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## A painless fracture of a phalanx of the left hand in a patient with type 1 diabetes – case report

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## Abstract

The aim of our study is to present a case report of a patient who, due to advanced symmetrical peripheral diabetic polyneuropathy, was unaware of the fracture of the fifth finger of the left hand and even tried to restore it to its previous position. The 53-year-old patient with type 1 diabetes at the age of 9, who, due to non-compliance with medical recommendations and poor metabolic control (over the last 15 years, HbA1c has never fallen below 8.1%, reaching 11.1% in May 2017), developed complications such as: ischemic heart disease, diabetic retinopathy, nephropathy and peripheral neuropathy. In February 2019, in the morning, when unscrewing the fuel filler cap in the car, the patient suffered a finger fracture. He remained unaware of this fact all day due to the lack of any pain symptoms. It was only in the evening that he noticed the wrong placement of the fifth finger on his left hand. On the next day, there was a slight soreness with pressure, and the swelling deepened, which prompted him to visit the emergency room. An X-ray examination was performed there, which showed a fracture of the shaft of the proximal phalanx of the fifth finger of the left hand with angular setting of the fragments. The finger was immobilized in a plaster cast and the patient was referred for further check-up in a specialist outpatient clinic. Fortunately, the attempt to set the finger on his own did not cause any significant complications, and after removing the plaster cast, the patient regained the use of the broken finger. A recent electromyographic study confirmed the existence of a very advanced peripheral neuropathy. In summary, improperly treated, poorly controlled type 1 diabetes has serious consequences. It is very important that people suffering from it conduct regular self-monitoring of blood glucose levels and lead a healthy lifestyle.

*Key words:* Case report, diabetes, painless fracture, phalanx fracture

## *Introduction*

Diabetic neuropathy affects up to 66% of diabetic patients [1], and may take the form of, for example, amyotrophy, vegetative neuropathy or acute inflammation of the peripheral nerves in the form of chronic insulin neuritis. Painless bone fractures in diabetic patients are most common in feet, however, we have not managed to find in the literature any case reports of painless phalanx fractures. We describe here a case of a patient with

chronic peripheral polyneuropathy with advanced sensory disturbance, which led to a painless fracture of the shaft of the fifth phalanx of the left finger.

### *Case report*

A 53-year-old patient developed type 1 diabetes in the age of 9, and since 2004 he has been under the constant supervision of a diabetologist at one of the clinics in Rzeszow, Poland. The first serious complication of diabetes in this case was the constantly progressive retinopathy, due to which he underwent laser therapy in both eyes, and in 2015 - a posterior access vitrectomy. Nevertheless, after three years, the right eye was completely blind. Moreover, he developed: ischemic heart disease, diabetic dyslipidemia, diabetic nephropathy, and autonomic neuropathy in the form of a complete inability to recognize hypoglycemia symptoms. In 2019, an EMG study was performed, where stimulation tests showed: no response to stimulation of right and left median and ulnar sensory nerves, and no response to stimulation of left median nerve motor fibers. In the case of the motor right median nerves and both ulnar nerves, an extension of the terminal latency, a significant reduction in amplitude, a slower conduction velocity and an extension of the F wave latency were observed, which confirmed the existence of severe axonal-demyelinating sensory-motor polyneuropathy.

There is a suspicion that the patient is not following the doctor's instructions completely because of very unstable blood glucose levels. In recent years, the patient has been treated with the following drugs: insulin lispro, insulin glargine, human neutral insulin and insulin glulisine. Nevertheless, the values of glycosylated hemoglobin HbA1c measured during visits to a diabetologist never dropped below 8.1% (65 mmol/mol) since 2004, reaching 11.1% (98 mmol/mol) in May 2018 and to 10% (86 mmol/mol) in the last test performed in April 2019. This assumption is also confirmed by the normalization of blood glucose levels and the elimination of hypoglycaemia during the patient's hospital stay in 2008. After discharge from the hospital, cases of hypoglycaemia returned, as did the fluctuations in blood glucose levels.

In February 2019, in the morning, the patient suffered a fractured finger while unscrewing the fuel filler cover in a car. Throughout the day he did not feel any symptoms, he carried out daily activities without any obstacles. In the evening he noticed the wrong positioning of the fifth finger of his left hand, but the area remained painless all the time. It was then that, thinking it was a sprain, he decided to try to adjust his finger on his own.

On the next morning, the swelling deepened, which prompted him to visit the emergency room. The physical examination showed that the position of the fifth finger was deflected laterally and there was swelling in the area of the left proximal phalanx without reddening, pain, heat. Sensation of the phalanx was lost distally to metacarpophalangeal joints of the left hand. Other phalanx bones and all carpal bones did not show any abnormalities, apart from hypoesthesia. On the same day the X-ray examination in the PA + lateral projection was performed and confirmed a fracture of the phalanx shaft of the proximal fifth finger of the left hand with a slight angular positioning of the bone fragments. The finger was immobilized in a plaster cast, and the patient was referred for further control in a specialist clinic.

The control visit was Patient's attempt to adjust the finger on his own did not cause significant complications. and after removing the plaster cast, the patient regained the functionality of the broken finger.

During the control visit after 10 days and 6 weeks the phalanx restored well. No complications in physical and X-ray examinations. The patient is under permanent diabetological control, however his HbA1c levels are in the range of 9-11% (75-97 mmol/mol) in past three years.

### *Discussion*

Neuropathy is one of the effects of improperly treated, too high glycemia - it may affect up to 66% of diabetic patients [1] Distal symmetric sensorimotor polyneuropathy is the most common in people suffering from metabolic disturbances in blood glucose regulation. Sensory axons are more often affected than motor axons [2]. Most fractures in diabetic patients, even with chronic neuropathy, are painful and very rarely painless, mostly these are foot fractures in neuroarthropathic joints (Charcot joints) and sometimes in Lisfranc joints [3,4]. Painless fractures in diabetic patients are very rare and the described cases refer to Charcot joints. [5]. Our case is therefore unusual, as the fracture was in the finger of the hand, was not associated with neuroarthropathic Charcot joints and was completely painless. Moreover, because of hypoesthesia, the patient initially overlooked the fracture, which could lead to serious complications. To prevent misdiagnosis and poor outcomes, it is very crucial to maintain a proper HbA1c and glucose levels in patients with diabetes mellitus, and to be very careful during examination, especially when it comes to patients with diabetic neuropathy and hypoesthesia.

### *Compliance with Ethical Standards*

The authors report there are no conflicts of interests to declare.

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The participant has consented to the submission of the case report to the journal and all required ethic approvals were obtained.

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