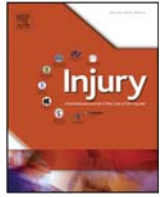




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General versus spinal anaesthesia in proximal femoral fracture surgery – treatment outcomes

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KEY WORDS

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ABSTRACT

Background: Proximal femoral fractures are a major public health problem because of the increasing proportion of elderly individuals in the general population. The mode of choice for anaesthesia in surgical treatment of these fractures is still debated in terms of better postoperative outcome.

The aim of our study was to compare the effect of general over spinal anaesthesia on mortality in proximal femoral fracture surgery.

Patients and methods: This study was a retrospective analysis of 115 patients aged at least 70 years who underwent surgery for proximal femoral fracture. The survey was conducted from 1 January to 31 December 2015 at the General Hospital Karlovac, Croatia. Patients were divided into two groups: group 1 – general anaesthesia and group 2 – spinal anaesthesia.

The primary outcome measure was the effect of mode of anaesthesia, general versus spinal, on mortality within 30 days, six months and one year after surgery.

Results: General anaesthesia (Endotracheal Anaesthesia) was administered in 77 patients (67%; group 1 – ETA) and spinal anaesthesia in 38 patients (33%; group 2 – SPIN). Both groups had more female than male patients: 69 patients (89.6%) in the ETA group and 32 patients (84.2%) in the SPIN group were female.

The mean age in the ETA group was 82.91 years and in the SPIN group was 80.18 years.

ASA II status was more common in patients in the SPIN group (25 patients [65.8%]).

The average time from hospitalisation to surgery was 53.44 hours in the ETA group and 53.33 hours in the SPIN group. There was no significant difference between groups in the number of comorbidities, or intraoperative and postoperative complications.

There was no statistically significant difference in mortality between the groups. Mortality after surgery in the ETA and SPIN groups, respectively, was as follows: 10.4% and 10.5% at 30 days, 23.4% and 15.8% at six months, and 32.5% and 31.6% at one year.

Conclusion: The results indicate that the mode of anaesthesia (general vs spinal) has no effect on postoperative mortality, and that the mode of anaesthesia should be applied on an individual basis in correlation with associated comorbidities.

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Introduction

Proximal femoral fractures are a major public health problem because of the increasing proportion of elderly individuals in the general population [1]. Age over 70 years with moderately severe limitation in function of one or more organs is one of the main

clinical criteria by which patients are classified as high-risk surgical patients [2]. The high perioperative mortality in elderly patients who underwent this type of surgery is therefore not surprising [3].

The treatment outcome after fracture of the proximal femur is affected by many factors, including patient comorbidity, type of surgery, time from hospital admission to surgery and the mode of anaesthesia administered.

Elderly patients present a medical challenge for anaesthetists, given the number of associated comorbidities, the incidence of which increases with age. Understanding the physiology of the elderly

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and using therapeutic procedures for associated comorbidities are imperative to provide optimal care [4].

Comprehensive treatment of these patients is based on a coordinated hospital multidisciplinary team approach (physicians and nurses), and a well-defined in-hospital treatment from the emergency department to the centre for rehabilitation. Furthermore, the optimisation of treatment and early surgery are considered key factors in reducing morbidity and mortality of these patients [5].

When selecting the mode of anaesthesia for this population, there is still considerable uncertainty when to choose a general or spinal anaesthesia in terms of better postoperative outcome [6].

Some studies of proximal femoral fractures have shown an interrelationship between these two types of anaesthesia and mortality.

Patients and methods

This clinical study was a retrospective analysis of 115 patients aged at least 70 years who were treated for an isolated fracture of the proximal femur in Karlovac General Hospital, Croatia, from 1 January 2015 to 31 December 2015. Patients were divided into two groups with respect to the mode of applied anaesthesia: group 1 – general anaesthesia (EndoTracheal Anaesthesia [ETA]) and group 2 – neuroaxial blockade (spinal anaesthesia [SPIN]). Exclusion criteria were refracture, polytrauma and pathological fractures due to malignancy.

A retrospective analysis of data obtained through the Hospital Information System (HIS) was conducted. The analysed data included demographic data (age and sex), the time elapsed from hospital admission to the start of surgery, the type of fracture of the proximal femur, the preoperative status of the patients (ASA – American Society of Anesthesiologists, physical status classification system) and the existing comorbidities of the patients.

An analysis of intraoperative recorded data was also conducted; this included the type of surgery, duration of surgery, intraoperative complications and mortality 24 hours after surgery.

The following postoperative data were analysed: the number of hospitalisation days, postoperative complications, a stay in intensive care units and vital organ support interventions. Mortality was analysed over a period of 30 days after surgery and six months and one year after surgery.

