Bilateral Obstetric Brachial Plexus Paralysis: A Case Report

Bilaterale geburtsbedingte Plexusparese: Fallbericht

Abstract

**Background:** Whereas cases of unilateral obstetric brachial plexus paralysis have been sufficiently described and discussed in the literature cases of bilateral obstetric brachial plexus paralysis are extremely rare and so far have not been mentioned and discussed satisfactorily.

**Patients:** We present a case of bilateral obstetric brachial plexus paralysis in an 8-months-old white boy. We performed a neurotisation of the Nervus suprascapularis with the Nervus accessorius and an Oberlin procedure on both sides in two operative steps.

**Results:** In an early follow-up 6 months after the second operation and intensive physiotherapy the little patient was able to crawl with the active help of both arms.

**Conclusions:** Bilateral obstetric brachial plexus paralysis is a very rare incidence in infants. An interdisciplinary approach including paediatrics, plastic surgeons, neurosurgeons, neurologists, radiologists and physiotherapists is essential for the success of treatment strategies in such cases.

**Introduction**

Although obstetric brachial plexus paralysis was first described more than two centuries ago, it still represents an interdisciplinary therapeutic dilemma. Today the incidence is 1 per 2000 live births (0.05%). High birth weight, breech birth, instrumental birth, premature birth and muscular hypotension due to neonatal asphyxia are frequent etiologies. However, the most frequent etiology is extreme lateral traction in a case of shoulder dystocia. Recent findings support the theory that lesions of the brachial plexus may occur due to intrauterine maladaptation prior to delivery [10–12]. Literature offers no information about the incidence of bilateral obstetric brachial plexus paralysis. Thus, there is still no gold standard available for the interdisciplinary treatment of unilateral lesions and even more for bilateral lesions.

**Case Report**

An 8-month-old caucasian boy and his parents were admitted to our Department. The boy suffered from bilateral brachial plexus paralysis since birth. He had no further history of trauma. The...
A boy was a 28th week gestational age pre-term baby with an extremely low birth weight of 800 gram. He had to be treated in the Neonatal Intensive Care Unit (ICU) with artificial ventilation, as his lungs were not sufficiently developed. Probably due to these life threatening circumstances and uncertain outcome the bilateral lesion of the brachial plexus came to the fore not until the age of 6 months. Physical and electromyographic examination revealed a bilateral lesion of the brachial plexus. Clinically both shoulders and both elbows had no function. Elevation and adduction in the both shoulder joints and flexion in both elbows were not possible. In addition both arms showed a typical internal rotation (\(A\) Fig. 1a, b). The function of both hands was normal and showed no pathological findings. A cervical MRI scan revealed normal cervical roots and thus indicated that there were no preganglionic lesions but peripheral lesions of the brachial plexus. Finally, we decided to operate the boy in two separated sessions. The first operation was performed on the left side. We could see a 1 cm long external scarification of the Truncus primarius superior (C5 and C6). As the internal neural structure seemed to be uninjured, we decided not to perform a resection of the segment with transplantation of Nervus suralis cables. After external neurolysis and epineurotomy of the Truncus primarius superior we exposed the Nervus suprascapularis and performed a neurotisation with the Nervus accessorius (\(A\) Fig. 2). Finally, we performed a procedure described by Oberlin in order to activate the Musculus biceps by partial ulnar nerve transfer to the biceps motor (\(M\) Fig. 3) [16, 17]. This microsurgical procedure uses motor fascicles of the ulnar nerve, which are separated 2 cm from the ulnar nerve and divided distally. Finally, these motor fascicles are sutured without tension to the Nervus musculocutaneous. Three weeks later we performed a plexus revision on the left side as described on the right side. In an early follow-up 6 months after the second operation and intensive physiotherapy the little patient was able to crawl with the active help of both arms (\(M\) Fig. 4a, b). The range of motion (ROM) in both shoulder joints for the elevation of both arms improved postoperatively from 0–0–20 (left side) and 0–0–10 (right side) degrees to 0–0–90 and 0–0–100 degrees respectively.
Discussion

Bilateral lesions of the brachial plexus in infants are an extremely rare clinical finding. A thorough review of the literature from 1966 to date did not show reports of comparable clinical cases [1–3, 6, 14]. Bhat et al. report no bilateral nerve injuries in a study which included 32637 deliveries [3]. Literature data dealing with bilateral brachial plexus injuries in general is poor. Kent et al. present a case report of bilateral brachial plexus palsy due to shoulder braces in a 32-year-old patient [15]. Grunwald et al. also report a bilateral brachial plexus palsy after right-sided modified radical mastectomy with immediate TRAM flap reconstruction in the adult [7]. Unilateral lesions of the brachial plexus in infants are a major handicap for the individual, especially in the future physical development. Bilateral lesions are even worse, as it is impossible for the infant to turn itself around or to crawl.

The diagnosis of a uni- or even bilateral paralysis of the brachial plexus in an otherwise healthy infant usually represents no problem in an interdisciplinary setting. However, in extremely ill patients such as very low birth weight pre-terms needing intensive care for a longer period of time after birth and uncertain outcome, the diagnosis of plexus lesions is both difficult to establish and primarily of secondary relevance. Once clinically diagnosed, one should perform electrodiagnostic studies. Although the electrodiagnostic studies have proven to be of limited prognostic value in the evaluation of children with acute obstetrical brachial plexus injuries, electromyography should be performed prior to surgery with the aim of later comparison of the results [8]. Furthermore, literature data provide incoherent information about the treatment strategy of brachial plexus lesions, especially in infants [4, 5, 13]. Therefore, a consensus about timing and surgical approach does not exist. However, there is strong clinical evidence that firstly the decision of possible surgical treatment should be based on clinical motor testing, secondly that a MRI should precede surgery to determine the status of the neural roots and thirdly that a surgical intervention should be performed within the first 6–8 months of age [9].

Conclusion

Bilateral obstetric brachial plexus paralysis is a very rare incidence in infants. However, speedy and correct diagnosis is relevant for further surgical or conservative approach of treatment. A clinical motor testing, an electromyographic examination and a MRI should be mandatory and precede every surgical or even conservative intervention. Early surgical intervention can yield satisfactory recovery of function. Finally, an interdisciplinary approach including paediatrics, plastic surgeons, neurosurgeons, neurologists and physiotherapists is essential for the success of such procedures.

Conflict of interest: The authors have no conflict of interest to disclose.

References

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