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SUBLUXATION OF THE HEAD OF THE RADIUS IN CHILDREN

By

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Subluxation of the head of the radius is an incomplete dislocation in which the head of the radius slips in the distal direction under the annular ligament, causing a painful condition, called by the French "pronation douloureuse". This lesion of the bones or joints is very common in children under 4 years old. A confident diagnosis can only be made by reposition of the arm, and the condition is not associated with fracture or cubital luxation.

A 4- to 5-year-old child is seen, obviously crying on account of pain. His arm is limp and immobilized in slight flexion. In the recumbent position, the arm is held obliquely across the body. The nurse tells us that she was walking in the street, holding the child by the hand. When she was helping him on to the pavement after crossing the street, he stumbled and lost his balance. Thus, all his weight suddenly came to be suspended from one hand, and at the same instant the child burst into tears. The nurse, who perhaps felt a small snap, is agitated, fearing that she may have caused dislocation of the shoulder or some "fracture". When describing the lesion, the English call it "nursemaid's elbow". Other, similar incidents may also be responsible. The child may, for instance, grasp at the top of his bedstead and lose his balance for some reason or other, or the lesion may result from swinging the child around by the hands. These cases are often remitted to a surgical outpatients' clinic with the diagnosis distorsio articuli cubiti or distorsio articuli humero-scapularis. On account of the obvious pain, the remitting doctor considers it safest to rely on the resources of a clinic, where he knows that X-ray studies, in particular, can be made.

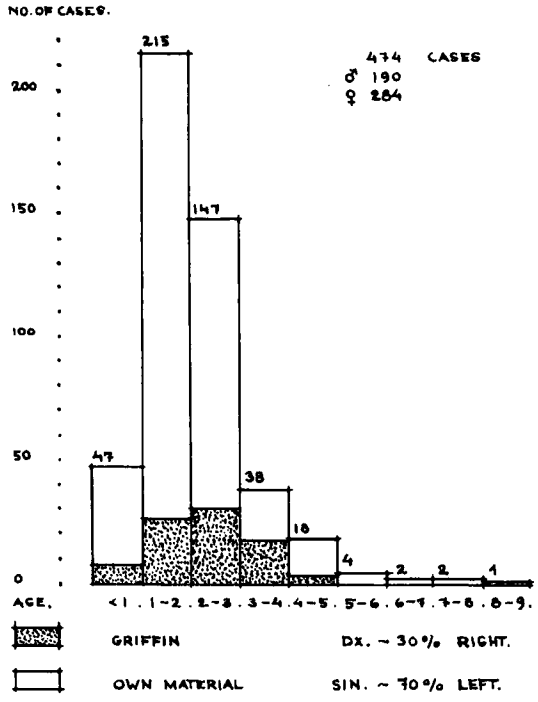

Fig. 1.

Age distribution in 474 cases of subluxation of the head of the radius. The dotted areas represent Griffin's corresponding series.

When examining the young patient we do not, perhaps, at once detect any deficiency in the extension or flexion of the elbow joint, but on comparison with the contralateral limb a slight limitation in movement is observed. On supination of the arm, the child cries more violently, and the manoeuvre is unsuccessful, the arm remaining immobilized and slightly pronated. No swelling is discernible over the head of the radius, but on pressing this site the child immediately shows signs of acute pain. Since the symptoms are not readily recognized and sufficient data regarding the precipitating event are not always obtainable, the lesion often remains undiagnosed, or is entered in the journal as distorsio articuli cubiti, carpi or humero-scapularis. This is particularly the case when an X-ray examination has failed to reveal anything pathological.

Although the symptoms are few, the lesion in question is a distinct clinical entity. In 1899, Arsdale presented a series comprising 100 cases collected in 2 years, and in 1955 Griffin reported 75 cases, collected in

8 months. Most other writers have only described occasional cases, e.g. Anderson, who in 1942 described 13 cases collected in 6 years. It is surprising that not a line has been devoted to this lesion in the usual textbooks on surgery although it is commoner in young children than, for instance, fracture of the clavicle. The condition is mentioned, however, in the more specialized surgical literature, e.g. in Key-Conwell's book "The management of fractures, dislocations and sprains" (1954) and in Geckeler's "Fractures and dislocations" (1943), where it is stated that subluxation of the head of the radius is very common in children under 5 years of age. The lesion is also described in Nelson's extensive "Textbook of Pediatrics", published in 1956.

