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A patient presenting with 'stiff hands'

Keywords: diabetes mellitus, arthritis/rheumatic diseases



Case study

Christie, 42 years of age, has a 30 year history of type 1 diabetes. She presents complaining of stiff hands. Over the past 10 years Christie's diabetic control has been moderate with HbA1c levels varying from 7.5–9.0%. She is a nonsmoker and has recently developed hypertension for which she takes perindopril. She has no other significant past history. Christie complains that, 'my ring finger is stuck permanently and my pointer finger sticks and clicks sometimes. Both my hands are really stiff in the morning – I've had to get a bigger mug for my coffee'. Christie states that until recently the stiffness tended to get a bit better later in the day; now she has had trouble all day with things such as opening doors, changing gears and steering the car. She says she feels like her hands are gradually freezing in a cupped position. On examination, Christie's hands are stiff, with thickened skin and a hard linear thickening over the fourth and fifth flexor tendons. There is also a nodule over the flexor aspect of the index finger metacarpophalangeal joint.

Question 1

What is the most likely cause of Christie's permanently 'stuck' finger?

Question 2

What is the most likely cause of Christie's 'sticking' finger?

Question 3

What is the most likely cause of the global stiffness of Christie's hands?

Question 4

In addition to the three conditions affecting Christie, what other connective tissue disorders may affect those with diabetes?

Question 5

What would be your management plan for Christie?

Answer 1

Christie's permanently 'stuck' finger is almost certainly a Dupuytren contracture which usually affects the ring and to a lesser degree the little finger. The palmar aponeurosis becomes thickened, contracts and flexes the fourth and fifth fingers. The overlying skin becomes tethered to the aponeurosis. Unlike the limited digit movement caused by tenosynovitis (see below), the skin does not move when the fingers are flexed. Dupuytren contracture is more common in diabetes (especially type 1 diabetes) and is thought to be caused by glycation of connective tissue with subsequent crosslinking of protein molecules reducing the flexibility of soft tissues and being associated with inflammation and scarring.

Answer 2

Christie's 'sticking' finger is likely to be the result of flexor tenosynovitis which usually affects the most commonly used fingers (*Figure 1*).¹ The inflammation results from trauma caused by repetitive movements, pressure over the metacarpophalangeal joint or direct trauma. Usually one or two digits are affected, but in diabetes (especially type 1 diabetes), several digits may be involved. Symptoms include pain and/or stiffness of the affected finger. As the inflammation and scarring progress, the tendon sheath can become so narrow that the tendon catches in the sheath with movement resulting in a clicking sensation. The finger may also become stuck in flexion if the tendon can no longer pass through the sheath ('trigger finger'); forcible extension of the finger overcomes the resistance and suddenly allows the finger to move. Eventually the tendon may no longer be able to pass through the sheath at all and the finger becomes stuck. Effective treatment may be more difficult in diabetic patients with multiple fingers involved.



Figure 1. Sticky fingers as a result of flexor tenosynovitis

Answer 3

The global stiffness of Christie's hands is likely to be caused by cheiroarthropathy, which refers to a general thickening of the skin and subcutaneous tissues. The skin feels thick and spongy and movement may be limited. Patients may become accustomed to the stiffness and not complain about it, but it can be made apparent by the so called 'prayer sign' (Figure 2). Patients may become more clumsy partly because of the thickening and stiffness per se, and partly because some loss of sensation is caused by the thickening. The thickening is particularly noticeable over the knuckles when the fingers are flexed since the usual thinning and tightening of the skin associated with stretching does not occur and so called 'knuckle pads' remain. The skin and subcutaneous tissue may become so thick that venipuncture and fingerprick blood sampling may be difficult. Rarely, the digits become swollen and painful and the overlying skin becomes tight and shiny as in scleroderma (sclerodactyly).

