Challenge Journal of PERIOPERATIVE MEDICINE

Case Report

Walking the tightrope: Anaesthesia for fragile hearts and overactive glands in elderly hip surgery

Ranganath Laxman Channappagoudar [a,*], Shilpa Shivananda [a]

[a] *Department of Anaesthesiology, S. Nijalingappa Medical College and HSK Hospital & Research Centre, Navanagar, Bagalkot, Karnataka, India*

ABSTRACT

Anesthetic management of elderly patients with ischemic heart disease, dilated cardiomyopathy with severe left ventricular dysfunction, and hyperthyroidism undergoing bipolar hemiarthroplasty presents unique challenges. Hyperthyroidism can exacerbate cardiac conditions, increasing perioperative risks. Preoperative optimization involves achieving euthyroid status using antithyroid medications and beta-blockers to control heart rate. A comprehensive cardiovascular evaluation is essential to manage heart failure and maintain hemodynamic stability. Severe pulmonary arterial hypertension further complicates anesthetic management due to increased perioperative morbidity and mortality. These patients are at higher risk for complications such as myocardial infarction and respiratory failure during anesthesia and surgery. Intraoperatively, regional anesthesia techniques may be preferred to minimize cardiovascular stress. Close monitoring of pulmonary pressures and ventricular function is crucial during the perioperative period. Postoperative care should focus on vigilant monitoring for potential complications, including thyroid storm, cardiac events, and exacerbation of pulmonary arterial hypertension. A multidisciplinary approach involving anesthesiologists, cardiologists, pulmonologists, and surgeons is essential to enhance surgical outcomes in such high-risk patients. In this case report, we present the combination of lumbar and sacral plexus blocks that we applied as the sole anesthesia method in a high-risk patient with multiple comorbidities undergoing bipolar hemiarthroplasty surgery.

ARTICLE INFO

Article history:
Received – June 5, 2025
Revision requested – September 17, 2025
Revision received – January 14, 2026
Accepted – February 4, 2026

Keywords:
Dilated cardiomyopathy
Severe left ventricular dysfunction
Hyperthyroidism
Bipolar hemiarthroplasty
Lumbar plexus block
Sacral plexus block

Citation: Channappagoudar RL, Shivananda S. Walking the tightrope: Anaesthesia for fragile hearts and overactive glands in elderly hip surgery. *Chall J Perioper Med*. **2026**;4(1):38–41.

1. Introduction

The anaesthetic management of elderly patients with ischemic heart disease, dilated cardiomyopathy with severe left ventricular dysfunction, and hyperthyroidism undergoing major orthopaedic surgeries like bipolar hemiarthroplasty presents significant challenges. Hyperthyroidism can exacerbate cardiac conditions, increasing perioperative risks. Reduced ejection fraction and left ventricular failure further complicate haemodynamic stability during surgery. Severe pulmonary artery hypertension adds an additional layer of complexity, as it is associated with increased perioperative morbidity and mortality.

A comprehensive preoperative evaluation, meticulous intraoperative management, and vigilant postoperative care are essential to optimise outcomes in such high-risk patients. This case report details the management of a 77-year-old male patient with a right neck of femur fracture, ischemic heart disease, dilated cardiomyopathy with severe left ventricular dysfunction, and hyperthyroidism scheduled for bipolar hemiarthroplasty.

2. Case Report

A 77-year-old male patient with a right neck of femur fracture was scheduled for bipolar hemiarthroplasty. The patient presented with pain in the right hip following a history of fall, with NYHA grade III dyspnea. On physical examination, the patient's general condition

* *Corresponding author*. E-mail address: drranganath53@gmail.com (R. L. Channappagoudar)
ISSN: 2980-292X / DOI: https://doi.org/10.20528/cjpm.2026.01.006

was weak with HR 68 bpm (irregularly irregular), BP 140/90 mmHg, SpO2 98% on room air, and RR 16 cpm. His past medical history was significant for IHD with LV failure for 4 years, and he was on the following medications preoperatively: T. Ramipril 2.5 mg, T. Sacubitril 24 mg + Valsartan 20 mg, T. Torsemide 10 mg + Spironolactone 50 mg OD, and T. Methimazole 10 mg OD.