Outcome

The primary outcome measure was the effect of mode of anaesthesia, general vs spinal, on hospital mortality and mortality within 30 days, six months and one year after surgery.

Statistical analysis

Data are presented in tables. Categorical variables are presented as frequencies and corresponding percentages; quantitative variables are presented as medians and interquartile ranges (25th to 75th percentile). Fisher exact test or Fisher-Freeman-Halton exact test of independence was used to analyse differences in categorical clinical parameters between patients when the contingency table is larger than 2×2 . Mann-Whitney U test was used to analyse differences in quantitative variables between the same groups. All p-values below 0.05 were considered significant. Data analysis software system IBM SPSS Statistics, version 21.0 (www.spss.com) was used in statistical analyses and graphical images.

Ethics

The study was approved by the local ethics committee of Karlovac General Hospital.

Results

Table 1 provides an overview of the main characteristics of the study population separated by anaesthesia type. From 1 January 2015 to 31 December 2015, a total of 115 patients underwent surgery for fracture of the proximal femur in Karlovac General Hospital.

General anaesthesia was administered to 77 patients (67%; group I – ETA) and spinal anaesthesia to 38 patients (33%; group 2 – SPIN). Both groups had more female than male patients: 69 patients (89.6%) in the ETA group and 32 patients (84.2%) in the SPIN group were female. The mean age in the ETA group was 82.91 (SD 6.831) years and in the SPIN group was 80.18 (SD 5.239) years (Table 2). There were no statistically significant differences between the two groups in the type of fracture of the proximal femur and the type of surgery (Table 1).

There was a statistically significant difference between the groups in ASA status ($p = 0.04$). ASA II status was more common in patients under spinal anaesthesia, with 25 patients (65.8%), whereas ASA III was more common in patients in the general anaesthesia group, with 42 patients (54.5%) (Table 1).

As shown in Table 2, the average time from hospitalisation to surgery was 53.44 hours in the ETA group and 53.33 hours in the SPIN group, which shows no statistically significant difference ($p = 0.784$). The mean duration of anaesthesia in the ETA group was 103.56 minutes and in the SPIN group was 101.24 minutes; this difference was not statistically significant ($p = 0.859$). There were also no statistically significant differences between the groups in the number of comorbidities (ETA = 3.21 vs SPIN = 2.92, $p = 0.257$), the number of intraoperative complications (ETA = 0.21 vs SPIN = 0.08, $p = 0.09$), the total number of hospitalisation days (ETA = 12.19 vs SPIN = 12.37, $p = 0.772$) and the total number of postoperative complications (ETA = 0.53 vs SPIN = 0.45, $p = 0.702$) (Table 2).

Table 3 presents the preoperative comorbidity in both groups. The most common comorbidities in both groups were hypertension (ETA = 77.9% vs SPIN = 78.9%, $p = 0.846$), bed sores (ETA = 36.4% vs SPIN = 26.3%, $p = 0.281$), the use of anticoagulants/antiplatelet drugs (ETA = 28.6% vs SPIN = 34.2%, $p = 0.536$) and history of deep vein thrombosis (ETA = 22.1% vs SPIN = 31.6%, $p = 0.270$); however, there were no statistically significant differences between the groups for these comorbidities. Other, less common, preoperative comorbidities included urinary tract infection, previous cerebrovascular disease, anaemia, orthopaedic disease, dementia or other psychiatric disease, previous cardiovascular disease, gastrointestinal disease and diarrhoea, previous respiratory disease, liver disease, diabetes, malnutrition and electrolytic imbalance. Again, there were no statistically significant differences between the groups in the presence of these comorbidities.

Table 1
Characteristics of the study population by anaesthesia type.

		Group				P (χ^2 test)
		ETA		SPIN		
		N	%	N	%	
Sex	Male	8	10.4%	6	15.8%	0.405
	Female	69	89.6%	32	84.2%	
Dg.	Femoral neck fracture	22	28.6%	17	44.7%	0.195
	Subtrochanteric fract.	8	10.4%	2	5.3%	
	Trochanteric fract.	47	61.0%	19	50.0%	
Op.	Partial endoprosthesis	18	23.4%	13	34.2%	0.216
	Total endoprosthesis	3	3.9%	1	2.6%	
	DHS	23	29.9%	13	34.2%	
	Intramedullar nail	31	40.3%	8	21.1%	
	OS with screws	2	2.6%	3	7.9%	
ASA	II	35	45.5%	25	65.8%	0.040
	III	42	54.5%	13	34.2%	

Dg. – diagnosis; DHS – dynamic hip screw; Op. – operation; OS – orthopaedic surgery.

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