Evolution of an inguinal hernia surgery practice

M Mokete, J J Earnshaw

Abstract

Background—Inguinal hernia surgery has undergone numerous advances in the last few years. This study analysed the changes in the practice of one surgeon in a district general hospital over a seven year interval. The effect of changing from Bassini to Lichtenstein repair in 1994 was evaluated.

Methods—The study involved two parts: first a search of a computerised database of inguinal hernia procedures, and second, postal audits of men who had an inguinal hernia repair in 1993 and 1994 with outpatient follow up for those with a possible recurrence.

Results—A total of 1037 hernias were repaired over the seven years. There was an increase in the proportion of day cases from 18% to 70% and the number of operations performed under local anaesthetic rose from 1% to 45%. The postal audits had response rates of 79% (1993) and 66% (1994). Some 5/98 (5%) recurrent hernias were identified from the 1993 (Bassini) patients compared with 1/67 (1.5%) from the 1994 (Lichtenstein) cohort.

Conclusion—Lichtenstein hernia repair can be performed safely as a day case using local anaesthetic in the majority of patients and appears to have a lower recurrence rate than Bassini repair.

(*Postgrad Med J* 2001;77:188–190)

Keywords: inguinal hernia; postoperative complications

In the last few years the various methods of inguinal hernia repair and their merits have become the subject of a vigorous debate. The increasing pressure on hospital finances as well as the documented advantages of day case surgery have led to changes in practice, including an increasing use of local anaesthesia for open inguinal hernia repair.¹ This study examined the practice of a single surgeon whose preferred method of repair changed from the Bassini repair at the end of 1993 to the Lichtenstein mesh repair. The aim was to perform as many operations as possible under local anaesthetic as a day case. The objectives of this study were to monitor the effect of changing practice and to determine whether the outcome was affected.

Methods

The investigation had two parts. First the use of local anaesthesia and day surgery were compared over the seven years of the study. Second an attempt was made to compare outcome of two different inguinal hernia repairs in men in two successive years.

All hernia repairs were undertaken on a single surgical firm between 1993 (first full year of consultant's practice) and 1999 inclusive. Data were obtained from Auditbase, the surgical record system. The computer record included patient details, admission and operation data, outcome, and complications. Data were entered by the consultant surgeon and verified monthly at audit meetings. The main outcome measures were type of anaesthetic, duration of hospital stay, and complication rates.

All patients were referred to a general surgical outpatient clinic by their general practitioner. At the start of 1994, there was a deliberate policy decision to increase the use of local anaesthesia and day case surgery. Procedures were explained to each patient who was offered the final choice. Local anaesthetic hernia repair was not recommended in patients under the age of 40 who were encouraged to have their surgery done under general anaesthetic as a day case. Day case surgery could only be contemplated on patients with adequate domestic back-up. The majority of patients who did not have day case surgery stayed only one night in hospital.

In 1993, all inguinal hernias were repaired using a standard two layer nylon darn as described by Bassini.² In response to the publication of encouraging results, a change was made to Lichtenstein mesh repair at the start of 1994.^{3–5} Since then all inguinal hernias in adult men have been repaired with polypropylene mesh, anchored with 2/0 polypropylene sutures. Antibiotics were not used, but the mesh was soaked in povidone iodine which was also used to irrigate the wound on closure. Local anaesthetic procedures were done using local infiltration of 0.25% bupivacaine solution; patient sedation was used selectively and administered by an anaesthetist. The operations were completed on a variety of operating lists in both district and community hospitals; a minority were performed on a dedicated day surgery list. All grades of surgeon were involved from consultant to junior trainee under supervision. Postoperatively, there was no routine surgical follow up. An information sheet was given to all patients that offered follow up in the event of any complications. All patients who returned to outpatients or were readmitted with complications had their data re-entered onto the department audit database.

In 1995, data on all inguinal hernias from 1993 (Bassini repair) were collected as part of the Royal College of Surgeons hernia audit. A postal questionnaire was sent to all patients who had a primary inguinal hernia repair. The following index questions were used to try and identify patients who might have a recurrent hernia:

- Has your hernia repair remained successful?
- Has your hernia come back?