The patient's preoperative laboratory investigations were Hb 12.7, TLC 12,300, Plt 212,000/μL, PT 12.6, aPTT 35.6, INR 0.97, creatinine 0.7, serum electrolytes within normal limits, and LFT normal with elevated ALP 236.6 and albumin 3.3. The patient had a history of hyperthyroidism that was well controlled on T. Methimazole, rendering him clinically and biochemically euthyroid at the time of surgery. His chest X-ray showed emphysematous changes and cardiomegaly. ECG revealed left ventricular hypertrophy with ST-T changes in leads II, III, and aVF. A preoperative echocardiography revealed DCM (dilated cardiomyopathy), global hypokinesia of LV, dilated cardiac chambers, sclerotic aortic valve disease, mild-to-moderate mitral regurgitation/tricuspid regurgitation, severe PAH (100 mmHg), reduced LV and RV function, and LVEF 20%. The patient's diagnosis was closed traumatic right neck of femur fracture, belonging to ASA IV, and he was planned for uncemented bipolar hemiarthroplasty.

Grave risk consent was obtained explaining all intraoperative risks pertaining to the cardiac status of the patient. Prior to surgery, the patient fasted for 6 hours and an 18G peripheral IV cannula was secured.

On arrival in the operating room, standard ASA monitors were attached including HR, NIBP, SpO2, and ECG, and baseline hemodynamic parameters were recorded. Under aseptic precautions, left-sided radial artery catheterization was done and invasive blood pressure was noted, and the right IJV was cannulated. Injection ondansetron 4 mg was given. The patient was positioned in a lateral decubitus position, with the dependent limb kept straight while the limb to be blocked was flexed at both the hip and knee.

Using Capdevila's approach [1], the spinous process of L4 was identified. A line was drawn from the centre of the L4 spinous process laterally to intersect with a line passing through the posterior superior iliac spine parallel to the vertebral column on the side to be blocked. At the puncture point, local infiltration with lidocaine 2%, 2 mL, was given at the junction of the lateral one-third and medial two-thirds. The needle was advanced at right angles to the skin until the transverse process of L4 was encountered and then directed caudally, not more than 2 cm. A curvilinear ultrasound (GE) probe was placed in the transverse plane at the level of L3-L4. The transverse process, psoas major muscle, and lumbar plexus, which lies within the posterior part of the psoas major muscle, were visualized. The needle was inserted using an in-plane technique from the posterolateral edge of the probe, aiming anteriorly towards the posterior third of the psoas muscle (Fig. 1). Correct placement of the needle was confirmed using PNS (B Braun) with a current of 1–1.5 mA at 1–2 Hz, and the needle was advanced until twitches of the quadriceps muscle were obtained. The current was then lowered to obtain stimulation between 0.3–0.5 mA. At this point, using a 100 mm Stimuplex needle, 20 mL of 0.375% ropivacaine was given after negative aspiration.

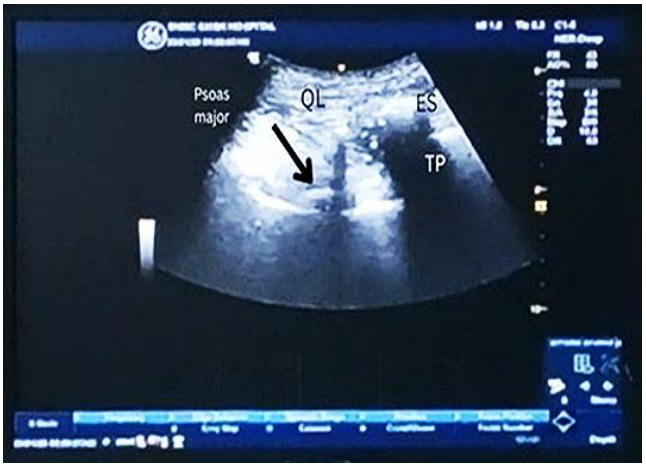

Fig. 1. USG guided lumbar plexus block, black arrow indicates the lumbar plexus (QL: Quadratus lumborum; ES: Erector spinae; TP: Transverse process).

Sacral plexus block was given using Mansour's parasacral approach [2]. A line between the PSIS and the ischial tuberosity was drawn. The needle insertion point lies 6 cm caudad to the PSIS on this line. The needle was inserted perpendicular to the skin and advanced slowly. Motor response of the sciatic plexus was obtained as visible or palpable twitches of the hamstrings, calf muscles, foot, or toes at a current intensity of 0.3–0.5 mA. Here, 15 mL of 0.375% ropivacaine was given after negative aspiration.

