

Management of Anaesthesia for Total Knee Replacement Surgery in a Patient with Cavernous Haemangioma of Right Knee Joint

Sandhya Gujar^{*1}, Pradyna Jagtap², Shirish Chavan³

¹Professor & HOD, Department of Anaesthesiology, ESI-PGIMSR & Model Hospital, Andheri, Mumbai-400 093, India

²Assistant Professor, Department of Anaesthesiology, ESI-PGIMSR & Model Hospital, Andheri, Mumbai-400 093, India

³Associate Professor, Department of Anaesthesiology, ESI-PGIMSR & Model Hospital, Andheri, Mumbai-400 093, India

*Corresponding Author:

Name: Dr. Sandhya Gujar

Email: drsandhyagujar@gmail.com

Abstract: Joint replacement surgeries are becoming more common now-a-days. Blood loss which occurs during these major surgeries is massive, mainly 1 to 1.5 litres for primary hip and knee replacement surgeries and 2 to 2.5 litres for revision surgery. As scientific data required for better management of blood loss and blood salvage are available, managing patient with blood loss more than 2 to 2.5 litres during intraoperative period is becoming easier with newer and modern methods of blood loss replacement therapy. Complication of allogenic blood transfusion like bacterial contamination, chemical errors which may lead to deaths of patient are becoming less common. This patient requires careful preoperative evaluation for HB and heamatocrit levels. Methods to decrease blood loss intraoperatively like regional anaesthesia, tourniquet application, drugs like tranexamic acid, systemic antifibrinolytics and postoperative replacement of blood loss with blood units is required. We are describing here a rare case report of a patient having cavernous haemangioma and osteoarthritis of right knee joint for replacement surgery, successfully managed perioperatively with blood loss of almost 2.5 litres.

Keywords: Joint replacement, tranexamic acid, cavernous haemangioma, osteoarthritis

INTRODUCTION

The number of joint replacement surgeries is increasing day by day. Blood loss which occurs during these major surgeries is usually massive upto 1 to 1.5 for primary hip and knee replacement surgeries and 2 to 2.5 litres for revision surgeries.

Perioperative management of these patients include proper preoperative evaluation for HB and heamatocrit levels and intraoperative methods of blood salvage and operative management of massive blood loss and blood transfusion which is required for the patient.

CASE REPORT

50 years patient with tricompartmental osteoarthritis with recurrence of quadriceps haemangioma was posted for total knee replacement surgery.

Patient had history of being operated for cavernous haemangioma and reconstruction of MLC ligament of same site 10 years back.

There was history of hypertension which was controlled with antihypertensive drugs.

ECG of the patient showed signs of early repolarisation with S-T changes.

X ray showed marked reduction in tibio-femoral space and popliteo-femoral joint space and calcified densities in soft tissue around knee joint.

MRI showed atherosclerotic calcification in right lower femoral artery, popliteal artery and its branches. Calcific foci and severe degenerative changes were seen in muscles around knee joint.

Patient was diagnosed to have cavernous haemangioma extending from distal femur to upper tibia and calf muscles. Patient was evaluated for haematological status with preoperative HB levels and heamatocrit levels were acceptable. In anticipation of major blood loss during surgery, as this was revision surgery of knee joint, autologous blood donation could not be used as patient had only 10 gm of HB, preoperatively patient was given Sclerotherapy to decrease size of haemangioma vessels. After careful titration of HB levels and keeping adequate blood ready and blood products available, patient was posted for

total knee replacement surgery with excision of haemangioma.

Intraoperatively after checking of vital parameters two intravenous lines were secured, one with 18 gauge large bore IV canula and other with cavafix of 14 gauge and 70 cm size for central venous catheterisation was used. Patient was given combined spinal-epidural anaesthesia, thinking of prolonged duration of surgery because of revision surgery with total knee joint replacement. Bupivacaine 0.5% 3.5 ml were injected after careful aspiration of free flow of cerebrospinal fluid with all aseptic precautions. Patient was given tranexamic acid injection with a dose of 500 mg (1).

Tourniquet was applied and surgery started patient was maintaining vital parameters and strict input and output chart was maintained.

As it was revision surgery crystalloids, colloids and blood was used to replace blood loss. Duration of surgery was prolonged and tourniquet was released to prevent complications of prolonged tourniquet time such as nerve compression.

Patient started bleeding profusely, within half an hour's period patient almost bled 1 to 1.5 litres. Patient developed severe hypotension with systolic blood pressure dropped to 50 -60mm of Hg.

As blood was already kept available, blood infusion started immediately and crystalloids were pushed to maintain BP upto 100 mm of Hg.

Patient required three units of blood transfusion to stabilise haemodynamic status of patient. Patient's condition stabilised it was decided to postpone further transfusion and to transfuse patient unit by unit as needed. Total duration of surgery was 4 hours.

Postoperatively at the time of closure patient was given injection buprenorphine 100 mg diluted to 10 ml of distilled water through epidural catheter to take care of severe pain associated with knee joint replacement. Epidural doses of analgesic were titrated accordingly to patients need and to maintain heart rate and blood pressure within range of 20 % of baseline measured preoperatively. Postoperatively VAS score was maintained and anaesthesia residents were asked to monitor patient for vital parameters as well as for pain relief factor.

