

Are current techniques of inguinal hernia repair optimal? A survey in the United Kingdom

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Key words: Hernia, inguinal; Surgery, operative; Physician's practice patterns; Great Britain

Data was collected on the techniques currently employed in adult inguinal hernia repair by means of a postal questionnaire to consultants in four Regional Health Authorities in England. Questionnaires were returned by 240 consultants (85%). This identified a considerable range in methods of repair, with a Moloney nylon darn being the sole method used by 35% of consultants, and the Shouldice technique, either alone or in combination with other methods, being used by 20%. Overall, 51% employ a subcuticular suture for skin closure, and traditional skin sutures are used by 31%. There was no association between consultant's date of qualification or subspecialty and type of repair. Consultants qualifying after 1969 are most likely to use a subcuticular suture. Some 14% of all consultants and 19% of those qualifying since 1969 employ a Shouldice procedure and a subcuticular suture.

Inguinal hernia repair forms one of a 'basket' of 20 procedures identified by the Audit Commission as suitable for day case surgery (1). Their analysis of four Regional Health Authorities (RHAs) in 1988/89 showed that the proportion of inguinal hernia repairs currently undertaken as day case surgery ranged between districts from 0% to 40% (median value 3.8%). In contrast, the

Royal College of Surgeons of England's recommendation in 1985 was that about one-third of adult males aged between 18 and 65 years who undergo inguinal hernia repair could be treated on a day case basis (2). Other estimates put the potential figure for day case surgery as high as 70% of inguinal hernia repairs (3). As the Audit Commission notes, some consultants in NHS hospitals currently perform up to 90% of inguinal hernias as day case surgery (1).

Clinical evaluations of day case inguinal hernia repair show that pain-free wounds and low haematoma and infection rates can be achieved in the short term. The long-term results are equally impressive, with recurrence rates lower than 2% at 5 years being reported (4-6). Modern techniques contributing to these favourable outcomes achieve a tension-free repair or replacement of the fascia transversalis. Postoperative pain is reduced by little operative trauma and haematoma formation and sepsis is avoided by meticulous technique. Similarly, tissue reaction and long-term sinus formation is avoided by using the modern man-made sutures which have superseded the old-fashioned biological derivatives such as catgut, silk and linen (7,8).

The task of expanding day case surgery for inguinal hernia repair and achieving favourable outcomes in the NHS, raises the question of how closely do repair techniques in the UK conform to the optimal practice reported in the literature? A challenging leading article on hernia repair which appeared in the *Lancet* in 1985

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advocated the Shouldice technique and use of man-made monofilament for the repair (9). Current British practice has been examined by means of a survey of consultants in four of the 14 Regional Health Authorities (RHAs) in England.

Methods

Consultant surgeons, and those consultant urologists thought to undertake inguinal hernia repair, who were employed by the four selected RHAs (Northern, Trent, South East Thames and Wessex) were identified with the assistance of the RHAs and through personal enquiries to districts. This produced the names of 323 consultants. Each was sent a short questionnaire consisting mainly of structured questions in the second week of January 1990 with a second mailing 3 weeks later. Respondents were invited to return their questionnaire anonymously if they wished.

χ^2 values were obtained from logistic regression analysis using the statistical package GLIM (10) to test the association between techniques of inguinal hernia repair and the consultant's date of qualification, subspecialty and region.

Results

Nineteen surgeons and 22 urologists were excluded from the original sample as they had retired or never performed inguinal hernia repair. Of the remaining 282 consultants, 240 (85%) returned questionnaires and comprised 231 general surgeons and nine urologists. Response rates in the four regions ranged between 80% and 88%. Date of qualification was obtained from the Medical Register for 234 (97.5%) responders and 35 (83%) non-responders. Assuming an age of 24 years at qualification, the mean ages were 47.9 years (SD \pm 7.1 years) for responders and 49.5 years (SD \pm 6.8 years) for non-responders.

Consultants qualifying in 1969 or later and thus aged 45 years or under, comprised 35% of responders, while the largest proportion (46%) were aged 45–55 years having qualified between 1959 and 1968 (Table I). Gastroenterology forms the main subspecialty, followed by vascular surgery, while 12% of the consultants do not claim a subspecialty.

