Case Report

Anaesthesia for fixation of repeated pathological fractures in a patient with multiple myeloma

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ABSTRACT

The introduction of new chemotherapeutic agents for the treatment of multiple myeloma (MM) has improved the life expectancy and quality of life for these patients in the last decade. Therefore, more patients with MM are being treated for repeated pathological fractures. The anaesthesiologist should continue the optimum supportive care received by these patients in the perioperative period also, by understanding the pathophysiology of the disease, the adverse effects of the chemotherapeutic agents and the guidelines for their supportive care. We report the perioperative management of a patient with MM and discuss the perioperative anaesthetic considerations.

Key words: Anaesthesia, multiple myeloma, peripheral nerve block

INTRODUCTION

Multiple myeloma (MM) has an incidence of 13% of all haematological malignancies.[1] In India, there are 6000 new cases/year with a median age of the diagnosis at 55 years.[2] The mean 5-year-survival rate of MM has increased from 25% in the 1970s to >50% in the last decade.[3] The introduction of new chemotherapeutic regimens for MM has improved the quality of life and increased survival rates in these patients. Therefore, anaesthesiologists are encountering more patients with MM posted for orthopaedic surgeries in the last decade. As the literature is sparse regarding the anaesthetic management of these patients, we would like to highlight the pathophysiology and the clinical symptomatology of this disease, the side effects of the chemotherapeutic agents and emphasise the guidelines to continue the appropriate supportive therapy during anaesthetic management in the perioperative period.

CASE REPORT

A frail 52-year-woman, diabetic and hypertensive, weighing 50 kg presented to our hospital with a history of pain in the right arm. She was diagnosed with MM 2 years ago for which she underwent six cycles of chemotherapy and had a relapse with bone involvement requiring radiotherapy. X-ray of the humerus showed pathological fracture of the right humerus requiring intramedullary nailing of the humerus [Figure 1]. She developed a pathological fracture of the right tibia, 6 months ago, for which intramedullary nailing was done under general anaesthesia. She was taking tablet lenalidomide 25 mg/day per oral (PO) and table. dexamethasone 40 mg/week PO, tablet acyclovir and tablet clotrimazole PO for infection prophylaxis and tablet aspirin 75 mg once daily (OD) orally for antithrombotic prophylaxis. She had undergone coronary artery bypass grafting 4 years ago for ischaemic heart disease. Blood investigation showed normal blood counts and renal function. Serum calcium was 8.3 mg/dl and serum albumin was 3.2 mg/dl. Glycated haemoglobin

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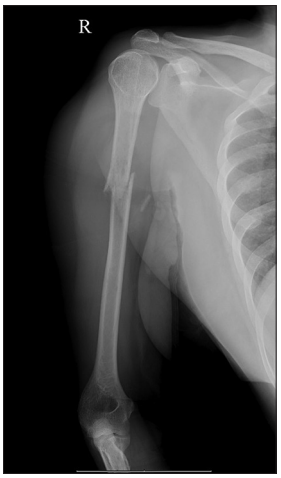

Figure 1: X-ray right humerus showing pathological fracture of the shaft

was 5.8 revealing adequate blood glucose control. Electrocardiogram showed evidence of old inferior wall myocardial infarction. Echo cardiography showed normal left ventricular function with mild hypertrophy.

It was decided to stop aspirin for 5 days, and bridge the period with dalteparin 5000 U subcutaneous OD. The preoperative dose of dalteparin was timed at 12 h before surgery. Preoperative antibiotic prophylaxis was administered with injection cefuroxime 1.5 g intravenous (IV). Under ultrasound guidance and asepsis, a continuous interscalene block of the brachial plexus was done by placing a 18 gauge 2 1/8' continuous peripheral block catheter around the plexus and 20 ml 0.5% bupivacaine was given for intraoperative pain relief. The patient was hydrated with 10 ml/kg of ringer lactate before induction of anaesthesia. Anaesthesia was induced with injection fentanyl 75 mcg i.v and injection propofol 100 mg i.v and laryngeal mask airway (LMA) size 3 was inserted. Anaesthesia was maintained with FiO_2 0.5 (air oxygen mixture) and sevoflurane. The procedure was uneventful with no haemodynamic disturbances and minimal blood loss. After surgery, inhalational anaesthetics were stopped, and the LMA removed. Patient had an uneventful recovery. Post-operatively, the patient was comfortable with infusion of 0.2% ropivacaine at 6 ml/h as continuous interscalene block. She did not require any rescue analgesics. Renal function tests and serum calcium were normal in the post-operative period. She was discharged on the fifth post-operative day.

