

Surgery in Africa - Monthly Review

What is the most appropriate repair for Groin Hernias in Africa?

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Introduction

The repair of groin hernias is one of the most common and important surgical procedures. It has been said that the history of groin hernias is the history of surgery itself. This is even truer in Africa where groin hernias comprise a greater percentage of the surgical volume and account for more morbidity. The principles of scientific surgery developed in the early part of the 20th century led to the widespread use of the Bassini repair. In the last 20 years there has been a total revolution in surgical repairs with the introduction of tension-free (mesh) and laparoscopic repairs. An immense amount of research has taken place to evaluate these new techniques. Kingsnorth (1) provides an excellent review of these developments and also deals with incisional hernias. This Review will attempt to summarize this research and apply it to the specific conditions in Africa.

Definitions and History

Groin hernias have been classified in a number of ways. (2) For practical purposes the main anatomical types are inguinal – indirect and direct – and femoral hernias. Clinically they may be asymptomatic, reducible, irreducible, incarcerated or painful, obstructed and strangulated. In no other condition is the surgical anatomy more complex or important to understand. Lau (3) reviewed the history of hernia repairs from the earliest Egyptian repairs to the present. Edoardo Bassini (4) was primarily responsible for articulating the principles of modern repair in the late nineteenth century, principles which lasted for one hundred years. These are: opening the inguinal canal, opening the posterior wall of the inguinal canal, high ligation of the sac, tightening of the internal ring and repair of the posterior wall by suturing the conjoint tendon to the inguinal ligament. Abrahamson (5) articulates these principles and describes the initial dissection. Mortality rates for elective repairs approach that for the risk for anaesthesia and elective repair has been widely adopted to prevent complications.

Conventional or sutured repairs – Bassini, Shouldice and others

The danger in the standard sutured repairs is that the tissues are under a certain amount of tension and this is felt to result in a breakdown of the repair and to recurrence. The standard rate of recurrence for the Bassini repair is 5%, but the actual rate is often higher. Various attempts have been made throughout the 20th century to resolve this problem resulting in a plethora of repairs. A relaxation incision of the rectus fascia (Tanner's slide) is one such manoeuvre often performed. Non-absorbable sutures improve the permanence of the repair. (6) The Shouldice repair (7) has emerged as the most successful sutured repair. Developed in a private clinic in Canada, this repair, carried out under local anaesthesia, uses a continuous suture (classically stainless steel although prolene may be used) to create a 4-layer repair of transversalis fascia and conjoint tendon. The results from this clinic with a recurrence rate of less than 1% are unparalleled. Porrero (8) showed that other surgeons could use this technique as well. Their recurrence was 2%. Despite some contradictory evidence, (Miedema (9) versus Danielsson (10)), it is clear that this technique can be taught to trainees. Randomized trials (RCT) comparing the Shouldice and Bassini repairs (11) consistently show the superiority of the former.

Tension-free Repairs – Lichtenstein, plugs and mesh repairs

Lichtenstein (12) advocated an open on-lay mesh repair applied over the internal oblique fascia in 1986. This ushered in the era of tension-free repairs using mesh. Numerous systems have been developed using this principle: the Prolene hernia system (13), plug repairs (14), which place mesh in the internal ring, as well as repairs which place the mesh in the preperitoneal space. (15) Numerous studies (16, 17, 18) show these techniques are easily acquired, performed quickly under local anaesthesia and with very good results. Recurrence rates have often been reported to be less than 1%. Over the decade since their development tension-free repairs have quickly supplanted the conventional tissue or sutured repairs. (19) RCTs have shown that the mesh repairs are superior to even the Shouldice repair (20). A meta-analysis of these trials (21) showed a reduction in recurrences of 50 to 75% with mesh repairs over non-mesh repairs, including Shouldice. Two RCTs (22, 23) have been carried out comparing various mesh repairs without showing any significant differences in recurrence rates.

