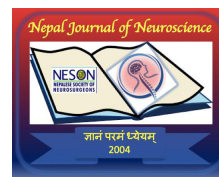


Brachial plexus injury: the problems of expectant management!

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Abstract

Brachial plexus injury is a devastating injury, affecting primarily young people involved in bike accidents. The management of these often conservatively cared patients has transformed over the last decades with the improvisation in diagnostic modalities, refinement in surgical approaches and availability of newer surgical adjuncts. Patients after surgical treatment, can lead productive life as they become able to use their paralyzed limb. They should no longer be doomed to expectant management, where their recovery is left to chance. However, it is imperative to recognize surgical indications at the earliest and offer appropriate surgical care to achieve the best possible outcome. If in doubt, it is recommended to refer these patients to centers dealing with care of these patients to avoid delays.

Keywords: brachial plexus injury, expectant management, functional recovery, low middle-income countries, Nepal, pre-ganglionic, post-ganglionic, surgery

Brachial plexus injury is a devastating injury, affecting primarily young people involved in bike accidents. The management of these often conservatively cared patients has transformed over the last decades with the improvisation in diagnostic modalities, refinement in surgical approaches and availability of newer surgical adjuncts. Patients after surgical treatment, can lead productive life as they become able to use their paralyzed limb.^{1,2} They should no longer be doomed to expectant management, where their recovery is left to chance. However, it is imperative to recognize surgical indications at the earliest and offer appropriate surgical care to achieve best possible outcome.

You do not find it unless you see for it

A famous adage, “the eyes cannot see what the mind does not know”, holds true for brachial plexus injuries (BPI); which are commonly associated with polytrauma, but are usually missed during resuscitation and trauma surveys as the

physicians do not consider looking for these injuries not only due to their ignorance but also because of the pressing demand of managing other primary injuries. Missing BPI has also been seen in situations where someone has associated upper limb or clavicle fractures for which their arm is either splinted or immobilized in the cast.

This delay in diagnosis of BPI has detrimental effects on the outcome as the patients are not only evaluated inadequately but also are not followed up for timely definitive care.³ In Low middle income countries (LMIC) like Nepal, we see this happen even at the level of tertiary care teaching hospitals. This may be one of many reasons for very few publications on BPI.⁴

Beside Road traffic accidents (RTA), fall from height particularly from cliffs or trees are other important reasons for BPI in LMIC. These modes of injury are more common in rural or hilly areas where health facilities are scarce and usually conservative management are offered due to the non-availability of surgical care.

Despite of the progress in the surgical care, many physicians still blindly believe in expectant management of BPI. Due to this ignorance of the physicians handling such cases in secondary and tertiary care centers, most of the BPI are referred for surgical management very late, often after a year when the muscle bulk has either atrophied or joint ankylosed, making nerve reanimation surgeries almost useless.³

Site and severity of injuries matters

No two BPI are same in site and severity! These factors are vital in deciding the time and type of management in BPI. Broadly BPI are categorized as pre and post-ganglionic injuries depending upon whether injuries has occurred proximal and distal to Dorsal root ganglion (DRG). While the former does not have any chance of spontaneous recovery, it's the latter group where expectant management can help, only if the severity of injury is limited to neuropraxia and in some cases of axonotmesis, but never in neurotmesis.¹

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How long should we wait?

In clean cut injuries, the repair should be immediate or as early as possible. However as most of the closed BPI are mixed injuries in terms of site and severity, it is advisable to wait for at least 3 weeks to see if the minor injuries are improving. Neuropraxia usually improves within 3 weeks and axonotmesis within 3 months.^{2,4}

The monitoring during this waiting period, should be both clinical and neurophysiological. If there is no improvement or cessation of improvement, one should consider surgical management rather than waiting further.

Unwarranted expectant management kills the advantage

The main reason why expectant management should not be prolonged in absence of improvement is to provide the patient a better chance of recovery after surgical repair. After either nerve repair or nerve transfer (also called neurotization), the regeneration starts from proximal (DRG) to distal neuromuscular receptors at approximately 1mm a day, which takes a long time to cross over long distances. Hence a delayed repair would not allow regeneration process to reach a healthy neuromuscular receptor, before they get atrophied.

Besides waiting for long without any convincing recovery has been found to demoralize the patient to get better, making them difficult to cooperate in the post-operative training programs.

When not to use expectant management?

Patients who have clean cut wounds where nerve has been found to be in two halves, should be surgically repaired as early as possible. In BPI with neurotmesis or pre-ganglionic injuries should not be conservatively managed beyond 3 weeks. In all other injuries, if patients do not show any sign of recovery beyond 3 months, should be surgically explored.

Brachial plexus reanimation surgeries do help

With the use of appropriate microsurgical techniques, reanimation surgeries either a direct nerve repair or with the help of graft has been shown to give the good results. In cases where the primary nerve is completely damaged, nerve transfers using intra-plexal and extra plexal donors have been shown to achieve functional capacity in more than three quarters of the patients. However functional outcome depends upon the delay in surgical care, site and severity of injuries, quality of donor nerves and post-operative rehabilitation.^{2,5}

The way ahead

Over the last one and a half decade, Nepal has seen a significant progress in the management of BPI, both in terms

of availability of trained manpower as well as the quality of repairs. The major obstacle for an effective health program has been poor referral, due to ignorance of primary physicians and public about the treatment facilities and the lack of support from government. A lot needs to be done to educate as well as provide affordable care to the patients with brachial plexus injuries.

Neurosurgeons have been leading this art of repair by not only providing services but also educating the physicians by incorporating the subject in the diploma courses as well as conducting workshops and seminars. World Federation of Neurological Societies (WFNS) has also recognized the importance of this specialty and its' peripheral nerve committee has been instrumental in making guidelines and organizing courses.

Delayed presentation and late surgery in traumatic BPI patients has been seen to be associated with initial diagnostic EMG ordered by the referring provider, who fail to timely identify the surgical indications.³ If in doubt, it is recommended to refer these patients to centers dealing with care of these patients to avoid delays.

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