DISCUSSION

MM is malignant proliferation of monoclonal plasma cells in the bone marrow leading to increased production of abnormal antibodies, and secretion of monoclonal immunoglobulins detectable in the blood or urine and associated with organ dysfunction. The clinical manifestations of symptomatic MM are lytic or osteopaenic bone lesions, hypercalcaemia, renal failure, anaemia and infections, but patients are now diagnosed earlier at an asymptomatic stage.[4]

The increased osteoclastic activity and destruction of stromal cells in the bone marrow lead to lytic bone lesions, repeated pathological fractures, bone pain and hypercalcaemia. Vertebral body collapse with spinal cord compression is an emergency in these patients requiring immediate vertebroplasty or kyphoplasty.[1,5] Renal failure commonly occurs because of damage to the renal tubules by the free light chains and hypercalcaemia due to osteolysis. Renal insufficiency carries a poor prognosis for these patients with higher incidence of mortality. Although the renal function tests were normal in our patient, we ensured adequate hydration by preloading the patient with IV fluids, maintaining the haemodynamics, avoiding non-steroidal anti-inflammatory drugs (NSAIDs) by performing brachial plexus blockade.[1,6] It is important for the anaesthesiologist to prevent deterioration of renal function in the perioperative period since these patients are at increased risk for acute renal failure (ARF).[7] We monitored the patient's serum calcium in the perioperative period. Adequate hydration prevents hypercalcaemia. Severe hypercalcaemia should be treated with thiazides and bisphosphonates.[6,8] Preventing and reversing renal failure in patients with MM improves long-term survival.[7]

The increased proliferation of plasma cells depletes the normal stromal cells of the marrow leading to anaemia and thrombocytopaenia placing these patients at high risk for excess bleeding intraoperatively, requiring transfusion of blood and platelets. Target haemoglobin of 12 g/dl preoperatively is recommended in these patients.[9] These patients are more prone for infections due to neutropaenia and immunosuppressive drugs. Prophylactic antibiotic was administered for our patient and absolute asepsis maintained. Acyclovir and clotrimazole were continued in the perioperative period to prevent recurrent herpes infections as she was on high-dose steroids.[5,10] Patients with MM, undergoing surgery for hip fracture, are at higher risk for hospital-acquired pneumonia, sepsis, surgical site infection and ARF than patients without MM.[7]

Apart from the above-mentioned problems, these patients also develop adverse events related to their drug therapy. The newer drugs – such as thalidomide, lenalidomide and bortezomib have prolonged the survival rates, but have serious adverse effects. Haematologic toxic effects such as neutropaenia and thrombocytopaenia are common with these drugs when used along with conventional chemotherapy. The incidence of venous and arterial thrombosis increases with thalidomide and lenalidomide. Since our patient was on lenalidomide, she was started on low-dose aspirin for thromboprophylaxis. As per the International Myeloma Working Group guidelines, the patient had >2 risk factors for thromboembolism (Lenalidomide therapy, high-dose steroids, diabetes, surgery and anaesthesia administration), and hence, she was switched to low-molecular-weight heparin (LMWH) (dalteparin 5000 U subcutaneous OD) during the perioperative period.[5] Hypotension in the perioperative period along with increased risk for thromboembolism makes these patients at high risk for stroke and MI.[11] Aspirin was restarted after surgery and Thromboembolism deterrent compression stockings were applied in the lower limbs to prevent deep vein thrombosis.

Central neuraxial blockade and regional nerve blocks are not contraindicated. There are few reports of successful management of caesarean section under central neuraxial blockade and lower limb surgeries with regional nerve blocks.[12,13] The intake of antiplatelets and anticoagulants may contraindicate regional techniques. Bridging the patient to LMWH from aspirin in the perioperative period also helps in performing regional nerve blockade without the risks of thromboembolism or bleeding. We decided to place a continuous block catheter around brachial plexus to provide intraoperative and post-operative pain relief for our patient, avoiding the requirement of opioids and NSAIDs in the post-operative period. The placement of continuous block catheters can be used as a component of multimodal approach in the pain management of these patients.

CONCLUSION

More MM patients are being anaesthetised for orthopaedic procedures in the last decade because of improved survival rates after introduction of new chemotherapeutic agents. There are specific guidelines for the supportive therapy of these patients to prevent renal failure, infections, anaemia and thromboembolism in patients with MM. It is important for the anaesthesiologist to know these guidelines to prevent long-term complications when these patients are under their care for a short perioperative period.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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