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Case Report

Algodystrophy of the Wrist in Adolescent: A Case Report

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Abstract

Algodystrophy or complex regional pain syndrome is a locoregional microcirculatory disorder combining vasomotor and trophic pain phenomena, resulting from a neuro-vegetative disturbance, most often in response to local aggression. It can be idiopathic. The object of our work is to report a case of post-traumatic algodystrophy of the wrist in an adolescent, given the rarity of this disease in this age group, and to review the various clinical and radiological signs that guide the diagnosis.

Keywords: *Algodystrophy; Adolescent; Wrist; Complex Regional Pain Syndrome*

Abbreviations

MRI: Magnetic Resonance Imaging; STIR: Short Tau Inversion Recovery; AD/DA: Algodystrophy; CT: Computed Tomography

Introduction

Algodystrophy is a broad term; according to French speakers, it encompasses different entities: Sudeck's atrophy, osteoporosis and/or transient medullary oedema. However, in English-speaking countries, the same entities are considered different [1]. At present, the term "complex regional pain syndrome" (CRPS) is preferred. It primarily affects the limbs, the hip and the knee. Rarely the spine. It can be single, segmental, bipolar or extensive.

Case Report

A 10 year old girl with a history of right wrist trauma dating back 5 months, treated orthopaedically with a cast. Three weeks after removing the cast. A tumefaction on the dorsal face of the right wrist appeared. On clinical examination, there were no obvious inflammatory signs: no redness, no pain, no sensory-motor disorders. Standard X-rays of the face and profile showed a demineralised, blurred appearance of the carpal bones, reminding us of the mottled appearance. MRI of the affected hand showed signal abnormalities in the carpal bones reaching the lower radial and ulnar epiphyses in T2 hyper signal and STIR, T1 hypo signal, enhanced after injection of Gadolinium, associated with subchondral erosions and local cortical thinning of the carpal bones. Diffuse infiltration of the soft tissues of the posterior and lateral regions of the carpus. There were no fracture lines or osteonecrosis, and the carpal and guyon canals were respected. There

was no collection adjacent. The musculo-tendinous structures were respected. The diagnosis of algodystrophy was evoked in the light of anamnestic, clinical and radiological data.

Discussion

Algodystrophy, known as complex regional pain syndrome (crps), is a painful condition characterised by erythema, oedema, functional impairment, sensory and vasomotor disturbances.

There are complete and incomplete forms. The pathophysiology is not well established [2].

Currently, two types are distinguished: Type I (CRPS) without neurological signs, Type II (CRPS) with neurological involvement [3].

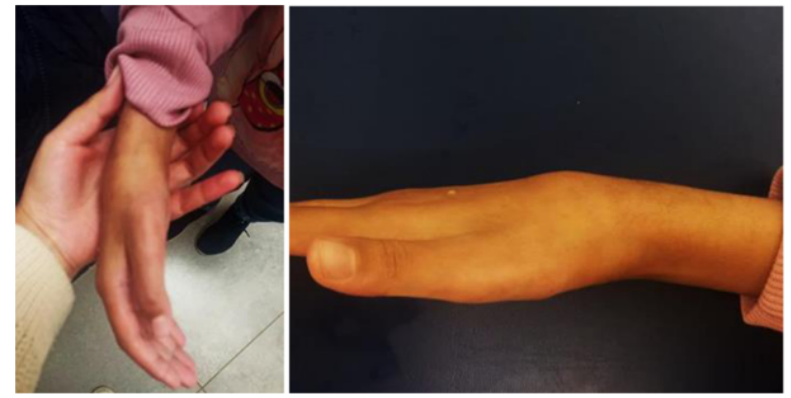

Figure 1 and 2: *Clinical appearance of the tumefaction on the dorsal surface of the right wrist.*