Gloucestershire Royal Hospital, Great Western Road, Gloucester GL1 3NN, UK

M Mokete
J J Earnshaw

Correspondence to:
Mr Earnshaw
earnshaw@rudford.demon.co.uk

Submitted 10 March 2000
Accepted 11 July 2000

Table 1 Details of hernia repairs, complications, and grade of surgeon; results are number (%)

	1993	1994	1995	1996	1997	1998	1999	Totals
Total	123	101	156	158	171	157	171	1037
Local anaesthetic	1 (1)	11 (11)	30 (19)	36 (23)	49 (29)	67 (43)	77 (45)	271 (26)
Day case procedure	22 (18)	42 (42)	62 (40)	83 (53)	89 (52)	103 (66)	125 (70)	526 (51)
Bilateral	7 (6)	6 (6)	4 (3)	7 (4)	3 (2)	1 (0.6)	2 (1.2)	30 (3)
Recurrent	8 (7)	10 (10)	10 (6)	11 (7)	11 (6)	4 (3)	6 (3.5)	60 (6)
Consultant	63 (51)	64 (63)	99 (63)	110 (70)	106 (62)	80 (51)	112 (65)	634 (61)
Specialist registrar or staff grade	19 (15)	19 (19)	30 (19)	32 (20)	50 (29)	48 (31)	50 (29)	248 (24)
Basic surgical trainee	41 (34)	18 (18)	27 (18)	16 (10)	15 (9)	29 (18)	9 (5)	155 (15)
Complications	1 (1)	3 (3)	1 (0.6)	3 (2)	4 (2)	3 (2)	5 (3)	20 (2)

- Have you seen any other doctor about the same hernia since the operation?
- Have you had any further operations on the same hernia?

The patients were then invited to make comments if they wished. Any patient whose answers suggested the possibility of recurrence (including those who answered "don't know" or did not answer) had their case notes reviewed and was invited to attend for interview and clinical examination by the consultant surgeon in the outpatient department. Hernia recurrence was defined as a palpable hernia sac. All patients with recurrence were offered (and accepted) reoperation.

To compare the results of Bassini repair with the first year of Lichtenstein repairs, the same questionnaire as used for the Royal College of Surgeons audit was sent to all adult men who had a hernia repair in 1994, exactly a year after the previous audit so that the cohorts were matched for length of follow up (two years).

Results

1993 was the first full year of the consultant surgeon's practice. Since then there has been a steady increase in the number of day cases and in the use of local anaesthesia (table 1). Some 1037 patients had an inguinal hernia repair between 1993 and 1999 inclusive. The number of day case operations increased from 18% in 1993 to 70% in 1998 and almost half the patients in 1999 had a local anaesthetic repair. Thirty patients had bilateral hernia repair, all performed under general anaesthetic. The proportion of bilateral repairs has reduced as more patients currently choose to have sequential local anaesthetic day case repair than bilateral repair under general anaesthetic. More recently the number of recurrent hernias being repaired

has started to decline; only six (3.5%) were done in 1999.

Twenty patients had complications. There was no association between complications and grade of surgeon (consultant nine, specialist registrar nine, and basic surgical trainee two). Fifteen patients developed a significant haematoma postoperatively. Two required surgical evacuation and the rest were managed expectantly. One of the haematomas was in the Bassini group and 14 followed Lichtenstein repair. Of the Lichtenstein repairs that were complicated by haematoma, six had a general and nine a local anaesthetic. There was one significant wound infection that required inpatient treatment with antibiotics. No patient required mesh removal for infection. Other significant complications included one bladder perforation (managed conservatively with catheterisation), one urinary retention, and two day case patients who had a severe syncopal attack postoperatively and were admitted for observation overnight. The overall complication rate was 2% and varied from 1% to 3% per year throughout the study (table 1).

The proportion of patients operated on by trainees appears to have altered during the years of the study. In particular the number of repairs performed by a basic surgical trainee has declined from 34% in 1993 to 5% in 1999 (table 1). The number of repairs done by specialist registrars has slowly increased: only a few repairs were done by someone of staff grade and the proportion did not change during the study.

The results of the outcome audits in 1993 and 1994 are shown in table 2. Response rates to the two questionnaires were 79% in 1993 and 66% in 1994. All patients who indicated the possibility of recurrence in any part of the questionnaire were invited for review in outpatients. A total of five recurrent hernias (5/97, 5%) were detected in patients who had Bassini repair compared to one (1/67, 1.5%) after Lichtenstein repair (not significant, χ^2 test).

