

Original Article

Comparative Study of Tailor-made Mesh Plug Herniorrhaphy Versus Lichtenstein Herniorrhaphy Versus Bassini Operation: A Prospective Clinical Trial

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OBJECTIVE: Operations to cure inguinal hernia are among the most common surgical procedures. However, the most effective surgical technique for inguinal hernia repair is unknown, and the recurrence at 5 years varies between 1% and 10%. Surgical techniques and implanted materials are crucial to the result of and costs associated with hernia repair. The objective of this study was to determine whether the tailor-made mesh plug for inguinal hernia repair was as effective and safe as other methods of herniorrhaphy.

METHODS: Of 94 patients who had a primary diagnosis of inguinal hernia prospectively included in the study, 25 were treated with tailor-made mesh plug herniorrhaphy, 26 with Lichtenstein herniorrhaphy and 36 with the Bassini operation. The primary outcome was the recurrence of hernia at 1 year, and secondary outcomes included surgical complications and hospital stay.

RESULTS: There was no postoperative mortality in this study. Three patients had recurrence after Bassini operation, but there was no recurrent hernia after Lichtenstein or mesh plug herniorrhaphy. Groin swelling and ecchymosis were found in two patients (1 tailor-made mesh plug, 1 Lichtenstein herniorrhaphy). No surgical site infection occurred. Mean operating time was 60 minutes (range, 45–75 minutes) for tailor-made mesh plug herniorrhaphy, 82 minutes (range, 30–120 minutes) for Lichtenstein herniorrhaphy, and 82 minutes (range, 30–135 minutes) for the Bassini operation.

CONCLUSION: Tailor-made mesh plug herniorrhaphy is a safe operation. The mesh plug material (Mersilene) was cheap. The recurrence rate was lower with tailor-made mesh plug herniorrhaphy than with the Bassini operation, but equal to that with Lichtenstein herniorrhaphy. Postoperative complications did not differ among all operations. [*Asian J Surg* 2006;29(2):74–8]

Key Words: anterior repair, groin hernia, postoperative complication

Introduction

Inguinal hernia repair is among the most common surgical procedures performed, but the most effective surgical technique is unknown and the reported rate of hernia recurrence varies between 1% and 10% at 5 years.¹ Several methods have been developed over the years to improve the outcome of

surgery. During the last two decades, mesh repair has become more accepted because it results in tension-free repair with a low recurrence rate.²

Mesh plug herniorrhaphy was first introduced in the 1970s, but has only recently been promoted as a repair for all varieties of inguinal hernia.³ In this study, we tailored mesh plugs from Mersilene mesh and determined if the tailor-made

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mesh plug was as effective and safe as other methods of herniorrhaphy.

Patients and methods

Between 1 June 2003 and 1 January 2004, all patients with inguinal hernia in Unit B General Surgery of Ramathibodi Hospital, who met the inclusion criteria, were included in this study. The inclusion criteria for patient selection were: age > 15 years; direct, indirect or combined inguinal hernia; elective surgery involving the attending surgeon; and no concomitant procedure. The exclusion criteria were recurrent inguinal hernia and inability to come for protocol follow-up. Patients were allocated to each procedure according to surgeon preference. All patients were followed-up at 2 weeks, 6 and 12 months, and 2 years after surgery.

Surgical technique

In the Bassini operation, the inguinal canal was opened and inspected. An indirect sac was dissected off the spermatic cord, then ligated and transected at the level of the internal ring. The transverse abdominis aponeurosis arch (TAAA, internal oblique muscle, transversus abdominis aponeurosis and transversalis fascia) was sutured to the inguinal ligament

using interrupted polypropylene sutures and the external oblique fascia was closed to the cord.

In Lichtenstein herniorrhaphy, the hernial sac was dissected, ligated and transected, then polypropylene mesh was trimmed to match the size of the inguinal floor. The mesh was secured with polypropylene sutures and the external oblique fascia was closed to the cord.

Tailor-made mesh plug herniorrhaphy was performed with a plug and patch, which were made from Mersilene mesh (Ethicon Inc, Somerville, NJ, USA) (Figure 1). The plug was inserted in the internal ring, the patch was then secured to the inguinal floor (TAAA and inguinal ligament) with prolene sutures and the external oblique fascia was closed to the cord.

Outcome

Outcome measures included duration of surgery, hospital stay and complication and recurrence rates.

