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STUDY OF EPIDEMIOLOGY AND NERVE TRANSFER SURGERIES FOR ELBOW FLEXION IN UPPER BRACHIAL PLEXUS INJURIES-A FIVE YEAR REVIEW

Plastic Surgery

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ABSTRACT

Introduction Traumatic brachial plexus palsy is one of the commonest disability among the survivors of road traffic accidents. Though nerve transfers for elbow reanimation are unpredictable in in pan brachial plexus palsy, Oberlin's procedure of transferring an intact ulnar nerve fascicle revolutionize the scope for recovery of elbow flexion in upper brachial plexus injuries.

Materials and methods This is a retrospective study of patients with upper brachial plexus palsy who were operated for elbow neurotization in our centre from January 2012 to December 2016. Out of the 42 patients who underwent the elbow neurotization procedures for upper brachial plexus injury, only 24 patients responded to our call. Hence, epidemiological data are available for 42 patients but evaluation studies are possible in only 24 patients.

Results The age of the patients ranged from 15 years to 50 years. In 30 patients the right side was affected and in 12 patients the left side was affected. 50% of the patients sustained associated head injury. Only in 8% of patients there was no associated injury. In Oberlin transfer 60% of patients achieved a power of Gr IV. 20% obtained a power of Gr III.In 20% of patients no useful flexion could be achieved.

Conclusion In upper brachial plexus injuries Oberlin 1 transfer if done at the earliest possible time, offers the best hope for the recovery of elbow flexion.

KEYWORDS

Upper Brachial Plexus Palsy; Epidemiology Of Brachial Plexus Injury;o Berlin Transfer; Elbow Reanimation

INTRODUCTION

With the exponential increase in the number of motorized two wheelers(200 million in india alone) and the consequent increase in the rate of accidents, traumatic brachial plexus palsy is fast emerging as the commonest disability among the survivors of road traffic accidents. Like helmets according a reasonable degree of protection against the head injuries, no devices are available for protection against brachial plexus injuries.

Though nerve transfers for elbow reanimation are unpredictable in pan brachial plexus palsy, Oberlin's procedure of transferring an intact ulnar nerve fascicle revolutionize the scope for recovery of elbow flexion in upper brachial plexus injuries.

In 1994 Oberlin et al reported the transfer of 10% of the intact ulnar nerve to the biceps motor branch of musculocutaneous nerve. They described a cadaveric study of the branching pattern of the musculocutaneous nerve in the biceps muscle.They described the functional recovery in a series of four patients.[1]They followed it up with a clinical series of 18 patients in 1997.[2] Thomas H Tung et al further improved the results by neurotizing the motor branch to brachialis emphasizing that the power of elbow flexion was better as brachialis being the prime muscle of flexion.[2]Susan mackinnon et al did double fascicular transfers from the intact ulnar and median nerves to motor branches of the biceps and brachialis and reported faster and better recovery of elbow flexion.[3] Over the years , fascicular transfers devised by Oberlin have become the gold standard for elbow reanimation in upper brachial plexus palsy. In this study, we have discussed our experience in dealing with the upper brachial plexus injuries.

MATERIALS AND METHODS:

This is a retrospective study of patients with upper brachial plexus palsy who were operated for elbow neurotization in our centre from January 2012 to December 2016. Records of all upper brachial plexus injury patients who underwent elbow neurotization procedures were collected and tabulated as per the proforma using our departmental brachial plexus injury register. Patients were traced, located and reviewed at our out patients department. All the patients were evaluated clinically to assess the functional return. Appropriate investigations like nerve conduction studies and electromyography were done if deemed necessary.Digital still photographs and video were taken for documentation and record. Data were analyzed & the results were compared with other studies.

Out of the 42 patients who underwent the elbow neurotization procedures for upper brachial plexus injury, only 24 patients responded to our call. Hence, epidemiological data are available for 42 patients but evaluation studies are possible in only 24 patients. The following data were recorded in the proforma. 1. Demographic data 2. Primary Injury evaluation data 3.Surgical procedures data 4. Post surgical outcome /follow-up data 5. Video 6. Final analysis .

RESULTS

The age of the patients ranged from 15 years to 50 years. Average age was found to be 30.05 . (of 42 patients) There was only one female patient.71% were skilled labourers,17% were unskilled labourers,8% were graduates and 4% were professionals. In 30 patients the right side was affected and in 12 patients the left side was affected.There was no left handers in our treated group.50% of the patients sustained associated head injury,34% of patients suffered long bone fractures. Only in 8% of patients there was no associated injury.

