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EFFECTS OF COMBINED SPINAL EPIDURAL ANESTHESIA IN ORTHOPAEDIC SURGERY OF ELDERLY PATIENTS :

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Abstract

Objective

Combined spinal epidural anesthesia (CSEA) is applied to lower limb orthopaedic surgery in the elderly. This study is aimed at exploring the effect of CSEA in orthopaedic surgery of elderly patients.

Methods

A total of 40 elderly patients with femoral fracture needing hip replacement or femoral head replacement in our hospital were selected as the research objects. The subjects were divided into observation group (n = 20) and control group (n = 20) by random number table method. The control group was given epidural anesthesia, while the observation group was given CSEA. Hemodynamic indexes (heart rate (HR) and mean arterial pressure (MAP)), visual analogue scale (VAS) pain score changes, anesthetic effects, and postoperative complications were compared between the two groups.

Results

After operation, the observation group had lower HR and MAP values than the control group (P < 0.05). The dosage of local anesthetics in the observation group was significantly less than that in the control group (P < 0.05). The onset time and improvement time of sensory block in the observation group were significantly faster than those in the control group (P < 0.05). The observation group had a lower VAS score than the control group (P < 0.05). There was no significant difference in Bromage score or incidence of complications between the two groups (P > 0.05).

Conclusion

The use of CSEA has good anesthetic effect. It has the disadvantage of no headache after traditional spinal anesthesia, is not limited by time, and can be used for postoperative analgesia, which is more suitable for the anesthesia of lower limb orthopaedic surgery in the elderly.

Keywords: Orthopedic surgery, Regional anesthesia, Spinal, Epidural, Combined spinal epidural, Peripheral nerve blocks, Neuraxial blocks, Upper extremity, Lower extremity.

Introduction

In the current aging society of our country, there are more and more elderly surgical cases, and the requirements for surgical anesthesia are becoming higher and higher. As the general physiological function of the elderly is reduced and their tolerance to anesthesia and surgery is poor, the choice of anesthesia for elderly patients undergoing lower limb surgery is a contradictory problem [1, 2]. General anesthesia methods include epidural anesthesia, spinal anesthesia, and combined spinal epidural anesthesia. Lumbar anesthesia interferes with the respiratory and circulatory system. Anesthesia takes effect quickly. Once the anesthesia level fails to meet the requirements, only intravenous general anesthetics can be added to complete the operation, which increases the management difficulty and has time limit. If the operation time is too long, it is difficult to meet the requirements. In addition, postoperative headache may occur during spinal anesthesia, which is the most painful problem for patients after spinal anesthesia, making anesthesiologists and surgeons worried about spinal anesthesia [3, 4]. Epidural anesthesia has the advantages of less interference to the respiratory and circulatory system, less physiological impact, faster postoperative recovery, less complications, etc. [5]. However, it is easy to cause circulatory respiratory depression when applied to the elderly to shorten the onset time, reduce the local anesthetics required for the wide block plane, and strengthen the management at the same time [6]. For example, it is a safe anesthesia method to use small-dose fractional injection; however, there are some problems, such as incomplete epidural anesthesia, especially adhesion in the epidural space caused by multiple epidural anesthesia, and the diffusion of local anesthetics is blocked. Epidural catheter entering into intervertebral foramen resulted in limited block range; and there may be unilateral anesthesia. The circulatory and respiratory disturbance caused by intravenous general anesthetics during incomplete block increases the risk of anesthesia and the difficulty of management [7].

Material and methods :

A total of 40 elderly patients with femoral fracture who planned to undergo hip replacement or femoral head replacement in our hospital were selected as the research objects. This study was approved by the Ethics Committee of our hospital. The subjects were divided into observation group and control group by random number table method, with 20 cases in each group. In the observation group, there were 11 males and 9 females; the average age was 74.32 ± 8.27 years. In the control group, there were 10 males and 10 females; the average age was 75.16 ± 8.33 years. There was no significant difference between the two groups ($P > 0.05$).

