



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

INTERNATIONAL JOURNAL  
OF CURRENT RESEARCH

International Journal of Current Research  
Vol. 13, Issue, 12, pp. 20031-20033, December, 2021

DOI: <https://doi.org/10.24941/ijcr.42736.12.2021>

## RESEARCH ARTICLE

# CORONA VIRUS DISEASE – 19 ASSOCIATED MUCORMYCOSIS IN A CHILD WITH DIABETIC KETOACIDOSIS AND NEWLY DIAGNOSED TYPE 1 DIABETES MELLITUS

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### ARTICLE INFO

#### Article History:

Received 17<sup>th</sup> September, 2021  
Received in revised form  
28<sup>th</sup> October, 2021  
Accepted 10<sup>th</sup> November, 2021  
Published online 29<sup>th</sup> December, 2021

#### Keywords:

COVID-19, COVID associated mucormycosis (CAM), Diabetic Ketoacidosis (DKA), Type 1 Diabetes Mellitus

### ABSTRACT

COVID-19 pandemic continues to affect billions of lives world over, and especially during the second wave, India was reeling under a double pandemic of COVID-19 and COVID associated mucormycosis (CAM), with thousands of cases reported daily. The cause of this deadly combination of COVID-19 and mucormycosis still remains elusive, though various theories have been put forth such as extensive use of steroids and immunosuppressants, premorbid conditions such as diabetes, immunosuppressive states such as malignancies, etc. Fortunately, symptomatic acute COVID-19 and its complications are strikingly less in children. We report a child presenting as diabetic ketoacidosis (DKA), was diagnosed to have type 1 DM, was also SARS-CoV-2 RTPCR positive, and landed in worst possible complication of CAM, all within a span of 2 weeks; and was successfully treated for all of these ailments. So acute symptomatic COVID-19 infection, though rare in pediatric age group, can sometimes present as complications of undiagnosed comorbidities, and although challenging, successful management is rewarding.

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Citation: Dr. Narahari Venkata Susmitha, Dr Ravindra Shamrao Pawar, Dr. Priti Kamble, Dr. Y Ravi Kiran Kumar Reddy, Dr. Ramesh Nigade, Dr. Anil B Kurane and Dr. Rajashri Mane. "Corona Virus Disease – 19 Associated Mucormycosis in a child with diabetic ketoacidosis and newly diagnosed Type 1 Diabetes Mellitus.". 2021. International Journal of Current Research. 13. (12). 20031-20033.

## INTRODUCTION

Waves of COVID-19 pandemic continue to affect billions of lives world over, and especially during the second wave, India was reeling under a double pandemic of COVID-19 and COVID-19 associated mucormycosis (CAM), with hundreds of adult cases reported daily (1,2).

A COVID-19 infected patient may be more susceptible to mucormycosis because of a dysregulated immune system, immunosuppressant drugs and steroids, increased iron in the circulation, and sometimes through mucor contaminated oxygen devices (3). A patient with DKA is 50 percent more likely to develop mucormycosis than without DKA (4).

### CASE REPORT

A 12-year-old boy was admitted in PICU with high grade fever, pain in abdomen, vomiting and increased respiratory rate. On examination he was febrile, dehydrated and had acidotic breathing. Systemic examination was normal. Striking investigations were high blood sugars, metabolic acidosis on arterial blood gases, and 4+ urine ketones. A diagnosis of diabetic ketoacidosis (DKA) was made and treatment was started according to the DKA protocol. His RTPCR for COVID-19 was positive.