Questions on surgical techniques all related to a fit male aged 20–55 years with a simple inguinal hernia. More than one method of inguinal hernia repair is used by 18% of consultants. The Moloney nylon darn is the most widely employed, with 35% using this technique exclusively. A Bassini repair only is employed by 26%. The Shouldice technique is used exclusively by 18% of consultants and as one method of repair by a further 7.5% (Table II). Five consultants identified a method of repair which was not listed on the questionnaire. Three employed the Hindmarsh procedure, one used either a

Table I. Distribution of consultants by date of qualification, subspecialty and attitude to day case inguinal hernia repair

	%	(n = 240)
<i>Date of qualification</i>		
1969 or later	34.6	(83)
1959–68	45.8	(110)
Before 1959	17.1	(41)
Not known	2.5	(6)
<i>Subspecialty</i>		
Gastroenterology	37.1	(89)
Vascular	27.9	(67)
Urology*	12.1	(29)
Other subspecialty	10.8	(26)
No subspecialty	12.1	(29)
<i>Regional Health Authority</i>		
Northern	26.2	(63)
Trent	28.3	(68)
South East Thames	28.3	(68)
Wessex	17.1	(41)

* Consists of 20 general surgeons specialising in urology and nine urologists

Bassini repair or a Gallie fascial darn, and the other combined a Moloney darn with Marlex mesh.

Nylon or prolene was identified as the first preference for internal suture by 216 consultants (90%), Dexon® (polyglycolic acid) is used by two (1%) and four use polydioxanone (2%). A further 15 (6%) named suture materials not listed on the questionnaire, including braided polyester, extruded PTFE, thread and silk. A subcuticular suture is the most widely used method of skin closure and is employed by 122 (51%) of consultants, with 34% using absorbable and 17% non-absorbable material for the subcuticular suture. However, 31% use skin sutures and 15% clips or staples (Table III).

The proportions of consultants using a Moloney darn, Shouldice technique and subcuticular suture by date of qualification and region, are shown in Table IV. The χ^2 values indicate that there is no significant association between date of qualification and use of a Moloney darn

Table II. Consultants' methods of inguinal hernia repair

Method of repair*	%	(n = 240)
Darn only	34.6	(83)
Bassini only	25.8	(62)
Shouldice only	18.3	(44)
Bassini and darn	10.4	(25)
Shouldice with Bassini		
or darn	7.5	(18)
Other	2.1	(5)
No answer	1.3	(3)

* Consultants were able to identify up to two methods of repair; 43 (18%) gave more than one method

Table III. Consultants' first preference of method of skin closure for inguinal hernia repair

Method of skin closure	%	(n = 240)
Subcuticular suture:		
Absorbable	33.8	} 50.8 (81)
Non-absorbable	17.0	
Skin sutures	31.3	(75)
Clips or staples	15.4	(37)
Tape	1.3	(3)
No answer	1.3	(3)

or the Shouldice technique. However, there are significant regional effects: a relatively high proportion of consultants use only a Moloney darn in Wessex and a relatively low proportion in the Northern region, whereas the Shouldice procedure is most frequently employed (either as the sole method or one method of repair) in the Northern and South East Thames RHAs. A subcuticular suture is significantly associated with both date of qualification and region, being most frequently used by the younger consultants and by consultants in South East Thames RHA. Northern and South East Thames RHAs thus have relatively high proportions of consultants who use both the Shouldice procedure and a subcuticular suture, although even in these RHAs this accounts for only 19% of consultants.

Discussion

The expansion of day case surgery for intermediate procedures highlights the importance of promoting optimal care. One aspect of quality assurance relates to the surgical expertise and techniques employed. This study of surgeons in four regions indicates that a wide range of techniques of inguinal hernia repair are currently employed in the UK. The Moloney darn (11) is the most frequently used technique (and is the sole technique used by 35% of consultants in this sample), but no longer features in North American or European practice and is not described in some contemporary textbooks (12-14). A recent report of the darn operation gave a cumulative 5-year recurrence rate of over 10% (15). Morris and Jarrett (16) reporting their experience of day case inguinal hernia repair from Kingston, Surrey, in 1987 gave an early recurrence rate of 4.2% when they used a nylon darn technique and comment "there is no room for complacency in our figures and we are planning to use the Shouldice technique in the future". We are also surprised to find that darning with fascia (17) lingers on in clinical practice.