Although the absolute hernia recurrence rate could not be calculated from this study, the minimum recurrence rate for Bassini repairs was 5/123 (4%) and Lichtenstein repairs was 1/101 (1%). Since then two further hernias are known to have recurred after Lichtenstein repair between 1994 and 1999 inclusive giving a minimum recurrence rate of 3/914 (0.3%).

Discussion

Most surgeons do not know their individual rate of hernia recurrence or complications.

Table 2 Postal questionnaire results, 1993 and 1994

Question	Yes	No	Other
(A) Inguinal hernia repair audit: 1993 (Bassini repair) (No of questionnaires returned = 97; response rate = 79%)			
Has your hernia remained successful?	85	8	No answer 4
Has your hernia come back?	3	86	Don't know 8
Have you seen any other doctor about the same hernia since the operation?	9	88	0
Have you had any further operations on the same hernia?	2	95	0
Overall recurrence rate = 5/97 (5%)			
(B) Inguinal hernia repair audit: 1994 (Lichtenstein repair) (No of questionnaires returned = 67; response rate = 66%)			
Has your hernia remained successful?	66	1	0
Has your hernia come back?	1	62	Don't know 1
			No answer 3
Have you seen any other doctor about the same hernia since the operation?	4	59	No answer 4
Have you had any further operations on the same hernia?	0	64	No answer 3
Overall recurrence rate = 1/67 (1.5%)			

This would require complete and long term follow up, denied by constraints of time and other clinical commitments. To compare the results of different hernia repairs requires similar attention to follow up, but would need a large number of patients in a randomised trial. The present study used indicators of outcome to provide evidence that the transition from Bassini to Lichtenstein mesh repair at the start of 1994 was worthwhile. The response rates to the questionnaires were a little disappointing, but not unusual for postal inquiries.

Large consecutive series of patients having open tension-free mesh inguinal hernia repair have been described with excellent results.³⁻⁶ The hernia recurrence rate with the Lichtenstein method is reported to be less than 1%. Only two randomised trials totalling fewer than 200 operations have compared Bassini and Lichtenstein hernia repairs.^{7,8} Several others have contrasted mesh and other sutured repairs such as the Shouldice operation.⁹⁻¹² In general there seems little difference in reported outcomes such as complication and recurrence rates between darn and mesh repairs,^{9,12} although the trials are all potentially flawed by their small size. Four trials reported either lower postoperative pain scores,^{8,10,11} or speedier convalescence^{7,10,11} after mesh insertion, possibly as a result of reduced tension in the repair.

In the present study it has also been possible steadily to increase the use of local anaesthetic and day case surgery. A recent systematic review argues that the use of local anaesthetic avoids the complications of general anaesthesia and enables more patients to go home on the day of operation.¹³ Local anaesthetic repairs are quicker, have fewer adverse effects on respiratory function than both general and regional anaesthesia, and may reduce wound complications.¹³ However, local anaesthetic repair is technically more demanding, which may explain the decline in the number of operations in the present series performed by basic surgical trainees as the proportion of local anaesthetic operations rose. Hernia surgery is one of the few intermediate operations still available to junior trainees and this is another example of the diminishing training opportunities available for them. Lichtenstein hernia repair is at least probably easier for trainees to learn. In a recent comparative study surgical trainees had higher recurrence rates learning Shouldice repairs.¹⁴

Complications in the present series were few and not associated with the experience of the surgeon. The commonest complication was haematoma and the rate (1.4%) compared favourably with other reported series (up to 15%).¹³ Some complications may have been missed because of the lack of routine follow up but those referred back were added to the database. Reoperation rates are also decreasing, although the significance remains unclear and could reflect a number of reasons, includ-

ing changing referral patterns. Analysis of the proportion of recurrent hernias is important as useful longitudinal data can be obtained.¹⁵ It is presently proposed by government to collect the rate of recurrent hernias in each surgical department as an indicator of surgical performance.

The increasing use of day case surgery is in line with guidelines of the Royal College of Surgeons, which state that at least 30% of all hernia repairs should be repaired as a day case.¹⁶ In fact, our experience shows that the majority of adult patients can be treated safely as day cases under local anaesthetic with good results.