Fig 1d



Fig 1a

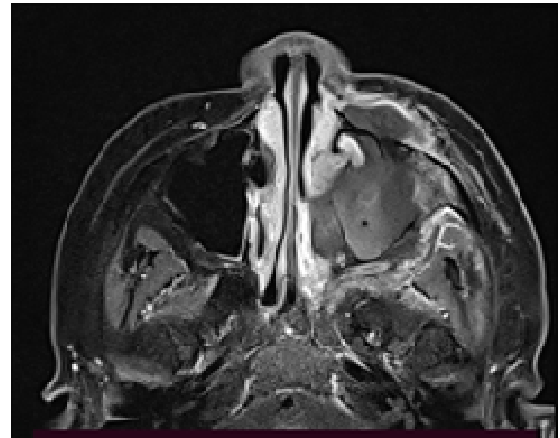


Fig 1e



Fig 1b

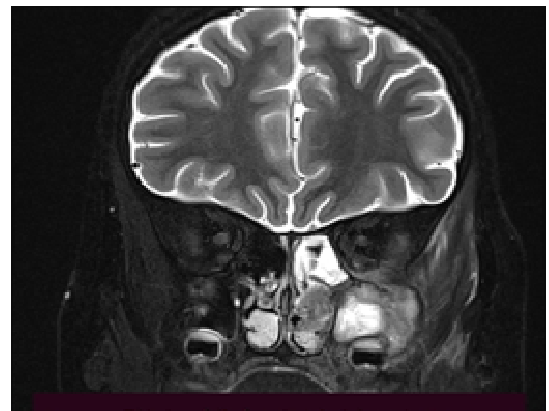


Fig 1f

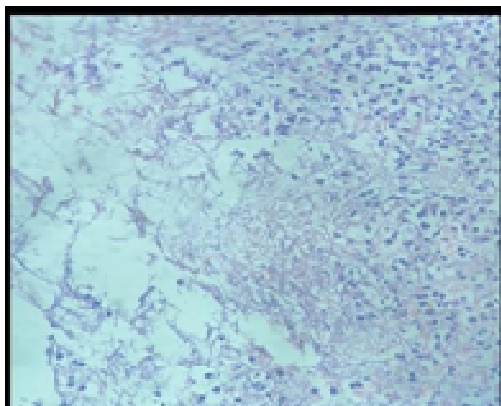


Fig 1c



Fig 1g

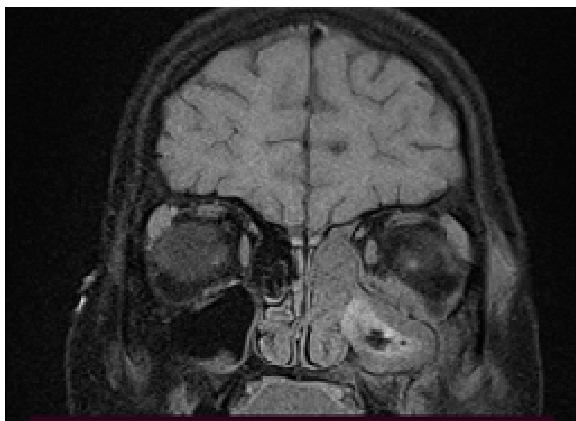


Fig 1h

C- reactive protein was raised but other investigations were within normal limits. He was started on IV antibiotics, other symptomatic treatment and was gradually shifted over to subcutaneous insulin after two days. From day 3 of admission, he had a painless swelling around left eye, involving eyelids, later extended on to cheek, and was associated with redness and difficulty in opening the eye (Fig 1a). MRI brain, paranasal sinus and orbits was done, which showed “mucosal thickening and necrotic tissue involving entire left maxillary, ethmoidal, frontal and left half of sphenoidal sinuses, along with left premaxillary space and infra and periorbital region, suggestive of mucormycosis” (Fig 1e-h). The swelling spread around left eye, peri-orbital area, eyelids and left cheek, was now painful, with foul smelling discharge from the nose and eyes. IV Amphotericin-B was started and after 14 days, surgical debridement of the swelling was done. Histopathology of the tissue from middle turbinate confirmed mucormycosis (Fig 1b-c). Amphotericin-B was continued for one more week, and he was discharged on oral Posaconazole, and subcutaneous insulin. Two weeks post-surgery, his swelling reduced (Fig 1d).

## DISCUSSION AND CONCLUSION

Mucormycosis is the third most common etiology for invasive fungal infection, with mortality rate more than 40%, despite intensive antifungal treatment and surgical debridement (2).

In a recent study in India (1), a 2.1-fold rise in mucormycosis cases as compared to pre-COVID times was noted. Uncontrolled DM was the most common underlying disease among CAM and non-CAM patients and COVID-19 was the only underlying disease in 1/3rd of CAM patients. The mean age was 56.9years, and none were in the pediatric age group (1). In our case, COVID-19 infection precipitated DKA, which led to the diagnosis of DM, which then further got complicated by CAM, all within a span of 2 weeks. However, he was successfully managed for DKA, COVID-19, as well as CAM, and was asymptomatic at 1 month follow up. To conclude, acute symptomatic COVID-19 infection, though rare in pediatric age group, can sometimes present as complications of undiagnosed comorbidities, and although challenging, early diagnosis and successful management is rewarding.

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