which a mesh is placed deep to the fascia transversalis and can be secured to transversalis and Cooper's ligament. Placement of the mesh deep to the muscle layers should theoretically reduce inguinal pain, by avoiding scar tissue around the ilio-inguinal and genito-femoral nerves. There is also a theoretical mechanical advantage by applying the prosthesis to the back of the abdominal wall as the higher intra-abdominal pressure actually contributes to the integrity of repair.

Immediate complication rates of both the procedures are similar in our series and are comparable to those reported by a specialist hernia centre in the UK. The British Hernia Clinic reported wound haematoma in 2%, infection requiring antimicrobial treatment in 1.3% and testicular swelling in 1%[3]. The senior author previously reported wound haematoma and infection rates of 3.3% and 1.1% with two-layered hernia repair using absorbable sutures[4]. Infection rates of less than 1% are reported with mesh repairs of inguinal hernias[5]. Although routine use of antibiotics is not considered necessary, we considered the severity of occasional sepsis in the mesh sufficient to justify a single shot of a broad-spectrum cephalosporin. In the current era with concerns about *C.difficile* infection, this policy has been revised. The response rate of 80% to the questionnaires is comparable to the similar studies in literature[4,6].

Outcome analysis in hernia surgery is usually performed by assessing postoperative recurrence rates and long-term pain. Recurrence rate remains the most traditional outcome measure of the efficacy of hernia repair. However, there is no universal agreement on whether a bulge or cough impulse at the site of original operation or only those that require reoperation should be considered a recurrence[6]. Other confounding factors are the duration of follow up and the loss of patients to follow up. We included all positive cough impulses as recurrences, even though most of these patients have elected not to have the (often small) recurrent hernia repaired. We were unaware of most of the recurrences until we contacted the patients.

In our series, the Kugel repair is associated with higher recurrence rates (6.3%) than the Lichtenstein repair (1.1%). The difference is, however, not statistically significant (p = 0.09 Fisher's Exact test). Similarly, rates of chronic pain are similar between the two groups. Complication rates are reported to be similar between the two procedures in the only published prospective, randomised comparative study[7]. Recurrence rates of Lichtenstein repair are reported to vary from 0% -1.3%[5]. A 2-3 cm overlap over the pubic tubercle with medial fixation is recommended to prevent the recurrence[8] and this technical detail alone may reduce the risk of recurrence by 50%[9]. Kugel reported a recurrence rate of 0.62%[2] that further reduced to 0.4%[10] with experience. There are conflicting reports of high recurrence rates of 7.7%[11] and 3.7%[12] and low recurrence rates of 0.8%[13] and 1.9%[14].

The Kugel patch undoubtedly has a learning curve with recurrence rates as high as 18% reported during a surgeon's first 36 cases, reducing to 2.9% thereafter[11]. In our series, 5/8 (62%) of recurrences occurred in the first 50% of cases.

Chronic neuralgia can be associated with any groin hernia repair and is attributed to nerve entrapment, perineural fibrosis and development of neuromas at the cut ends of the nerve. The frequency of chronic groin pain is reported to vary from 0% to 37% of patients undergoing conventional hernia repair[9]. It was for this reason that we wished to explore the role of the Kugel patch technique. Kugel repair might be expected to have a lower incidence of chronic pain as the incision is much higher than conventional groin hernia incisions and the mesh is not placed on the major inguinal cutaneous nerves (ilioinguinal and genitofemoral). Kugel advises care to avoid damage to the cutaneous nerves that course on the internal oblique, meticulous haemostasis and minimal manipulation of the cord structures[10] to avoid chronic pain.

The reported incidence of chronic pain with Kugel technique varies from 0% - 3.5%[12-14]. Bay-Nielsen *et al* observed moderate to severe pain in 3.9 percent of patients with no significant difference between open mesh, Shouldice and Marcy repair[15]. Aroori reported a 9% incidence of severe chronic pain after inguinal hernia repair (Bassini, darn and Lichtenstein) in the Northern Ireland population[16]. In our series, 1.6% of Kugel group complained of severe chronic groin pain but none in the Lichtenstein group. Recurrent hernias and large scrotal hernias are independent risk factors for recurrence and younger patients are at greater risk of chronic pain irrespective of the open technique used[17].

The low day case rates in this study are disappointing. It is

known that day case surgery is not fully developed in the UK[18]. In this series, patients at the Royal Victoria Hospital were admitted to a general ward (combined medicine and inpatient surgery) and not a specialist day surgery facility. Most were admitted with the intention of discharge the same day. Since the patients operated on at the Ulster Independent Clinic had higher day surgery rates with an identical surgical and anaesthetic approach, it can only be concluded that the lack of a dedicated day surgery unit was the main reason for delayed discharge.

This study was not intended to be a randomised trial, so comparisons between the groups must be made with caution. False negative long-term results were possibly reduced with a good response rate (80%) to the postal and telephone survey but were not completely eliminated. Furthermore the Kugel patch experience represents a learning curve for the procedure, whereas the Lichtenstein repair is well established.

We are not aware of any other study that has addressed the recurrence rate following prosthetic inguinal hernia repair in the Northern Ireland population. The results in this study show a significant improvement over our previous outcomes in the pre-mesh era, when the recurrence rate was 2.2%[4]. The overall chronic groin pain rate is comparable to published literature though the incidence of severe pain in our study is much lower (1.6%), with no severe chronic pain in the Lichtenstein group.

CONCLUSION

There is no significant difference in the immediate complication rates between the two operations. Although recurrence and groin pain rates are higher with Kugel repair, this is not statistically significant. Day case rates may be improved by the provision of appropriate dedicated facilities.

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