

Knuckle pads: A Rare Case in a Male Child

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ABSTRACT

Knuckle pads are smooth, firm papules, nodules, or plaques that are well-circumscribed. They are usually asymptomatic and overlie the dorsal hand joints; the thumbs and toes are less commonly affected. Most reported cases of knuckle pad lesions occur over the Proximal Interphalangeal (PIP) joints rather than the Metacarpophalangeal (MCP) joints. Ultrasonography and histopathology can diagnose knuckle pads and differentiate them from any swelling affecting the joints. Knuckle pads usually appear in the third decade of life. A case of knuckle pads will be described based on clinical, histopathological findings as well as the use of dermoscopy and ultrasonography in a 9 year old male child with no family history of the condition.

KEYWORDS

Knuckle pads, Firm papules, Dupuytren's disease

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CASE HISTORY

A 9-year-old male child presented to our dermatologic outpatient clinic with painless local swellings over the dorsal aspect of both hands' middle Interphalangeal (PIP) joints. The patient noted the swellings over the course of many years, with no apparent cause or previous injury. The patient's medical history was unremarkable and did not point to a potentially serious condition. The mother complained from Hereditary Dupuytren's contracture. The extended family background was unremarkable. The patient's medical background and the formal general inquiry were both unremarkable and did not indicate a predisposition to a particular musculoskeletal condition. The patient denied any signs or local changes in the MCP, distal interphalangeal, or wrist joints. He did not have any morning stiffness, paraesthesia, or discomfort during the night; he had no other symptoms of inflammatory or mechanical pain.

Several firm cutaneous nodules were found on clinical inspection on the dorsal aspect of the middle PIP joints of both hands. There was no local tenderness, and the temperature of the overlying skin was normal. The nodules were not adherent to the capsule of the joint. The affected PIP joints' range of motion was normal.

Synovitis, tenosynovitis, palmar fascia thickening, or muscle atrophy were not present. An assessment of the local nervous system was within normal limits. The skin covering the rest of the hand joints and nails was deemed normal. X-rays of the hand showed no abnormal findings. The nodules were found to have multiple subcutaneous hypoechoic masses with irregular borders on ultrasound (US). They ranged in size from 10 to 15 mm. internal flow signals were not detected by color Doppler. Soft tissues, joints, and extensor and flexor tendons were all within normal limits.

Dermoscopy of lesions revealed honeycomb scales, whitish areas, brownish areas as well as areas that were red-brown and accentuated skin creases.

A skin biopsy was done from one lesion and revealed hyperkeratosis, hypergranulosis and acanthosis with elongation of rete ridges. The upper dermis showed fibrosis with numerous fibroblasts, myofibroblasts and thickened capillary walls.

A diagnosis of Knuckle Pads (KP) was established based on family history, clinical evidence, histopathological features and ultrasound appearance.

DISCUSSION

Garrod identified the first findings of Knuckle Pads (KP) in 1893. Knuckle pads, also known as "Garrod's nodes," are benign fibrofatty subcutaneous pads that can be mistaken for arthritis and are located over the PIP joints.¹ They rarely impact the MCP joints on the dorsal side. They are painless and often affect both hands in an asymmetrical fashion. KP shares signs with camptodactyly (a fixed flexion deformity of the interphalangeal joints of the little finger) and is linked to a number of genetic factors.²

KP co-exists with palmar (Dupuytren's disease) or plantar fibromatosis (Ledderhose's disease) or Peyronie's disease, and may be linked to repetitive local trauma (for example, repetitive batting of the knuckles, e.g. by boxers or children who suckle their fingers).³⁻⁵

The majority of KP cases are idiopathic.⁶⁻⁸ Some authors attempted to differentiate KP (dorsal cutaneous pads) from dorsal Dupuytren's nodules, which is clinically impossible and unnecessary since the two conditions are identical.⁹ A fibrous thickening of the palmar fascia with a palpable stiff and tense band characterizes palmar Dupuytren's contracture. Unlike Dupuytren's disease, which causes the affected fingers (usually the ring finger) to be unable to fully extend and may result in a flexion deformity, the affected fingers with KP are usually not limited in motion.¹⁰

