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Case report/Kazuistyka

Bilateral obstetric brachial plexus injury: A case report

Obustronne położnicze uszkodzenie splotów barkowych: Opis przypadku

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ABSTRACT

Our case report describes a bilateral obstetric brachial plexus injury in a 14-year-old boy. In the first years of his life, treatment was conservative. After a period of clinical improvement, spontaneous regeneration had stopped. At age two years and three months, neurotmesis with root avulsion was diagnosed, which was the grounds for microsurgery. Unilateral revision and external neurolysis were performed. Currently, we observed dysfunction of the upper limbs associated with paresis primarily of the shoulder flexors, abductors, external rotators, elbow flexors and abnormal posture as well.

Introduction

According to various reports, the incidence of obstetric brachial plexus palsy (OBPP) is 0.2–5.1 per 1000 live births. Damages to both sides occur less frequently and includes only 5% of all OBPP [1]. Just as with unilateral damages, it may occur due to mechanical trauma during delivery or intrauterine pathology. Injury is caused by concurrent traction, compression, fracture of the humerus and congenital torticollis [1–3]. OBPP may be associated with paralytic dislocation of the shoulder [4]. There is an emphasis on the relationship of injuries with shoulder dystocia, fetal macrosomia or extremely high birth weight, maternal diabetes (it affects the child's weight, proportions, and perhaps more sensitive tissues), advanced maternal age or obesity, prolonged second stage of labor, clavicle fracture, and instrumental birth. Among intrauterine pathology factors, the most frequently reported are fetal malposition (breech or transverse position), prematurity, oligohydramnios, compression of the umbilical cord wrapped around the neck of the child, uterine fibroids, muscular hypotension due to necrosis of the newborn, and CNS hypoxia [2–5]. Bilateral obstetric brachial plexus paralysis is a main complication in breech birth [6, 7].

Damage may occur in the upper part of the plexus C5-C6 (Erb-Duchenne palsy), middle C7, C8-Th1, lower

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(Déjerine-Klumpke's palasy) and in the whole plexus C5-Th1. A common injury is an upper – middle type C5, C6, C7. The anatomical division of injury includes preganglionical lesions, *i.e.* detachment of roots from the spinal cord (avulsion) and peripheral lesions involving the roots, trunks, cords and nerves leaving the plexus.

Many infants with OBBP have neuropraxia and recover spontaneously because neuropraxia tends to disappear within 4–6 weeks. Axonotmesis is a type of nerve injury requires regrowth of the axon to the target muscle, which takes a considerable amount of time (12–18 months) [4].

The consequences of injury are paresis, constrained positions, trophic disturbance and hypoplasia of the shoulder girdle and upper limb, as well as motor and posture pattern changes [2, 3]. One of the unfortunate sequelae in OBPP is upper limb length discrepancy [8]. The severity of OBPP determines the functional changes, the process of regeneration and appropriate treatment options.

Case report of clinical series

The boy was full-term from a second pregnancy born in a breech position with manual help, with a birth weight of 3200 g, asphyxia and an Apgar's score of 1. Because of respiratory failure, immediately after delivery, he had to be treated in the Neonatal Intensive Care Unit (ICU) with artificial ventilation during seven days. He was diagnosed with encephalopathy. Increased muscle tension, periodic seizures, stiffening of the whole body, apnea and symptoms of renal impairment were observed. Neonatal Cranial Ultrasound showed minor periventricular leukomalacia (more on the right side).

NCV/EMG (Nerve Conduction Velocity/Electromyography) examination carried out at 4 months revealed a bilateral lesion of the brachial plexus at the C5 and C6 spinal root level, without breaking of their continuity (neropraxia – according to Seddon's classification). More severe damage was on the left side. Clinically, both shoulders and both elbows had no function, muscle tension in the upper limbs was decreased, and tendon reflexes were abolished. The functioning of both hands showed no pathological findings. The patient received Vojta therapy, massage, galvanisation and positioning (hands were bandaged in the abduction and external rotation position). After treatment, there were slight active movements of the shoulder joints.

NCV/EMG examination conducted 10 months later showed significant improvement of neuromuscular function; however, another NCV/EMG examination carried out at 2 years 1 month of age revealed lack of the regeneration process in the tested motor nerve conduction.

At the age of two years 3 months, cervical myelography revelated right and possibly left C5 preganglionical lesions revealed right and possibly left C5 preganglionical lesions. Bilateral revision and external neurolysis of C5-C6-C7 were performed. Postoperative control examination of both brachial plexuses showed that motor conduction was within the normal range. After intensive physiotherapy, there was significant improvement in the function of both upper limbs.

A recent control ENG/EMG test, at the age of 14, showed bilateral lesions of the suprascapular nerves (predominantly on the left) and conduction impairment in the left axillary motor nerve fibers due to an axonal injury. Conduction parameters of the other examined nerves were within the normal range, but decreased in the left musculocutaneous nerve.

Current clinical picture

Clinical examination revealed bilateral Erb's palasy, more pronounced on the left side (Fig. 1). Shoulder girdle and

Fig. 1 – The patient in casual position
Ryc. 1 – Pacjent w pozycji swobodnej