Results

From June 2003 to January 2004, 94 patients were included in this study. They were allocated to one of three groups: 25 underwent tailor-made mesh plug herniorrhaphy, 26 under-

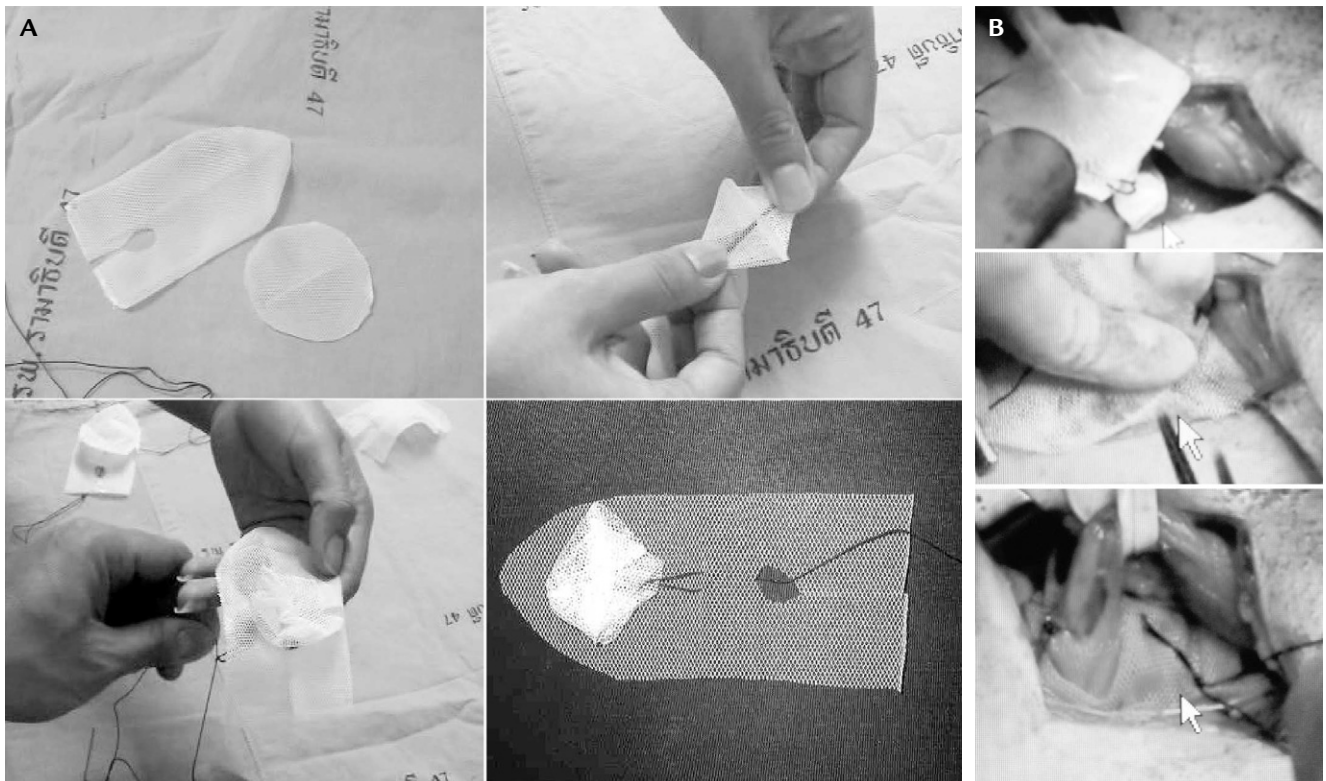


Figure 1. (A) Tailor-made mesh plug; (B) tailor-made mesh plug repair procedure.

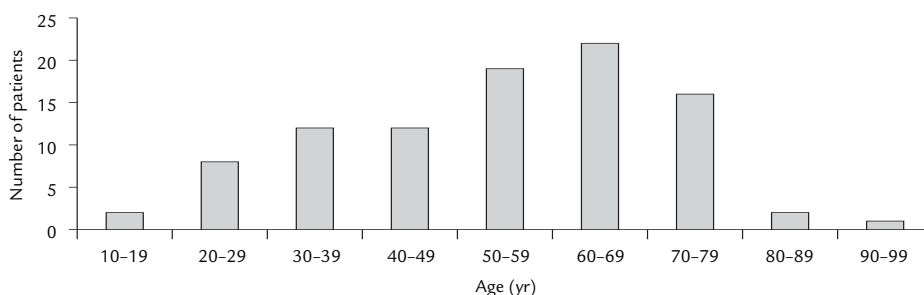


Figure 2. Patients' age distribution.

went Lichtenstein herniorrhaphy, and 36 underwent Bassini operation. The age distribution and demographic data are shown in Figures 2 and 3. Most patients (73) received spinal anaesthesia (Table 1).

Duration of surgery and hospital stay

Mean operating time was 60 minutes (range, 45–75 minutes) for tailor-made mesh plug herniorrhaphy, 82 minutes (range, 30–120 minutes) for Lichtenstein herniorrhaphy, and 82 minutes (range, 30–135 minutes) for the Bassini operation.

Mean duration of hospital stay for tailor-made mesh plug herniorrhaphy was 2.4 days, for Lichtenstein herniorrhaphy was 2.3 days, and for the Bassini operation was 2.5 days.

