



MAIN TRENDS IN THE TREATMENT OF CHRONIC DISLOCATIONS OF THE RADIAL HEAD IN CHILDREN (LITERATURE REVIEW)

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Abstract

Traumatic injuries are increasing globally in both adult and child populations. The number of injured children accounts for 25-30% of the total number of human injuries [1-5]. In pediatric trauma, the proportion of injuries to the upper extremity is almost 70%. In general, elbow injuries predominate among upper extremity injuries and among adolescents, the proportion is 50%. In young children, the incidence, variability and severity rank first. Sources describe the incidence of dislocations of the forearm at about 81% [34-36]. From the above data, nearly 10% are dislocations of the head of the radius[16].

Keywords: traumatic injuries, elbow joint, Montagee-type injury

Introduction

One of the most severe pathologies is chronic dislocations of the head of the radius, which occur in 2-2.7% of all chronic ulnar injuries [7-9]. This rate in children is about 86%, a rather high rate among all traumatic dislocations [3,8,13,19].

According to various data among all types of forearm injuries, fractures with dislocation account for approximately 6% [12,13,20,21]. Montagee injury is a ricochet injury in which a fracture of the diaphysis of the middle or upper third of the ulna with dislocation of the head of the radius occurs [14,15]. Four types of Monteggi's fracture-dislocation are noted in the sources, depending on the nature of displacement of the bone fragments and the localisation of the dislocation of the radial head. In the first type, a Monteggi fracture occurs in the diaphyseal part of the ulna with dislocation of the radial head anterior to the condyle head of the humerus. This type of injury is more common and accounts for about 70% of all injuries (9,18). The second type is the Monteggi fracture of the diaphysis or metaphysis of the ulna combined with posterior dislocation of the head of the radius. This type of injury occurs mainly in





adolescents, with a peak incidence in 14-year-old children. The incidence of the second type ranges from 3% to 6% according to different sources, and few authors claim an incidence of at least 1% (28,29). The third type of injury, there is a fracture of the metaphyseal part of the ulna, with obligatory dislocation of the radial head laterally or anterolaterally. In terms of incidence, the third type of Monteggia is second only to the first type, which is observed in approximately 23% of all injuries. The fourth type of injury is less common and is characterised by a single-stage fracture of the forearm bones at the same level, or fracture at different levels and dislocation of the radial head anteriorly. The incidence of this type does not even exceed 1%, which proves the rarity of this type of injury. Congenital dislocation of the radial head is generally rare. However, it is the most common congenital anomaly of the elbow joint. Congenital dislocation of the radial head can also occur as an isolated dislocation or can occur in conjunction with other coexisting conditions or developmental syndromes. Posterior dislocation of the radial head is the most common (70% of cases), whereas anterior (15%) and lateral (15%) dislocations are relatively less common. Congenital dislocation of the radial head is most often asymptomatic and is therefore late in most cases (33).

Injuries to the humerus joint that include dislocations and in combination with bone fractures in which there is a tear of the ligamentous apparatus, resulting in instability of the joint, must be treated surgically. Currently, there is a sufficiently large number of methods that, if chosen objectively and correctly performed, allow for satisfactory functional results in the long term. The main indications for surgical treatment are chronic cases, valgus or varus deviation of the elbow joint along the axis of the arm above 200, and limitation of movement in the joint [17, 30]. The surgery is performed under general anaesthesia, the patient lies on the back and the shoulder is placed on the operating table for the upper extremity. Then the shoulder is abducted and the forearm is rotated inwards. The elbow joint is bent at an angle of 90°, while the biceps brachii are released. The incision is made using the posterolateral Kocher access [22,27], which provides a good visual overview of the humeral articulation. A number of authors [3,11,23,25,27] have described the difficulty and timing of Monteggia's injuries, which often leads to diagnostic errors and subsequent complications. Some authors have observed in their practice that dislocations of the radial head in children can occur with fractures in the proximal or upper third of the ulna, and in some cases even with fractures in the middle third of the diaphysis and rarely with fractures of the distal end [19,20,31]. In such cases, open reduction and osteosynthesis of the ulna is performed. There are cases where the head of the radius is not repositioned successfully, resulting in proximal growth and even resection (31-35).



