

SUMMARY

Obstetrical brachial plexus palsy (OBPP) displays a stable incidence of 0.15 – 3 per 1,000 live births. Most children show good spontaneous recovery, but a recent literature reviews show that a residual deficit remains in 20% to 30% of children. Shoulder dystocia, macrosomia and instrument delivery, forceps or vacuum extraction present the greatest risk for brachial plexus injury. Caesarean section, having a twin or multiple birth mates seems to offer some protection against injury.

The resulting nerve injury may vary from neurapraxia or axonotmesis to neurotmesis and root avulsion from spinal cord. In neurapraxia or axonotmetic lesions complete recovery will usually occur over the course of weeks or months. In a neurotmetic injury or in case of root avulsion, the most sever type of lesion, useful regeneration of axons cannot take place.

Although we perform electromyography and imaging studies, the final decision of operation relies heavily on the clinical examination. Manual muscle testing system although reliable for examination of motor power in adults is not suited for use with infants. All patients involved in the study were evaluated using the Active Movement Scale (AMS), which greatly increases the ability to detect partial movements.

The results of neurophysiological investigations in older patients are mostly accurate, indicating the severity, location and extent of the lesions. In contrast, the findings of EMG and nerve-conduction studies in obstetrical brachial plexus palsy mostly suggest a falsely optimistic prognosis.

Computed Tomography Myelography was considered to be the technique of choice for diagnostic root avulsions. Detection of root avulsion was important not only in the decision for surgery, but it helped to accurate our operative strategy. So far, no MRI study has proven to be effective in visualizing the roots emerging from the spinal cord better

The aim of this study was to evaluate the results achieved using various surgical techniques in patients with partial and total obstetrical brachial plexus palsy. Twenty patients had follow-up periods greater than 24 months and met criteria for inclusion in the study. The outcomes of different nerve reconstructive procedures including nerve transfers, nerve grafting after neuroma resection and end-to-side neurorrhaphy are presented.

Although the indication and timing of surgery remains controversial among authors, we believe that the optimal indication and timing of surgery in cases of total palsy with impaired hand function is within the first 3 months of age. In cases of upper brachial plexus injuries, within the first 4 months is acceptable if there is no useful elbow flexion. In partial lesions with questionable movement we recommend surgery until before 6 months of age.

The surgical objective in cases of upper OBPP is functional restoration of shoulder abduction with external rotation and biceps function. The overall success rate in upper plexus birth injury was 80% in shoulder abduction, 50% in external rotation and 81.8% in elbow flexion with median follow-ups of 36 months.

The surgical objective in cases with complete OBPI in recovery of hand function and to establish the ability to use the affected hand in bimanual activities. Reanimation of hand is essential; otherwise the maximal function obtained for the affected limb is that of a hook. Our series achieved useful hand reanimation in 87% of cases. Shoulder abduction was successful in 87%, external rotation in 25%, elbow flexion in 75% and supination in 25% of cases. Elbow extension was successful in 87%, wrist extension in 50 % and finger, thumb extension in 37% of cases.

The use of the end-to-side technique has been abandoned by most surgeons due to poor results. We present 2 cases with surprisingly good results, which can be attributed exclusively to the ETSN technique. In both patients we performed a perineural suture after the creation of a perineural window. This result may be explained due to superior nerve regeneration capacity in infants compared with adults. One advantage of ETSN over end-to-end neurotization is that with ETSN there is no need to sacrifice the surrounding nerves. In cases of late obstetrical brachial plexus palsy, nerve surgery will likely be ineffective and thus secondary surgery is called for to improve the hand, forearm, elbow and shoulder function, and to prevent muscle contractures and bone shortening. Surgery should be carried out after the age of 4 years, when the child has ability to cooperate in rehabilitation.

Although the present study contains a limited number of patients, our results demonstrate, that improved function can be obtained for infants with obstetrical brachial plexus injury with early surgical reconstruction.