Case report: diabetic foot amputation prevention during COVID-19

Kshitij Shankhdhar

During the COVID-19 pandemic, clinicians have needed to adapt to new ways of delivering care. In this case report, the treatment of a patient with a diabetic foot ulcer was interrupted by the pandemic lockdown. The author and his diabetes care team managed the patient using online services and phone calls. The patient's self-care at home was successful and his ulcer healed completely, saving his toe from amputation.

On the day before the COVID-19 pandemic lockdown was enforced in the city of Lucknow, in the north Indian state of Uttar Pradesh, Mr S presented at the author's diabetes centre with a diabetic foot lesion on his left foot (*Figure 1*).

A detailed medical history was taken, including family history of metabolic issues, duration of diabetes and his medication and treatments. Medical staff examined all the medical documents he had brought with him and prepared a proper summary for the consultant diabetologist at the centre (the author).

After gaining a proper understanding of his metabolic and treatment history, the author and colleagues focused on the diabetic foot lesion on his left big toe (*Figure 1*). Based on the history given by the patient, it was concluded that the lesion started as folliculitis and developed into cellulitis and ulceration. Perhaps due to underlying diabetic sensory neuropathy, the patient neglected the lesion during the earlier stages, leading to rapid spread of the bacterial infection in the great toe tissue, possibly involving the bone (osteomyelitis with septic arthritis of the joint).

Blood samples were taken, both fasting and post-prandial (2 hours after breakfast). A plain X-ray was ordered and a tissue culture was scheduled to be done during surgical debridement the same afternoon. Detailed neurovascular examination of the lower extremity was also planned in order to assess the presence of diabetic neuropathy and peripheral vascular disease. However, the patient requested that investigations and debridement be delayed until the next day (possibly due to his financial situation and lack of insurance).

His fasting blood glucose was recorded as 167 mg/dl and post-prandial blood glucose 268 mg/dl. His HbA_{1c} was 9.2% and serum uric acid was 9.2 mg%. His blood pressure was 140/90 mmHg and his LDL cholesterol levels were high (180 mg/dl). His electrocardiogram was fairly normal, and he gave no history of tobacco use or alcohol consumption.

He was taking 2 mg of glimepiride in the morning and 1 mg at night, and 500 mg of metformin twice daily. He was also taking atorvastatin (10 mg) and telmisartan (20 mg) at night. He was applying an antibiotic ointment to his lesion and dressing with a simple cotton and bandage.

Treatment and medication changes

Some adjustments were made to his regular medication regimen. Based on his reports, the metformin dose was increased to 1,000 mg, twice a day. Glimepiride was continued as before. Allopurinol (100 mg) was added once a day. Telmisartan was increased to 40 mg and atorvastatin to 20 mg, to be taken at night. Co-amoxiclav (500mg of Amoxycillin and 125mg of Clavulanic acid) was prescribed twice a day for 2 weeks.

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Article points

1. The patient presented with a diabetic foot ulcer on his big toe.
2. The COVID-19 lockdown meant his care could not continue in clinic.
3. The patient was guided through his self-care by video discussions and phone calls, and his ulcer healed completely.

Key words

- COVID-19
- Diabetic foot ulcer
- Remote monitoring
- Telemedicine

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Figure 1. Mr S's foot lesion at presentation, day 15 and day 30.

Surgical debridement and the remaining investigations were planned for the next day. Since lockdown started the next morning, this could not be carried out.

When the patient connected with the author online, he guided the patient on how to change the dressing at home. As instructed in a 15-minute online video discussion, the patient washed the lesion with normal saline and attempted mechanical debridement using simple sterile gauze (gradual cleaning of wound bed). The lesion was possibly neuropathic, which meant that the patient could clean the lesion reasonably well without much pain. After thoroughly cleaning the wound and the surrounding area with saline, the patient removed any excess fluid by blotting with gauze. The wound surface was left slightly moist, because a moist wound bed plays an important role in wound healing (Cutting et al, 2003).

Cadexomer iodine was chosen for the patient to use at home (*Box 1*). It is known to remove the barrier to healing with its dual antimicrobial and desloughing properties (Angel et al, 2008). Pharmacodynamic study has shown that when cadexomer iodine is in contact with wound exudate, it releases free iodine, which reduces the bacterial count (Gottardi et al, 1991). It also absorbs fluid (as much as 6ml of fluid per gram of cadexomer iodine), removes pus and debris, and facilitates desloughing (Holloway et al, 1989). Literature is available on the therapeutic benefits of cadexomer iodine in the treatment of chronic wounds, particularly in venous leg ulcers (Angel et al, 2008). However, limited studies exist on its role in the treatment of diabetic foot ulcers and pressure ulcers (Moberg et al, 1983; Malone et al, 2017).

Under online observation, the patient used cadexomer iodine dressing products delivered to his home by a local pharmacy. The patient was informed that:

- A single application of cadexomer iodine should not exceed 50g
- The total amount of cadexomer iodine ointment used in 1 week should not exceed 150g
- The duration of treatment should not exceed 3 months in any single course of treatment.

The patient applied cadexomer iodine directly to a dry, sterile non-adherent gauze. Then he moved a gloved finger lightly over the dressing to spread the ointment underneath, with a depth of 3mm. The patient was trained to change the dressing at home and monitoring was carried out online, twice a week. The lesion improved remarkably within

Box 1. Cadexomer iodine.

Cadexomer iodine is a delivery system in which iodine is present within a cadexomer starch bead that acts as a carrier and permits the slow release of iodine into the wound bed to ensure a steady state concentration of 0.9% iodine at the wound bed. Clinical outcomes of cadexomer iodine are attributed to the following salient features:

- Promotes a clean wound healing environment.
- Has a prolonged antibacterial action of up to 72 hours, disrupts biofilms and prevents their formation.
- Absorbs up to six times its own weight and reduces the number of dressing changes required.
- Forms a layer on the wound, which contributes to moist healing and helps eliminate the odour of heavily contaminated wounds.
- Effectively lowers the bacterial load and acts as a barrier to invasion of new pathogens.
- Does not adhere to wounds, eliminates the trauma associated with dressing changes and protects the delicate skin epithelium.
- Changes its colour to yellow/grey as an indication of the need to change the dressing.

re-ulceration and it was emphasised that he must look after his feet long term.

Discussion

The author has coined a pneumonic — MAGIC in which M stands for metabolic control, A for aggressive debridement, G for ground clearance (offloading), I for infection control and C for compliance. These five factors are vital for the healing of diabetic foot lesions.

One must remember that once healing is achieved, re-ulceration is always a real possibility in people with diabetes. Ulcer recurrence significantly increases the long-term costs for diabetic foot care (Apelqvist et al, 1995) and further increases risk of amputation, as well as deterioration of patient's health and wellbeing (Singh et al, 2005).

Conclusion

At the beginning of the COVID-19 lockdown, we were unable to continue with our patient's care in person. Therefore, he was taught how to care for and dress his diabetic foot ulcer at home via video call. This strategy was successful, with his wound progressing to complete epithelialisation by day 30.

Staff worked to educate the patient and his toe was saved. The author is hopeful that the education offered to the patient has made a lifelong positive impact on his self care. ■

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