



Revista Portuguesa
de

irurgia

II Série • N.º 10 • Setembro 2009

The case for open inguinal hernia repair – still the gold standard and my default procedure.

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Laparoscopic and open mesh repair of inguinal hernia nowadays give similar excellent results in terms of recurrence [1,2]. Because both these procedures, when carried out correctly, are so effective at “curing” a hernia, when deciding on the most appropriate procedure we need to examine other important outcome criteria. Supporters of laparoscopic repair claim that diminished post-operative discomfort, faster return to normal activities and a lower incidence of long-term discomfort in the reported trials make routine laparoscopic repair for all groin hernias the preferred option. But laparoscopic inguinal hernia repair suffers from four major drawbacks - a significant learning curve, the need for general anaesthesia, the potential for serious complications and the cost. These four drawbacks are closely interrelated. Let us examine each of them in turn and compare them with open ambulatory local anaesthetic inguinal hernia repair.

LEARNING LAPAROSCOPIC INGUINAL HERNIA REPAIR

Laparoscopic repair of an inguinal hernia is technically demanding, requiring a high level of hand-eye coordination and dexterity. The good surgeons, who report good results with low recurrence and low complications, are very good. The training period is long for a challenging and unforgiving procedure, requiring

appropriate teaching and close supervision. Neumayer and colleagues [3] have suggested that the learning curve is 250 repairs, and this is probably the minimum number required to achieve an acceptable level of competence. There is good evidence that improvements in operating time, incidence of complications and recurrence rates are still occurring up to 600 cases [4, 5]. Training opportunities throughout Europe and the rest of the World are limited, and becoming more so. In the USA for instance junior general surgeons may carry out less than three laparoscopic repairs in their final year of training, while the average general surgeon in the UK only repairs about 50 hernias a year. There is no doubt that poorly trained or inexperienced, low volume surgeons are likely to get inferior results and more complications, particularly with a technically complex procedure. In contrast open mesh repair can, after a relatively short training period, give good results in the hands of ‘non-expert’ surgeons [6].

RESULTS OF LAPAROSCOPIC REPAIR FROM ‘NON-EXPERTS’

While it is true that excellent results following laparoscopic inguinal hernia repair are reported from specialist high volume centres [4, 5], do these figures reflect what is happening in the real world? The large multicentre study from the USA (general surgeons at



Veterans Administration, VA, hospitals) noted a higher recurrence rate after laparoscopic repair of unilateral primary hernia than after open repair [3]. Results from the Swedish National Database showed that laparoscopic repair was associated with a higher re-operation rate after laparoscopic than after open repair [7] and a recent nationwide analysis from Denmark showed a significantly higher re-operation rate after bilateral laparoscopic repair than after bilateral open repair. [8]. The laparoscopic repair with its long learning curve will require surgeons worldwide and society as a whole to invest time and money in training, accompanied by robust assessment of the laparoscopic hernia surgeon's performance and mandatory audit of results [9].

COMPLICATIONS OF INGUINAL HERNIA REPAIR

Regarding complications, published reports (from experts) tell us that visceral injury occurs in approximately 1 in 500 laparoscopic hernia repairs [10]. In Bittner's large series (more than 6000 patients) there were seventeen visceral injuries, and in Tamme's report of 3800 TEP patients there were eight bladder injuries. These are the results appearing in the literature from enthusiastic experts. Common sense suggests that these results are unlikely to be reproducible in the real world. In the nationwide Scottish Audit there were three visceral injuries out of 229 laparoscopic repairs but only one visceral injury in 5000 open repairs, (relative risk 33, $p < 0.001$) [11]. Furthermore the results of the majority of general surgeons will never appear in the literature at all. The EU meta-analysis found no difference in complication rate between open and laparoscopic repair [12] and in the VA trial in the USA the total complication rate was higher in the laparoscopic group (39% than in the open group (33%) [3].

The complications of open repair are relatively minor; complications following laparoscopic repair can be disastrous and life threatening [3] [13]. Medical problems, eg cardio-respiratory and haemorrhagic, following prolonged laparoscopic procedures particularly in elderly patients can have serious life threatening

consequences [13]. This is apart from unplanned admission required for surgical complications – accidental intra-abdominal visceral or vascular injury – or post-anaesthetic problems such as prolonged nausea and vomiting and urinary retention. None of this data appears in the literature and without any need for mandatory reporting (in the UK at least) we have no way of knowing the true figures.

