Matched pair analysis of postoperative early ambulation after hip fracture surgery - spinal or general anesthesia

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Introduction

Hip fracture is a common trauma for geriatric patients and early postoperative ambulation training is a big issue. Recent guidelines have advocated greater use of regional anesthesia1). We evaluated the efficacy of postoperative early ambulation when provided either spinal (SA) or general anesthesia (GA).

Materials & Methods

This research was approved by the institutional review board and the patient informed consent was waived. (IRB No. 2016-015)

We conducted an analysis involving patients who received hip fracture surgery at a single institute. We examined 635 patients and matched two groups; patients received SA or GA without any other regional anesthesia. (SA+Sedation without airway management included SA, SA+GA, SA or GA+another regional anaesthesia was excluded). At last, 595 patients were received matched analysis.

Primary endpoint was the frequency of postoperative ambulation training within postoperative day one. The second outcome was the frequency of postoperative agitation (defined as Richmond Agitation-Sedation Scale +1 to +4). Supplementary analysis included the relationships between ambulation training and age, preoperative diagnosis of dementia, and preoperative stand-by time till surgery.

Statistical Analysis

We used an iterative process to develop a multivariate logistic regression model to estimate a propensity score for the comparison. These variables included age, gender, Body Mass Index(BMI), The type of surgery (ORIF or BHA), ASA PS, Fast track surgery within 48 hours before admission or not, past medical history of diabetes mellitus (DM), brain infarction (BI), hemodialysis on chronic renal failure (HD), neurological disability (ND; paralysis, motor disturbance, failure of sensory organs) and the diagnosis of dementia (DT).

To adjust the baseline difference and selection bias, we used a propensity score matching analysis and 282 patients from each group were identified for final analysis. The absolute standardized difference between groups were calculated after matching to ensure that the two groups were similar in all baseline characteristics. Results are expressed as relative risk ratio (RRs) with a 95% CI band. All P values were two tailed, sith statistical significance defied at $p<0.05$.

Table 1. Baseline patient characteristics in the study period (before matching) and in the propensity score matched cohort

	Before Matching			After Matching		
	GA (n=313)	SA (n=282)	P value	GA (n=282)	SA (n=282)	P value
Gender(F/M)	235/78	195/87	0.119	213/69	195/87	0.109
Age	82.9±8.9	82.6±8.9	0.732	82.7±9.0	82.6±8.9	0.825
BMI	20.7±3.5	20.5±3.4	0.673	20.6±3.5	20.5±3.4	0.721
Operation（ORIF/BHA）	176/137	166/116	0.561	160/122	166/116	0.67
ASA PS(1/2/3)	5/285/23	2/256/24	0.565	3/257/22	2/256/24	0.923
Surgery within 48hours(Y/N)	222/91	205/77	0.649	206/76	205/77	1
History_DM(Y/N)	89/224	71/211	0.405	72/210	71/211	1
History_BI(Y/N)	59/254	61/221	0.414	54/228	61/221	0.531
History_HD(Y/N)	11/302	14/268	0.418	11/271	14/268	0.683
History_ND(Y/N)	85/228	71/211	0.641	69/213	71/211	0.922
History_DT(Y/N)	136/117	104/178	0.112	119/163	104/178	0.228

Results & Discussion

After the propensity score matched analysis, SA-group and GA-group patients had no statistical difference of postoperative ability of ambulation training within postoperative day. The occurrence of postoperative agitation was not different among two groups.

Table 2. Results

	GA(n=282)		SA(n=282)			
	n	%	n	%	RR(95%CI)	P value
Outcomes						
Standing POD 1	204	72.3	211	74.8	1.13 (0.76-1.68)	0.57
Postoperative agitation	77	25.5	72	27.3	0.91 (0.60-1.35)	0.52

In the subgroup analysis, logistic regression analysis revealed there was a significant correlation between the frequency of ambulation training and the diagnosis of dementia (Odds ratio 0.35, 95% CI: 0.24-0.51, $p<0.001$), the stand-by time (Odds ratio 0.99, 95% CI:0.98-1.00, $p=0.007$) and the age (Odds ratio 0.98, 95% CI: 0.95-0.99, $p=0.03$). Previous analysis provided the evidence that anesthesia techniques including neuroaxial anesthesia or GA had no impact on the postoperative 30-day mortality but significant shortage of hospital stay. However, our analysis revealed that anesthesia techniques did not affect the postoperative ambulation rehabilitation or agitation, which may have been a burden of postoperative rehabilitation.

Conclusions

For geriatric patients undergoing hip fracture surgery, GA or SA is not significantly associated with postoperative ambulation rehabilitation or postoperative frequency of agitation.