Congenital radioulnar synostosis – case report

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Summary

Background: Congenital radioulnar synostosis is a rare malformation of the upper limb, with functional limitations of the limb.

Case Report: A 10-year-old child with pain and restricted mobility of the elbow joint was admitted to the hospital. Plain film radiography and CT examination was performed. Radiological examinations showed a congenital radioulnar synostosis.

The child underwent surgical treatment – derotational osteotomy.

Conclusions: Diagnostic imaging including computed tomography with three-dimensional (3D) reconstructions, preceding surgery enables planning of the surgical treatment.

Key words: radioulnar synostosis

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Background

Congenital radioulnar synostosis was first described by Sandifort in 1793 [1,2]. The literature reports on approx. 350 cases of congenital radioulnar synostosis [2–4]. This is a rare congenital malformation causing limited rotational movements of the forearm, which may lead to difficulties with some activities of daily living [5,6]. However, this is the most common congenital functional disorder of the elbow joint. In 60–80% of cases, it is observed bilaterally [1,4]. In 9% of cases, it runs in a family [2]. In 25% of cases, this malformation is genetically conditioned [7]. Congenital radioulnar synostosis is also one of many components of malformation syndromes in children with chromosomal aberrations [8,9]. It is commonly believed that this malformation is connected with chromosome X aberrations [10]. However, there are reports on cases of congenital radioulnar synostosis in chromosome Y aberrations [11].

Case Report

A 10-year-old child was admitted to District Hospital of Orthopedics and Trauma Surgery. The boy complained of minor pain within the area of the right elbow joint, mobility limitations, difficulties in writing and drawing. Family and trauma history was negative. Physical examination showed a deformed and slightly valgus elbow, as well as lack of full pronation. Limb innervation and perfusion were normal. The child was in good general health state. The psychomotor development was appropriate for age. There were no other concomitant malformations.

The previously performed X-rays showed congenital radioulnar synostosis with subluxation of the radial head.

Before the elective surgery, spiral CT was performed with planar and 3D reconstructions. CT confirmed the presence of bone anomaly in the form of radioulnar synostosis type II according to Cleary and Omer classification (Figures 1–4). The synostosis started at the level of 2.5 cm below the coronoid process of the ulna, and was visible for the next 4.5–5 cm. A 3D reconstruction allowed for spatial visualisation of the existing malformation and reciprocal anatomical relations within the bone structures (Figures 5–7).

The child was subjected to surgery which involved derotational osteotomy of the radial bone and stabilisation with plate and screws. The next stage of treatment involved the removal of the plate and screws, and introduction of
rehabilitation. The surgical procedure and rehabilitation led to a substantial improvement of the upper limb function.

**Discussion**

Congenital radioulnar synostosis is a malformation which develops in the early foetal life. The elbow begins to appear
on the 34–35th day of the foetal life, while the humerus, the radial bone, and the ulna – on the 37th day [4,10]. Any influence of adverse factors in this period leads to a disturbed segmentation, which in turns causes malformation [4]. Congenital radioulnar synostosis is mostly found in young children, aged 2–5 years [1]. In most of the cases, the evaluation of the malformation bases on classification by Cleary and Omer [1,10,12]. In type I, there is a decreased size of the radial bone, the fusion does not involve bones; in type II there is a radioulnar synostosis, and the remaining bone structures do not reveal any other changes. In type III, there is a radioulnar synostosis, hypoplastic head of the radial bone, and posterior subluxation of the radial head. In type IV, there is a short radioulnar synostosis, mushroom-shaped malformation of the head of the radial bone, and anterior subluxation of the radial head.

Depending on the degree of the malformation, the treatment may be conservative or surgical [4]. Qualification for surgery depends on individual functional limitations and forearm position. Surgery should be carried out in childhood [4]. Derotational osteotomy is one of the possible methods of surgical treatment. In patients qualified for surgery, it is necessary to analyse the results of diagnostic imaging: X-ray and CT. A preoperative CT with 3D reconstructions will precisely show all anatomical relations, spatial position of the bone components, allowing for a detailed planning of the surgical procedure (13).

Conclusions

Congenital radioulnar synostosis is a rare malformation, treated conservatively or surgically, depending on its degree and movement range. When taking a decision on the method of treatment, it is extremely helpful to use the results of diagnostics imaging procedures and especially the results of CT with 3D and planar reconstructions. CT allows for a detailed visualisation of the spatial relations, which facilitates precise planning of the surgical procedure.

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