



# Does the number of trauma lists provided affect care and outcome of patients with fractured neck of femur?

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## ABSTRACT

**INTRODUCTION** Delay in surgery for fractured neck of femur is associated with increased mortality; it is recommended that patients with fractured neck of femur are operated within 48 h. North West hospitals provide dedicated trauma lists, as recommended by the British Orthopaedic Association, to allow rapid access to surgery. We investigated trauma list provision by each trust and its effects on the time taken to get neck of femur patients to surgery and patient survival.

**PATIENTS AND METHODS** The number of trauma lists provided by 13 acute trusts was determined by telephone interview with the theatre manager. Data on operating delays, reasons for delay and 30-day mortality were obtained from the Greater Manchester and Wirral fractured neck of femur audit.

**RESULTS** A total of 883 patients were included in the audit (35–126 per hospital). Overall, 5–15 trauma lists were provided each week, and 80% of lists were consultant-led. Of patients, 31.8% were operated on within 24 h and 36.9% were delayed more than 48 h; 37.7% of delays were for non-medical reasons. The 30-day mortality rates varied between 5–19% (mean, 11.8%). There were no significant relationships between the number of trauma lists and these variables. When divided into hospitals with > 10 lists per week ( $n = 6$ ) and those with < 10 lists per week ( $n = 7$ ) there were no significant differences in 48-h delay, non-medical delay or mortality. However, 24-h delay showed a trend to be lower in those with > 10 lists (34.6% of patients versus 28.9%;  $P = 0.09$ ).

**CONCLUSIONS** Most trusts provided at least one dedicated daily list. This study shows that extra lists may enable trusts to cope better with fractured neck of femur but do not change mortality.

## KEYWORDS

Fracture – Neck of femur – Hip surgery – Trauma

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Orthopaedic trauma makes up a significant proportion of the trauma workload of any acute department.<sup>1</sup> There is evidence that operating delays in patients with proximal femoral fractures are associated with greater mortality<sup>2–5</sup> and subsequent morbidity.<sup>6,7</sup> However, this is still debated.<sup>8</sup> Franzo *et al.*<sup>9</sup> showed no significant association between delayed surgery and increasing in-hospital mortality in 13,822 hip fracture patients. Mackenzie *et al.*<sup>10</sup> showed an association between delay to surgery and mortality following hip fracture in patients who were unfit for surgery but failed to find an association in those patients whose operation was delayed for administrative reasons (8470 patients).

Until recently, guidelines from both the Royal College of Physicians<sup>11</sup> and the British Orthopaedic Association<sup>12</sup> rec-

ommended that patients be operatively stabilised within 24 h. More recent guidelines require that hospitals dealing with orthopaedic trauma have daily dedicated trauma lists performed that are consultant-led<sup>13</sup> and have extended the operative window to 48 h.<sup>14</sup> A study in 2005 found that orthopaedic trauma list provision does not meet this national standard of dedicated consultant-led trauma lists.<sup>15</sup>

No study has examined whether hospitals with large numbers of dedicated orthopaedic trauma lists treat patients with fractured neck of femur more quickly and with fewer complications than those with fewer lists. Therefore, we aimed to investigate whether hospitals with more trauma lists had: (i) reduced delays in operation for fractured neck of femur; and (ii) reduced mortality from

**Table 1 Summary of results**

Hospital	Lists per week	Consultant surg. (No. per list)	Patients ( <i>n</i> = 883)	Patients operated within 24 h (%)	Patients delayed over 48 h (%)	Patients delayed due to non-medical reasons (%)	Patients deceased at 30 days (%)
1	16	5 (0.3)	76	47	27	14	16
2	14	13 (0.9)	126	42	27	9	11
3	14	13 (1)	85	38	38	16	15
4	13	10 (0.8)	85	12	49	35	8
5	12	9 (0.75)	70	37	31	8	10
6	11	12 (1.1)	95	30	35	14	13
7	9	8 (0.9)	67	23	48	12	11
8	8	8 (1)	53	25	46	22	9
9	7	6 (0.9)	43	38	25	6	7
10	6	6 (1)	57	31	31	8	18
11	6	6 (1)	55	31	38	10	5
12	6	5 (0.8)	36	36	24	10	19
13	5	5 (1)	35	24	61	20	11
	<b>7.8</b>	<b>8 (0.9)</b>	<b>57</b>	<b>30.6</b>	<b>37.7</b>	<b>14.2</b>	<b>11.4</b>
				<i>P</i> = 0.14	<i>P</i> = 0.68	<i>P</i> = 0.56	<i>P</i> = 0.77

fractured neck of femur. We also aimed to determine whether acute departments in the North West were complying with national guidelines regarding trauma list provision.

