



OUR EXPERIENCE OF POSTERIOR APPROACHES FOR BRACHIAL PLEXUS INJURIES UPPER TRUNK INJURIES IN RTA A CASE SERIES .

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ABSTRACT **Aims and objective :** In this world of aesthetic and cosmetic surgeries many patients been neglected or been only on rehabilitation of brachial plexus injuries , so rehabilitative surgeries are so important part of our community . Traumatic brachial plexus injury is not uncommon. It results in variable loss of upper extremity function. The restoration of this function requires good stability if the involved shoulder and elbow flexion of adequate strength and range of motion. A proper understanding and evaluation of brachial plexus lesions is a prerequisite to any reconstructive procedure. Here we present a case of 30 year old male patient presented in our department after 7 months of Right shoulder injury following fall from bike in a road traffic accident. And we will be also discussing our experience with BPI and review of literature.

KEYWORDS :

Procedure :

surgical management and physiotherapy

2 Brachialis

3 Brachioradialis

Aim of surgery :

Shoulder stabilization

Shoulder abduction

Elbow flexion

Sensory recovery

Regaining muscle volume , tone and girth

B. Vascular : Vascular examination should be performed during initial evaluation. Major vascular injury is found in association with brachial plexus injury in 10% to 16% of cases. Progressive loss of motor and sensory function of the affected extremity suggests an expanding hematoma or aneurysm compressing the adjacent neural structure. An angiography is indicated in any abnormal vascular examinations, widened mediastinum and first rib fracture.

Plan of surgery:

For Shoulder Abduction :

Spinal Accessory Nerve To Supra scapular Nerve.

By Posterior Approach

C. Sensory: Sensory loss of arm - along distribution of C5 C6, Severe pain - Right shoulder and arm .

For Elbow flexion : OBERLIN Transfer

i.e Bi-fascicular Nerve Transfer (Fascicle Transfer Only)

1. Ulnar Nerve(Supero medial Nerve Fascicle) To N To Biceps
2. Median Nerve (Supero medial Nerve Fascicle) To N To Brachialis

D. Neurological: Every muscle of the affected upper extremity innervated by the brachial plexus must be examined and graded according to the Medical Research Council score. It has a scale of 0 to 5 of which 5 is the normal muscle strength, whereas 0 is a flail muscle. Brachial plexus root avulsions may be associated with spinal cord injury, therefore examination of the lower extremity muscle power is also required to detect the presence of long tract sign.

Institute: Department Of Plastic Surgery , Mahatma Gandhi Medical College and hospital

Case presentation :

- A 30 year old male patient presented in our department after 7 months of Right shoulder injury following fall from bike in a road traffic accident. A complete understanding of the anatomy, nature and mechanisms of injury is important in evaluating patients with a brachial plexus injury. Knowing the exact neck and arm position at the moment of injury greatly assists in predicting the site of the brachial plexus lesion.

A complete sensory examination should include both subjective and objective sensory changes. Objective tests of all sensory modalities are performed on each dermatome of the cervical and brachial plexus. Pain, temperature, touch, vibratory sense, and two-point discrimination are tested and recorded. Pain is a complex and difficult feature of the brachial plexus injury. It can be divided into neuralgic pain and causalgic pain. Neuropathic pain in brachial plexus injury may be present with avulsion lesion of the lower roots. The deafferentation pain from root avulsion usually appears a few weeks after injury. The causalgic pain has no precise distribution and appears immediately after injury.

Chief complaints :

- Patient's main complains were :
 1. Absence of Flexion at Elbow Joint
 2. Absence of Abduction and External Rotation at Shoulder Joint
 3. Unstable Shoulder Joint
 4. Severe Pain in Limb
 5. Loss of Sensation in Arm
- § Patient was able to move his wrist joint and fingers and shrugging of shoulder was present.

Investigations :

Radiography : normal

Routine blood investigation normal .

MRI: Non visualization of nerve roots along right C5 C 6 neural foramina .No obvious evidence of pseudomeningocele .Possibly sequelae of root / trunk injury ,Partial atrophy supraspinatus, infraspinatus ,deltoid , posterior spinal muscles ,right scapularis – sequelae of subacute denervation atrophy . No extrinsic compression seen on trunks / divisions and cords.

Clinical examination :

Posture : Right upper limb hanged by side Adducted with medially rotated . A. Motor :

EMG: was suggested of complete denervation of muscles in C5, C6 distribution, i.e right sided supraclavicular brachial plexopathy .

Shoulder movements : Muscle inspected were paralysed -

1. Deltoid
2. Supraspinatus
3. Infraspinatus
4. Subscapularis

NCV: reported neurophysiological evidence of Right sided supraclavicular brachial plexopathy with normal median and ulnar nerve conduction study .

Elbow flexion

1 Biceps brachii

Plan of surgery :

A. Posterior approaches:

Donor nerve – Spinal accessory nerve

Recipient nerve- Suprascapular nerve

Distal Spinal accessory nerve is anastomosed with Proximal Supra scapular nerve by 10 –O ethilon under magnification .

Benefits of posterior approaches :

No vessels in operative route.
Trapezius function preserved as you can take selected fibres only.
You can find out any distal injury to suprascapular nerve.
Less distance b/w donor and recipient nerve.

B. Oberlin technique : Bifascicular -
Supero medial fascicle of Ulnar nerve anastomosed with motor branch of nerve to Biceps brachii muscle . (Oberlin transfer 1)

Supero medial fascicle of Median nerve anastomosed with motor branch of nerve to Brachialis muscle (Oberlin transfer 2) .

