

Intraoperative brachial plexus injury – *Do we need a wake-up call?*

Madam,

A 21-year-old male patient was posted for left femur osteosarcoma excision with free flap repair. He had undergone three chemotherapy cycles in the past. Surgery was done in supine position under general anesthesia. Epidural was not used as the patient was scheduled to receive fondaparinux during the surgery. His head was kept in midline on a head ring and both the arms were on arm boards at around 70°. Anesthesia time was 660 min and surgical time was 640 min. There were no episodes of hypotension or desaturation. Blood loss was 600 mL, and he received one packed red blood cell (PRBC) intraoperatively. He was extubated at the end of surgery without any complications and was shifted to the ward. The next morning, he complained of

left upper limb weakness mainly at the shoulder and elbow joint. He had power 2/5 on left shoulder flexion, 0/5 on left shoulder extension, 2/5 on left shoulder adduction and abduction, 2/5 power on left elbow flexion, and 0/5 on left elbow extension. He complained of paresthesia along the left forearm. The power in the right upper limb, both lower limbs, and left wrist and fingers was 5/5. A neurologist's opinion was sought and a clinical diagnosis of brachial plexus injury (BPI) at C5–C6 level was made. Magnetic resonance imaging and electromyography (EMG)/nerve conduction velocity studies were deferred by 2–3 weeks according to the extent of recovery.

He was promptly started on intravenous methylprednisolone 500 mg for 3 days. Vitamin B12 was concurrently administered. Oral gabapentin 300 mg BD was started for pain and paresthesia. The arm was secured in a sling. He underwent regular physiotherapy of the affected arm and operated leg.

He started showing signs of recovery on day 4 with reduction in paresthesia and improvement in elbow flexion to 4/5. He kept improving and was discharged on day 7 with no paresthesia. Power was 2/5 on shoulder extension, 4/5 on shoulder flexion, 4/5 on shoulder adduction and abduction, 2/5 on elbow extension, and 4/5 on elbow flexion. The patient and his family were counseled about good rate of recovery and were advised to continue physiotherapy for 1 month. On 1-month follow-up, elbow flexion extension had completely recovered with power 5/5, shoulder power flexion was 4/5 and extension was 3/5, and power on shoulder adduction and abduction was 4/5. At 2 months' follow-up, there was full recovery of left shoulder and elbow.

The brachial plexus is anatomically prone to damage because it is fixed at the cervical vertebra, precervical fascia, and axillary fascia.^[1] Causative factors for BPI during surgery are intraoperative positioning of the neck and arms, and comorbidities such as diabetes mellitus, anatomical malformations, prolonged operative times, median sternotomy, Trendelenberg position, obesity, hypotension, and hypothermia.^[2] Suspicion of BPI in the postoperative period should arise when the patient complains of dysesthesia, heaviness, weakness, and altered sensation in the affected limb. Clinical examination detailing the sensory and motor loss should be meticulously done. Electrodiagnostic studies with nerve conduction and EMG will help in diagnosing BPI. Denervation changes in the nerves appear 2–3 weeks after the injury, and hence an EMG study done immediately after the injury may not reveal the correct picture.^[3] Physiotherapy is the mainstay of treatment where the limb is put through full range of passive motion to keep the joints supple. A protective splint is provided to prevent damage to the flail limb.^[4] Pharmacological agents used include gabapentin, steroids, and nonsteroidal analgesics. Vitamin B12 helps in rapid reinnervation of muscles and can be added.^[5] In general, the prognosis of intraoperative BPI is fairly good, and patients feel symptomatic improvement within 10 weeks.^[6]

Prevention of BPI primarily requires minimization of operating time in susceptible individuals and positions, hyperextension of the head, abduction, external rotation, and extension of the arm should be avoided.^[1] Also, repetitive check on patient's intraoperative postures is necessary for prolonged surgeries. Recent studies have reported that utilization of cross chest straps, gel mattress, vacuum bags, and so on was helpful in staving off BPI for long-duration laparoscopy requiring the Trendelenburg position.^[7] More recently, continuous monitoring of the somatosensory potentials in the ulnar nerve and transcranial electric motor-evoked potentials has shown

that impending BPI can be detected earlier. This has been done more in relation to robotic thyroid surgery, but can be adopted in other cases as well.^[8]

Despite considerable knowledge and preventive strategies, BPI remains a frequent occurrence in the perioperative setting. The importance of careful positioning is stressed; however, our patient despite being operated in supine position developed BPI. Mention of this complication in the preoperative discussion and consent forms will be helpful. A high index of suspicion and awareness of this complication among all involved personnel is needed so that preventive measures can be adopted along with constant monitoring of vulnerable patients.

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.

Supriya Dsouza, Preeti Gupta, Manju Butani

Department of Anaesthesiology, P. D. Hinduja Hospital and Medical Research Centre, Mumbai, Maharashtra, India


Address of correspondence: Dr. Supriya Dsouza, Department of Anaesthesiology, P. D. Hinduja Hospital and Medical Research Centre, Mumbai, Maharashtra, India.
E-mail: supriyalynnettedsouza@yahoo.com

References

- Gagnon J, Poulin EC. Beware of the Trendelenburg position during prolonged laparoscopic procedures. *Can J Surg* 1993;36:505-6.
- No M-Y, Shin JM, Choi W-J. Two cases report of brachial plexus injury in laparoscopic colorectal surgery. *Korean J Anesthesiol* 2013;65:149-50.
- Schwartz DM, Sestokas AK, Hilibrand AS, Vaccaro AR, Bose B, Li M, *et al.* Neurophysiological identification of position-induced neurologic injury during anterior cervical spine surgery. *J Clin Monit Comput* 2006;20:437-44.
- Thomas J. Post-operative brachial plexus neuropraxia: A less recognised complication of combined plastic and laparoscopic surgeries. *Indian J Plast Surg* 2014;47:460-4.
- Waikakul S, Hirunyachote P. Effects of methylcobalamin in neurotisation after brachial plexus injury. *Clin Drug Investig*

- 1999;17:179.
6. Brill S, Walfisch S. Brachial plexus injury as a complication after colorectal surgery. *Tech Coloproctol* 2005;9:139-41.
 7. Shveiky D, Aseff JN, Iglesia CB. Brachial plexus injury after laparoscopic and robotic surgery. *J Minim Invasive Gynecol* 2010;17:414-20.
 8. Luginbuhl A, Schwartz DM, Sestokas AK, Cognetti D, Pribitkin E. Detection of evolving injury to the brachial plexus during transaxillary robotic thyroidectomy. *Laryngoscope* 2012;122:110-5.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online	
Quick Response Code:	Website: www.joacp.org
	DOI: 10.4103/joacp.JOACP_173_18

How to cite this article: Dsouza S, Gupta P, Butani M. Intraoperative brachial plexus injury – *Do we need a wake-up call?* *J Anaesthesiol Clin Pharmacol* 2019;35:404-6.

© 2019 Journal of Anaesthesiology Clinical Pharmacology | Published by Wolters Kluwer - Medknow