

## Towards no incisional hernias: lateral paramedian versus midline incisions

P J Cox FRCS J R Ausobsky FRCS H Ellis MCh FRCS A V Pollock FRCS *Professorial Surgical Unit, Westminster Hospital, London SW1, and Department of Surgery, Scarborough Hospital, North Yorkshire*

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### Summary

A prospective randomized controlled clinical trial is reported which compares midline with lateral paramedian incisions in relation to the development of incisional hernias at one year. Of 431 patients randomized, 329 were available for assessment one year later. Two patients suffered burst abdomen, both being in the lateral paramedian group. Twenty-two incisional hernias occurred, 2 in the lateral paramedian group and 20 in the midline group ( $P < 0.001$ ). Of the two types of incision, the lateral paramedian incision takes longer to perform, requires a longer incision, rarely results in dehiscence, and does confer protection against incisional hernia.

### Introduction

The advent of the mass closure technique with insertion of sufficient length of suture material has appreciably reduced the incidence of burst abdomens after laparotomy<sup>1</sup>. Incisional hernias, however, continue at a rate of about 10% when carefully looked for in prospective controlled trials<sup>2</sup>. Donaldson and his colleagues<sup>3</sup> conducted an audit of 850 patients who had had laparotomies performed through a lateral paramedian incision between 1977 and 1981, and reported no wound dehiscences and 3 incisional hernias, a rate of 0.35%. We therefore organized a clinical trial to compare the failure rate of the lateral paramedian incision with that of our standard midline incision.

### Patients and methods

The trial was carried out in 1983 at the Westminster Hospital in London and Scarborough Hospital, Yorkshire. Consecutive patients undergoing elective or emergency laparotomy under the care of one consultant at each hospital were entered into the trial. We excluded those in whom a rapid midline incision was indicated (mainly emergency laparotomies for bleeding), and those whose laparotomy was performed through a previous scar. Randomization was masked from the operating surgeon and was determined from a list of random numbers.

Standard midline incisions were performed and closure effected with loop monofilament polyamide using hand needles. The length of the polyamide used was measured and was between three and eight times the length of the wound. The lateral paramedian incisions were performed according to the technique of Guillou and colleagues<sup>4</sup>. The skin and anterior rectus sheath were incised vertically at a point *two-thirds of the width of the rectus abdominis from the midline*. The rectus was then dissected from

its anterior and medial attachments and retracted laterally. The posterior sheath and/or peritoneum was incised vertically in the same plane as the anterior sheath. Closure was effected in two layers, the posterior sheath and/or peritoneum with catgut or polyglycolic acid and the anterior sheath with polyamide or polypropylene.

The details of the operation, complications and outcome were recorded on pro formas and the data coded and entered into a microcomputer for later analysis. All wounds were reviewed by an experienced surgeon after one year with specific search for incisional hernias. An incisional hernia was defined as a palpable defect allowing a bulge in the wound on straining, coughing, raising the legs, raising the head or standing up.

Statistical analyses were by the chi-square test for proportions and by the Mann-Whitney 'U' test for non-parametric data.

### Results

Four hundred and thirty-one patients were included in the trial but 102 were withdrawn because patients died within a year, had their incisions reopened or were lost to follow up. There were two burst abdomens, both in the lateral paramedian group, one occurring at each hospital (Table 1). Twenty of the 22 incisional hernias discovered within one year were in the midline group (chi-square = 15.34,  $P < 0.001$ ). Similar numbers of incisional hernias occurred at each hospital.

The median age of patients at Scarborough was greater than that of patients at the Westminster (Table 2). There were no differences in the distribution of risk factors for incisional herniation between the two types of incision except for fistula formation which was more common (but not significantly so) in

Table 1. Comparison of midline and lateral paramedian incisions (number)

	Midline	Lateral paramedian	Total
Number	218	213	431
Burst abdomen	0	2	2
Incisional hernia	20●	2●	22
Lost to follow up at 1 year	59	43	102

●  $\chi^2 = 15.34, P < 0.001$

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Table 2. Ages of patients

	Westminster	Scarborough
<i>Median age (range) in years</i>		
Midline	60 (18-85)	66 (16-89)
Lateral paramedian	57 (17-82)	67 (19-86)
<i>Number above and below 65</i>		
< 65	146	93
> 65	81	111

$\chi^2 = 14.508, P < 0.0001$

Table 3. Risk factors (numbers)

	Midline	Lateral paramedian	Total
Chest infection	45	43	88
Wound infection	18	13	31
Distension	33	26	59
Jaundice	16	11	27
Fistula	0	5	5●
Sinus	4	4	8

●  $\chi^2 = 3.33, 0.1 > P > 0.05$

Table 4. Time for incisions. Mean in minutes (s.d.)

	Midline	Lateral paramedian
<i>Time taken (Westminster)</i>		
Opening	3.17 (1.81)	8.91 (3.02)
Closing	8.09 (3.37)	9.88 (3.36)
<i>Opening time (Westminster &amp; Scarborough)</i>		
Less than 5 minutes	108	4
5 to 9 minutes	17	84
> 10 minutes	1	91

Comparing less than 5 minutes and greater than 5 minutes:  
 $\chi^2 = 218.2, P < 0.00001$

Table 5. Length of wound and nylon/stitch in centimetres (Scarborough)

	Midline	Lateral paramedian
<i>Length of wound●</i>		
10-15	61	34
> 16	40	68
<i>Length of nylon/stitch■</i>		
< 4	24	76
4.1-4.9	37	15
5+	34	6

●  $\chi^2 = 13.86, P < 0.0001$

■ Comparing < 4 with > 4,  $\chi^2 = 52.09, P < 0.0001$

the lateral paramedian group; only one of these was associated with an incisional hernia (Table 3).

It took longer to open and close a lateral paramedian incision (Table 4) and these incisions needed to be longer to allow access (Table 5). The layered closure of the paramedian incision required less polyamide per suture than the mass closure of the midline incision (Table 5). All these variations between the groups were highly significant.

## Discussion

The lateral paramedian incision does protect against the development of incisional hernias at one year. It has been found that hernias continue to present after one year<sup>5</sup> and therefore the further progress of patients in both groups will be monitored.

The lateral paramedian incision is more tedious to learn and takes longer to perform, which may make it inappropriate in emergency surgery.

The most worrying feature about this trial were the 2 burst abdomens, admittedly a small number but a disaster for the patients when they occur. A clue to the aetiology of this is seen in the table showing the length of nylon used per stitch (Table 5). Obviously when only the anterior rectus sheath is sutured and the bites do not include the whole abdominal wall, less nylon is used.

The length of wound required is longer than that of a midline incision for the same exposure due to the fact that the rectus has to be retracted out of the way, and this impedes access.

How important are incisional hernias? If they are to be prevented at all costs, then the lateral paramedian is a worthwhile incision. Most incisional hernias, however, do not cause any discomfort and may only be noted by the eager observer who is taking part in a trial. The burst abdomens, however, are of great relevance and potentially lethal. These arguments have led one of our number (AVP) to stop using the lateral paramedian incision.

Finally, if the policy adopted is one of continuing to use the lateral paramedian incision, is it necessary on closure to suture the posterior sheath? A further trial is being carried out (HE) to see whether this is necessary; encouragingly, no burst abdomens have occurred so far.

## References

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