KP is seen on ultrasound as diffuse or focal hypoechoic subcutaneous thickening at the dorsal aspect of affected PIP joints, which is demonstrated by our patient. The nodes are usually non-compressible masses with irregular margins that lack internal color and power on Doppler flow signals. Peripheral hypervascularization can be observed on rare occasions. The neighboring tendons and joints are normally unaffected.^{11,12} Other subcutaneous nodules such as rheumatoid nodules, gouty tophi, Bouchard's and Heberden's nodes, synovial cysts, tumors (e.g. giant cell tumor of the tendons sheaths, neurofibromas) or retained foreign bodies inside the soft tissues are included in the differential diagnosis of KP and should not be mistaken for a joint disease. In this situation, a thorough clinical and evaluation by ultrasonography of the affected area is needed. High-resolution ultrasound equipment allows for precise examination of the joints and the surrounding soft tissue. Rheumatoid nodules (RN) are painless and firm nodules that appear on the joint's extensor surface. Periarticular oval homogeneous hypoechoic nodules with hyperechoic walls are seen on ultrasound in rheumatoid nodules.^{13,14} In rheumatoid arthritis, musculoskeletal ultrasound

can also identify pathological changes such as synovitis (tenosynovitis, bursitis, tendon tears, secondary nerve entrapment, and cartilage and bone changes) as a precise and reliable method. Active synovial inflammation is detected using power and color Doppler ultrasound, indicating hypervascularization and neoangiogenesis.¹⁴

Gouty tophi show up as a mix of hypoechoic and hyperechoic nodes. They can also cast an acoustic shadow. Erosion of the bony surface can be seen, which is also demonstrated in RA.¹⁵ An isoechoic mass with hyperechoic spots within the synovium, erosions, and the appearance of a double contour sign are other US characteristics of gout.¹² Osteophytes and synovitis are common findings in osteoarthritis (OA) of the fingers. Furthermore, in erosive hand osteoarthritis, US can detect bone cortex defects.^{16,17}

In giant cell tumors of the tendon sheaths, US reveals a heterogeneous or homogeneous mass that can be hypoechoic or hyperechoic, and usually originates from the tendon sheaths of the fingers' flexor tendon. In color or power Doppler mode, there is usually a rise in central or peripheral hypervascularization.¹⁸ As an example, consider masses caused by foreign bodies that have become lodged in the body. Small foreign bodies may be detected and appear hypo echoic if they are made of wood, or hyper echoic with comet-tail reverberation if they are made of metal. If the foreign body is in the skin, for example, a hypo echoic halo with potential hyper vascularization may be present.¹⁹

Since knuckle pads are asymptomatic, there is no agreement about whether or not therapy should be initiated. There were no cases of idiopathic knuckle pads that responded to treatment until recently. Because of the high risk of scarring and recurrence, excision of idiopathic knuckle pads is normally not advised. Topical corticosteroids with occlusion are recommended by Paler and Hebert. However, for the patients mentioned in their study, this procedure was ineffective; for example, they described a patient who was unsuccessfully treated for two months with 0.025 percent fluocinolone actinide ointment. They also identified a patient whose knuckle pads did not illicit satisfactory results to salicylic acid gel treatment.²⁰

Weiss and Amini identified two people who had their idiopathic knuckle pads successfully shrink after receiving intralesional 5-fluorouracil in 2007. The capacity of the antimetabolite drug to inhibit fibroblast proliferation was suggested by the researchers as the mechanism for improvement.²¹ This method of therapy may be the solution to both cosmetic and practical problems.

This is the first case report of hereditary idiopathic knuckle pads in children in Kuwait without any associated conditions or inherited knuckle pad disorders that we are aware of. To support the diagnosis of benign knuckle pads and rule out other conditions, a thorough medical history and US should be done.

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