



General versus regional anaesthesia for hip fractures. A pilot randomised controlled trial of 322 patients



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ABSTRACT

Uncertainty remains regarding the optimum method of anaesthesia for hip fracture surgery. We randomised 322 patients with a hip fracture to receive either general anaesthesia or regional (spinal) anaesthesia. Surviving patients were followed up to 1 year from injury. There was no notable difference in the outcomes of hospital stay, need for blood transfusion or post-operative complications between groups. 30-day mortality was marginally reduced for spinal anaesthesia 7/164(4.3%) versus 5/158(3.2%) ($p = 0.57$), whilst at 1 year it was less for general anaesthesia 20/163(12.1%) versus 32/158(20.2%) ($p = 0.05$). Within the confines of the limited patient numbers studied we conclude that there are no marked differences in outcome between the two techniques.

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Introduction

At present about 1.5 million hip fractures occur each year around the world with numbers predicted increase to between 7 and 21 million by 2050 [1]. In the UK the incidence is about 77,000 [2]. The number of hip fractures in England is expected to reach 100,000 by the year 2033 [3]. The majority of these fractures are treated surgically requiring some form of anaesthesia.

Despite the frequent nature of the condition controversy still exists regarding the optimum choice of anaesthesia [4–6]. For specific groups of patients one particular type of anaesthesia may be preferred. For example those with chest disease are felt to be better treated with spinal anaesthesia, whilst for those on warfarin general anaesthesia (GA) is more likely to be chosen. There remains a substantial proportion of patients for which either technique may be used. This study aims to revisit this controversy by randomising 322 patients with a hip fracture to either regional or general anaesthesia to see if there is any suggestion of a significant benefit for either technique.

Patients and methods

The protocol for this study is that it only included those patients aged over 49 years of age presenting to one hospital with an acute hip fracture. Discussion with study participants was undertaken by the lead trialist (MJP). Patient with dementia were included if their next was willing to allow their relative to participate in the study. Patients with more than one injury were included within the study if spinal anaesthesia was suitable for all necessary surgical procedures. Patients who expressed a preference to a particular method of anaesthesia were excluded at their request. In addition those patients in whom either the attending anaesthetist or surgeon felt either technique was more appropriate were also excluded.

Randomisation was undertaken by the opening of sealed opaque numbered envelopes, which were prepared at the start of the study by a person independent to the trial. Each envelope contained details of the type of anaesthesia to be given (general versus spinal anaesthesia). The exact technique and doses of drugs used for the different types of anaesthesia was the choice of the anaesthetist. Patients were assessed on admission and this included the patients ASA grade [7], mental test score [8] and a mobility score [9,10]. Surgery was undertaken or supervised by a single surgeon (MJP). All patients received low molecular weight heparin from admission for approximately 14 days. Any complications that occurred after surgery were recorded. After discharge surviving patients were initially reviewed in a hip fracture clinic at six weeks from discharge and then completed a telephone assessment at 1 year from injury.

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The primary outcome measure for this study was mortality. Independent statistical advice for patient numbers for this study was undertaken based on data from the Cochrane review which reported a 30 day mortality of 6.8% for spinal anaesthesia versus 9.4% for general anaesthesia [5]. To detect a significant difference with minimum power threshold of 80% then an estimated number of participants would be 2520 in total (1260 in each group). These large numbers of participants was not possible for a single centre study and therefore in the absence of sufficient funding it was decided to undertake this trial as a pilot study.

All participants within the study provided written consent apart from patients with dementia who were included if the assent of the next of kin was obtained. There was no blinding of trialists, participants or outcome assessors. There was no external source of funding for this study. The study had research ethics approval and approval of the hospital Research and Development Committee.

Binary outcomes for the two groups were analysed using Fisher exact test and the unpaired two-tailed *t*-test for continuous outcomes. For the outcome of hospital stay, the data was not parametric and therefore the Mann-Whitney *U*-test was used. A *p*-value of $p < 0.05$ was considered as statistically significant. All results were analysis on an intention-to-treat basis using GraphPad InStat (version 3.00 for Windows 95, GraphPad Software, San Diego, CA, USA).

Results

Fig. 1 details the flow pattern of participants. Between June 2007 and November 2012, 2200 patients were admitted with a hip fracture to Peterborough District Hospital (latterly Peterborough City Hospital). 322 of these patients consented to be involved in the study. 164 were allocated to general anaesthesia but 6 of these

received regional anaesthesia, generally because of a change of their condition prior to surgery. 158 patients were allocated to spinal anaesthesia but for 10 patients it was not possible to achieve a satisfactory block and a general anaesthetic was given. In another 3 patients a general anaesthesia was given because of a change in the patient's condition. 1 patient in the general anaesthesia group was lost to follow-up at 68 days from admission. 1879 patients were excluded from the study for a variety of reasons given in Fig. 1. Some patients were excluded from the study for more than one reason.