The Bassini operation used by some 36% of the respondents is probably not the original operation described by Bassini in the 1890s (Bassini divided the posterior transversalis fascia wall of the inguinal canal and sutured it, together with the conjoint tendon, to the inguinal ligament), but rather a simple approximation of

Table IV. Proportion of consultants using a Moloney darn, the Shouldice technique, and a subcuticular suture by date of qualification and Regional Health Authority*

	Moloney darn only		Shouldice technique‡		Subcuticular suture		Shouldice and subcuticular suture	
	%	(n)	%	(n)	%	(n)	%	(n)
<i>Date of qualification†</i>								
1969 or later	37	(31)	29	(24)	66	(55)	19	(16)
1959-1968	35	(39)	24	(26)	44	(48)	10	(11)
Before 1959	32	(13)	24	(10)	37	(15)	12	(5)
Not known	17	(1)	33	(2)	67	(4)	17	(1)
χ^2 2 d.f.	0.5		0.6		11.0		0.3	
(P value)	(0.78)		(0.74)		(0.004)		(0.86)	
<i>Regional Health Authority</i>								
Northern	24	(15)	32	(20)	41	(26)	19	(12)
Trent	35	(24)	15	(10)	46	(31)	4	(3)
South East Thames	37	(25)	34	(23)	63	(43)	19	(13)
Wessex	49	(20)	22	(9)	54	(22)	12	(5)
χ^2 3 d.f.	7.8		8.3		13.4		1.1	
(P value)	(0.05)		(0.04)		(0.004)		(0.78)	

* The χ^2 values were obtained from logistic regression analysis including three factors (date of qualification, region and subspecialty) and are a test of whether the proportions using a particular technique differ significantly with the categories of that factor. Since the proportions were very similar for all subspecialties this factor has been omitted from the table

† The six consultants whose date of qualification is not known were excluded from the regression analysis. All denominators are shown in Table I

‡ Consists of the 62 consultants who use the Shouldice technique only or as one method of repair (Table II)

the conjoint tendon to the inguinal ligament with a variety of sutures but usually nylon. Bassini himself obtained impressive results, but more recent studies show the Bassini operation to give less good recurrence rates than its modern derivation the Shouldice operation (18), with reported 5-year recurrence rates of less than 2% (19–21).

Two other very successful modern techniques were not mentioned in the responses to our questionnaire. One is the McVay–Cooper ligament repair combining closure of the defect in the posterior inguinal canal wall with a muscle slide to reduce tension, a technique which gives superb results in North America (22). Another is the primary repair/replacement of the fascia transversalis by pliant non-absorbable prosthetic mesh in the extraperitoneal plane (23,24), a technique widely used in Europe and reported in New York day case practice using local anaesthetic (25).

The importance of holding the repaired tissues together during the slow healing process is well known and hence the argument to use non-absorbable or delayed absorption sutures. Man-made monofilament is also recognised as having advantageous properties. However, a minority of surgeons use polyglycolic acid (absorbable), strips of fascia, thread or silk, in the myofascial repair.

Prospective studies of skin wound healing and wound pain have pointed to the advantages of a subcuticular suture (26). This method of skin closure is advocated by the Royal College of Surgeons of England (2), while the use of the modern absorbable polymer suture for subcuticular wound closure obviates the requirement for post-operative nursing care and suture removal (27). A subcuticular suture is the first preference for wound closure for 51% of consultants in this study. However, it is more widely used by the younger group of consultants qualifying since 1969 (66%), than by consultants qualifying between 1959 and 1968 (44%) or those qualifying before 1959 (37%).

Despite the reported advantages of the Shouldice operation and of a subcuticular suture, there is no consistent relationship between the use of both these techniques. Overall, 62 (26%) of consultants in the four regions employ the Shouldice technique, whereas only 33 (14%) use both the Shouldice technique and a subcuticular suture.

This survey and other data on techniques of inguinal hernia repair point to an urgent need for the review of practices in the UK, with the aim of achieving low initial pain and morbidity and recurrence rates of less than 2% in 5 years. As this study indicates, the results of clinical research often percolate slowly through to everyday practice, while the high proportion of younger consultants who use a darn provides no indication that changes in methods of hernia repair are in process. This reflects the lack of incentives that exist in the NHS to discard outmoded surgical habits and to change to modern techniques or suture materials, as well as the absence of specialised ambulatory surgical centres or specialised hernia hospitals which have been at the forefront of practice in a number of other countries.

The new incentives and mechanisms for review introduced by the reformed NHS (28) will encourage a greater emphasis on quality assurance in relation to the process and outcome of care. These include the requirements for clinical audit in terms of the collective peer review of current practice (29). This should form an important mechanism for encouraging the diffusion of optimal clinical standards and identifying issues requiring further evaluative research.

We would like to thank Mr T Bates, Mr B T Jackson and Mr A B Richards for their advice on the questionnaire and Professor W W Holland, Dr L Seidl and Mr G Bevan for their helpful comments and discussions. We are indebted to all the consultants who participated in the survey and the Regional Advisers for their support. The study was financed by the Department of Health. However, the views expressed are those of the authors alone.

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Received 8 March 1991