Inevitable Massive Transfusion for Spine Surgery in Patients with Multiple Myeloma

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Submission: January 26, 2018; Published: March 20, 2018

Abstract

The incidence of Multiple Myeloma (MM) is about 1% of all malignancies and 15% of hematologic malignancies. There are several difficulties during the intraoperative management of patients with MM. In recent years, Tranexamic Acid (TXA) has been reported to be used safely without increasing the risk of venous thromboembolism and other complications. The present case report aimed to introduce the management of massive bleeding of a MM patient undergoing lumbar instrumentation.

Keywords: Tranexamic acid; Massive transfusion; Spine surgery; Multiple myeloma

Introduction

The incidence of Multiple Myeloma (MM) is about 1% of all malignancies and 15% of hematologic malignancies [1]. There are several difficulties during the intraoperative management of patients with MM; malignant hematological disorders and thrombosis may be an issue. As immunomodulation may occur with allogenic transfusion, the use of cell saver is a source of major controversy [2]. In recent years, Tranexamic Acid (TXA) has been reported to be used safely without increasing the risk of venous thromboembolism and other complications [3]. The present case report aimed to introduce the management of massive bleeding of a patient operated with lumbar instrumentation in between T1-T10, vertebroplasty and 2 level laminectomy due to a MM mass located in thoracic vertebrate T2-T3.

Case Report

A male 60 year old patient in 70kg had a background of hypertension and MM history diagnosed about one year ago. The patient operated for inguinal hernia repair, meniscus and vertebroplasty surgeries was also given chemotherapy and radiotherapy due to MM 9 months ago. He was in a therapy including metoprolol succinate 25mg, aciclovir 200mg, nifedipine 30mg and lansoprazol 30mg. Physical examination of the patient showed his functional capacity as 4 MET, with a risk of unstable angina. ECG showed sinus rhythm at a rate of 66bpm, detecting ST depression in D2, D3, AvF derivations. His echocardiography indicated the ejection fraction as 57%, 1 positive mitral insufficiency, 2-3 positive aortic insufficiency, 1 positive tricuspid insufficiency, systolic pulmonary arterial pressure as 27mmHg, type 4 atrial septal aneurysm and dilatation (4.8mm) in ascending aorta. In cardiology consultation, Myocardial Perfusion Scintigraphy was requested. An infarctional perfusion defect was detected and found to be compatible with ischemia. Coronary angiography of the patient indicated a 30% obstruction in the Left Anterior Descending (LAD) artery, recommending a medical therapy. Preoperative laboratory findings were as follows: Hematocrit: 29.6%, Hemoglobin: 11.2g/dL, Platelets: 76000/mcL, Leukocyte: 5000/mcL, PT: 13, 7sec, aPTT: 28.0 sec, INR: 1.16, creatinine: 87mg/dL, Sodium: 132mEq/L, Potassium: 4.2mEq/L, Sedimentation: 1st hour 79mm/h, 2nd hour 102mm/h.

Following the chemotherapy and radiotherapy treatment, relapsed malign melanoma emerged in the patient and thrombocytopenia developed due to bone marrow infiltration. Preoperative hematologic consultation was requested. Rare macrothrombocytes were detected in the peripheral smears. In the morning of surgery, 1U apheresis thrombocyte transfusion was applied to the patient. Thereafter, the platelet level increased up to 106000/mcL and the patient was taken into operation.

In his electromyography, polynueopathy correlated with the chemotherapy and lack of deep tendon reflex in right leg was found. Operations on the patient were planned as thoracic instrumentation, vertebroplasty and 2 level laminectomy in between T1-T10 due to a MM mass located in thoracic vertebrate T2-T3.

Intravenous injections of propofol 2.5mg/kg, fentanyl 2mcg/kg, rocuronium 0.6mg/kg were administered to the patient. Then, 25mg/kg dose of TXA was administered as IV bolus to the
A cell saver was not possible in this MM case; thereby 25mg/kg IV bolus of TXA was administered to the patient at the beginning of operation. Our purpose of this was to prevent more increase in bleeding by using an anti fibrinolytic agent, as well as averting loss of coagulation factors due to bleeding. One of the most large-scale studies using TXA, CRASH 2 research, a placebo controlled randomized study, stated to administer either 1g IV bolus dose of TXA or placebo to totally 20,111 traumatic patients at the first 8 hours [4]. This study reported no increased risk of thrombosis, even found a significant decrease in incidence of fatal and non-fatal thrombotic cases of TXA administered patients.

A recently published meta-analysis evaluating 73 randomized controlled studies analyzed the data of 4174 patients undergoing major orthopedic surgery with a high risk of thromboembolism and 2779 control patients [5]. According to the results, the thromboembolism incidence of the patients administered with TXA was 2.1% while not-administered incidence was 2.0%. Consistent with these studies, our case report also revealed that TXA can be used safely. The fact that we could not use a cell saver due to a cancer operation history of the patient, increased bleeding in this major surgery. However, TXA application limited the bleeding without any more increase. Massive transfusion was applied to the patient. We could not prevent this condition but we consider that the bleeding would seriously increase in case of not using TXA.

If this patient got an IV iron therapy from the beginning of the preoperative period, we consider that his perioperative bleeding could be limited. Because, delivered to the anesthesia clinic, Hb value of the patient was 11.2g/dL and he was anemic according to the criteria of World Health Organization [6]. However, we did not have enough time for an iron therapy for this patient undergoing a cancer surgery. Yet the amount of transfused blood could be reduced in this patient if his anemia was cured with an oral or IV iron therapy.

A Cochrane review has reported that 76% of the patients in the preoperative period are anemic [7]. Transfusion need in the preoperative period was reported to decline for 30% on the patients who are cured with iron therapy.

Conclusion

In the reported case, we have demonstrated that optimizing coagulation through goal directed use of blood products with the administration of TXA can reduce bleeding in major orthopedic surgery.

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How to cite this article: Ayten S, Gozde C Y, Mehmet Y, Kernal T S. Inevitable Massive Transfusion for Spine Surgery in Patients with Multiple Myeloma. Ortho Surg Ortho Care Int J . 1(4). OOOJ.000518.2018. DOI: 10.31031/OOOJ.2018.01.000518