Basrah Journal of Surgery

Bas J Surg, September, 8, 2002

GUARNIERI TECHNIQUE FOR INDIRECT INGUINAL HERNIA REPAIR

M K Mohammed

Arab Board Certified Surgeon, General Surgeon, Al-Karama Teaching Hospital and Senior Lecturer, Al-Kindi Medical College, Baghdad University, Baghdad; IRAQ.

Summary

This paper presents a personal experience with a technique for indirect inguinal hernia repair, first described by Antonio Guarnieri et al. from Rome, Italy in 1992. Thirty patients with indirect inguinal hernia were operated upon, using this technique, from June 1995 to October 1996. The main characteristics of this technique are the creation of a deep neo-inguinal ring in a more medial site, shortening of the inguinal canal by transposition of the superficial ring to the point where the inferior border of the internal oblique muscle is well represented, reinforcement of the inguinal canal by overlapping the external oblique aponeurosis in a double-breast fashion, and maintenance of the cremasteric muscle. Follow up was carried out at 1,6,12 and 24 months in all the patients. There were no recurrences, no mortality and no testicular atrophy. Two patients (6.6%) had subcutaneous seroma. One patient (3.3%) had hematoma, 5 patients (16.5%) had temporary testicular oedema. The wound infection rate was (3.3%).

Introduction

Inguinal hernia inflicts a varying degree of disability on a considerable fraction of the population, mostly in the active range of age. Many techniques have been proposed to repair the defect in the inguinal canal responsible for herniation. Some are quite old and went through different modifications, like Bassini repair, and some are rather recent like Guarnieri repair, which was introduced for the first time in 1992 in Italy.

Correspondence to:
Dr. MK Mohammed
Department of Surgery, University of Baghdad
Al-Kindi Medical College, Baghdad; IRAQ.

Patients and Methods

From June 1995 to August 1996, 30 patients with indirect inguinal hernia were operated upon using this technique. The average age was 33 years (range from 8 to 54 years). No patient's selection was used for the surgical procedure. A pre-operative single dose (Ampiclox 1 gm) was given I.V. (knife-on-skin) followed postoperatively by 3 doses of ½ gm Ampiclox I.V. at 6 hourly intervals. All patients underwent surgery under GA, ambulation was permitted as soon as possible. Normal physical activity was allowed between the 3rd and 7th postoperative day. Strenuous exercise was discouraged for 4 weeks. Sutures

included were "O" polypropylene for the 3 deep continuous suture layers and "OO" vicryl for the superficial layer.

Operative technique

The same techniques described by Guarnieri was used with no modifications. The skin incision used was oblique inguinal incision for all patients as it gave a better access to the upper part of the inguinal region.

The external oblique aponeurosis is completely exposed laterally, incised in the direction of its fibers, opening the superficial inguinal ring. The medial border of the external oblique aponeurosis is detached from the rectus muscle sheath towards the midline. The cord is isolated, the inferior border of the internal oblique muscle is separated from the medial cremasteric fibers. The plane of cleavage between the internal oblique muscle and the aponeurosis of the transversalis muscle is easily identified. The internal oblique muscle is retracted in order to identify the transversalis fascia medial to the deep inguinal ring (Figure 1).

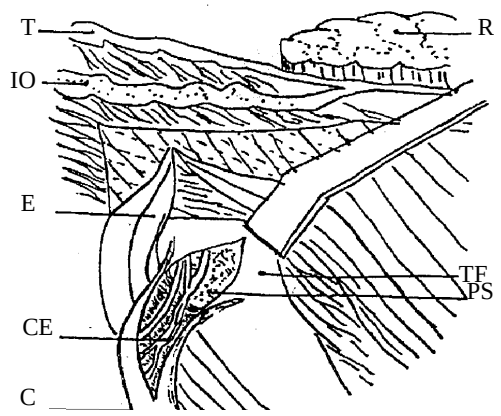

Figure 1. The internal oblique muscle is retracted, the incised tunica vaginilis, the deep ring, and the transversalis fascia is exposed. T= transversalis muscle; IO= internal oblique muscle ; E=external oblique aponeu. CE= cord elements; C=Cord; R=rectus muscle; TF =transversalis fascia; PS= preperitoneal space (Right Side).

