

CASE REPORT

Cerebrospinal fluid rhinorrhea post COVID-19 nasopharyngeal swab: a case report

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ABSTRACT

Background: Cerebrospinal fluid (CSF) rhinorrhea is a potentially life-threatening condition and it is a rare emergency presentation. Most cases have been related to head trauma. However, CSF leak post COVID swab has been rarely reported.

Case Presentation: We report a 10-year-old male, who presented to emergency department complaining of unilateral clear watery nasal discharge for 14 days, the discharge started after COVID-19 nasopharyngeal swab. The patient was a known case of Malpuech-Michels-Mingarelli-Carnevale syndrome and had undergone surgical repair for cleft lip and cleft palate. From the history and physical examination, CSF rhinorrhea was highly suspected and nasal endoscopy confirmed the diagnosis of cribriform defect on the left side. The patient underwent surgical repair and the symptoms resolved after the surgery.

Conclusion: COVID-19 nasopharyngeal swab can cause potential life-threatening complications and one should consider the contraindications and the alternative methods available to detect COVID-19 to minimize the potential risks.

Keywords: CSF rhinorrhea, COVID-19, CSF leak, case report.

Introduction

Cerebrospinal fluid (CSF) rhinorrhea is rare and a potentially life-threatening condition. The most common cause of CSF rhinorrhea is head trauma, which is attributed to 90% of the cases. Other causes include congenital defect, brain tumor eroding into the anterior cranial fossa, and iatrogenic causes related mainly to surgical procedures involving the skull base. The most feared complication of CSF rhinorrhea is meningitis with an incidence of occurrence reaching up to 40% depending on the etiology [1].

A few case reports have been published regarding CSF leak post COVID-19 swab and meningitis has been reported as a serious complication in one of these cases [2]. All reported cases were of adult patients. To the authors' knowledge, this is the first case of CSF leak post COVID-19 swab in a pediatric patient.

Case Presentation

A 10-year-old male presented to the emergency department (ED) in November 2020 complaining of unilateral clear, watery nasal discharge from the left nostril for 14 days. The symptoms started immediately

after he presented to the ED 14 days prior to the second presentation complaining of low-grade fever (38°C), dry cough, nasal congestion, and body aches, and was found to have congested throat, otherwise unremarkable physical examination. COVID PCR nasopharyngeal swab was done in first ED visit and the patient was discharged home on symptomatic treatment.

The patient reported that the clear nasal discharge started immediately after COVID swab was done in the same nostril, and whenever he leant forward, the discharge increased. The patient had started to feel dizzy lately but denied headache, fever, nausea, vomiting, neck stiffness, blurred vision or rash.

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The patient was a known case of Malpuech-Michels-Mingarelli-Carnevale syndrome; an autosomal recessive disorder characterized by distinctive facial features like hypertelorism, blepharophimosis, blepharoptosis, highly arched eyebrows, and cleft lip and palate. Other findings include growth deficiency, cognitive impairment, and hearing loss [3]. The patient underwent surgical repair for cleft lip when he was 3 months old and cleft palate when he was 6 months old (stage 1). The second stage of surgery was done on October 2019, where he underwent alveolar bone grafting.

On physical examination, the patient was laying on bed comfortably, and vitals were within the normal limits. Facial dysmorphic features were noted; the patient had a broad forehead, low set ears, and hypertelorism. The patient was alert and oriented to self, time, and place. His Glasgow Coma Scale was 15. Neither focal neurological deficit nor Kernig and Brudzinski signs were present. Focused examination showed active clear watery discharge from the left nostril as shown in Figure 1. The rest of the physical exam was unremarkable.

CSF leak was highly suspected from the history and physical examination. Lab results were unremarkable, including normal white blood cell count and inflammatory markers.

CT brain without contrast was done and reported as following “No intracranial abnormality identified. Poor definition of the cribriform plate and with significant rightward deviation of the nasal septum warrants further assessment with high-resolution magnetic resonance



Figure 2. Computer tomography (CT) scan of brain without contrast.

imaging (MRI) scan” (Figures 2 and 3). However, MRI was not done for unknown reason.

The patient was started on prophylactic antibiotics and was admitted under pediatrics neurosurgery. He underwent surgical repair on the second day of admission



Figure 1. Active clear watery discharge from the left nostril.



Figure 3. CT scan of the brain anterior view.

by Ears Nose and Throat (ENT) and neurosurgery teams. Nasal endoscopy was done and showed medial lamella cribriform defect about 1 mm with meningocele in the left side. An endoscopic endonasal repair of CSF leak was done.

After the surgical repair, the patient reported complete resolution of the symptoms. The patient was under observation for 5 days post surgery, no complication was observed during this period. One week post discharge, the patient followed up in the clinic and no complications were reported.

Discussion

From this case report, one can understand the possible complications related to COVID-19 nasopharyngeal swab and importance of considering the patient's history before proceeding to COVID-19 swab. It is critically significant to consider high quality training for all individuals involved in taking COVID-19 swab and to emphasize the correct way of taking it.

To take a nasopharyngeal swab correctly, the patient should tilt his head to the back and the swab should be inserted along the nasal septum, parallel to the palate. The depth of the swab should be the same as the distance from the nostril to the ear [4].

It is also important to consider other ways available for testing for COVID-19, especially in pediatrics age group. A retrospective study compared the oropharyngeal and nasal swab (mid turbinate) in detecting COVID-19. The authors concluded the superiority of nasal swab in detecting COVID-19 as compared to oropharyngeal swab [5].

Another way of detecting COVID-19 is using pooled saliva. A meta-analysis regarding the sensitivity of saliva sample in detecting COVID-19 showed a sensitivity of 91% as compared to nasopharyngeal swab that has a sensitivity of 98%. This study showed a promising alternative to the nasopharyngeal swab especially when COVID-19 detection is needed and the patient has contraindications limiting the use of nasopharyngeal swab [6].

According to The Royal Children's Hospital practice guidelines, COVID-19 nasopharyngeal swab is not recommended in the following groups: children at risk of obstruction (croup), bleeding disorders (platelet count $<30 \times 10^9/l$), recent facial trauma, fracture, or surgery [7].

Conclusion

As the number of COVID-19 cases are increasing worldwide, and hence the number of COVID-19 swabs. It is of important to consider the contraindications and the alternative methods available to detect COVID-19 as this might prevent unwanted potentially life-threatening

complication. Considering the patient's background and previous medical history is of value before proceeding to the chosen test for detecting COVID-19.

Acknowledgment

None.

List of Abbreviations

CSF	Cerebrospinal fluid
CT	Computer tomography
ED	Emergency department
MRI	Magnetic resonance imaging
ENT	Ear Nose and Throat
PCR	Polymerase Chain Reaction

Conflict of interest

The authors declare that there is conflict of interest regarding the publication of this article.

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Consent for publication

Written informed consent was taken from the parents of the patient to publish this case report and related images.

Ethics approval

Ethical approval is not required for this anonymous case report.

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