

# Preseptal cellulitis and infraorbital abscess as a complication of a routine COVID-19 swab

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## SUMMARY

This case report describes a significant complication of a routine COVID-19 swab in a previously fit and well young patient who developed preseptal cellulitis and an infraorbital abscess as a consequence of the mentioned nasal swabbing. Other authors have previously reported various complications in connection with the use of nasal swabs, including retained swab fragments, epistaxis and cerebrospinal fluid leakage. To our knowledge, to date, this is the first reported case of an abscess as a consequence of COVID-19 swabbing. There has been a clear growth in the use of nasal swabbing worldwide over the last 9 months and many healthcare workers involved in COVID-19 prevention may not be aware of the potential risks of nasopharyngeal swabbing. The presented case highlights the need for better awareness of the complications of these routine tests and we hope that it will also lead to their safer implementation.

## BACKGROUND

The COVID-19 pandemic has resulted in a substantial rise in the number of nasopharyngeal and deep nasal swab tests carried out worldwide. The possible complications of such frequent testing are often overlooked. It is of high importance to ensure correct implementation of swabbing in order to minimise the risk to those involved.

## CASE PRESENTATION

A 35-year-old young woman presented to accident and emergency (A&E) of a district hospital with right eye periorbital swelling, redness and pain. It turned out that her symptoms had developed 1 week after having had a routine COVID-19 nasal and pharyngeal swab. The COVID-19 test was performed as a safety measure because she works as a care worker and in this regard her workplace regularly screens their employees every 5 days. She had undergone multiple swabs in the last 5 months, which had all returned negative, and at the time of presentation she had no symptoms suggestive of COVID-19 infection either. She described the swabbing procedure in her right nostril 1 week prior to admission to have been particularly painful. Three days after this test, she noticed worsening redness, swelling and pain around her right eye associated with fever. The vision in the right eye also became blurry, without diplopia. Her general practitioner had commenced oral co-amoxiclav 1 day prior to presenting to A&E. She denied any recent coryzal or dental symptoms. She was previously fit and well and had no medical or ophthalmological

co-morbidities. In particular, she did not suffer from Diabetes Mellitus.

On physical examination, the patient had visible ecchymosis and swelling around her right eye, which was very tender to touch (see figure 1). Her Snellen chart visual acuity was 6/9.5-1 in the right eye and 6/6-1 in the left eye. There were no eye proptosis and eye movement deficits and her colour vision was intact bilaterally. Both pupils were equal and reactive and there was no relative afferent pupillary defect noted. Slit-lamp examination showed no conjunctival injection, clear corneas and 'deep and quiet' anterior chambers. Dilated funduscopy showed normal optic discs and maculae, with no signs of disc oedema. Humphrey's visual field assessment was within normal limits. She had good dental hygiene.

Anterior rhinoscopy showed right nasal septal spur. Both ears were normal with normal-looking tympanic membranes. Oropharynx examination was unremarkable, with no postnasal drip noted. Flexible nasal endoscopy revealed only a right septal spur and the nasal mucosa looked healthy. Right middle meatus was clear of pus or polyps. No intranasal ecchymosis or swelling was noted and the nasopharynx was clear. A tender swelling was noted along the right nasal bone, with no fluctuation on palpation.

Her vital signs were all within normal limits: respiratory rate 16 breaths per minute, oxygen saturation 98%, blood pressure 118/69 mm Hg and heart rate 73 beats per minute.

## INVESTIGATIONS

The patient's blood profile showed mildly raised inflammatory markers (white cell count  $10.4 \times 10^9/L$ , neutrophils  $9.9 \times 10^9/L$  and C reactive protein 36 mg/L.) The remaining blood results were unremarkable. The patient's blood glucose was 5.1 mmol/L.

An orbital CT scan was requested by the A&E team on admission. The consultant radiologist reported a right-sided preseptal cellulitis and a  $1.4 \times 0.7$  cm abscess located inferior to the right orbit, extending along the right nasal bone and towards the right upper canine roots (see figures 2–5). The paranasal sinuses and the mastoid air cells were clear.