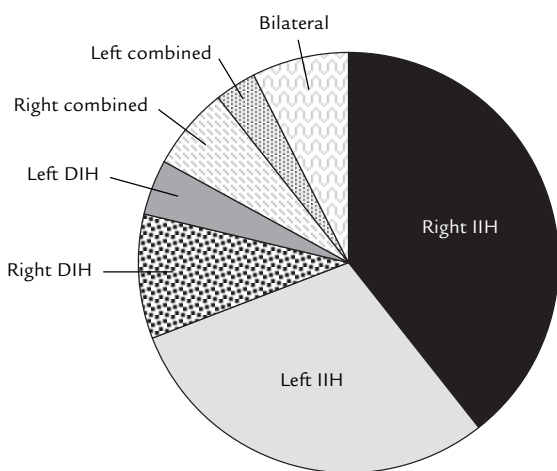


Figure 3. Patients' demographic data. IIH = indirect inguinal hernia; DIH = direct inguinal hernia.

Table 1. Type of anaesthesia used

	Surgical approach		
	Mesh plug (n = 25)	Lichtenstein (n = 26)	Bassini (n = 36)
General anaesthesia	4	4	6
Spinal anaesthesia	21	22	30

Postoperative complications

There was no postoperative mortality or surgical site infection (Table 2). Three patients had recurrent hernia after Bassini operation, but there was no recurrent hernia after either Lichtenstein or tailor-made mesh plug herniorrhaphy. Groin swelling and ecchymosis were seen in two patients (1 tailor-made mesh plug herniorrhaphy, 1 Lichtenstein herniorrhaphy). The mean follow-up was 16 months (range, 12–18 months).

Discussion

Herniorrhaphy for groin hernia is one of the most common operations performed by general surgeons. The evolution of this procedure has progressed dramatically over the past two decades. The Bassini operation has been the method of choice for over 100 years, but the use of prosthetic material is now established in groin herniorrhaphy, and the concept of plugging the defect has evolved considerably since 1974.³

Mesh plug and patch hernioplasty was popularized by Rutkow and Robbins.³ The advantages of this method are its simplicity and a tension-free result. The plug protects the internal ring and allows less dissection. The mesh and plug not only overlap the defect, but also cover the entire myopectineal orifice. In this study, we modelled the tailor-made mesh plug for inguinal herniorrhaphy. The efficacy and safety of tailor-made mesh plug herniorrhaphy were as good as those of Lichtenstein herniorrhaphy. The recurrence rate was lower than that with the Bassini operation. No differences

Table 2. Postoperative complications

	Mesh plug	Lichtenstein	Bassini	Total
Complication				
Death	0	0	0	0
Wound infection	0	0	0	0
Seroma/haematoma	1	1	0	2
Testicular atrophy	0	0	0	0
Recurrence	0	0	3	3

Table 3. Previous studies of inguinal herniorrhaphy

Authors	Study design	Procedures	N	SSI	Wound haematoma	Recurrence
Goyal et al ⁶	RCT	Plug & patch	100	1%	3%	14%
Pirski et al ⁷	RCT	Plug & patch	70	2 (2.7%)	0	7 (9.4%)
Millikan et al ⁸	Prospective study	Plug alone	135	0	5 (1.1%)	0
Bringman et al ⁹	RCT	Plug & patch	104	3	8 (8%)	2 (2%)
Nienhuijs et al ¹⁰	RCT	Plug & patch	113	9	No report	8 (2.5%)

SSI = surgical site infection; RCT = randomized controlled trial.

in the rate of complications and mean duration of hospital stay were found among the three methods. The mesh plug material was cheap, and one 20 × 25-cm Mersilene mesh made four plugs.

Recurrence following inguinal hernia repair is clearly a significant issue. One problem is that patients must be followed for a significant period to evaluate the recurrence rate. Having all patients return to the hospital for a physical examination is time-consuming and may not be cost-effective for the healthcare system. The mean follow-up in this study was 16 months, which is relatively short. Two previous reports have shown that using a questionnaire for long-term follow-up is a good alternative to clinical visits.^{4,5}

Other factors that should be considered when choosing a hernia repair method are technical difficulty, complication rate, recovery time and cost. Our tailor-made mesh plug was designed for the anterior approach, which is comfortable for most surgeons. Unlike laparoscopic herniorrhaphy or open preperitoneal repair, which require special instruments or the ability to navigate the mesh, our technique was simple and required only a short learning curve.

Postoperative complications in this study were uncommon. No mesh infection or removal of mesh occurred. Our tailor-made mesh plug was designed to eliminate the problem of plug migration by fixing the plug inside the mesh. The incidence of complications did not differ among the three groups and was similar to that in other randomized trials

(Table 3).⁶⁻¹⁰ We did not evaluate the rehabilitation and recovery time of patients. More than 90% could perform normal activities within 3 days and return to work within 14 days, while 80% stopped all pain medication 3 days after surgery. Cost was a difficult factor to determine. Our tailor-made mesh plug was designed in standard size. Minimal waste of material occurred during the manufacturing process. There was a selection bias in the study because patients were allocated to each procedure according to surgeon preference.

In conclusion, our tailor-made mesh plug herniorrhaphy was a safe and effective method for inguinal hernia repair. There was an early recurrence rate of zero, with minimal complications. This method is suitable for inguinal hernia repair. However, long-term follow-up is needed to confirm the results.

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