The Internet Journal of Anesthesiology
Volume 13 Number 2

Succesful Use Of Continuous Spinal Anesthesia Technique For Femoro-Popliteal By-Pass In A Patient With Congestive Heart Failure And Pulmonary Hypertension

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Citation

M Inal, A Colak, C Arar, I Gunday. *Succesful Use Of Continuous Spinal Anesthesia Technique For Femoro-Popliteal By-Pass In A Patient With Congestive Heart Failure And Pulmonary Hypertension*. The Internet Journal of Anesthesiology. 2006 Volume 13 Number 2.

Abstract

Regional anaesthetic techniques alone or combined with general anaesthesia are common practice. Continuous spinal anesthesia technique has been used succesfully in many surgical procedures in elderly and high-risk patients. We describe the use of continuous spinal anesthesia technique for femoro-popliteal bypass in a patient with congestive heart failure and pulmonary hypertension.

This case report is accepted as a poster presentation PAIN Congress 2006 in Istanbul.

INTRODUCTION

Continuous spinal anesthesia is the technique of producing and maintaining spinal anaesthesia with small doses local anaesthetic which are injected intermittently into the subarachnoid space via a catheter. Continuous spinal anesthesia was first described by Edward Tuohy in 1944. Continuous spinal anesthesia technique assures safe and adequate spinal anaesthesia and analgesia especially in elderly or high-risk patients ([1,2,3]).The advantage of the continuous spinal anesthesia is; the level can be established gradually with small incremental doses of the local anaesthetic agent, a method that greatly reduces the possibility of high spinal anaesthesia, and decreases the likehood of cardiovascular instability during anaesthesia([2]).

We describe now the use of continuous spinal anesthesia for femoropopliteal by-pass in a patient with congestive heart failure and pulmonary hypertension.

CASE REPORT

An 71 year old, oxygen-dependent (2 L/min) man with severe hypertension and congestive heart failure was scheduled for elective right femoral-popliteal bypass with synthetic graft. The patient's main complaint was progressive pain and coldness in right toe. Altough the surgery was not urgent, the course of the vascular disease and the present level of patient's continuous discomfort required right lower extremity revascularization. He had hypertension for 10 years and congestive heart failure for 5 years. His past medical history was significant for severe myocardial infarction complicated by congestive heart failure. A preoperative echocardiogram revealed biatrial dilatation, moderate mitral, aort and tricuspidal insufficiency and pulmonary hypertension (pulmonary artery pressure ~55-60 mmHg).

His preoperative medications included digoxin, furasemide, enalapril and nitroglycerin patch.He had no known drug allergies and operations.

On physical examination, the patient was 170 cm height and weighed 65 kg. Head and neck evaluation was significant and he had a mallampati class ?? airway. The cardiac examination revealed an irregular heart beat with a grade 2/6 pansystolic murmur. The lungs were clear to auscultation.

Hemoglobin, white cell count, platelet count, plasma electrolytes, prothrombin time and activated partial thromboplastin time were normal.

After presenting to the operating room; electrocardiogram, pulse oximetry, non-invasiv arteriel blood pressure and saturation were monitored. % 0.9 Isotonic solution was given prior to initiation of spinal anesthesia. A 22-gauge Touhy epidural needle was then inserted at the L_{3-4} interspace into the subarachnoid space. A 27-gauge catheter was inserted through the needle into the subarachnoid space. After confirmation of aspiration cerebral spinal fluid through the catheter, 2.5 mg of plain bupivacaine 0.5% was injected through the catheter. His blood pressure before the administration of the local anesthetic was 160/70 mmHg and his heart rate was 66 bpm. After reassessement of systemic blood pressure and sensory level, a second dose of 2.5 mg of plain bupivacaine 0.5% was given 5 minutes later. A L_1 sensory level of anesthesia was obtained 5 minutes after the second dose. Then 2.5 mg plain bupivacaine was given. After the third dose (5 minutes later) T_{10} sensory level of anesthesia was obtained.

For surgery, a semisitting position was used. During the operation the patient was lightly sedated with intermittent doses of midazolam. Also throughout the surgery, oxygen was administered nasally at rate of 2 L/min.

Both the sensory level of analgesia and vital signs remained stable during the operation.

After the operation; the patient was transported to the recovery room with comfort and no pain.

Vital signs of the patient were normal. The continuous spinal anesthesia cathater was used for postoperative pain. 48 hours after surgery the catheter was removed from the patient.

After the operation there were no cardiac or postural puncture headache complication.

DISCUSSION

General anesthesia is often preferred over central neuroaxial blockade for the anestetic management of patients with ischemic heart disease. Peripheral sympathetic nervous system block produced by regional anesthesia can lead to an undesirable decrease in systemic vasculer rezistance with decreased venous return to to the heart and coronary system (1,2,3,4,5,6,7,8).

If regional anesthesia is selected, epidural rather than spinal anesthesia is often recommended due to the more likely gradual onset of peripheral sympathetic nervous system blockade (1,2,3,4,5,6,7,8).

The main advantages of continuous spinal anesthesia over epidural and single dose spinal anesthesia is its easier technique and the possibility of providing an adequate level and duration of local anesthesia with small incremental doses, a method that greatly reduces the possibility of high spinal anaesthesia, and decreases the likehood of cardiovascular instability during anaesthesia (2).

Klimscha et al. (9) and Collard et al. (1) showed that continuous spinal anesthesia in healthy elderly patients resulted in a significantly lesser decrease in blood pressure and lower incidence of vasopressor use when compared to age-matched controls receiving continuous epidural anesthesia. In our case we also observed no decrease in blood pressure.

Klimscha et al. (9) and Schneider et al. (10) point that the maximum hemodynamic effects produced by local anesthetic injection may not occur for up to 20 minutes after injection.

Klimscha et al. (9) waited 25 minutes before reinjection of local anesthetic, Schneider et al.(10) waited 6 minutes before reinjection and Collard et al. (1) waited 5 minutes before reinjection. In our case we waited 5 minutes before reinjection of local anesthetic. Instead of use of a fixed dose or time interval, systemic blood pressure and sensory level must be assessed prior to reinjection of local anesthetics.

Continuous spinal anesthesia may be left in place postoperatively for pain management. Collard et al. (1) used duramorph for analgesia. In our case the spinal cathater was removed immediately.

Continuous spinal anesthesia avoids many of the disadvantages of general anesthesia. The hemodynamic responses of direct laryngoscopy and intubation are avoided with continuous spinal anesthesia. In addition, the use of volatile anesthetics may lead to myocardial depression and peripheral vasodilatation. Also because avoidance of using neuromusculer agents there is no fluctutions in heart rate. In a patient with coexisting chronic obstructive disease complications associated with positive pressure ventilation and possible infectious risks associated with intubation are avoided (10).

Continuous spinal anesthesia does have potential complications such as post-dural puncture headache, persistant paresthesia, low back pain and risk of infection.

The incidence of post-dural puncture headache after continuous spinal anesthesia remains controversial, with widely differing reported incidences. Some prospective studies have shown a very low incidence, while others found incidences of 6-9% (2). There are few data about persistant paresthesia and low back pain.

Our experience shows continuous spinal anesthesia to be a safe anesthetic technique and provide better hemodynamic stability during the perioperative period. As a result, continuous spinal anesthesia may be the technique of choice for lower limb surgery in the elderly and high-risk patients, when hemodynamic stability is critical.

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