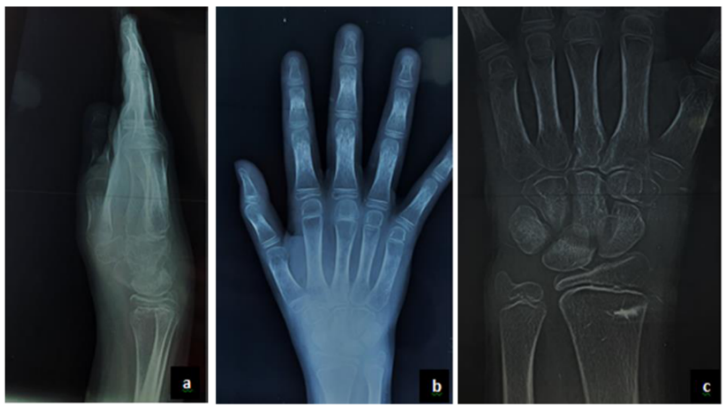

Figure 3: *Standard radiographs of the face (a) and profile (b) of the diseased wrist vs of the healthy wrist (c) showing the demineralised and mottled appearance of the carpal bones with swelling of the soft tissues opposite.*

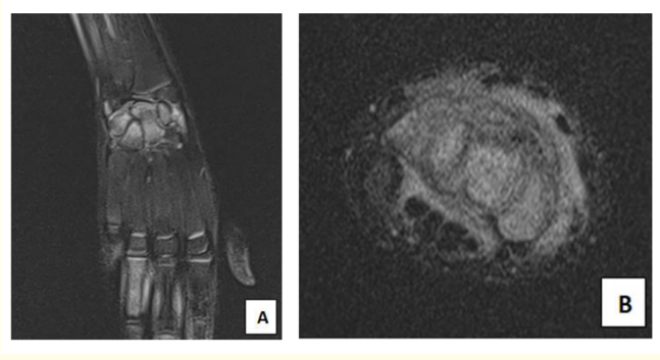

Figure 4A and 4B: *MRI T2 sequence coronal (A) and axial (B): Carpal bone signal abnormalities T2 hypersignal.*

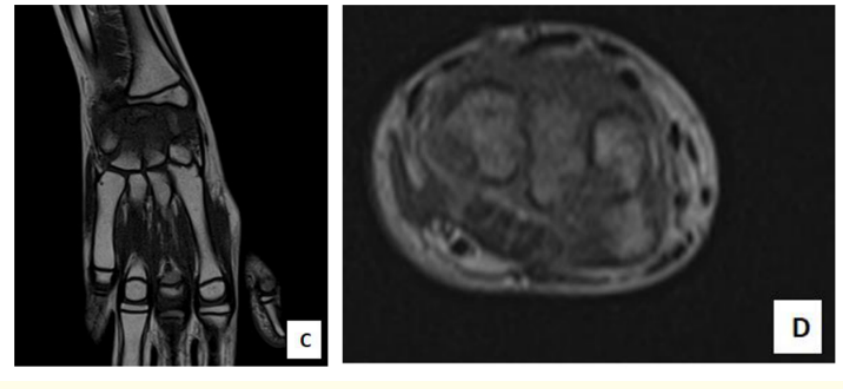

Figure 4C and 4D: *MRI T1 coronal (C) and axial (D) sequences: hyposignal of soft tissue and carpal bones. No fracture.*

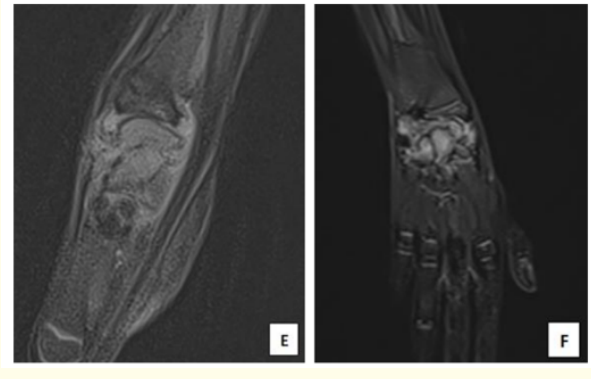

Figure 4E and 4F: *MRI sequence: Proton density in sagittal (E) and coronal STIR (F) sections: Hypersignal of carpal bones and soft tissues. Respect of the musculo-tendinous structures.*

