De novo generalized pustular psoriasis following Oxford-AstraZeneca COVID-19 vaccine
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Dear Editor,

Various cutaneous manifestations have been reported with COVID-19 infections during the pandemic, with some reports of new onset skin disease or flares of pre-existing skin disease occurring after rollout of the vaccination programmes.1 We present a case of new-onset generalized pustular psoriasis (GPP) that was considered secondary to the Oxford-AstraZeneca COVID-19 vaccine.

A 66-year-old woman presented to the emergency department with a 3-week history of a worsening, generalized, erythematous and pustular rash. Her medical history included hypertension and depression. She had no prior dermatological issues and there was no family history of psoriasis or other skin diseases. Her long-term medications included aspirin, sertraline, amlodipine and bisoprolol, which she had been taking for many years with no prior skin issues. No new medications had been commenced in the weeks preceding the rash and there were no recent illnesses, including COVID-19 respiratory symptoms. The first dose of the AstraZeneca vaccine was given 3 weeks prior to onset of the rash.

Physical examination revealed an extensive erythematous pustular rash to the trunk and proximal aspect of the limbs, with no mucosal membrane or palmoplantar involvement (Fig. 1). The patient was clinically stable with normal blood test results. A COVID-19 PCR test was not performed. Histological examination of an 8-mm diagnostic punch biopsy confirmed the clinical suspicion of GPP (Fig. 2).

The patient was initially managed with topical steroids and later commenced on acitretin 20 mg once daily, resulting in significant improvement and resolution of the rash. Following departmental discussion, it was deemed to be in the patient’s best interest for her to receive her second vaccination dose, to which she was agreeable and she received it with no subsequent consequences to her skin. A yellow card was submitted via the Medicines and Healthcare products Regulatory Agency (MHRA). The patient remains stable on acitretin.

GPP can be triggered by viral infections, and there are a few reports in the literature associating it directly with COVID-19 infection2–4 (Table 1). In one case, there was no prior history of psoriasis, and in all three reported cases, the cutaneous changes were preceded by COVID-19 respiratory symptoms. To our knowledge, there is only one other reported case of GPP following the first dose of COVID-19 vaccination (with the Sinovac vaccine CoronaVac).5 However, in that case, the patient had a known diagnosis of stable plaque psoriasis and the onset of the rash was much more acute, developing 4 days after vaccine administration. That patient was also given acitretin, but with no initial improvement, and resolution was achieved through intravenous infliximab infusions. Our patient responded very well and promptly to acitretin, and
it is the preferable treatment in this current era with minim-
al risk of immunosuppression. Bisoprolol was considered as potential trigger, but felt less likely than the vaccine, given the prolonged use of bisoprolol and the acute eruption developing post-vaccination.

To our knowledge, this is the first reported case of de novo GPP following the first dose of the Oxford-AstraZeneca COVID-19 vaccine. We believe it is important for clinicians to be aware of potential adverse effects implicated with COVID-19 vaccinations, and to enquire about recent vaccinations in any patient with new onset or flare of skin disease.

Table 1 Summary of reported cases of generalized pustular psoriasis affiliated with COVID-19 infections.

| Patient | Sex/age, years | Pre-existing psoriasis | Clinical description | Treatment |
|---------|----------------|-------------------------|----------------------|------------|
| 1       | F/72           | Acrodermatitis continua of Hallopeau | 2-week history of generalized pustular eruption overlying erythematous plaques mainly on lower abdomen and thighs, accompanied by fevers and malaise and preceded by COVID-19 respiratory symptoms and positive nasal PCR test 2 weeks previously | Acitretin and infliximab with full resolution |
| 2       | F/62           | None, but positive family history of psoriasis | 2-week history of palmoplantar pustules, pustular and psoriasiform rash on the extremities, trunk and scalp, 2 weeks after resolution of COVID-19 respiratory symptoms (positive nasal PCR test) | Not reported |
| 3       | M/60           | Childhood history of plaque psoriasis | 2-day history of widespread pustular and erythematous rash to trunk and limbs accompanied by fevers, 3 weeks after initial COVID-19 symptoms and positive nasal PCR test | Acitretin with improvement |