An incision in the proximal portion of the tunica vaginalis, including the internal ring and the transversalis fascia, is made (Figure 1), the incision is directed medially and cranially and prolonged to the transversalis for about 1 to 2 cm. The sac is isolated beyond its neck, ligated and cut, the cord elements (vessels and vas deferans) are separated from the tunica vaginalis and cremasteric muscle. The incision made in the transversalis fascia is extended for an additional 1 to 2cm up to the rectus muscle sheath (Figure 1).

All the inguinal elements are transposed to the medial end of the incision of the transversalis fascia and the first suture layer started. At this stage and with the first suture inserted medially, a deep neo-inguinal ring is created, the size of the ring can be easily calibrated. The rest of the opened transversalis fascia is then closed with continuous suture which is going to occlude the original deep inguinal ring laterally (Figure 2A). A second layer with the same suture is carried out by suturing on the previous layer part of the cremasteric muscle and tunica vaginalis (Figure 2B).

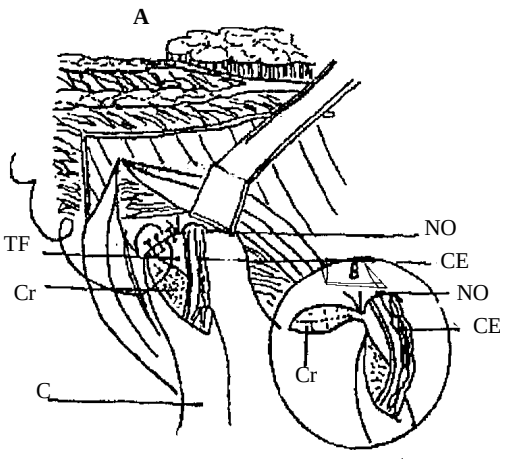

Figure 2. (A) The cord elements are transposed medially on the transversalis fascia incision. The internal neo-orifice is created, and the primary deep orifice is closed by sutures. (B) The continuous suture is reinforced by the cremasteric muscle and the tunica vaginalis. TF = transversalis fascia; CR=cremasteric muscle; C=cord; NO=new orifice; CE = cord elements (Right Side).

The point where the inferior border of the internal oblique muscle interlocks with the rectus muscle sheath is now identified. The external ring will be transposed to this new site. At this point, the rectus muscle sheath and the lateral border of the external oblique aponeurosis behind the cord are sutured with a continuous suture up to the pubic tubercle and back to the starting point taking again the rectus sheath and the external oblique aponeurosis (figure 3)

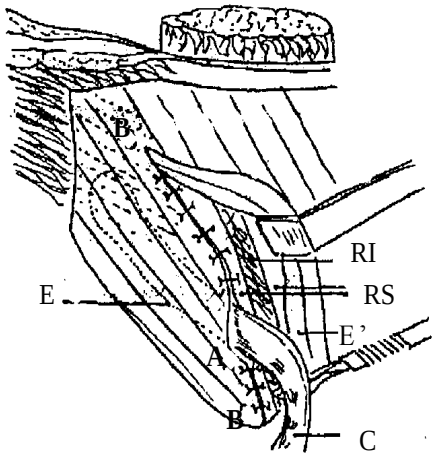

Figure 3. Continuous suture between the lateral border of the external oblique aponeurosis and the rectus muscle sheath (A-B and A′-B′). the external neo-orifice (A-A′) is transposed where the inferior border of the internal oblique muscle interlocks with the rectus muscle sheath. E=lateral border of the external oblique aponeurosis; B=pubis; A′=inferior border of the internal oblique muscle; A-A′=neo-superficial orifice; B′=upper limit of external oblique incision; RI=releasing incisions on the rectus sheath (RS); E′=medial border of external oblique aponeurosis; C=cord (Right Side).

Another continuous suture is used to suture the lateral border of the external oblique aponeurosis and rectus muscle sheath above the cord, thus forming the new external inguinal ring up towards anterior superior iliac spine and back (figure 3). A long releasing incision on the rectus sheath is carried out (figure 3).