COST OF LAPAROSCOPIC REPAIR

Laparoscopic repair is undoubtedly more costly than open repair, most obviously because of the instrumentation. This cost difference becomes even more marked when comparing laparoscopic with open repair carried out under local anaesthetic (LA). At present laparoscopic repair requires GA, and further costs are incurred because of the additional pre-operative investigations for these patients that would not be necessary with local anaesthetic. There is additional objective data that patients spend longer in the operating suite, both the operating room and the recovery area. The quoted figure is a 600-euro difference between laparoscopic and open repair [14]. How was this figure arrived at? In the UK for instance an exact figure is impossible to obtain because of difficulties with 'patient level costing'. I have been told by a number of colleagues in the UK and Portugal that their hospital accounting departments cannot justify the cost of laparoscopic repair, calculated overall at far in excess of 600 euro.

However in order to argue their case proponents of laparoscopic repair have had to include in their financial calculations an estimate of the cost saving if patients return to work more quickly after laparoscopic than open repair [15]. These calculations are entirely theoretical and speculative [16]. Many hernia patients are of an age when they are no longer working, and even employed patients will often take two weeks off work whatever the procedure. Several large trials have reported that patients undergoing lap repair return to their usual activities a few days sooner than



those who underwent open repair. Is this really a clinically important advantage; enough to justify the increased cost and risks of laparoscopic repair for a primary unilateral hernia in an elderly unfit patient?

In addition the cost argument fails totally if, as pointed out above, the repair is not carried out expertly and a patient subsequently needs unexpected admission for a serious post-laparoscopic injury or for a complication associated with general anaesthetic such as nausea and vomiting or urinary retention. An extra one or two nights in hospital will add over 1000 euros to both hospital and society's costs [9]. An incidence of recurrence above 2% will similarly make nonsense of the cost argument in the real world [16].

The mandatory use of general anaesthetic (GA) for laparoscopic repair raises other issues. The population as a whole is ageing, and it is in the aged population that the highest incidence of inguinal hernia occurs. The average 70 year old is likely to be ASA 3 [17], with several comorbidities, and many will be taking cardiac medication [18]. They will therefore create more anxiety amongst anaesthetists than if they were having a local anaesthetic, and require more sophisticated and expensive pre-operative screening, with its associated cost implications. Some may even be deemed unfit for elective repair for surgery if a GA is all that can be offered, and will have to live with their hernia. They will consequently run the risk of strangulation (and subsequent emergency surgery) [19] [20] or at best have a reduced quality of life. An open local anaesthetic repair avoids all of these concerns [21].

CHRONIC POST-OPERATIVE PAIN

Open hernia repair is said to be more likely to result in post-operative discomfort than laparoscopic repair. However many of the studies are of poor quality regarding pain assessment, and pain has rarely been the primary outcome variable. [22].

Good quality studies are rare. One large long term follow-up study found a difference in mild or moder-

ate pain between patients after open or laparoscopic repair, but no difference in the incidence of severe pain [23]. A further large long-term study found no difference between late discomfort at five-year follow-up after laparoscopic TAPP and Shouldice repair [24]. Certainly the incidence of post-operative discomfort that we see at the British Hernia Centre [21], and that seen by colleagues of mine with a special interest in open hernia repair is far less than the "officially" quoted figures of 12-30% [25]. [25] What type of open procedure is being carried out that leaves one-third of patients in prolonged pain? My personal feeling is that the majority of open repairs are carried out by inexperienced trainees, partly because of a perception that 'no great harm' will come to the patients

LOCAL ANAESTHETIC (LA) OPEN REPAIR

Despite strong evidence regarding the benefits of LA in terms of patient satisfaction, short time in hospital, safety and efficacy many surgeons seem reluctant to adopt it [26, 27]. Indeed it is strange that so little time is given to learning how to repair an inguinal hernia under LA, compared with the amount of time trainees and trainers seem willing to devote to mastering laparoscopic repair.

EVIDENCE FROM TRIALS

Can randomised controlled trials (RCTs) ever give us an answer. RCT's have strict entry criteria, so that the elderly and patients unsuitable for GA have usually been excluded from trials of open and laparoscopic repair [2,9,28,29]. There is no doubt that laparoscopic repair of groin hernia has efficacy in appropriately selected medically fit patients when carried out by well trained enthusiastic surgeons. But does it have effectiveness in the 'real world' as the default procedure for inguinal hernia repair? At present I think not.



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