

Anaesthetic Management of the Elderly with Low Ejection Fraction Undergoing Non-cardiac Surgery

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ABSTRACT

Low ejection fraction in the elderly presenting for anaesthesia could be very challenging to the anaesthetist on account of the heightened risk of perioperative complications. The combined risk of low ejection fraction and poor cardiac reserve may predispose to increase perioperative mortality. Complications in the perioperative period includes acute exacerbation of heart failure which can arise from pump failure or cardiac dyskinesia, and these could be debilitating in the elderly. Therefore, maintaining good systolic function and cardiac rhythm will ensure cardiovascular stability. We present the management of an 89year old man who had hypertensive heart disease with ejection fraction of 40% that successfully had dynamic hip replacement under combined spinal epidural (CSE) anaesthesia.

Keywords: neuraxial blockade, ejection fraction, elderly.

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Prise en charge anesthésique des âgées à faible taux d'éjection subissant une chirurgie non cardiaque

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Résumé

Une faible fraction d'éjection chez les âgées se présentant pour une anesthésie pourrait être très difficile pour l'anesthésiste en raison du risque accru de complications péri opératoires. Le risque combiné de faible fraction d'éjection et de faible réserve cardiaque peut prédisposer à une augmentation de la mortalité péri opératoire. Les complications de la période péri opératoire comprennent une exacerbation aiguë de l'insuffisance cardiaque qui peut résulter d'une défaillance de la pompe ou d'une dyskinésie cardiaque, et celles-ci pourraient être débilitantes chez les personnes âgées. Par conséquent, le maintien d'une bonne fonction systolique et d'un bon rythme cardiaque assurera la stabilité cardiovasculaire. Nous présentons la prise en charge d'un homme de 89 ans qui avait une cardiopathie hypertensive avec une fraction d'éjection de 40% qui a eu avec succès une arthroplastie dynamique de la hanche sous anesthésie épidurale rachidienne combinée (AERC).

Mots-clés : Blocage neuraxial, fraction d'éjection, personnes âgées

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INTRODUCTION

Life style modification in addition to recent advances in interventional cardiology has resulted in good surgical outcome for many geriatrics with background cardiovascular diseases presenting for surgery (1). Ejection fraction (EF) refers to the percentage volume of blood pumped out of the left ventricle with each heart beat and it is normally 55-70%. A mild-to-moderately reduced EF of 40 - 54% is a pointer to suboptimal systolic function while EF less than 35% often indicates severely compromised cardiac systolic function.

Life threatening complications could result from very low ejection fraction, for instance, heart failure with cardiogenic shock. Heart failure is reported to account for twice the incidence of postoperative death in the elderly (1). The maintenance of effective myocardial contractility is therefore imperative to ensure effective tissue perfusion in the perioperative period. The use of Neuraxial blockade has been suggested to produce better treatment outcome in patients with cardiovascular disease undergoing a non-cardiac surgery compared to general anaesthesia (2).

We report the case management of an elderly patient with background hypertensive heart disease with low ejection fraction who had dynamic hip screw surgery for transcervical femoral fracture under combined spinal epidural (CSE) block.

CASE REPORT

An 89years old male who presented at the accident and emergency unit of our hospital with history of left hip pain and inability to walk due to trauma of two weeks duration. He was not a previously diagnosed hypertensive or diabetic.

On examination, he was in painful distress, pale and had pedal oedema up to the proximal third of the left leg. He had an enlarged heart and the first, second and fourth heart sound were heard. Serum electrolytes were not deranged. His haemoglobin concentration was 8g/dl and the haematocrit was 25%. A pelvic X-ray showed fractured left femoral neck. Chest X-ray revealed cardiomegaly (CTR 110:189, 58.2%). Unfolding of the aortic knuckle with calcific rim and homogenous opacities with air bronchogram noted in both lower lung zones.

A conclusion of left femoral fracture with orthostatic pneumonia was made. Electrocardiogram (ECG), showed sinus rhythm, mild bradycardia with left anterior hemi-block and frequent premature

ventricular contraction (ectopics) and bigeminy. Echocardiography revealed a dilated left atrium, calcified aortic valve with moderate mixed aortic valve disease (regurgitation and stenosis). Mild tricuspid regurgitation with pulmonary hypertension, grade II left ventricular diastolic dysfunction and ejection fraction of 40%. He was later scheduled for dynamic left hip screw surgery on account of left transcervical femoral neck fracture.