Post Operative Care :

Immediate:

Splintage of neck in neutral position .

Shoulder adducted ,Elbow flexed , Arm pouch sling with abdominal support , For 2 weeks

Late :

Physiotherapy from 3rd week to 1 month

Initially – Passive exercises for 1 month , Active exercises after 2 month , Till 2 years. Postoperative rehabilitation is important. Restoration of full range of movements is essential to prevent joint and soft tissue contractures. Reinnervated muscles need to be re-educated. Regular assessment is important to determine return of function or sensation. Regime of exercises may proceed from isometric to isotonic and gravity eliminated to gravity resisted movement.

Prognosis depends on :

- Mode of injury
- Type of injury
- Site of injury
- Age of patient
- Duration of injury
- Associated injuries
- Surgical Technique
- Patient compliance – Physiotherapy pre and post operative

CONCLUSION

The principles guiding brachial plexus reconstruction continue to evolve and the modern management of brachial plexus injuries should focus on early aggressive microsurgical reconstruction. The return of functions of upper extremity depends on the severity of the injury and that the reconstruction may require multiple stages, from simple neurolysis to nerve repairs, nerve transfers, nerve grafting, nerve banking, tendon transfers, muscle transplantations, osteotomies, and bone fusions. The future may bring further advances in nerve rootlet replantation for preganglionic injuries and in free muscle transfer techniques. Research into growth factors that promote nerve regeneration may make nerve grafting and transfers more appealing in the future. It's a team work where plastic surgeon , neurologist , orthopaedician , neurosurgeon , anesthetist , physiotherapist and occupational therapist all work together to improve the outcome of a patient of brachial plexus injury .

Best outcome when : Primary repair without nerve graft (it is possible only when patient operated with in 1 to 3 months of injury) .

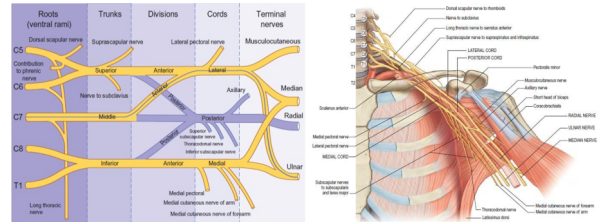
Our Experience

Sno.	Cmo.	Type of injury	Duration of injury	Type of surgery	Results
1	15-44549	Right upper trunk injury	3month	Neurolysis	Excellent
2	16-50546	Pan brachial injury	6month	Nerve transfer posterior approach	Fair result
3	17-39017	Upper trunk injury	4 month	Nerve transfer posterior approach	Excellent

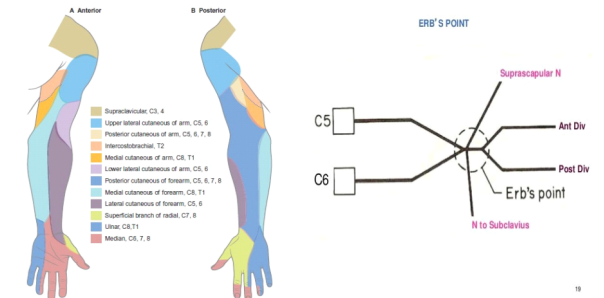
4	17-46834	Lt supraclavicular injury	7 month	Nerve transfer posterior approach	Satisfactory
5	17-12065	Pan brachial injury	3 month	Nerve transfer posterior approach	Muscle volume and girth increased and pain relieved
6	17-20346	Pan brachial injury	6 month	Nerve transfer SAN TO SSN ICN TO MCN	Good
7	18-12623	Upper trunk injury	2year	Muscle transfer trapezius to deltoid	Fair
8	18-18765	Supraclavicular injury	3 month	Nerve transfer SAN TO SSN ICN TO MCN	Recently operated

Images:

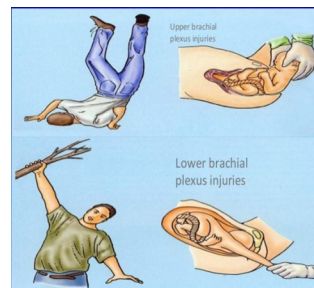
Anatomy of brachial plexus



Dermatome



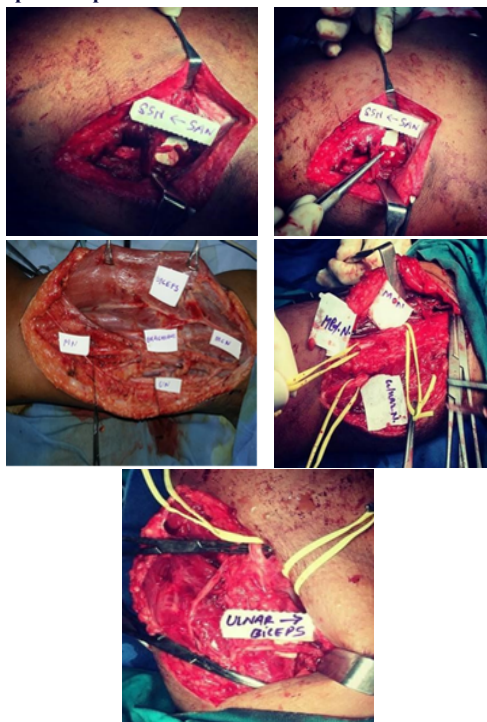
Positioning of injury



Operative plan and markings Posterior approach:



Intra operative pictures:



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