Regarding the repositioning or removal of the head of the radial bone in neglected cases, S.B. Korolev [3] suggested the arthrolysis of the joint, reduction of the radial bone head, excision of the radial bone head, preserving the tortuous stem, and reinforcement of the coronal process bed.

It should be noted that in advanced dislocations of the radial head, an osteotomy of the ulnar bone is used to reposition the radial head (8,9). The implementation of this technique consists of excision and clearing of scar tissue at the humeral articulation, followed by mobilisation of the head of the radius, followed by fixation of the limb. After release of the fixation, the development of movement in the joint is prescribed. In addition, in some cases after osteotomies of the ulna, the bone fragments are brought together to form an open angle to the radial side in order to keep the head of the radius in the retracted position. In addition, the open angle is also formed by applying an external fixation apparatus [25-26]. The method of dislocated radial head repositioning is also used in the treatment of residual radial head dislocations in Montagee injuries in children [24]. This involves arthrotomy of the joint, but it can lead to scarring and an extended rehabilitation period. Наблюдения L. Wattincourt и R. Seringe [3,8] have shown that in some cases when, after surgical reduction of the head of the radius and osteotomy of the ulna, a re-dislocation of the head of the radius occurs. Thereafter, a false ulnar joint is observed at the site of the excision.

Gill S.P.S et al. [23] use the Ilizarov apparatus for chronic dislocations of the radial head, gradually traction of the ulna in the first stage, and in the second stage, the dislocated head of the radius is repositioned. The most common post-traumatic elbow joint deformity is seen in Montagee injuries. The head of the radius was openly repositioned and an Ilizarov osteosynthesis apparatus was applied to the ulna according to the procedure of the Clinic of Pediatric Traumatology. In which we observed the ulnar bone deformity angle decreased to 3° after surgery.

To date, several methods have been proposed and used to repair damaged ligamentous structures of the elbow joint in children. P.Y. Fischenko [10] proposes a method of restoring the circumflex ligament with a graft created from the tendon of the triceps brachii muscle. In this case, the triceps muscle is dissected from two accesses, but the dissection of the triceps muscle in turn significantly weakens the functional state. The technique is traumatic and requires a long rehabilitation period. N.A. Ovsyankin [6] proposed a method of operation to keep the head of the radius in the embedded position using two tendon flaps. A tendon of the biceps muscle was used to form the first flap. And for the second flap Pirogov's fascia was used. The formed first flap is conducted along the outer edge of the neck of the ray, guided from behind through the channel formed in the tuberosity of the ulna. The two flaps are



sutured together and the tendon of the biceps brachii muscle is shortened [6]. I.Yu. Khodzhanov [11] proposes plasty of the annular ligament with a m.anconeus flap. The method is as follows: an incision is made along the posterior-surface area of the elbow joint, with the level of the incision corresponding to the neck of the radius with transition to the distal end of the humerus. After removing the fibrous tissue bands, the head of the radius is repositioned by pushing the underlying muscles, then the ulnar muscle is mobilized, the external epicondyle is opened, and the proximal end of the m. anconeus tendon is resected at its attachment to the external epicondyle. The soft tissue is then mobilized to the muscularis and a tendon-muscle flap is formed. This flap is about 4 cm long and is reinforced with silk threads. The proximal part of the radius in the neck region is mobilised in an acute and blunt manner. A newly created tendon-muscle flap is attached to the neck of the radius as a loop and the end of the flap is fixed to the ulna at the base corresponding to the level of the radial notch. Although the loop formed is quite firmly fixed, an additional transarticular Kirschner wire was used to fix the head of the radius for 2 weeks in order to ensure good adaptation of the new flap.

Conclusions

Analysis of the literature has shown that there is almost no specific data on the incidence of chronic dislocations of the radial head in children; dislocations of the radial head may be isolated, following Monteggi, Brecht, Malgene, and congenital injuries. Numerous methods of surgical treatment for chronic dislocation of the radial head have been proposed by various authors, but the question of which method of surgical intervention is most effective in restoring the function of the ulnar and no less important radius joints remains open. The issues of reconstruction of the annular ligament and prevention of recurrence of radial head dislocation remain particularly debatable.

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