### Patients and Methods

Data on surgical delay, reasons for delay and patient mortality were available from the 2006 Greater Manchester and Wirral fracture neck of femur audit for 13 hospitals based on patients admitted during the 4-month period April–July

2005.<sup>16</sup> We contacted corresponding theatre managers by telephone interview in December 2006 to determine: (i) the number of dedicated orthopaedic trauma lists provided in each department; and (ii) whether lists were consultant-run. This information was then sent to the principal investigator (NK) for validation. Trauma lists were defined as one operating session. Data were analysed using SPSS (v.14) and correlation between the number of trauma lists and outcome variables was calculated using Spearman's Rank correlation. Hospitals were then divided into two groups, those

**Table 2 Hospitals with more than 10 lists per week versus those with less than 10 lists per week**

	More than 10 lists per week ( <i>n</i> = 6)	Less than 10 lists per week ( <i>n</i> = 7)	
Number of patients	537	346	<i>n</i> = 883
Number operated before 24 h	186	100	
Operated within 24 h (%)	34.6	28.9	<i>P</i> = 0.09
Number delayed > 48 h	184	136	
Delayed > 48 h (%)	34.3	39.3	<i>P</i> = 0.15
Number delayed for non-medical reasons	85	42	
Delayed due to non-medical reasons (%)	15.8	12.1	<i>P</i> = 0.15
Number dead at 30 days	65	39	
Deceased at 30 days (%)	12.1	11.3	<i>P</i> = 0.79

with less than 10 lists per week ( $n = 7$ ) and those with 10 or more lists per week ( $n = 6$ ). Operative delays and mortality were compared between the two groups using Fisher's exact test (two-sided). Values were expressed as range (median); differences were considered significant at the  $P = < 0.05$  level.

## Results

A total of 883 patients were included in the audit (35–126 per hospital; Table 1). Between 5–15 (median 9) trauma lists were provided each week, and 80% of lists were consultant-led. The results were similar for anaesthetic management (90% of lists consultant-run). Hospitals serving large populations had more trauma lists than those serving smaller populations. Overall, 85–97% (median 94%) of patients were operated on, 2–7% (median 3%) were treated conservatively, 0–5% (median 2%) were not fit for operation and subsequently died, and 0–3% (median 1%) died before an operation could be performed.

Between 12–47% (median 31%) of patients were operated on within 24 h, 24–61% (median 35%) of patients were delayed more than 48 h and 6–35% (median 12%) of delays were due to non-medical reasons. The 30-day mortality varied between 5–19% (median 11%). There were no significant correlations between the number of trauma lists and these outcome variables. Results are summarised in Table 1.

When divided in to hospitals with 10 or more trauma lists per week ( $n = 6$ ) and those with less than 10 per week ( $n = 7$ ), there was evidence of a trend in the number of patients operated on within 24 h (34.6% versus 28.9%;  $P = 0.09$ ) but no difference in mortality between the two groups (12.1% versus 11.5%;  $P = 0.79$ ; Table 2). Fewer patients were delayed more than 48 h (34.3% versus 39.3%;  $P = 0.15$ ) and more patients were delayed due to non-medical reasons (15.8% versus 12.1%;  $P = 0.15$ ), although these differences were not significant.

## Discussion

Almost all patients received an operation. More patients were delayed for > 48 hours (36.9%) than were operated on before 24 h (31.8%), the maximum recommended operating delay. Although our study was underpowered to detect significant differences, the data showed a correlation between the number of lists and the proportion of patients operated within 24 h (correlation coefficient of +0.42; Table 1); when the hospitals were grouped into those with 10 or more lists and those with fewer than 10 lists, the difference in operation rate showed a trend, although this was not significant (Table 2). Again, the difference was not significant when considering patients delayed for more than 48 h, and more patients were delayed for non-medical reasons in hospitals with more trauma lists.

Most trusts provided at least one dedicated daily list, and implementing practices as described by the British Orthopaedic Association with the goal of operation within 48 h of admission.<sup>14</sup> Ideally, this would lead to less morbidity, allow early rehabilitation to promote independence and return to home.<sup>14</sup> Although we have shown that the majority of lists are time-tabled as senior-led, we cannot be sure whether this is actual practice.

This study shows that, whilst extra lists may enable trusts to cope better with neck of femur, they do not of themselves influence mortality. Although there was no reduction in mortality, we appreciate that other reasons for ensuring early operation, such as improved patient dignity and well-being, as well as reducing the length of stay<sup>17</sup> are also important considerations. Delays increase morbidity, pressure sores, deep vein thrombosis and confusion, whilst early stabilisation reduces pain and improves comfort. Delays also add to the cost of care through delayed return to mobilisation, and delayed return home.<sup>14,18</sup>

We also note that theatre availability is not the single important factor; as well as theatre capacity, medical optimisation prior to surgery will improve morbidity and mortality, highlighting the importance of pre-operative care.<sup>14</sup>

Another important consideration is postoperative care. These patients are at risk of future fragility fractures, and should be investigated or treated for osteoporosis, should be given a falls assessment, and are at risk of deep vein thrombosis. The employment of a specialist orthogeriatrician can be effective in improving medical care, and management of these patients will benefit in the future from a National Hip Fracture Database, currently being implemented by the British Orthopaedic Association and the British Geriatrics Society.

We were unable to take account of differences in trauma case-load and case-severity, nor have we examined the efficiency of running of trauma lists. These factors might impact on delay and mortality and should ideally be taken into account. For example, the increased non-medical delays in hospitals with more than 10 lists per week might indicate inefficiency and would warrant audit. The throughput and efficient running of trauma lists might be improved by reducing non-medical delay for surgery.

Although it is generally accepted that delays will increase mortality, we note there has been some debate as to whether delays do alter this outcome.<sup>4,8–10</sup> We acknowledge our delays did not show statistical significance across our different hospitals and that that our patient population was a sample of actual activity.

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