Prior to surgery, all patients had a power of 0/5 in the shoulder and the elbow.37 patients underwent ulnar nerve fascicle transfer to biceps motor branch.(Oberlin 1 procedure) 3 patients underwent spinal accessory to musculocutaneous nerve transfer , 2 patients underwent multiple intercostal nerves transfer to musculocutaneous nerve.

Of the 24 patients who could be re evaluated in our study,22 patients under went Oberlin nerve transfer,1 patient each underwent accessory and intercostals nerves transfer. Follow up was for 12 months to 47 months. Elbow flexion was assessed by MRC grading. In Oberlin transfer 60% of patients achieved a power of Gr IV. 20% obtained a power of Gr III.In 20% of patients no useful flexion could be achieved. The patient who underwent spinal accessory nerve transfer Gr IV power was present at 24 months follow up. No useful elbow flexion was present in the case of intercostals nerves transfer. In Oberlin transfer the clinical recovery was evident at an average of 4 months post surgery. In accessory nerve transfer the recovery took 18 months since surgery.

Though the donor morbidity three months after Oberlin transfer is nil , four cases complained of transient weakness of wrist flexion and numbness in the hypothenar region .

DISCUSSION

In a study of epidemiology of brachial plexus injuries in a multi trauma population Midha reported that 72% of the patients had head injuries.Only 6% of patients suffered isolated brachial plexus injuries.[4]This is comparable to our study where only 8% had isolated brachial plexus injuries. In centres with no dedicated head injury services the spectrum of injuries may differ.[5] There was only one

female patient in our study.This can be explained by the fact that men driving the two wheelers overwhelmingly out number the women.

Oberlin et al in their series of 18 patients achieved a power of M3-4 in 13 patients. Five of their patients required Steindler flexoroplasty.[1,2] Thomas H tung , Susan-E-Mackennon et al in their paper contended "As biceps muscle is a prime supinator and brachialis is a prime elbow flexor neurotization of brachialis is as important as that of biceps" .They obtained clinical recovery in 3-7 months.[2,3]

Bhandari et al in their study on outcomes after nerve transfers in upper brachial plexus injuries reported that out of 20 cases ,intercostals and phrenic nerves were used in five cases,Spinal accessory nerve was used in one case, Oberlin 1 procedure was used in four patients and combined ulnar &median nerve fascicular transfer was used in ten cases.They obtained power of M4 in eight cases,M3 in seven cases & M2 in five cases.[6] Marcelo Rosa de Rezende et al documented that out of 19 cases in whom they did Oberlin 1 transfer they achieved the power of M4 in eight cases,M3 in two cases and less than M3 in nine cases.They concluded that the interval between the injury and the surgery is an important determinant for favourable outcome.[7] Lynda et al in their systematic review of nerve transfer and nerve repair for the treatment of adult upper brachial plexus injury concluded that for shoulder there was no significant difference between nerve repair and nerve transfer.But for elbow flexion nerve transfer is distinctively superior.[8]

In our series 80% achieved the power of M3-4. 20% obtained no useful elbow flexion.The resuls are comparable to studies from other centres.The poor results in 20% of patients can be explained by the delay in performing the nerve transfer surgery due to life threatening associated injuries.

CONCLUSION

In upper brachial plexus injuries Oberlin 1 transfer if done at the earliest possible time, offers the best hope for the recovery of elbow flexion.

Figure legends

Figure1-Isolation of the ulnar nerve postero medial fascicle to flexor carpi ulnaris

Figure2-Coaptation of ulnar nerve fascicle to biceps motor branch

Figure3-Normal range of elbow flexion 9 months after Oberlin transfer

FIGURE 1

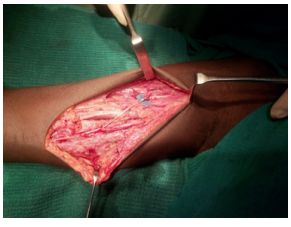


FIGURE 2

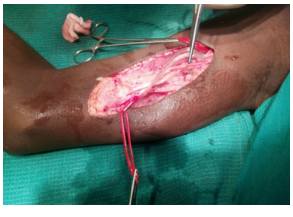
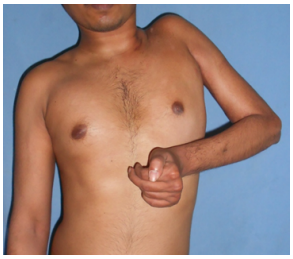


FIGURE 3



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