CASE REPORT

Unwanted baggage

Nicolas Leitz,^{1,2} Zarqa Leitz,³ Martin Schaller¹¹Department of Dermatology, University Hospital Tuebingen, Tuebingen, Germany²Outpatient Dermatology Practice, Dres Leitz, Stuttgart, Germany³Department of Dermatology, Hautklinik Bad Cannstatt, Stuttgart, Germany

Correspondence to

Dr Nicolas Leitz,
nicolas.leitz@gmail.com

SUMMARY

An elderly woman with a rapidly progressing lower leg ulcer presented with features of systemic inflammatory response syndrome (SIRS). The ulcer had occurred after hitting her leg against a piece of luggage. The causative pathogen in our case was by *Corynebacterium ulcerans*, demonstrated in bacterial cultures and by PCR. Disease progression was stopped only by Linezolid intravenous. after several other antibiotics failed to help. Diphtheria is known to most physicians as a respiratory disease caused by *Corynebacterium diphtheria* which is occurring in the developed world infrequently because of widespread use of immunisation programmes. However, cutaneous infection with diphtheria is increasingly being diagnosed.

BACKGROUND

Diphtheria is a rare disease in western Europe. But it can lead to life-threatening consequences especially in unvaccinated patients.

CASE PRESENTATION

In October 2010 a 90-year-old woman was referred to us with a 7-week-old non-healing ulcer on her left ankle, with sudden deterioration of her general condition over the past 2 days. On admission she presented with features of systemic inflammatory response syndrome (SIRS) including tachypnoea, tachycardia, hypothermia (35.1 °C), leucocytosis ($20\,100 \times 10^3/\mu\text{l}$) and raised C reactive protein (20.1 mg/dl). Further symptoms included nausea, vomiting with haemoptysis and melaena. No pathological ECG changes besides tachycardia were seen.

The wound had developed after she grazed her ankle against a piece of luggage at a train station. The resulting ulcer increased in size over 7 weeks despite treatment with oral clindamycin, penicillin ciprofloxacin and intravenous Cefotaxime as well as steroid creams. She had previously been well and had no history of lower leg ulcers.

On examination of the left ankle we found a deep central ulcer of 5×5 cm surrounded by a necrotic area of 12×10 cm with multiple haemorrhagic blisters peripherally. A wound swab was found positive for diphtheria toxin producing *Corynebacterium ulcerans*. Bacterial isolation was done on blood-agar as well as by (PCR). Rod-shaped bacteria on aerobic conditions were cultured with no growth of anaerobic bacteria. Blood cultures were taken on admission showing no bacterial or fungal growth. MRI of the leg showed no osteolytic lesion or necrotising fasciitis.

We diagnosed wound diphtheria with secondary SIRS. Linezolid 600 mg intravenous twice daily was used for 15 days together with aggressive fluid

rehydration for the renal impairment associated with SIRS. Her overall symptoms improved within 3 days but the ulcerated area increased to a final size of 35×18 cm (figure 1). Extensive necrosectomy with tendon resection was needed. After successful recovery, she was discharged to a rehabilitation facility. She showed no neurological symptoms on admission but later developed Guillain—Barré syndrome. The neurological disease resolved over several months. On follow-up 6 months later, signs of re-epithelisation were visible and skin grafting was performed.

Three strains of *Corynebacterium* spp. can produce diphtheria toxin (*C. diphtheria*, *C. ulcerans* *C. pseudotuberculosis*) leading to either respiratory or cutaneous disease. Infections with corynebacteria are generally rare in western Europe thanks to the high rate of immunisation. Incidence is as low as four cases per year in the UK.¹

Classical respiratory disease caused by toxigenic strains is recognisable by notorious features like nasopharyngeal membrane and bull-neck. In contrast, cutaneous disease (caused by toxigenic and non-toxigenic strains) is difficult to diagnose as symptoms are less dramatic, though it may be more contagious than respiratory disease. The lesions usually occur on the extremities and are often described as punched-out ulcers. Cutaneous infections seem to be more frequently associated with *C. ulcerans*. Co-isolation of other pathogens is common. Major risk factors for infections with toxigenic corynebacteria is travel to endemic countries or close contact to cattle such as agricultural workers² or drinking unpasteurised dairy products.³

Our patient lacked any of the above risk factors and received her last booster vaccination for diphtheria 3 months previously. Whether the trauma served as an entry point for the bacterium remains speculative, as survival of *Corynebacterium* spp. on dry inanimate surfaces is estimated to be within 1 day to 6 months.⁴ It is unclear why the disease

Figure 1 Clinical image of the lower leg upon arrival.

To cite: Leitz N, Leitz Z, Schaller M. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-009260

occurred in this recently vaccinated patient however it is plausible that the likelihood of death as an outcome in this case may have been higher without the vaccination in view of the fact all deaths in the UK from diphtheria occurred in unvaccinated patients. We also believe this may have been the reason there was no progression to respiratory diphtheria.^{1 5}

Erythromycin or clindamycin is recommended for cutaneous diphtheria; however, penicillin can also be effective.⁶ Linezolid was used in this case as it offered very good tissue penetration⁷ together with little side effects concerning progressive worsening of the patients kidney function.⁸

The use of diphtheria antitoxin is recommended in respiratory disease but not for isolated cutaneous disease.⁶ Toxic sequelae of cutaneous infection are rare and can warrant antitoxin. However, no clinical trials have been done to evaluate the use of antitoxin in cutaneous diphtheria.

Learning points/take home messages

- ▶ Diphtheria is a rare disease in western Europe with an incidence of around four cases per year in the U K.
- ▶ Respiratory diphtheria is more often caused by *C. diphtheria*. Cutaneous diphtheria is more often caused *C. ulcerans*.
- ▶ *C. ulcerans* seems to be more contagious.
- ▶ The efficacy of diphtheria antitoxin has not been tested for wound diphtheria

Contributors N L, Z L and M S wrote the report. N Land MS looked after the patient.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Wagner KS, White JM, Crowcroft NS, *et al*. Diphtheria in the United Kingdom, 1986–2008: the increasing role of *Corynebacterium ulcerans*. *Epidemiol Infect* 2010;138:1519–30.
- 2 Vetricevél TP, Pise GA, Agrawal KK, *et al*. Cutaneous diphtheria masquerading as a sexually transmitted disease. *Indian J Dermatol Venereol Leprol* 2008;74:187.
- 3 Wellingshausen N, Sing A, Kern WV, *et al*. A fatal case of necrotizing sinusitis due to toxigenic *Corynebacterium ulcerans*. *Int J Med Microbiol* 2002;292:59–63.
- 4 Kramer A, Schwebke I, Kampf G. How long do nosocomial pathogens persist on inanimate surfaces? A systematic review. *BMC Infect Dis* 2006;6:130.
- 5 Tiwari TS, Golaz A, Yu DT, *et al*. Investigations of 2 cases of diphtheria-like illness due to toxigenic *Corynebacterium ulcerans*. *Clin Infect Dis* 2008;46:395–401.
- 6 Begg N. WHO diphtheria manual for the management and control of diphtheria in the European Region. Copenhagen. 1994.
- 7 Majcher-Peszynska J, Haase G, Sass M, *et al*. Pharmacokinetics and penetration of linezolid into inflamed soft tissue in diabetic foot infections. *Eur J Clin Pharmacol* 2008;64:1093–100.
- 8 Ziglam HM, Elliott I, Wilson V, *et al*. Clinical audit of linezolid use in a large teaching hospital. *J Antimicrob Chemother* 2005;56:423–6.

Copyright 2013 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow