

Associated Factors of Perioperative Shivering in Patients Undergoing Orthopedic Surgery Under Spinal Anesthesia

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Introduction

Perioperative shivering is a common adverse event of anesthesia, causes many serious complications, such as hypoxemia, myocardial ischemia, cardiac arrhythmia. Moreover, shivering is one of the leading causes of discomfort for postsurgical patients.

Objective

To identify associated and risk factors of perioperative shivering in patients undergoing orthopedic surgery under spinal anesthesia.

Materials and Methods

This was a retrospective case-control study. The orthopedic patients aged 15-85 years undergoing spinal anesthesia at Maharat Nakhon Ratchasima Hospital during April 2019 and September 2019 were reviewed. Fifty eight shivering patients were identified and labeled as a case group. One hundred sixteen patients were enrolled as a control group. The associated factors were extracted: gender, ASA, age, weight, height, BMI, Hct, type and milligrams of bupivacaine, total intravenous fluid administration, total blood loss, total blood replacement, anesthetic and operative time, operative site and anesthetic level. All associated factors were analysed by univariate and multivariate analysis for crude and adjusted odds ratios.

Results

The shivering group had lower weight, lower height and lower BMI. The milligrams of bupivacaine, total blood loss and operative site at hip and femur were higher in the shivering group. From univariate analysis, crude odds ratios of weight < 60 kg, bupivacaine ≥ 15 mg, operative site at hip and femur were 2.60, 2.22 and 2.59. From multivariate analysis, only weight < 60 kg was in the equation with adjusted odds ratio 2.43.

Table 1 Factors which related to peri-operative shivering analysed by univariate analysis

Factors	Crude Odds ratio	95% confidence interval	P-value
Weight < 60 kg	2.60	1.35-5.00	0.004*
Height < 160 cm	1.51	0.61-2.17	0.665
BMI < 30 kg/m ²	2.52	0.69-9.14	0.161
Operative site			
knee, leg, foot	2.59	1.36-4.95	0.004*
hip, femur	1.00		
Bupivacaine ≥ 15 mg	2.22	1.12-4.44	0.023*
Total blood loss ≥ 500 ml	2.64	0.68-10.24	1.160

Table 2 Factors which related to peri-operative shivering analysed by multivariate analysis

Factors	Adjusted Odds ratio	95% confidence interval	P-value
Weight < 60 kg	2.43	1.21-4.90	0.013*
Operative site			
knee, leg, foot	1.69	0.81-3.51	0.162
hip, femur	1.00		
Bupivacaine ≥ 15 mg	1.96	0.90-4.29	0.093

Conclusions

The risk factor of perioperative shivering in patients undergoing orthopedic surgery under spinal anesthesia from multivariate analysis was weight less than 60 kg.

Keywords: orthopedic surgery, perioperative shivering