The fourth suture line goes from the pubis to the new superficial inguinal ring and from the ring towards the anterior superior iliac spine overlapping the medial border of the external oblique aponeurosis to the lateral surface of the lateral oblique aponeurosis in a double-breast fashion (figure 4).

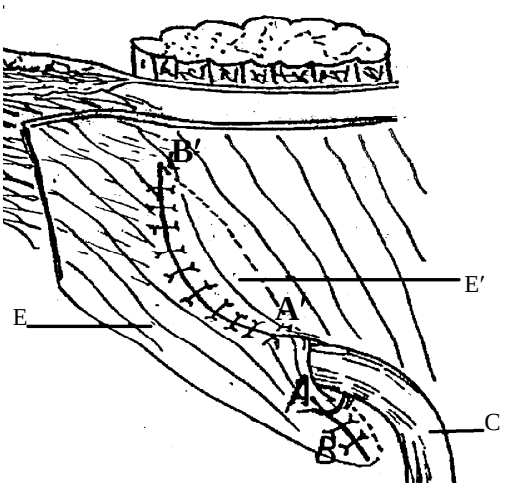

Figure 4. The medial border of the external oblique aponeurosis is overlapped to the lateral one in a double-breast fashion. B′-A′ = over the cord; A-B= under the cord; E′=medial border of the external oblique aponeurosis; E=lateral border of external oblique aponeurosis; C=cord. (Right Side).

Results

The immediate postoperative complications were a seroma collection in 2 patients (6.6%) that was aspirated promptly. One patient (3.3%) had hematoma that was left to liquify then aspirated after 7 days with no sequalae. Temporary testicular oedema occurred in 5 patients (16.5%). The oedema resolved at average time of 10 days (5-15 days). In spite of prophylactic broad spectrum antibiotics, there was severe wound infection occurred in one patient. Subcutanuous pus drained and the wound healed with no sequlae. All the patients were told that this was a new technique and this encouraged them to follow up over one year period. Seven patients are still reporting. There were no recurrences. Results are summarized in Table I.

Age	Complication	Events during surgery	Management
17 years	Seroma	Uneventful	Aspiration
32 years	Seroma	Long standing Lt. inguinal hernia. Sac difficult to separate	Aspiration
21 years	Hematoma	Uneventful	Left to liquify aspirated after 7 days
34 years	Temporary testicular odema	Uneventful	Resolved after 7 days
25 years	Temporary testicular odema	Uneventful	Resolved after 5 days
50 years	Temporary testicular odema	Difficult dissection	Resolved after 15 days
48 years	Temporary testicular odema	Uneventful	Resolved after 9 days
41 years	Temporary testicular odema	Uneventful	Resolved after 14 days
36 years	Severe wound infection	Uneventful	Drainage after 5 days. Antibiotic continued 5 days postoperatively

Table I. Relates the complications in 9 patients to the events during surgery.

Discussion

Inguinal hernia surgery is one field in general surgery that showed a lot of dissatisfaction among surgeons with the methods employed for repair, this had been very clear because of the large number of contributors to the issue. The main cause of dissatisfaction was the high recurrence rate reported with the traditional techniques namely the "Bassini" and "Halsted" repairs [1]. The reported recurrence rate of 4-10% world wide was the stimulant to new techniques for repair.

The 1880-1890 period in the 19th century could justifiably be termed "the decade of inguinal hernia". Significant contributors included Lucas Champonnier (Incision and opening of the external oblique fascia), Banks (High ligation of the peritoneal sac), Marcy (Closure of the transversalis fascia/ilio pubic tract) and Bassini (complete division of the fascial floor of the inguinal canal from the internal ring to the pubic and closure with a layer of non-absorbable sutures). The decade of 1990's may have equivalent significance in the 20th century due to the enthusiastic uptake of the prosthetic mesh and the emergence of laparoscopic techniques for hernioplasty. The darn technique, Shouldice repair and the tension-free hernioplasty (Lichtenstein's technique) are examples[2]. However, most of these techniques are not concerned with repair of the internal ring, more or less they are more directed to reinforcement of the inguinal canal floor[3].