Answer 4

The following other connective tissue disorders may affect those with diabetes:

- carpal tunnel syndrome (CTS) and other tunnel syndromes. In these conditions, thickened subcutaneous tissues traps nerves at sites where they pass through tunnels surrounded by fixed structures. Carpal tunnel syndrome is the most common of these affecting the median nerve,² but nerves can also be 'trapped' in other tunnels – at the elbow (affecting the ulnar nerve) knee (affecting the peroneal nerve) or ankle (affecting the tibial nerve, the 'tarsal tunnel' syndrome)



Figure 2. Positive 'prayer sign' in a patient with cheiroarthropathy. The patient is asked to hold the palms together. A 'positive prayer sign' is seen when the patient is unable to extend the wrists to 90 degrees and oppose the palms and fingers

- de Quervain syndrome and other forms of tenosynovitis. In de Quervain syndrome, inflammation from repeated trauma causes pain over the radial dorsal surface of the wrist where the abductor pollicis longis and extensor pollicis brevis pass over the distal end of the radius. Inflammation causes swelling over the wrist and pain when the thumb is extended or adducted. The diagnosis is confirmed by the Finkelstein test where the thumb is grasped in the palm and the hand is adducted (the ulnar movement stretches the tendons as they pass over the radius onto the thumb)
- adhesive capsulitis. Adhesive capsulitis results in stiffness at the shoulder joint causing a severe limitation of movement¹
- Peyronie disease of the penis. Although not relevant to Christie, Peyronie disease of the penis is more common in diabetes. This association may be related to age, vascular



Figure 3. Site of corticosteroid and local anaesthetic injection for flexor tenosynovitis

disease or neuropathy, but it is also more common in those with Dupuytren contracture suggesting a link with cheiroarthropathy.³

Answer 5

For Christie's Dupuytren contracture, referral to a physiotherapist, hand therapist and/or occupational therapist may help minimise the limitations associated with the contracture.

However, this condition generally requires surgical excision of the aponeurosis to relieve the fixed flexion deformity. Surgery is usually followed by rehabilitation with physiotherapist, hand therapist and/or occupational therapist to maximise the functional result.

For the sticking, clicking and triggering associated with Christie's flexor tenosynovitis there are a range of effective nonsurgical interventions including corticosteroid and local anaesthetic injection, splinting and topical and/or oral non-steroidal anti-inflammatory medications. Corticosteroid and local anaesthetic injection is usually effective. Figure 3 indicates the site of injection. Injection can be repeated if necessary, however multiple injections may be associated with weakening and rupture of the tendon. Splinting of the digit to stop movement of the affected tendon may relieve pain. The digit needs to be splinted for least 2 weeks. If nonsurgical interventions are not effective in controlling symptoms and surgical release of the tendon is indicated.

Improved glycaemic control may reduce the likelihood of the progression of Christie's connective tissue problems. The connective tissue syndromes described above only become common after 5–10 years duration of diabetes and are thought to be caused by protein glycation. However, no trials have tested the benefits of glycaemic control on progression of symptoms. Nonetheless Christie's HbA1c of 8–9% indicates that her control is not good; her considerable risk of long term diabetes related complications would be reduced by 30% for each 1% decrease in her HbA1c.⁴

Christie's problems may prompt her to take her diabetes more seriously and may provide you with an opportunity for a GP Management Plan and Team Care Arrangements (Medicare Benefits Schedule Item 721 and 723). Medicare would then subsidise five sessions in a year in total for physiotherapy or occupational therapy for her hand problems, and a diabetes educator and dietician for her diabetes.

Key points

- Christie's 'stiff hands' result from a combination of diffuse skin thickening (cheiroarthropathy), tenosynovitis and Dupuytren's contracture.
- In addition to these three conditions, diabetics are more likely to suffer from carpal and other 'tunnel' syndromes, other forms of tenosynovitis such as de Quervain's tenosynovitis, adhesive capsulitis and, in men, Peyronie disease of the penis.
- Dupuytren contracture generally requires surgical excision of the aponeurosis to relieve the fixed flexion deformity.
- For tenosynovitis there are a range of effective nonsurgical interventions including corticosteroid and local anaesthetic injection, splinting and topical and/or oral nonsteroidal anti-inflammatory medications.
- Improved glycaemic control may reduce the likelihood of the progression of connective tissue problems.

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Conflict of interest: none declared.

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