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A Rare Diabetic Neuro-Osteoarthropathy Localisation Associated with an Exceptional Skin Complication of Diabetes: A Case Report

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Abstract **Case Report**

The foot and the ankle are the usual localisations of diabetic neuroarthropathy. The knee is rarely affected. Diabetic neuropathy and microangiopathy also cause skin fragility causing trophic disorders and ulcers. Diabetic bullosa is rare. We report the case of a 19-year-old female patient with type 1 diabetes complicated by knee neuroarthropathy and diabetic bullosa.

Keywords: Neuroathropathy, knee, bullosa, diabetes, complication.

INTRODUCTION

The diabetic neuroarthropathy of the knee is a rare complication of diabetes mellitus. It is secondary to neuropathy and microangiopathy. It should be evaluated in any diabetic patient who presents with knee arthritis or an unstable knee (Patel A *et al.,* 2018) (Goetti P *et al.,* 2016). Microvascular damage and changes cause ischemia and tissue hypoxia which are associated with skin complications, frequently observed in diabetics, including diabetic dermopathy, delayed wound healing, leg ulcers and trophic disorders. Diabetic bullosa is a rare skin complication exclusive to diabetes (El NI *et al.,* 2016). We report the case of a 19-year-old diabetic patient with type 1 diabetes complicated by osteoarthropathy of the knee and diabetic bullosa.

A CASE REPORT

We report the case of a 19-year-old female patient with a history of type 1 diabetes mellitus under insulin since the age of 7 years, poorly controlled, and causing delayed puberty and weight gain. Three months before her admission, the patient presented a painless tummefaction of the right knee (Figure 1). The clinical examination showed a large effusion, subluxation and deformation of the right knee, with the presence of spontaneously ruptured scars of indolent bullae opposite both knees, suggesting diabetic bullosa (Figure 2). The neurological examination showed a peripheral neurogenic syndrome with sensitivity disorders, trophic disorders and decreased osteotendinous reflexes. On biological examination, the sedimentation rate was 124 mm, the c-reactive protein was 44 mg/l, the fasting blood glucose was 3.4 g/l with two marks of glycosuria and two marks of acetonuria on the urine test strip, the glycosylated haemoglobin was 14.4%. The syphilitic serology and the search for mycobacterium tuberculosis on the pulmonary expectoration were negative. The articular ponction showed a mechanical liquid with a sterile culture. Synovial biopsy showed soft tissue with foci of synovial chondromatosis. The standard bacteriological culture and the search for tuberculous mycobacteria on the synovial fragment were negative. The standard radiograph of the knee showed an infiltration of the soft tissues, femorotibial dislocation, and destruction of the bone extremities (Figure 3). Magnetic resonance imaging of the knee showed significant joint destruction with tendon ruptures and meniscus lesions (Figure 4). The diagnosis of diabetic neuroarthropathy was confirmed after eliminating other differential diagnoses such as syphilis, tuberculosis, or other spinal cord disease. The patient was a candidate for knee arthrodesis, but had died before the operation because of diabetic ketoacidosis.