Inclusion criteria are as follows: patients who underwent elective surgery; age > 60; American Society of anesthesiologists (ASA) grade I or II; there were no serious pathological changes of important organs before operation; the operation time was less than 2 hours; and those who agree to participate in the study and sign the informed consent form.

Exclusion criteria as follows: long-term use of analgesic and sedative drugs; preoperative blood glucose and blood pressure were not effectively controlled; severe coagulation dysfunction; the skin at the puncture site is broken; severe deformity of spine; contraindication of intraspinal anesthesia; and history of acute and chronic pain.

Results :

The dosage of local anesthetics, onset time of sensory block, block completion time, and pain recovery room in the observation group were significantly less than those in the control group ($P < 0.05$).

HR and MAP at T2 and T3 time points in the control group were higher than those at T0, T1, and T4time points ($P < 0.05$). HR at T2, T3, and T4 in the observation group was lower than that at T0 and T1 ($P < 0.05$). The HR of patients in the observation group at T2, T3, and T4 time points was lower than that in the control group ($P < 0.05$). The MAP of patients in the observation group at T2, T3, and T4 time points was lower than that in the control group ($P < 0.05$). There were no significant difference of HR and MAP at T0 and T1 time points between the two groups ($P > 0.05$).\

There was no significant change in the preoperative VAS pain score of the two groups ($P > 0.05$). The VAS pain score at the time of awakening after operation was increased significantly and showed a downward trend 24 hours after operation. The VAS pain score in the control group was higher than that in the observation group, the difference was statistically significant ($P < 0.05$).
The incidence of complications including chills, low blood pressure, slowed heart rate, nausea and vomiting, and headaches in the observation group was lower than that in the control group, but the difference was not statistically significant ($P > 0.05$).

Discussion and Conclusion

CSEA absorbs the advantages of epidural anesthesia and spinal anesthesia. As long as the anesthesia level is controlled below T8, it has little interference on circulation and respiration, and the anesthesia effect is good. At the same time, the operation is basically completed within 2 h. Generally, the operation can be completed without adding local anesthetics, so as to avoid incomplete epidural anesthesia block. At the same time, the local anesthetics dose required is small, which also reduces the occurrence of toxic and side effects of local anesthetics, and the postoperative recovery is fast, with less complications [14]. Because the CSEA lumbar puncture needle is thinner than the traditional lumbar anesthesia needle, there are no headache complications in the postoperative follow-up. This is mainly because the 25 g pen point SA needle is used to puncture the dura mater in a separate way, with relatively few dots and less cerebrospinal fluid outflow, and CSEA is not limited by time. The anesthesia time can be extended arbitrarily according to the needs of the operation. PCEA analgesia or treatment is feasible after the operation.
This study showed that both groups of anesthesia planes could meet the requirements of surgery and had little impact on the body. Combined spinal epidural anesthesia not only has the advantages of fast onset, muscle relaxation, and perfect analgesia but also can effectively adjust the anesthesia plane to prevent the high anesthesia plane [15]. Small-dose bupivacaine given in combined spinal epidural anesthesia can provide anesthesia plane in a short time and reduce the degree of interference to respiratory and circulatory system, and small dose can significantly reduce intravascular local anesthetic drugs and reduce the risk of local anesthetic drug poisoning [15, 16]. Meanwhile, the results of this study showed that the VAS pain score, hemodynamic index changes, and anesthesia index of the observation group were better than those of the control group, which was mainly related to the fact that intraspinal anesthesia can lead to significant preganglionic block of the sympathetic nerve in the block area, dilation of blood vessels, insufficient blood volume, and cardiac output [17]. In addition, elderly patients have a certain degree of autonomic and peripheral nerve degenerative changes. When the body is under anesthesia, the catecholamine level can be reduced during anesthesia. In addition, their body position changes after anesthesia, resulting in large changes in hemodynamic indicators [18]. The index parameters of the observation group were all within 20% of the basic value, indicating that it had little interference with the circulatory system.

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