DISCUSSION

Strategies for blood management in perioperative period of total joint replacement are changing with better understanding of blood loss and blood replacement option in this patient.

Preoperative planning of blood management options needs to be decided.

We further have to take into consideration patient specific factor such as age, gender comorbidities and haemoglobin level. There are extensive studies which show that blood loss which commonly occurs with joint replacement surgeries and almost 60 - 80 % of patient requires some form of blood replacement therapy [2].

Preoperative HB is a major predictor for transfusion requirement [3, 4] and other risk factors like age (older patients, weight, estimated blood loss (more for revision surgery than primary replacement), aspirin use and thrombocytopenia.

Different methods available for blood replacement should be planned like autologous blood donation, typically 1- 2 units for primary joint, 3 -4 for bilateral joint and 4 -6 litres for revision surgery with last unit drawn at least 3 days prior to surgery [5, 6].

To increase haemopoiesis with injectable iron and those patients giving autologous blood donation, more effective method is administration of erythropoietin (alpha recombinant human erythropoietin). Advantage of this approach is that it augments number and quality of red blood cells, preoperative autologous deposited blood and HB level to maximum.

Erythropoietin stimulates formation of red blood cells; it mimics action physiological glycoprotein erythropoietin [7, 8]. It increases quality and number of autologous blood units.

In normovolumic or hypervolumic / haemodilution, blood is collected immediately preoperatively and stored for infusion in postoperative period [9].

Blood is collected is replaced by crystalloids and colloids. Advantage of this method is that it reduces quality of blood that is lost in intraoperative period. This method cannot be used in patients with cardiac, renal and pulmonary problems. Perioperative salvage is collection of blood which is lost during intraoperative and post operative period is washed and reinfused [10]. If it is to be infused unwashed, complication rates is very high as reactionary coagulopathy. Allogenic blood transfusion is most effective method for replacement of lost blood as it is not without risk. Method to decrease, blood loss should be used during intraoperative, preoperative and postoperative period in our patient. We have given allogenic blood transfusion with minimum required units to stabilise patient vital parameters. Basically blood loss which occurs should

be replaced and health of patient should be improved which mainly helps in maintaining postoperative vigour and improve recuperative power of this patient.

CONCLUSION

Joint replacement surgeries results into significant blood loss causing patient to be at increase risk of transfusion complications .Goals of management of this patient is to reduce requirement of allogenic transfusion , proper preoperative risk assessment with preoperative evaluation , adoption of intraoperative measures to decrease blood loss .Postoperative management which mainly includes postoperative pain management which is very severe i n knee joint replacement .In our institute we commonly used epidural buprenorphine which gives good analgesia and helps in early mobilization of patient and knee joint with increase power which helps in shortening length of stay and it becomes cost effective also.

REFERENCES

1. Benoni G, Carlsson A, Petersson C, Fredin H; Does tranexamic acid reduce blood loss in knee arthroplasty? *Am J Knee Surg.*, 1995; 8(3):88-92.
2. Carson JL, Duff A, Berlin JA, Lawrence VA, Poses RM, Huber EC *et al.*; Perioperative blood transfusion and postoperative mortality. *JAMA*, 1998; 279(3):199-205.
3. de Andrade JR, Jove M, Landon G, Frei D, Guilfoyle M, Young DC; Baseline hemoglobin as a predictor of risk of transfusion and response to Epoetin alfa in orthopedic surgery patients. *Am J Orthop (Belle Mead NJ).*, 1996; 25(8): 533-542.
4. Faris PM, Spence RK, Larholt KM, Sampson AR, Frei D; The predictive power of baseline hemoglobin for transfusion risk in surgery patients. *Orthopedics*, 1999; 22(1 Suppl): s135-140.
5. Biesma DH, Marx JJ, van de Wiel A; Collection of autologous blood before elective hip replacement. A comparison of the results with the collection of two and four units. *J Bone Joint Surg Am.*, 1994; 76(10): 1471-1475.
6. Goulet JA, Bray TJ, Timmerman LA, Benson DR, Bargar WL; Intraoperative autologous transfusion in orthopaedic patients. *J Bone Joint Surg Am.*, 1989; 71(1): 3-8.
7. Goodnough LT, Monk TG; Erythropoietin therapy in the perioperative setting. *Clin Orthop.*, 1998; 357: 82-88.
8. Goodnough LT, Monk TG, Andriole GL; Erythropoietin therapy. *N Engl J Med.*, 1997; 336(13): 933-938.
9. Mielke LL1, Entholzner EK, Kling M, Breinbauer BE, Burgkart R, Hargasser SR *et al.*; Preoperative acute hypovolemic hemodilution with hydroxyethylstarch: an alternative to acute normovolemic hemodilution? *Anesth Analg.*, 1997; 84(1): 26-30.
10. Schreiber GB, Busch MP, Kleinman SH, Korelitz JJ; The risk of transfusion-transmitted viral infections. *N Engl J Med.*, 1996; 334:1685-1690.