For his medical conditions his haematocrit was optimized via blood transfusion. He received intravenous antibiotics, oral anticoagulant (dabigatran) and had chest physiotherapy (even though his pulmonary function test was normal) on account of his age, for 2 weeks. The anticoagulant was stopped for 7 days prior to surgery. Pre-anaesthetic evaluation showed airway grading (Mallampati) IV and American society of anesthesiologists assessment (ASA) IV. High risk informed consent was obtained after explaining the anaesthetic procedure to the patient and relatives.

At surgery, ECG, non-invasive blood pressure (BP), pulse rate (PR) and oxygen saturation SPO₂ were monitored. Intravenous, (IV) access was obtained in both arms using 16G cannula. Preoperative vital signs were: Pulse-55-62 /min, BP of 140/100mmHg and SPO₂ 95- 99% in room air. Premedication was with IV atropine 0.6mg, following which the pulse rate rose to between 65 and 76 beats/min. He also had IV antibiotics and 1g tranexamic acid. A preload of IV 500mls normal saline was given, then the combined spinal epidural (CSE) block was given with the patient assisted in the sitting position. The epidural block was sighted at the L3-L4 interspace and the epidural catheter fixed at 10 centimetres, a test dose of 3ml lidocaine with adrenaline (1: 200 dilution) was administered. Subsequently the spinal anaesthesia was given at the L4-L5 interspace with 2mls, 0.5% heavy bupivacaine and patient allowed to sit for 3-5mins. The level of block was accessed at T8. The vital signs were maintained to within 20% of baseline with IV fluids. No vasopressor was given. Surgery commenced 1hr after placement of spinal anaesthesia due to dynamic patient positioning and it lasted for 2hrs.

At the end of surgery, epidural injection of 5ml 0.125% plain bupivacaine was given for postoperative analgesia. Intraoperatively patient had IV atropine 0.6mg twice intermittently when PR falls below 60 beats/min. There were no other complications intraoperatively or in the

postoperative period. Graded oral feeds (clear fluids) was commenced 6 hrs post operatively, physiotherapy and ambulation (with Zimmer frame) after 24hrs, and he was discharged on the 5th day following surgery.

DISCUSSION

Cardiovascular dysfunction has been reported as the commonest co-morbid condition found in preoperative patients presenting for elective procedures (3).

Low ejection fraction often times results from long standing, poorly controlled hypertension, diabetes and coronary artery diseases. Assessment of ejection fraction is necessary to determine the systolic pump ability of the heart to adequately pump out blood, and also serial measurement can be used to monitor heart failure. Normal ejection fraction is estimated to be between 55% and 70%. Values between 40% - 55% may indicate previous heart attack, and values less than 35% can lead to heart failure (HF). Acute exacerbation of heart failure in the perioperative period may occur in 25% of patients (4).

Elderly patient with low ejection fraction scheduled for non-cardiovascular surgery presents a multiple challenge to the anaesthetist. Aside from the elderly age, the cardiovascular disease carries an additional risk factor. It requires optimal preoperative preparation.

General anaesthesia, although very challenging can be utilized in the management of patients with low ejection fraction undergoing major surgery (5). However, recent guidelines suggest that neuraxial blockade may be considered for patients with cardiac diseases (2).

Regional blockade used alone or in addition to general anaesthesia is been reported to reduce significantly, perioperative complications (6,7). Although spinal anaesthesia may result in sudden haemodynamic fluctuations with compromise, epidural blockade offers stability in patients with cardiovascular diseases. A combination of both offers an early block and a continuous top-up dose to maintain adequate cardiac stability and anaesthesia. Moreover, small/low dose of local anaesthetics has been documented to minimize hypotension during spinal anaesthesia (8).

Sanatkar *et al* showed that low dose of spinal anaesthetic may help in increasing the ejection

fraction due to absence of change in the pressure - volume ratio contractility index (9).

Our patient, after preloading with a pint of normal (0.9%) saline had low dose spinal anaesthesia following the epidural citation in the sitting position to avoid high blocks. There was no incidence of hypotension and no vasopressor was given, although intraoperative fluids and blood were given as appropriate in the perioperative period.

A multinational study on the effects of neuraxial block and postoperative epidural analgesia on cardiovascular morbidity and mortality concluded that there is reduced cardiovascular complications (10), even though another study indicated no reduction in overall mortality (11). At the end of surgery, our patient had postoperative epidural analgesia with 5mls of 0.125% bupivacaine. This also is a low volume, low concentration dose that is not associated with local anaesthetic toxicity.

In conclusion, our report corroborated with other studies (9,12,13) on the favourable outcome of neuraxial anaesthetic technique in patients with background cardiovascular diseases and low ejection fraction.

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