The characteristics of the two groups of patients included in the study are given in Table 1. The only statistically significant difference between the two groups was an increased proportion of male patients in the general anaesthesia group ($p = 0.002$). 84% of anaesthetics were undertaken or directly supervised by one of 29 different consultant anaesthetists. The remaining anaesthetics were undertaken by trainees or staff grade anaesthetists. All surgical operations were undertaken of directly supervised by the lead author (MJP).

Table 2 details the outcome measures. Intraoperative hypotension was defined as a fall in systolic blood pressure of more than 40 mm for more than 5 min. Orthopaedic ward stay refers to the days spent on the admission orthopaedic ward and total hospital stay refers to the days stay on any hospital ward till discharge home. Fig. 2 details the patient survival graphically.

Discussion

Controversy still continues over the value of regional (spinal) versus general anaesthesia for hip fracture repair. Most anaesthetists believe there is no difference in outcome between the two techniques, and at present both methods are used with similar

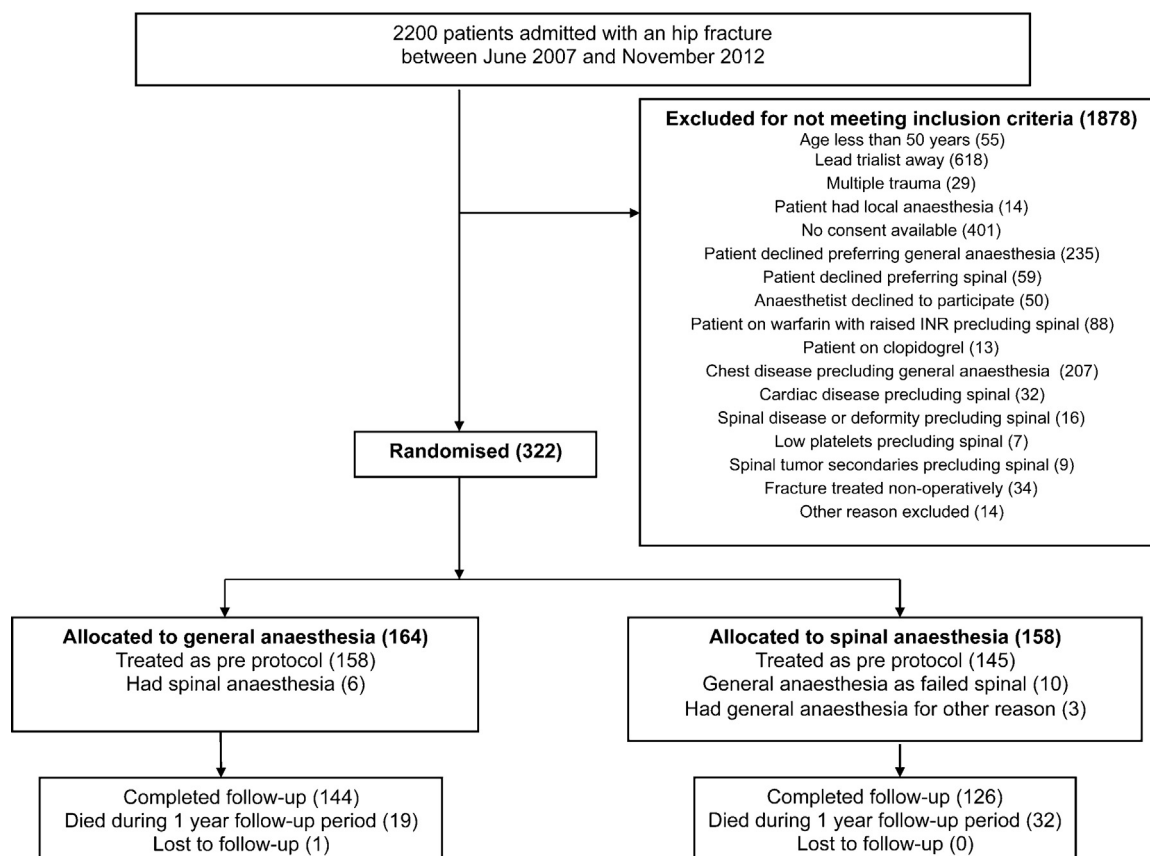


Fig. 1. Details of patient included and excluded from the study; flow pattern of participants. Patients may be excluded for more than one reason.

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