

Dislocation of the head of the radial bone associated with the perinatal brachial plexus palsy

Krzysztof Metera¹, Jolanta Szymańska²

Faculty of Health Sciences, Vincent Pol University in Lublin¹.

Rehabilitation Clinic of The Children's Memorial Health Institute in Warsaw².

Abstract

The dislocation of the head of the radial bone is sometimes connected to perinatal damage to the brachial plexus. Considering the different interpretation of the aetiology of the dislocation of the head of the radial bone and the different therapeutic treatment of this injury, this article presents the views related to this issue. They were supplemented with the x-ray documentation of 3 children with perinatal injury of the brachial plexus with concomitant dislocation of the head of the radial bone. For rehabilitation, these children were admitted in a period distant from the injury itself to the Functional Adaptation Clinic at the Rehabilitation Clinic of the Children's Health Institute in Warsaw. It ought to be noted that a delay in the diagnosis of damage to an elbow significantly reduces the possibility of regaining its optimal function.

Key words: perinatal palsy, brachial plexus, dislocation of the head of the radial bone

Objective

The objective of the article is to accentuate the possibility of the occurrence of the dislocation of the head of the radial bone as a trauma associated with the perinatal brachial plexus palsy. This dislocation is often not recognised in the first days after birth, which reduces the chance of the successful head reposition.

Introduction

It is well known that the perinatal brachial plexus palsy may be accompanied by the damage to other structures, including clavicle and humeral bone fracture, shoulder and elbow injuries. Among the injuries to the elbow, the dislocation of the head of the radial bone is often overlooked at the initial stage of the diagnostic and therapeutic procedure. The dislocation of the head of the radial bone in the neonatal period, as an isolated injury, occurs extremely rarely. In contrast, the dislocation of the head of the radial bone in older people

often accompanies an elbow fracture (Monteggia fracture).

Determining the causes of the dislocation of the head of the radial bone in a child with the perinatal brachial plexus palsy is often rendered significantly more difficult due to the distant in time diagnosis of this injury. Some authors indicate the strenuous passive exercises which supinate the forearm as the cause of the dislocation of the head of the radial bone [1, 2]. The surgical reposition of the head of the radial bone undertaken during this period does not bring the expected outcome and often results in the occurrence of complications [3].

A number of papers covering this subject do not contain any data on the age at which the elbow injury was diagnosed. There is also a lack of information on the type of treatment previously undertaken. Regardless of the discussion on the treatment distant in time, based on literature, the authors provide information on serious dislocation

of the head of the radial bone associated with the perinatal brachial plexus palsy [4,5].

The authors of studies related to the elbow injury accompanying perinatal brachial plexus palsy repeatedly focus on the results of surgical treatment of the damage to the joint, ignoring the biomechanical analysis of the cause of this damage [6].

Reference

In order to supplement the above views, and suspecting an elbow injury accompanying PBPP, the diagnosis of this joint was pictured. This article describes the observations of three children in 1990 with the brachial plexus palsy with concomitant dislocation of the head of the radial bone. Out of 19 children with the perinatal brachial plexus palsy (PBPP), referred for rehabilitation to the Functional Adaptation Clinic of the Children's Health Institute, the coexistence of dislocation of the head of the radial bone was confirmed in three. Due to the lack of correct diagnosis of this damage immediately after delivery, also in recent years, it seems advisable to present these cases, despite the considerable amount of time since our study was carried out.

Case study

R.W., a four-month old infant, was admitted and diagnosed with Erb's perinatal brachial plexus palsy of the right upper limb. During the examination, apart from paresis of the shoulder muscles, the displacement of the head of the radial bone during the passive flexing and extension of the elbow was confirmed as well as the lateral instability of this joint. These symptoms indicated the rupture of both the annular ligament and the collateral radial ligament. The diagnosis was confirmed by the radiological examination. The image in the anteroposterior projection taken with the elbow held in a forced varus confirmed the initial diagnosis (Fig. 1).



Fig. 1. R.W., a four-month old infant. The X-ray of the right elbow with forced varus of the forearm shows a rupture of the collateral radial ligament.

(photo from the Department of Radiology of the Children's Health Center)

The child was referred for treatment to an orthopaedic centre and was qualified for a non-surgical treatment. The registration at the Functional Adaptation Clinic was distant in time, at the age of 14. The examination showed significant limitation of flexion and extension in the elbow joint.

E.M. was admitted to the Functional Adaptation Clinic at the age of 3 with the diagnosis of perinatal brachial plexus injury with extensive paresis of the mixed type of the right upper limb. The examination of the elbow joint showed its instability in the frontal plane. During the passive flexing and extension of the elbow, the movement of the head of radial bone could be sensed. The comparative X-ray examination of the elbows confirmed the initial diagnosis.



Fig. 2. E.M., a three-year old child. The X-ray of the right elbow. The dislocation of the head of the radial bone is visible.

(photo from the Department of Radiology of the Children's Health Center)

Despite significant damage to the brachial plexus, the fact that the paretic limb was used for stabilisation during everyday activities, e.g. undressing and dressing, is noteworthy.

Fig. 3. P.W., was admitted at the age of 15 months with Erb's perinatal brachial plexus palsy of the right upper limb. Regardless of the shoulder muscle dysfunction, the range of elbow movement was limited: 90° flexion, minus 30° extension. The X-ray of the elbow joint revealed the dislocation of the head of the radial bone. (X-ray 3).



Fig. 3. A fifteen-month old child. The dislocation of the head of the right radial bone.

(photo from the Department of Radiology of the Children's Health Center)

Summary

In the three children presented, irrespective of the perinatal brachial plexus palsy, the injury

to the elbow of the same limb was diagnosed. The X-rays in the anteroposterior and lateral projection revealed the displacement of the head of the radial bone indicating a rupture of the annular ligament. Elbow lateral instability was also confirmed with the possibility of the forced varus of the forearm. This symptom indicated the rupture of the radial collateral ligament. It ought to be noted that the depicted injuries of the elbow joint were not diagnosed simultaneously with the perinatal brachial plexus palsy. It could be assumed that in some cases, overlooking the dislocation immediately after the delivery resulted from the focus of the examiner's attention on, above all, the assessment of the extent of the palsy and its degree (neuropraxia, axonotmesis, neurotmesis, nerve root avulsion) and on commencing the immediate treatment. Previous rigorously used immobilization of the abducted limb and external rotation of the shoulder significantly limited the possibilities of deepening the diagnostics for possible concomitant elbow joint injury. Nonetheless, the aetiology of the dislocation of the head of the radial bone is not clear. In a number of cases, however, the diagnosis of a dislocation immediately after a delivery suggests the injury coexistent with the plexus palsy [7]. Bearing these data in mind, the views put forward by some authors suggesting other causes of the dislocation of the head of the radial bone seem less justified, for instance:

- strenuous forced passive exercises to increase the range of forearm supination,
- imbalance in tension between specific muscle groups,
- too long immobilisation of the limb.

Conclusions

1. The perinatal injury of the brachial plexus may be accompanied by a dislocation of the head of the radial bone.

2. The late diagnosis of the dislocation of the head of the radial bone is primarily the result of the focus of attention on the brachial plexus injury and the implementation of the treatment. Other causes of the dislocation are possible, but less likely.
3. The distant in time treatment of the dislocation of the head of the radial bone is reduced to palliative procedures, bringing partial improvement.

Corresponding author address:

Krzysztof Metera
Vincent Pol University,
Lublin Choiny Street 2, Poland
e-mail: metera.wssp@gmail.com

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