On the basis of extensive anatomical experiments on cadavers, Stone, in 1912, advanced the theory regarding the mechanism responsible for subluxation of the radial head which is probably the one most widely accepted. According to Stone, subluxation of the proximal end of the radius under the annular ligament is due to a combination of several factors. Firstly, it can only occur when the forearm is pronated. In this position the space between the head of the humerus and the scaphoid bone is longest, and the radius, which is situated between them, is therefore capable of considerable movement in the axial plane. Secondly, there must be a sudden traction in the distal direction combined with extension. After birth, the epiphysis of the radial head, from being a bone of uniform thickness, develops a club-shape. Thus, a third factor is the shape of the radial head. As long as it is uniform in thickness, it may slip in the distal direction when the pronated forearm is pulled. After the age of 4–5 years, such subluxations become less frequent owing to the change in shape of the head of the radius; when it becomes more club-shaped it is retained in position. The general elasticity of the joint ligaments in children may, of course, be regarded as an additional factor. Furthermore, the lack of complete muscular coordination at this age in combination with a pronounced need of exercise readily leads to loss of balance. The statistical data available corroborate the assumption that the above-mentioned factors are responsible, the incidence being highest in the age group between 1 and 4 years, i.e. when children are still led by the hand, when their need of exercise is great and their joints elastic, and the head of the radius is uniform in shape.

At the Finnish Red Cross Hospital about 1,000 cases, at least, of subluxation of the head of the radius have been diagnosed since 1944. Attention was drawn to this lesion, and the importance of instructing

medical students in its diagnosis was emphasized, by Rehnberg, who at a meeting of the Finnish Association of Surgeons immediately after the Second World War gave a lecture on "dislocations of the elbow region", in which the condition here concerned was briefly discussed. He suggested the name "subluxatio distalis capituli radii". The present series consists of 396 cases treated at the Finnish Red Cross Hospital during the 5-year period 1952–1957 and 78 cases treated in 1957 at the Surgical Outpatients' Clinic of the city of Helsinki. All cases are included where the diagnosis was confirmed by reposition. Thus, the frequency was about 1–2 cases weekly. The highest incidence occurred in the age group 1–3 years old. With regard to the age incidence, the present series corresponds to Griffin's series of 75 patients. Of our patients, 190 were boys and 284 were girls. In 70 per cent the condition involved the right elbow, in 30 per cent the left.

The diagnosis is confirmed by reposition, which is the only proper way of treating this painful lesion, although it has been contended that spontaneous reduction sometimes occurs. It cannot be of frequent occurrence, however, owing to the fact that the annular ligament is tightened when the capsule is stretched, thus preventing spontaneous reduction of the radial head. Reposition is easy and does not require anaesthesia. When it is successful, a small snap is felt at the head of the radius. With the thumb at the radial head, the doctor grips the affected elbow with one hand. With the other hand he grips the patient's hand and slowly turns his forearm from pronation towards supination, beginning from 120° flexion of the elbow joint and finishing at 45°. Where the thumb is held there is a snap when the head of the radius clicks back into position under the annular ligament. Immediately afterwards the patient is able to move his elbow freely, and he soon stops crying. Subsequently the arm is put in a sling for a couple of days.

We have not been able to diagnose this lesion with X-rays, a major difficulty being that of obtaining pictures with identical positioning of the arm. Sometimes X-ray examinations have had a beneficial effect, however, inasmuch as reduction has occurred on placing the forearm in the position proper for exposure. Recurrence occurred in 5 per cent of the present cases. One patient had 5 recurrences at short intervals. It has been alleged that chronic forms occur, but these seem to be extremely rare. I have seen a patient who had subluxation for 2 weeks, but even in this case reposition was easy. Hence, there does not seem to be any reason for discussing the possibility of surgical intervention in this condition.

SUMMARY

Subluxation of the head of the radius is described, and it is emphasized that this is the commonest lesion of the bones and joints in young children. As a result of traction the head of the radius slips in the distal direction under the annular ligament, causing a painful condition. The pathological mechanism and the treatment are described, and a series of 474 cases is presented, in which the diagnosis was confirmed by reposition.

RESUME

Description de la subluxation de la tête du radius en faisant ressortir que c'est la lésion la plus commune des os et des articulations chez les jeunes enfants. En raison de la traction, la tête du radius glisse en direction distale sous le ligament annulaire, ce qui cause un état douloureux. Le mécanisme pathologique et le traitement sont décrits. Une série de 474 cas dans lesquels le diagnostic a été confirmé par reposition est présentée.

ZUSAMMENFASSUNG

Subluxation des Radiusköpfchens wird beschrieben und es wird hervorgehoben, dass dies die häufigste Knochen- oder Gelenksbeschädigung bei kleinen Kindern ist. Als eine Folge von Zug gleitet das Radiusköpfchen in distaler Richtung unter das ligamentum annulare und ruft dadurch einen schmerzhaften Zustand hervor. Der pathologische Mechanismus und die Behandlung werden beschrieben. Eine Reihe von 474 Fällen wird vorgestellt, in denen die Diagnose mittels der Reposition gesichert wurde.

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