Laparoscopic repairs

With the introduction of laparoscopic general surgery in the 1990s, came the development of inguinal hernia repairs using the introduction of mesh through the laparoscope. (24) The two major approaches are the transabdominal preperitoneal repair (TAPP) and the total extraperitoneal repair (TEP) (25). The principle of tension free repair is followed. Unfortunately these procedures are costly, are difficult to learn and require general anaesthesia. (26) Nerve irritation is a more common complication, whose prevention requires specific precautions. (27) Numerous clinical trials comparing laparoscopic (LHR) and open repairs (OHR) have been conducted. Liem (28) showed the superiority of LHR over Bassini type OHR. Johannsson (29) and Bringman (30) showed that patients undergoing LHR had faster recovery times, but the procedure incurred significant increased costs. In Rattner's multicentre RCT (31), patients undergoing LHR had more serious complications. In all these studies recurrence rates were basically the same for LHR or mesh OHR. In Neumayer (32) recurrence rates were higher for primary hernias repaired with LHR, but equal for repairs of recurrent hernias. In a meta-analysis, Memon (33) confirmed less postoperative pain, improvements in recovery times and increased costs with LHR with similar recurrence rates. McCormack (34) published another meta-analysis comparing 41 trials with over 7000 participants. This report confirmed the improved results with LHR over non-mesh OHR. The recurrence rates with mesh OHR and LHR were similar. Decreased pain and faster recovery times with LHR were offset by increased costs and more serious complications. O'Dwyer (35) summarized the current status of LHR versus OHR. He stated that the drawbacks of LHR – necessity of general anaesthesia, longer learning curve, increased costs, and more serious complications – precluded its general use. Nathan (36) and Voyles (37) agreed that OHR was the procedure of choice for primary inguinal hernias, but accepted LHR for recurrent and bilateral hernias.

Additional issues: anaesthesia, day-surgery and convalescence

It is clear that, except for LHR, most inguinal hernia repairs can be conducted under regional or local anaesthesia. Nordin (38) proved the benefits of these. Furthermore blocking somatic nerves with long acting local anaesthetics can reduced post-operative pain and should be used more widely. Day-surgery is clearly appropriate for the majority of elective and uncomplicated hernia repairs. Ramyil (39) in Nigeria confirmed this in the African setting. More rapid return to full activity is another benefit of LHR and mesh OHR. Surgeons traditionally advocate 6 weeks of convalescence after Bassini repair. Bay-Nielsen (40) showed that 7 days to return to work and 14 days to full activity were the mean for the newer procedures.

Complications: recurrence, wound infection, pain, infertility

While recurrence rates are the traditional yardstick, by which the efficacy of hernia repairs are judged, other complications are also significant. Stephenson (41) reviewed these. With regard to wound infection, infection rates of clinical trials in developed countries run from less than 1% to 8%. Infection of the mesh itself has very seldom been reported. Sanchez-Manuel (42) in a meta-analysis of trials concluded that prophylactic antibiotics did little to reduced post-operative wound infections. This will be important in considering the African situation. Post-repair pain and chronic pain is another complication after hernia repair. Poobalan (43) reviewed this problem. He noted that chronic pain is less frequently documented with LHR and mesh OHR in comparison with non-mesh OHR, but concluded that more standardization of reporting was required. Finally, reports of infertility from obstructed vas deferentes after placement of mesh, have caused concern recently. (44, 45, 46, 47) The significance of this remains to be established, but it bears watching.

Special cases:**Paediatric hernias**

While Levitt (48) reported variability in the performance of herniorrhaphy amongst American paediatric surgeons, this simple procedure, rather than the hernioplasties described above, is sufficient for paediatric hernias, which are almost entirely indirect. Inguinal hernias comprised 43% of all elective paediatric operations in Kumasi, Ghana. (49) Omar from Libya (50) reported that 4.7% of all paediatric hernia repairs were emergencies with a significantly increased complication rate. The main controversy in children is: when is contra-lateral exploration indicated? Tackett (51) contends this is only necessary in premature infants and those with incarceration.

Femoral hernias

Hachisuka (52) reviewed the less common, but more dangerous, femoral hernia and illustrated how newer mesh repairs could replace the older inguinal approaches.

Bilateral and recurrent hernias

In bilateral hernia repairs, Sarli (53) showed that LHR was less painful compared to mesh OHR. Mahon (54) confirmed this for bilateral and recurrent hernias and Feliu (55) did so for recurrent hernias. Richards (56) favoured mesh OHR and Barrat (57) suggested that the secondary repair be based on that of the first procedure.

Strangulated hernias

That patients with strangulated hernias suffer increased morbidity and mortality is well known. Ohana (58) and Alvarez (59) document this. Kulah (60) and Gunnarsson (61) argue that these increased risks are indications for elective repair in elderly patients. Wisocki (62) used mesh OHR in 25 patients with incarcerated hernias but only one patient required bowel resection. The use of mesh OHR in this setting has not been adequately investigated and traditional surgical teachings preclude the use of foreign bodies in potentially infected conditions.