Surgical anaesthesia was achieved after 20 min. A low dose of inj norepinephrine infusion was started prophylactically to prevent transient hypotensive episodes, as it maintains systemic vascular resistance and coronary perfusion pressure without causing tachycardia or a significant increase in pulmonary vascular resistance, thereby preserving both left and right ventricular function and preventing acute RV failure. Fluid administration was done with the help of stroke volume variation of IBP. No haemodynamic fluctuations were observed and no pain was reported by the patient. The rest of the operative time was uneventful, and a standard cementless hip hemiarthroplasty was done within an operative time of 40 min.

Postoperatively, the patient was shifted to the ICU for close monitoring where he had AF with a fast ventricular rate, which was well managed with 12.5 mg diltiazem slow IV, and 48 hours later he was shifted to the orthopaedic patient wards.

3. Discussion

The anaesthetic management of elderly patients with significant cardiac comorbidities undergoing non-cardiac surgery presents a formidable challenge. This case highlights the complexities of perioperative care in a 77-year-old male with severely reduced left ventricular ejection fraction (LVEF 20%), dilated cardiomyopathy, and severe pulmonary hypertension (PAH 100 mmHg) undergoing bipolar hemiarthroplasty.

A markedly low ejection fraction is associated with significantly increased perioperative risk. Studies indi-

cate that LVEF <30% is correlated with a 5- to 7-fold increase in perioperative cardiac complications, including myocardial infarction, arrhythmias, and decompensated heart failure [3]. Furthermore, severe PAH (>70 mmHg) is a well-established independent predictor of perioperative mortality, with reported rates ranging from 4% to 24% in non-cardiac surgery [4]. Right ventricular (RV) dysfunction further complicates the clinical picture, as RV failure can rapidly develop under conditions of increased pulmonary vascular resistance, such as those caused by hypoxia, acidosis, or fluid overload [5].

The Revised Cardiac Risk Index (RCRI) categorizes this patient as high risk, with ischemic heart disease and heart failure as major predictors. This implies an estimated >11% risk of major adverse cardiac events (MACE) during the perioperative period [6]. Moreover, due to impaired cardiac reserve, patients with advanced heart failure are unable to mount an adequate increase in cardiac output in response to anaesthetic or surgical stress. In this context, maintaining normovolemia, avoiding afterload surges, and ensuring adequate oxygenation are of paramount importance [7].

This patient was euthyroid, removing the additional anaesthetic risk posed by uncontrolled thyrotoxicosis. This allowed us to focus exclusively on the haemodynamic challenges associated with his cardiac condition.

General anaesthesia (GA) and neuraxial techniques such as spinal or epidural anaesthesia may not be well tolerated in patients with compromised biventricular function. GA carries the risk of myocardial depression, sympathetic stimulation during airway manipulation, and increased susceptibility to arrhythmias [8]. Similarly, central neuraxial blocks can cause profound hypotension due to sympathetic blockade, which these patients may not physiologically compensate for [7].

Given these considerations, a combined ultrasound-guided lumbar plexus and sacral block was selected. This approach provided effective surgical anaesthesia while preserving haemodynamic stability and avoiding the risks of general anaesthesia. Regional techniques allow for stable cardiovascular dynamics, attenuated stress responses, and avoidance of myocardial depressant agents, making them especially suitable in patients with advanced cardiomyopathy and PAH [8,9].

Ultrasound and peripheral nerve stimulator guidance ensured precise local anaesthetic deposition. Ropivacaine 0.375% was preferred due to its lower cardiotoxicity compared to bupivacaine, making it safer in patients with cardiac disease [10]. The intraoperative use of a low-dose norepinephrine infusion provided vasomotor support without increasing heart rate, and fluid administration guided by stroke volume variation (SVV) helped avoid both under- and over-resuscitation [11].

In the early postoperative period, the patient developed atrial fibrillation with rapid ventricular rate, which was effectively managed with intravenous diltiazem. This reflects the high susceptibility of such patients to arrhythmias during perioperative stress and the importance of close cardiac monitoring postoperatively [12].

This case supports the findings of Ravishankar et al. [7], Salami et al. [8], and Gemawan et al. [9], emphasizing that regional anaesthesia, particularly peripheral nerve blocks, can be a safe and effective technique for non-cardiac surgery in patients with severe left ventricular dysfunction. With appropriate planning and vigilance, optimal outcomes can be achieved even in patients with extreme cardiac risk profiles.