The maxillofacial team assessed the patient and based on their clinical findings and the orthopantomogram (see figure 6) concluded that the collection did not originate from her teeth.



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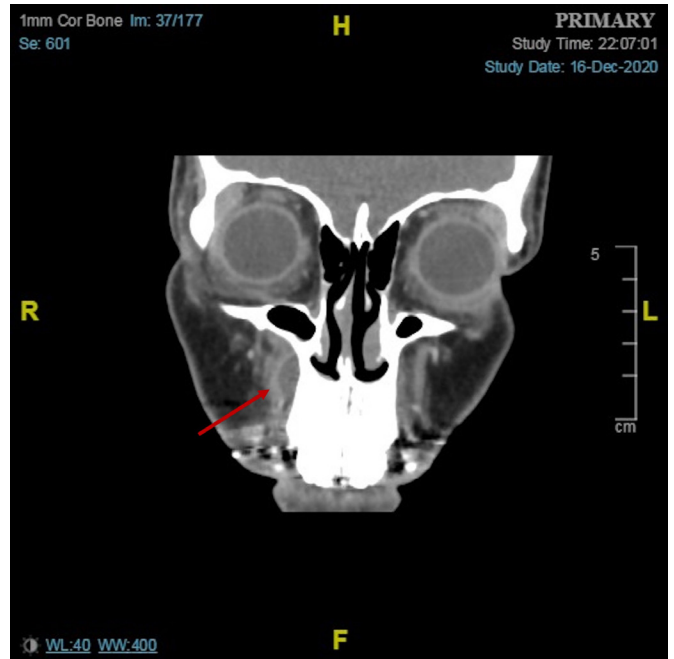
**Figure 1** Photo of the right side of the face showing swelling and ecchymosis around the right eye as seen in a mirror.

**TREATMENT**

The patient was admitted by the ear, nose and throat (ENT) team and was immediately commenced on intravenous co-amoxiclav and oral metronidazole. A single dose of 6.6 mg intravenous dexamethasone was also administered in view of worsening swelling overnight.

**OUTCOME AND FOLLOW-UP**

There was a marked improvement in the swelling around her eye as early as day 1 after hospital admission. She underwent daily ward-round reviews and was seen in the eye clinic on a daily basis. The patient was subsequently discharged after 2 days of

