

## Anaesthetic management of bilateral hand transplantation

Sir,

Vascularised composite tissue allotransplantation is now considered a feasible reconstructive option for patients with upper extremity loss. We are reporting the anaesthetic management of the first hand transplantation in India, world's first in a non-white. A 31 year-old male patient who lost both his hands in a train accident was put on the waiting list of the transplant programme 2 years back. Donor became available when the family of a 24 year-old healthy male patient, diagnosed to be brain dead, came forward with the willingness to donate both his hands.

Pre-operatively, the recipient received tacrolimus, mycophenolate mofetil and valganciclovir orally. Under local anaesthesia, right sub-clavian central line, right dorsalis pedis arterial line and two 16 G peripheral lines in the feet were introduced. Thymoglobulin 1 mg/kg, methylprednisolone 500 mg and piperacillin/tazobactam 4.5 g were given intravenously.

The hand harvesting was performed under tourniquet and the limbs were perfused with cold HDK solution through the brachial vessels before amputation. Other organs were harvested only after the hand harvesting was done. The recipient received a standard anaesthesia protocol: induction with propofol, pancuronium for muscle relaxation, morphine as analgesic, maintenance with oxygen and nitrous oxide (1:2) with isoflurane (1%), and mechanical ventilation. Supra-clavicular brachial plexus catheters were placed bilaterally with the aid of an ultrasound probe and 10 ml bupivacaine 0.25% was given on each side.

Intra-operatively, the patient received methylprednisolone 500 mg and bolus of intravenous fluid with 1 meq/kg sodium bicarbonate prior to reperfusion. The surgery took 17 h; in the last 4 h he went into severe hypotension requiring colloids (1.5 L) and 7 units of packed red blood cells (PRBC). Vasoconstrictors were avoided for fear of vasospasm at the anastomotic sites. The patient had received 12.5 L of Ringer lactate intra-operatively. At the end of the surgical procedure, bilateral supraclavicular block was repeated with 10 ml of 0.5% bupivacaine. The patient was ventilated for 3 h until he became normothermic.

The patient [Figure 1] had an uneventful post-operative period and was shifted out of the transplant Intensive Care Unit after 2 weeks.

The Pittsburgh Upper Extremity Transplant Anesthesiology Protocol offers important guidelines and recommendations for management of upper extremity transplant recipients focusing on fluid management, intraoperative monitoring and regional anaesthesia strategies.<sup>[1]</sup> In addition, problems associated with massive blood loss, hypothermia and reperfusion injury should be taken care of.

The ideal time of limb procurement is prior to solid organ harvest, i.e., before the aorta is cross-clamped, given the concern for ischaemia time.<sup>[2]</sup> Use of tourniquet minimises blood loss in the heart-beating donor and reduces the risk of destabilisation due to blood loss.<sup>[3]</sup> The standard immunosuppression involves induction therapy with antibodies combined with multi-drug maintenance therapy.

Since these surgeries involve massive blood loss,<sup>[4]</sup> with an inherent risk of dilutional coagulopathy and rhabdomyolysis,<sup>[5]</sup> multiple large intravenous access is essential, so is arrangement of at least 10 units of PRBC and adequate products. The goals of haemodynamic management include avoidance of hypotension, reduction of vasopressor use and improving oxygenation to the graft.<sup>[1]</sup> During microsurgeries with multiple vessel anastomoses, improved oxygenation to graft is usually accomplished by haemodilution and controlled hypertension by means of volume expansion. Hence, aim is to have a well-filled patient with a good urine output. As viscous blood tends to clot around the anastomotic sites, haemoglobin of >10 g/dL is not recommended.



**Figure 1:** Post-operative picture of the patient

In addition, regional anaesthesia provides vasodilatation which improves perfusion of the graft. Intra-operatively we supplemented general anaesthesia with brachial plexus block using 0.25% bupivacaine, mainly to obtain vasodilatation. However, post-operatively 0.5% bupivacaine was used aiming intense block that provided maximum vasodilatation with analgesia and motor block.

#### 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.

#### Financial support and sponsorship

Nil.

#### Conflicts of interest

There are no conflicts of interest.

**Sunil Rajan, Ramanathan Kannan Suppiah,  
Jerry Paul, Lakshmi Kumar**

Department of Anaesthesia and Critical Care, Amrita Institute of Medical Sciences and Research Centre, Amrita Vishwa Vidyapeetham, Kochi, Kerala, India

#### Address for correspondence:

Dr. Sunil Rajan,  
Department of Anaesthesia and Critical Care, Amrita Institute of Medical Sciences and Research Centre, Kochi, Kerala, India.  
E-mail: sunilrajan@aims.amrita.edu

## REFERENCES

1. Lang RS, Gorantla VS, Esper S, Montoya M, Losee JE, Hilmi IA, *et al.* Anesthetic management in upper extremity transplantation: The Pittsburgh experience. *Anesth Analg* 2012;115:678-88.
2. Cavadas PC, Landin L, Thione A, Rodríguez-Pérez JC, Garcia-Bello MA, Ibañez J, *et al.* The Spanish experience with hand, forearm, and arm transplantation. *Hand Clin* 2011;27:443-53.
3. Hausien O, Swanson EW, Abraham JA, Higgins JP, Lee WP, Shores JT, *et al.* Surgical and logistical aspects of donor limb procurement in hand and upper extremity transplantation. *Vasc Compos Allotransplant* 2014;1:31-41.
4. Lantieri L, Hivelin M, Audard V, Benjoar MD, Meningaud JP, Bellivier F, *et al.* Feasibility, reproducibility, risks and benefits of face transplantation: A prospective study of outcomes. *Am J Transplant* 2011;11:367-78.
5. Hinojosa Pérez R, Porras López M, Escorresca-Ortega AM, Herruzo Avilés A, León A, Noval JA, *et al.* Severe rhabdomyolysis after allogeneic transplantation of facial structures: A case report. *Transplant Proc* 2010;42:3081-2.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

Access this article online	
Quick response code	Website: www.ijaweb.org
	DOI: 10.4103/0019-5049.171593

**How to cite this article:** Rajan S, Suppiah RK, Paul J, Kumar L. Anaesthetic management of bilateral hand transplantation. *Indian J Anaesth* 2015;59:819-20.