4. Conclusions

This case exhibits successful management of a high-risk elderly patient with severe cardiac dysfunction (LVEF 20%, severe PAH, IHD, dilated cardiomyopathy) undergoing bipolar hemiarthroplasty. Regional anaesthesia using combined ultrasound and PNS-guided lumbar and sacral plexus blocks is a safe choice of anaesthesia for a patient having limited cardiac reserve. It reduces afterload, decreases stress response, and avoids airway instrumentation and haemodynamic response to laryngoscopy, thereby reducing morbidity. Careful haemodynamic monitoring with norepinephrine support maintained cardiovascular stability throughout the procedure. The successful result demonstrates that patients with significant heart disease can still safely undergo essential orthopaedic procedures when individualised anaesthetic approaches are employed. This case highlights the importance of adapting clinical management to each patient's unique physiological challenges and demonstrates the growing importance of ultrasound-guided regional anaesthesia techniques for patients with such comorbid conditions.

Acknowledgements
None declared.

Funding
The authors received no financial support for the research, authorship, and/or publication of this manuscript.

Conflict of Interest
The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this manuscript.

Data Availability
The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author upon reasonable request.

AI Assistance
No AI-based tools were used in the preparation of this manuscript.

Ethics Approval and Consent to Participate
Written informed consent was obtained from the patient who participated in this study.

Author Contributions
Ranganath Laxman Channappagoudar: *conceptualization, data curation, investigation, methodology, supervision, visualization, writing – original draft, writing – review & editing.*
Shilpa Shivananda: *conceptualization, data curation, methodology, visualization, writing – original draft.*

REFERENCES

1. Capdevila X, Coimbra C, Choquet O. Approaches to the lumbar plexus: success, risks, and outcome. *Reg Anesth Pain Med*. **2005**;30(2):150.
2. Mansour NY. Reevaluating the sciatic nerve block: another landmark for consideration. *Reg Anesth Pain Med.* **1993**;18(5):322-323.
3. Landesberg G, Beattie WS, Mosseri M, Jaffe AS, Alpert JS. Perioperative myocardial infarction. *Circulation*. **2009**;119(22):2936-2944.
4. Minai OA, Yared JP, Kaw R, Subramaniam K, Hill NS. Perioperative risk and management in patients with pulmonary hypertension. *Chest*. **2013**;144(1):329-340.
5. Vlahakes GJ. Right ventricular failure following cardiac surgery. *Coron Artery Dis*. **2005**;16(1):27-30.
6. Lee TH, Marcantonio ER, Mangione CM, Thomas EJ, Polanczyk CA, Cook EF, Sugarbaker DJ, Donaldson MC, Poss R, Ho KK, Ludwig LE. Derivation and prospective validation of a simple index for prediction of cardiac risk of major noncardiac surgery. *Circulation.* **1999**;100(10):1043-1049.
7. Ravishankar RB, Vidya NT. Anaesthetic management of ischemic heart disease with ejection fraction of 30% posted for fracture femur surgery – a case report. *J Evid Based Med Healthc*. **2020**;8(19):1453–1455.
8. Salami OF, Onuoha KM, Uduagbamen PK, Olayinka BA, Alade OA. Anaesthetic management of the elderly with low ejection fraction undergoing non-cardiac surgery. *Res J Health Sci*. **2020**;8(3):209-13.
9. Gemawan T, Handoko A, Misturiansyah NI. Anesthesia in low ejection fraction patient: Case report. *Jurnal Profesi Medika: Jurnal Kedokteran dan Kesehatan*. **2023**;17(2):121-129.
10. Scott DB, Lee A, Fagan D, Bowler GM, Bloomfield P, Lundh R. Acute toxicity of ropivacaine compared with that of bupivacaine. *Anesth Analg*. **1989**;69(5):563-569.
11. Futier E, Lefrant JY, Guinot PG, Godet T, Lorne E, Cuvillon P, Bertran S, Leone M, Pastene B, Piriou V, Molliex S. Effect of individualized vs standard blood pressure management strategies on postoperative organ dysfunction among high-risk patients undergoing major surgery: a randomized clinical trial. *Jama.* **2017**;318(14):1346-1357.
12. Gillinov AM, Bagiella E, Moskowitz AJ, Raiten JM, Groh MA, Bowdish ME, Ailawadi G, Kirkwood KA, Perrault LP, Parides MK, Smith RL. Rate control versus rhythm control for atrial fibrillation after cardiac surgery. *N Engl J Med*. **2016**;374(20):1911-1921.