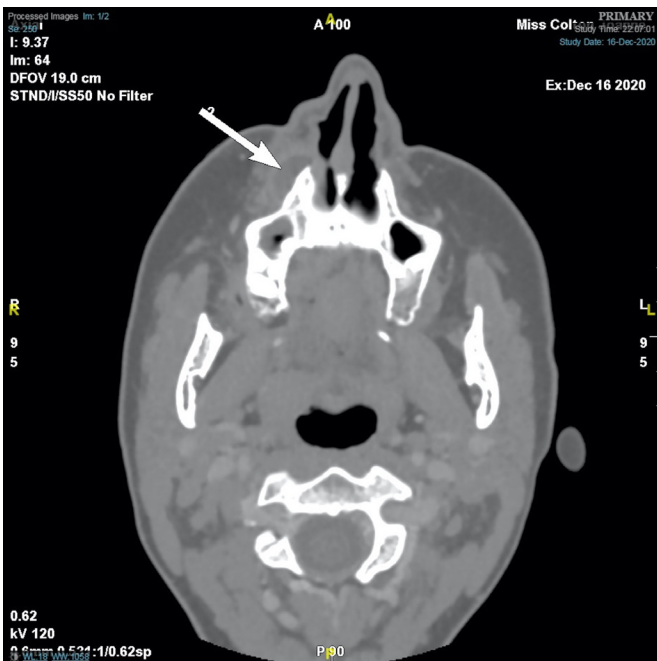


**Figure 3** CT section showing the infraorbital abscess (red arrow): coronal section.

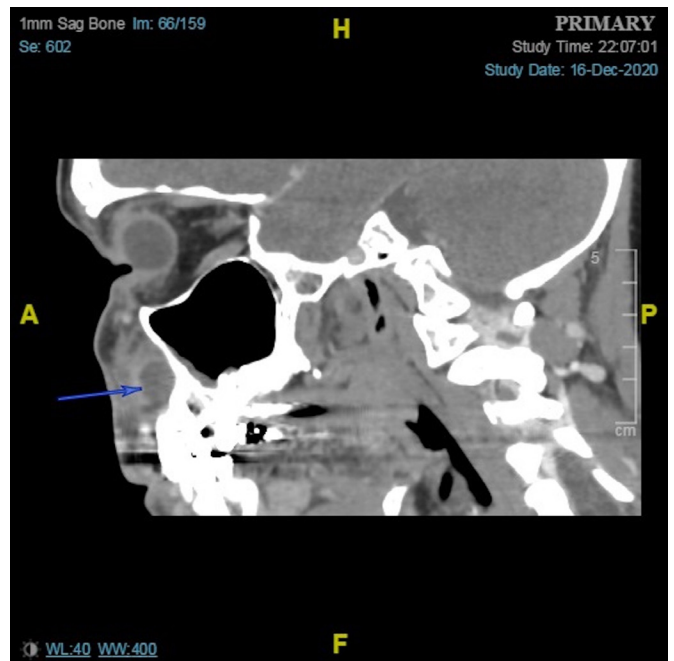
inpatient treatment with a course of oral co-amoxiclav and oral metronidazole. Appointments were arranged to review her in the outpatient ENT and ophthalmology clinics.

**DISCUSSION**

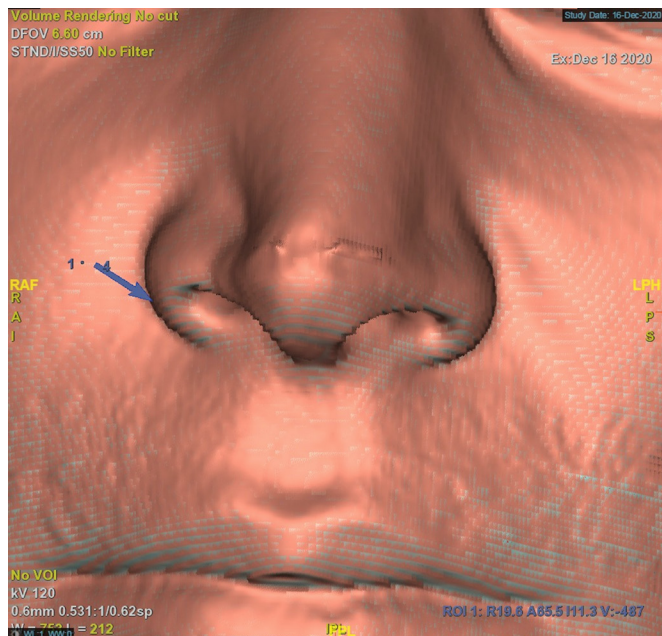
As a result of the current COVID-19 pandemic, the number of COVID-19 tests has significantly increased worldwide.<sup>1</sup> It is estimated that to date over 650 million tests have been performed worldwide, of which nearly 43 million tests have been carried out to date in the UK.<sup>2</sup> Large-scale testing is one of the key