Figure 2 (a) Prominent subcorneal pustule formation; the pustules were filled with a predominantly neutrophilic infiltrate and there was mild acanthosis of the underlying dermis with a mild to moderate neutrophilic infiltrate and minimal oedema; (b) closer view of perivascular infiltrate in the superficial dermis showing a mild mixed inflammatory cell infiltrate consisting of neutrophils, lymphocytes and extremely scanty eosinophils. (a,b) Haematoxylin and eosin; scale bars included in photos.

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National survey on the management of potassium permanganate by dermatologists
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Potassium permanganate (PP; KMnO4) is an antiseptic agent used for a variety of dermatological conditions.1 It should only be used externally. A never event occurred in our Trust in which PP was accidently administered as an oral treatment to a patient, resulting in their death. This highlighted the lack of guidelines on how to administer and manage the accidental ingestion of PP tablets, hence we carried out a national survey to investigate the current understanding of PP use and management of accidental ingestion of this among dermatology doctors in the UK.

A national survey was sent out by the British Association of Dermatologists (BAD), and 49 dermatologists completed the survey. The survey showed that 90% of responders used PP in their practice. The most frequent conditions that PP is used for are weepy ulcers (80%), infected eczema (53%), blistering conditions (53%), fungal infections (22%) and ‘other’ (4%; stated as ‘weepy gravitational dermatitis’). When asked what form PP is available in, most responders (66%) documented tablet form, while other forms reported were solution, crystals and powder form, and 15% of responders did not know what form it is available in. When asked how much water is required to dilute the PP tablets, over a third (35%) of respondents did not know, and < 50% of respondents selected the correct answer of 4 L of water.

An encouraging finding is that 59% of dermatologists provide BAD patient information leaflets to their patients. Conversely, the majority of responders (86%) were not aware of the immediate steps required following accidental ingestion of the tablet, with only 14% stating that they were aware of these measures.

Another interesting finding is that 39% of responders documented that they do not know the consequences of ingestion of these tablets. The commonest consequences selected were pharyngeal oedema (20%), bowel perforation (16%), haemoptysis (14%), multiorgan failure (14%) and cardiovascular collapse (10%), with 42% selecting all of these options (which was the correct choice).

In the event of accidental ingestion of PP in an emergency hospital setting, the most popular choice for first action to be taken was to contact the National Poisons Information Service or consult its database (Toxbase). Other actions chosen were to contact the on-call physician (31%), on-call anaesthetist (12%) or pharmacist (6%), with 43% selecting all stated actions as relevant (which is the correct choice). The majority (73%) of respondents did not know what treatment can be given within the first few hours of accidental ingestion, with only 8% selecting the correct answer of milk ingestion. Moreover, 73% did not have a protocol at their workplace to address accidental oral ingestion of PP tablets.

The immediate concern when PP is ingested is critical laryngeal oedema: therefore, the main priority is maintaining the airway.1 Another documented consequence of overdose is methaemoglobinaemia, for this methylthioninium chloride 2 mg/kg IV can be given gradually or exchange transfusion is required in severe cases.2

The treatment of KMnO4 ingestion is mainly supportive.1 There is an option of using gastric lavage but there is a high chance of perforation. Other management options include the oral intake of milk, which has been shown that it might help decrease local effects.4 Moreover, early endoscopy may be used to determine the extent of GI involvement and therefore aids with supplementary management.5 Additional management options may include corticosteroids to reduce tissue oedema and broad-spectrum antibiotics due to the high risk of perforation and peritonitis.1

Our survey highlights that immediate action is required to increase awareness of PP use amongst doctors in dermatology and other departments, as well as the need to immediately implement a national management guideline, as the consequences to the patient are fatal in the cases of accidental ingestion.

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