The technique compares favourably with laparoscopic repair. Although laparoscopic surgery reduces postoperative pain and speeds recovery, it is more complex and potentially more complicated.¹⁷⁻²¹ Open mesh repair is likely to remain the most widespread treatment for inguinal hernia.¹

- 1 Nicholson S. Inguinal hernia repair. *Br J Surg* 1999;**86**:577-8.
- 2 Bassini E. Ueber die Behandlung des Leistenbruchs. *Langenbeck Archiv für Klinische Chirurgie* 1890;**40**:429-76.
- 3 Kark AE, Kurzer M, Waters KJ. Tension free mesh repair: a review of 1098 cases using local anaesthetic in a day unit. *Ann R Coll Surg Engl* 1995;**77**:299-304.
- 4 Janu PG, Sellers PG, Mangiante EC. Mesh inguinal herniorrhaphy—a ten year review. *Am Surg* 1997;**63**:1065-9.
- 5 Amid PK, Shulman AG, Lichtenstein IL. Critical scrutiny of the open "tension free" hernioplasty. *Am J Surg* 1993;**165**:369-71.
- 6 Amid PK, Lichtenstein IL. Long term result and current status of the Lichtenstein open tension-free hernioplasty. *Hernia* 1999;**2**:89-94.
- 7 Pappalardo G, Guaralaxara A, Illomeni G, et al. La tecnica di Bassini versus l'ernioplastica "tension free" studio prospettico randomizzato. *Chirurgia (Bucur)* 1995;**8**:293-5.
- 8 Prior MJ, Williams EV, Shukla HS, et al. Prospective randomized controlled trial comparing Lichtenstein with modified Bassini repair of inguinal hernia. *J R Coll Surg Edinb* 1998;**43**:82-6.
- 9 Barth Jr JR, Burchard KW, Tosteson A, et al. Short term outcome after mesh or Shouldice herniorrhaphy: a prospective randomized study. *Surgery* 1998;**123**:121-6.
- 10 Zieren J, Zieren HU, Jacobi CA, et al. Prospective randomized study comparing laparoscopic and open tension free hernia repair with Shouldice's operation. *Am J Surg* 1998;**175**:330-3.
- 11 Kux M, Fuchsjager N, Feichter A. Lichtenstein-patch versus Shouldice-Technik bei primären Leistenhernien mit hoher Rezidivgefahr. *Chirurg* 1994;**65**:59-62.
- 12 Guglielminetti D, Tugnoli G. Ernioplastiche a confronto: Shouldice-Trabucco-Lichtenstein. *G Chir* 1994;**15**:308-12.
- 13 Cheek CM, Black NA, Devlin HB, et al. Groin hernia surgery. A systematic review. *Ann R Coll Surg Engl* 1998;**80**: (suppl 1):S1-S80.
- 14 Danielsson P, Isacson S, Hansen MV. Randomized study of Lichtenstein compared with Shouldice inguinal hernia repair by surgeons in training. *Eur J Surg* 1999;**165**:29-34.
- 15 Nilsson E, Haapaniemi S, Gruber G, et al. Methods of repair and risk for reoperation in Swedish hernia surgery from 1992 to 1996. *Br J Surg* 1998;**85**:1686-91.
- 16 Report of a working party convened by the Royal College of Surgeons of England. *Clinical guidelines on the management of groin hernias in adults*. London: RCS, 1993.
- 17 Amid PK, Shulman AG, Lichtenstein IL. An analytic comparison of laparoscopic hernia repair with open "tension-free" hernioplasty. *Int Surg* 1995;**80**:9-17.
- 18 Wellwood J, Sculpher MJ, Stoker D, et al. Randomised controlled trial of laparoscopic versus open mesh repair for inguinal hernia: outcome and cost. *BMJ* 1998;**317**:103-10.
- 19 MRC Laparoscopic Groin Hernia Repair Trial Group. Laparoscopic versus open repair of groin hernia: a randomised comparison. *Lancet* 1999;**354**:185-90.
- 20 Johansson B, Hallerback B, Glise H, et al. Laparoscopic mesh versus open preperitoneal mesh versus conventional technique for inguinal hernia repair: a randomized multicenter trial (SCUR Hernia Repair Study). *Ann Surg* 1999;**230**:225-31.
- 21 Juul P, Christensen K. Randomized clinical trial of laparoscopic versus open inguinal hernia repair. *Br J Surg* 1999;**86**:316-9.