Figure 1: Large tumefaction in the right knee

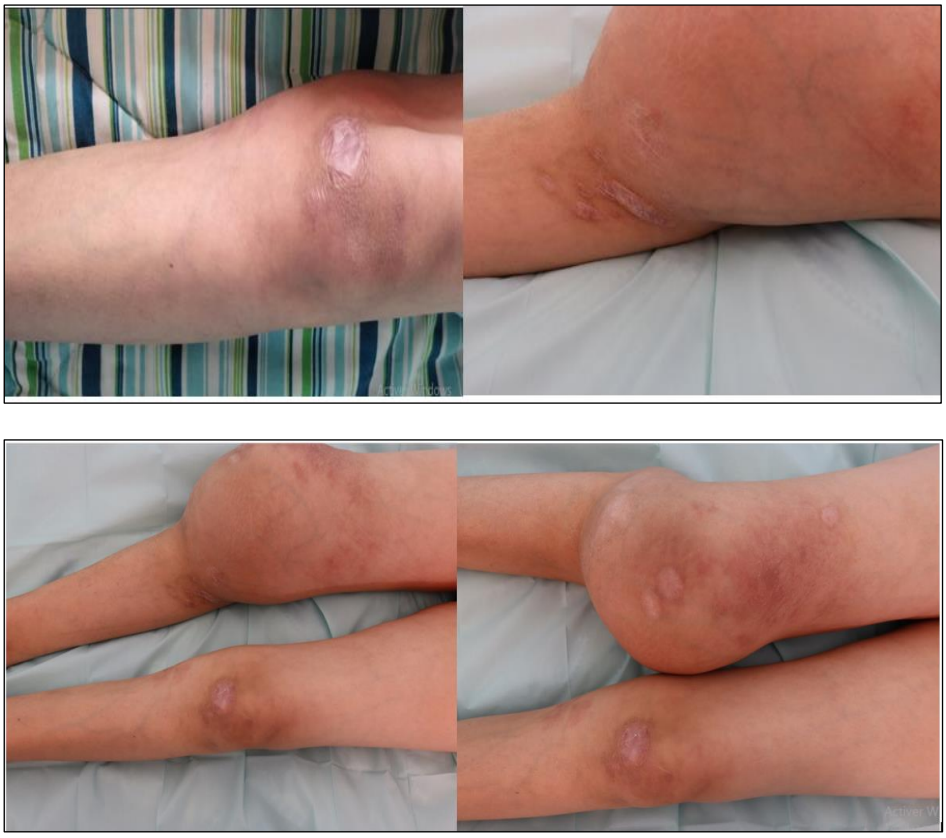

Figure 2: Spontaneously ruptured bulla scars

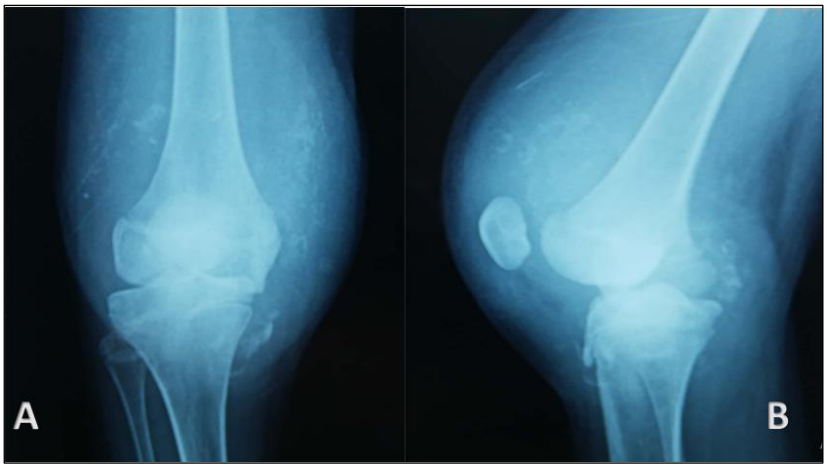

Figure 3: Standard radiograph of the right knee, front (A) and side (B), showing significant joint destruction with infiltration of the soft tissues in connection with diabetic neuroarthropathy

Figure 4: MRI of the right knee revealing a large articular effusion, femorotibial dislocation with total rupture of the cruciate ligaments, detachment of the medial meniscus and destruction of the bone extremities

DISCUSSION

Diabetic neuroarthropathy is a severe destructive and deforming arthropathy that occurs in the context of sensory nervous system damage. It encompasses three main disorders: sensitivity disorders, motor deficits and vegetative disorders. The most frequent etiology is diabetes (DANIEL A *et al.*, 2018). Its localization to the knee is rare, affecting 0.45% of diabetic patients. Clinical manifestations include joint swelling with effusion, deformity and instability of the knee. Pain may be moderate or absent due to underlying neuropathy (Hanson LF *et al.*, 2018). Proprioceptive deficit and motor instability could be the cause of undetected microtrauma due to sensory neuropathy, which could lead to pathologic fractures and bone destruction (Acquemin C *et al.*, 2015). The absence of pain and the rare location in the knee may lead to delayed diagnosis and treatment. The radiological appearance of a depressed tibial plateau fracture is characteristic in this context of knee neuroarthropathy. For treatment, immobilization and unloading of the extremity are the only options to prevent permanent deformity. Arthrodesis is the surgical therapy of first option, but it causes a significant reduction in knee mobility and is associated with a high risk of complications due to bone fragility and ligament instability (Illgner U *et al.*, 2014). Microvascular damage and alterations, as well as small nerve fibers damage, cause ischemia and tissue hypoxia, which may be manifested in the skin by the conditions usually observed in diabetics (diabetic dermopathies, delayed healing, leg ulcers and trophic disorders) (Senet P *et al.*, 2011). The Diabetic Bullosa is rarely observed and its etiology is still unknown. Several hypotheses have been suggested, including vascular alterations in diabetics that could be a reason for skin cleavage (Wagner G *et al.*, 2018). It is observed in uncontrolled diabetes, rarely in pre-diabetes and undiagnosed diabetes (Chouk C *et al.*, 2022). Diabetic bullosa is characterized clinically

by painless, tender bullae containing serous, sterile fluid that appear spontaneously on normal skin without a medical history, and may be recurrent. Distal locations are preferential, probably due to associated diabetic neuropathy (Wagner G *et al.,* 2018). The diagnosis is mainly clinical, histopathological examination is often not conclusive; it may show intra-epidermal and sub-epidermal cleavage without significant inflammatory infiltrate. In therapeutic terms, prevention of super infection by local antiseptic care is necessary. Other authors recommend leaving the bulla intact as it constitutes an effective and sterile cover for the subjacent lesion, or aspiration with a small fenestration in the roof of the bulla and application of topical antiseptics or antibiotics to prevent secondary infections (Pannu AK *et al.,* 2019). The lesion often resolves spontaneously in 2-6 weeks. Diabetic bullosa is often associated with diabetic neuropathy and significant glycemic unbalance (Chen Y *et al.,* 2018) as in the case of this patient. The differential diagnosis includes friction bullae, bullae due to burns or edema, bullous drug reactions, bullous pemphigoid, and epidermolysis bullosa acquisitive (Taylor SP *et al.,* 2017).

CONCLUSION

A painless and unstable swollen knee in a diabetic patient should suggest diabetic neuroarthropathy. Diabetic bullosa is a rare skin complication of diabetes. An interrogation, a rigourous clinical examination and a oriented paraclinical evaluation are necessary to make a positive diagnosis.

Author Contributions

All authors contributed to the writing of this manuscript and read and approved the final version.

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