**Figure 2** CT section showing the infraorbital abscess (white arrow): axial CT section.



**Figure 4** CT section showing the infraorbital abscess (blue arrow): sagittal section.



**Figure 5** Three-dimensional CT reconstruction showing the site of abscess (blue arrow).

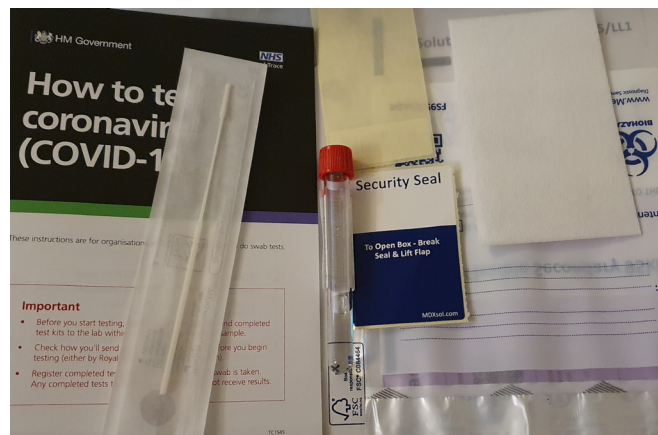
strategies to control the COVID-19 pandemic.<sup>3</sup> Swab testing for the population forms the second pillar of the ‘NHS Test and Trace’ campaign.<sup>4</sup> These tests are carried out at regional test sites, mobile test units and patients’ home. A large proportion of these tests involve obtaining an upper respiratory tract sample using combined nose and throat swab.<sup>5</sup>

Previous case reports have drawn attention to complications of viral swab testing in the nasopharynx. Mughal *et al*<sup>6</sup> described a nasal swab being retained in the nasal cavity of the patient after triggering the swab’s breakpoint mechanism. Sullivan *et al*<sup>7</sup> described the first case of cerebrospinal fluid leak requiring endoscopic surgical repair after nasal testing for COVID-19. Recently, a research group carried out a population-based monitoring study and reported three adverse events in a cohort of 11 476 deep nasal and oropharyngeal swabs (a complication rate of 0.026%) in Germany. These included two accounts of retained nasal swab in the nasopharynx and one account of temporomandibular joint dislocation on mouth opening.<sup>8</sup> To our knowledge, this represents the first case of preseptal cellulitis and infraorbital abscess as a complication of nasopharyngeal swabbing.

A plethora of visual and written information is available in the literature about how to carry out safe and effective



**Figure 6** Orthopantomogram showing no periapical pathology present at the upper right quadrant.



**Figure 7** Photo of ‘Miraclean’ COVID-19 swab applicator, the type used for the patient described in this case report.

### Patient’s perspective

After having a routine Covid swab on the 9/12/2020, I started with headaches [that were] painful when swabbed and after. On the Saturday [12/12/2020], right-side of my nose started swelling, Sunday [13/12/2020] very painful swollen going up to right eye, Monday [14/12/2020], nose, eye and top cheek swollen upper eye. Dr’s prescribed Co-amoxiclav on Tuesday [15/12/2020] very red and swollen around eye, nose, under eye top of cheek, Wednesday [16/12/2020] rang 111. Told to go to Hospital as right eye swollen, shut nearly, red, swelling spreading down face lower jaw towards neck. Transferred from Chesterfield hospital to King’s Mill Hospital Wednesday. Saw eye doctors, ear throat and nose doctor, had scan. I had eyes check Thursday [17/12/2020] and Friday [18/12/2020]. Found the treatment at Hospital to be excellent. Everyone friendly and very thorough checking everything.

### Learning points

- ▶ While swabbing is a crucial way to control the COVID-19 pandemic, it is by no means without its own risks and complications.
- ▶ The risks of swabbing need to be communicated to the patients as well as to the staff implementing the test.
- ▶ Control measures aimed at reducing these complications need to be developed and implemented.

nasopharyngeal swabs.<sup>9 10</sup> However, given the widespread use of these devices, we expect that swabbing safety standards are not always adhered to. This may be a topic for further study to substantiate this case report, such as auditing the technique of personnel carrying out the swabbing procedure.

For the patient in this case report, the Miraclean swab applicator was used, and this was carried out by a qualified nurse at her workplace (see figure 7). Recently, new designs of three-dimensional printed swabs have been developed; however, these carry their own risks. Gupta *et al*<sup>11</sup> found adverse events in 5%–10% of nasal swabs in both their commercial and three-dimensional swabs in a cohort of 176 patients.

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