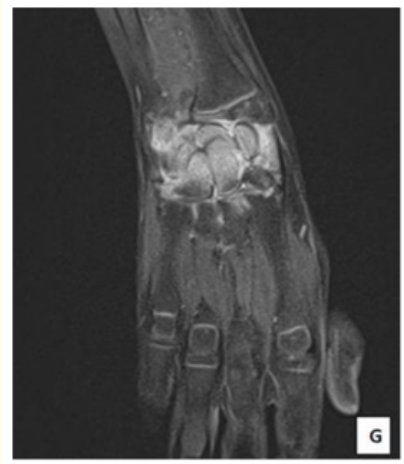

Figure 4G: *(G) Coronal injected T1 MRI sequence: Enhancement of carpal bone signal abnormalities extended to the radial and ulnar epiphyses and the soft tissue. Absence of osteonecrosis. Absence of collection.*

Epidemiologically: CRPS often affects the elderly (4^{th} and 7^{th} decade), it is rare in children and adolescents [4]. It affects the upper limb more than the lower limb. It is more frequent in women than in men. Algodystrophy often follows a triggering event (surgery, trauma), spontaneous occurrence without an initial cause is rare: it is then called idiopathic AD.

There are common triggering factors regardless of the site of the injury. We find the notion of trauma before, with a percentage of 28 to 40% in wrist AD [1]. Pregnancy, neurological impairment with motor deficits, certain medications, metabolic disorders such as dyslipidaemia and diabetes). CRPS is particularly frequent in cases of underlying osteopathy such as osteogenic imperfecta or osteomalacia [5]. Therefore, it is important to consider osteopathy in cases of focal DA without any triggering factor [5].

Clinically: The clinical manifestations are very variable. Theoretically, there are two phases of variable duration: The warm phase characterized by permanent pain, swelling, clinical signs of vasodilatation +/-dysesthesia. The cold phase; the limb becomes cold, blue, depilation, limitation of movements. This last phase may precede the first or overlap with it. Then the sequels can appear. It is responsible for a real long-term handicap made up of vasomotor disorders, limitation of movements and skin retraction [6].

Biological markers of inflammation are often normal [1].

Radiologically: The standard X-ray may show regional osteoporosis with a typical blurred and speckled appearance of the bone respecting the joint spaces. Cortical notches may be present [7]. This radiological bone hypertransparency recovers slowly and incompletely with time, hence the need for standard control radiographs. Regional osteoporosis has an orienting value but is not obligatory to establish the diagnosis [7]. CT scanning is of questionable value. It shows more clearly and earlier than standard radiography the aspect of mottled bone demineralisation [1].

MRI may show bone signs and/or soft tissue abnormalities. Bone signs are represented by a medullary oedema (hypo signal T1, Hyper signal T2, enhanced after injection of Gadolinium) diffuse, in sheet, speckled or subchondral [8] sometimes migrating within a few weeks and trabecular microfractures which are non-enhanced T1 bands reflecting the cause or consequence [9]. Soft tissue abnormalities are

manifested by synovitis, thickening and hyper vascularisation of the capsulo-ligamentary planes extending to the extra-articular side. The negative signs are important. There is no fracture, osteonecrosis or tumour. Gadolinium injection is particularly useful in the diagnosis of shoulder algodystrophy as it shows thickening and contrast of the inferior glenohumeral ligament. Rotator interval abnormalities are less sensitive and less specific [8]. The anomalies found can guide the treatment.

The scintigraphy shows a characteristic regional/plurifocal or patchy hyperfixation. It is a sensitive but non-specific method. A very focal fixation should lead to a search for an occult fracture [1]. The three-step dynamic scintigraphy plays an important role. It highlights early regional hyper vascularisation [10].

Regional migratory osteoporosis shares features with CRPS; some authors consider it an isolated entity but it should be included in DA. The migratory character can be explained by iterative trabecular fractures in a fragile bone environment [11].

Treatment: According to the authors it is a combination of: bisphosphonates, calcium supplements, magnetic therapy, hyperbaric oxygen therapy and partial weight bearing on the affected limb [8].

Conclusion

Typical algodystrophy must be evoked in front of a painful and pseudo-inflammatory clinical syndrome with a normal biology and a regional radiographic demineralization. MRI and scintigraphy play an important role in orienting the diagnosis and eliminating other differential diagnoses.

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Conflict of Interest

The authors declare no conflict of interest.

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