Recommendations for developed countries

I think that the dust has settled sufficiently in the modern hernia debate to make a number of recommendations for developed countries. These are in line with Kingsnorth (1)

1. The Bassini repair should be confined to the history books.
2. Surgeons should become proficient at the Shouldice technique and one of the newer tension-free repairs.
3. Shouldice, mesh OHR and LHR all give very low and basically comparable results in terms of recurrence rates.
4. Mesh OHR is probably easier to learn and perform than Shouldice repairs. This plus the slight reduction in recurrence rate makes it the procedure of choice for elective hernias in adults.
5. LHR has increased costs, learning curves, requires general anaesthesia and probably should be reserved for bilateral or recurrent hernias.
6. Most elective repairs can be performed under local or regional anaesthesia, as day surgery, and patients may return to work and full activity in from 7-14 days.
7. Antibiotics are probably not necessary although they are traditionally given when mesh is implanted.
8. For incarcerated hernias with no bowel necrosis a mesh repair under antibiotic cover might be recommended. Until there is definitive evidence showing the safety of mesh repairs for strangulated hernias requiring bowel resection, the Shouldice repair probably should be used in this situation.

What is different about Africa? – epidemiology, infrastructure and training

In Africa, inguinal hernias present in an entirely different manner than in developed countries. Ohene-Yeboah (63) reported that 65% of all hernia repairs in Kumasi, Ghana are emergencies. 71% of these are inguinal hernias, 10% femoral hernias. The bowel resection rate was 24% and the mortality for strangulated inguinal hernias was 6%. These statistics differ fundamentally from the developed world where strangulated hernias represent only 1-3% of the total repairs. In another study (64), from Sierra Leone, strangulated hernias represented 25% of all emergency operations with a resection rate of 33%. In Odula's study of groin hernia from Uganda (65), 76% of repairs were emergency. Fifty-five percent of cases were said to show strangulation, but unfortunately the rate of bowel resection was not indicated. There were wound infections in 7% of cases. Interestingly Bassini repairs were performed in 68% of cases. In Adesunkanmi's study (66) from Nigeria, obstructed hernias were said to represent 26% of all abdominal wall hernias. The resection rate was 13% and the wound infection 20%. In another study (67) of 250 consecutive patients over 50, the incarceration rate was 25%. This different epidemiology has significant implications. Mesh OHR will not be appropriate in more than 30% of cases due to the presence of contamination or risk of infection. In the presence of infection rates of around 10% or more the use of mesh might be considered ill advised.

The next issue is that of infrastructure. Although Pallas (68) mused over the possibility of laparoscopy, I think this is clearly utopian under present conditions. A more realistic question is whether African hospitals and patients can afford even the prosthetic material in mesh OHR. Rutkow, (69) discussing the costs of hernia surgery in the USA, placed more emphasis on time spent in OR and time to recovery than on differences in material costs. In my hospital in Canada a plug repair system costs \$126 (US)/case and a package of polypropylene mesh which might do for 12 cases costs \$45 (US) or less than \$4 (US)/case. In Africa the cost of mesh, not to mention its acquisition, might represent a formidable barrier.

The final issue is one of training and historical practise. The Bassini repair is still the standard in Africa. (65) Hollaar (70) in a structured training programme taught the Bassini technique. Shouldice repairs are considered to be difficult to learn, but Miedema (9) from USA showed that it could be successfully taught. Chan (71) from Malaysia showed that mesh repairs also are easily taught. Interestingly Robson (72) emphasized the importance of direct supervision for junior trainees with all techniques.

Recommendations for Africa

1. If the advantages of modern surgical experience are to benefit African patients, and since the Shouldice repair has been shown to be superior to the Bassini, efforts should be made to introduce widespread teaching of the Shouldice technique.
2. In order to prevent incarceration, elective hernia repair should be encouraged.
3. All hernioplasties should be performed with non-absorbable sutures.
4. Uncomplicated hernias can be discharged without danger on the same or next day.
5. Because of the higher incidence of incarceration, bowel resection and wound infections and considering the significantly increased cost of open mesh hernia repairs, these repairs will be probably remain in a secondary position, compared to conventional sutured repairs.
6. Considering the frequency of groin hernias, African surgeons are well poised to carry out RCTs comparing various hernia repairs. This will be the only way to decide which repairs are most appropriate for the African setting.

Brian Ostrow MD, FRCS(C)
Guelph, Canada

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