The technique described by Antonio Guarnieri in 1992 is unique in being equally directed to the repair of the internal ring and the inguinal canal floor, actually, it creates a new snug internal ring in addition to its being tension free repair[4]. Marcy in 1871 did put a deep suture layer repairing the transversalis

fasci, but there is no transportation of the internal ring[4]. The technique developed by Schmieden after removing the testis from the scrotum, aiming to create a key hole, thus allowing the egress of the cord through the internal oblique muscle, can not be considered a neo-genesis of and internal ring[5]. Zimmermann also double-breasted the external oblique apone-urosis but he fixed its lateral border to the internal oblique muscle and transversalis fascia rather than to the rectus sheath [6,7]. Druener and others also described a double breasted suture, but they take the ilieo-inguinal ligament as part of the repair[4] while Guarnieri did not include the ilieo-inguinal ligament by sutures thus avoiding fibers splitting and excessive line tension, and with the exception of the cremastric borders, only fascia is sutured so that the muscles can maintain their function. Guarnieri used rectus sheath releasing incision and so did others[4].

The original paper by Guarnieri – appeared in the American Journal of Surgery, volume 164 July 1992- reported a total of 242 patients operated up on using this technique. No patients selection was used and no antibiotics were used[4]. He carried his follow up in 1,6,12,24 months in 71% of his patients, he reported no recurrences except for one crural pseudo-recurrence. There were no mortality and no testicular atrophy. Thirteen percent of his patients had subcutenous seroma collection, 1% had hematoma, 2% had temporary testicular oedema, and 0.4% had wound infection[4].

According to Gillbert's classification the technique is most suitable for indirect inguinal hernia type II and type III (Table II).

In case we consider that one of the main causes of recurrence of indirect inguinal hernia is failure to sung the internal ring, this technique is very promising, in addition, a short ingunal canal created by transpositioning of the external ring is definitely stronger, thus a stronger posterior wall will be created, moreover the uninclusion of the ilieo-inguinal ligament in the repair is actually a tension-free repair along with the advantage of maintenance of the cremasteric muscle.

The patients operated upon using this technique experienced much less pain postoperatively, ambulation was much faster compared with patients operated upon by Bassini technique, and even faster than ambulation after Shouldice repair, thus a shorter hospital stay is expected[2,9]. However, these data are subjective rather than objective. Lastly, the study of this technique should be extended to evaluate the addition of prosthetic mesh in case the posterior inguinal canal floor is much defective. It may be the subject for future study.

Indirect	Type I	Sung internal ring. Intact canal floor.
	Type II	One finger breadth internal ring. Intact canal floor
	Type III	Two fingers breadth internal ring. Detective canal floor (scrotal and sliding hernias)
Indirect	Type IV	Entire canal floor defective, no peritoneal sac anterior to canal floor. Intact internal ring.
	Type V	Diverticular defect admitting no more than one finger. Internal ring intact.

Table II. The 5 types of inguinal hernia (after Gilbert).

References

1.Morgan M, Reynolds A, Swan AB, et al. Are current techniques of inguinal hernia repair optimal? A survey in the United Kingdom. Ann R Coll Surg Engl 1991; 73: 341-345.
2.Recent advances in surgery-current practice of hernia surgery. I. Taylor, CD Johnson 1995; 18: 159-176.
3.Griffith CA. Inguinal hernia, an anatomic surgical correlation. Surg Clin North Am 1959; 39: 531-556.
4.Guarnieri A. A new technique for indirect inguinal hernia repair. Am J Surg 1992; 166: 70-72.
5.Schmieden A. Inguinal hernia repair, a new technique. Ann R Coll Surg Engl 1987; 80: 20-22.
6.Zimmerman IM. The use of prosthetic material in the repair of hernia. Surg Clin North Am 1968; 48: 143-154.
7.Zimmerman IM, Anson BJ. The anatomy and surgery of hernia. Williams and Wilkins, Baltimore 1953.
8.Robertson GSM, Haynes IG, Burton PR. How long to patient convalesce about hernioplasty? Current principles and practice. Ann R Coll Surg Engl 1993; 75: 30-33.
9.Derlin HB, Russel IT, Muller D. et al. short stay surgery for inguinal hernia. Clinical outcome of Shouldice operation. Lancet 1977; 7: 847-849.