

phosphorus levels are due to a reduced renal clearance due to decreased action of the phosphaturic hormone fibroblast growth factor 23 (*FGF23*) which in turn may be due to mutated *FGF23* or an enzyme involved in stabilization of wild type *FGF23*, or α -klotho (the cofactor for *FGF23* action). Disorders like chronic renal failure with secondary hyperparathyroidism and hyper-vitaminosis D cause the secondary variety. In normophosphatemic tumoral calcinosis, family history is usually absent, even as recent literature shows emerging evidence of familial basis occurring due to mutations in the gene encoding for the protein sterile alpha motif domain-containing-9 protein (SAMD9) [3]. Normophosphatemic version presents before second decade of life and is associated with tropical or subtropical region of living.

Traditionally, complete surgical excision of symptomatic lesions as and when they appear is the treatment of tumoral calcinosis, but recurrence is the rule. Various methods to lower serum phosphorus have been tried in hyperphosphatemic familial variety, with marked clinical and radiological resolution of lesions and includes the use of aluminium hydroxide, sevelamer, lanthanum carbonate or acetazolamide [4]. Bisphosphonates have also been tried with successful resolution of lesions in some cases [5]. Dietary phosphorus restriction to as low as 400 mg/day is required.

Unlike the hyperphosphatemic variety, the effectiveness of medical therapy in normophosphatemic variety is not established. The only report in literature on medical therapy in normophosphatemic TC is by Jubbin, et al. [6], who described resolution of pain and radiological subcutaneous calcification with alendronate. The present case is the first to report beneficial effect of phosphate lowering therapy in normophosphatemic tumoral calcinosis.

The current case report shows subjective improvement in pain, limitation of movement and gait and an objective

improvement in range of movements of joints when phosphate lowering therapy was used with graded physiotherapy in normophosphatemic tumoral calcinosis. Further consideration to phosphate lowering therapy is warranted in children with normophosphatemic tumoral calcinosis.

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REFERENCES

1. Reiter N, El-Shabrawi L, Leinweber B, Berghold A, Aberer E. Calcinosis cutis, part I: Diagnostic pathway. *J Am Acad Dermatol.* 2011;65:1-14.
2. Smack D, Norton SA, Fitzpatrick JE. Proposal for a pathogenesis-based classification of tumoral calcinosis. *Int J Dermatol.* 1996;35:265-71.
3. Hershkovitz D, Gross Y, Nahum S, et al. Functional characterization of SAMD9, a protein deficient in normophosphatemic familial tumoral calcinosis. *J Invest Dermatol.* 2011;131:662-69.
4. Ichikawa S, Baujat G, Seyahi A, et al. Clinical variability of familial tumoral calcinosis caused by novel GALNT3 mutations. *Am J Med Genet A.* 2010; 152A:896-903.
5. Balachandran K, Kamalanathan S, Sahoo JP, Das AK, Halanaik D. Differential response of idiopathic sporadic tumoral calcinosis to bisphosphonates. *Indian J Endocr Metab.* 2014;18:521-25.
6. Jacob JJ, Mathew K, Thomas N. Idiopathic sporadic tumoral calcinosis of the hip: successful oral bisphosphonate therapy. *Endocr Pract.* 2007;13:182-86.

Successful Convalescent Plasma Therapy in a Child With Severe Coronavirus Disease

Most pediatric coronavirus disease (COVID-19) patients are asymptomatic or have mild to moderate disease and recover within two weeks [1,2]. In children, severe acute respiratory distress syndrome (ARDS) can occur, which may progress to toxic shock syndrome. In some affected children clinical features of Kawasaki disease may be observed [3]. Therapeutics like antiviral drugs and/or immune modulators available for COVID-19 children have weak recommendations [4]. COVID convalescent plasma (CCP) has been used successfully in the recent global outbreak for the treatment of adult patients with

COVID-19 [5,6]. We report paediatric patient who received CCP as a therapeutic option for treatment of severe COVID-19.

A severely undernourished 13-year-old girl with fever, cough, sore throat for three days was admitted with severe respiratory distress and restlessness. On admission, she was febrile, with tachycardia (146/min), hypotension (90/58 mm Hg) and respiratory rate of 20/min. The oxygen saturation was 88% on room air. Nasopharyngeal swab reverse transcriptase – polymerase chain reaction (RT-PCR) confirmed SARS-CoV-2, and a diagnosis of severe COVID-19 was made. Child was tried with non-invasive ventilation, which was subsequently escalated to pressure control mode of mechanical ventilation. In view of hypotension, cytokine storm was thought of as a possibility and appropriate fluid resuscitation was done. Arterial invasive blood pressure monitoring was done, along with use of inotropic agents like noradrenaline. Bedside echocardiography suggested ejection fraction of 26%. Child was

shifted to a COVID-designated intensive care unit and started on remdesivir, enoxaparin and antibiotics. Investigations on day of admission revealed deranged hematological, biochemical and inflammatory markers. X-ray chest showed non-homogenous opacities of pneumonitic changes in the mid and lower zone of both lung fields with right-sided pleural effusion. On day 2 of admission, the child deteriorated and had worsening septic shock with arrhythmia (prolonged QTc) and subsequently adrenaline was added. Mechanical ventilation was continued in view of ARDS with highest plateau pressure around 28.

With increasing severity of symptoms on day 2, we planned to transfuse CCP 200 mL per day for consecutive two days as per the hospital COVID-19 management protocol. Both CCP doses contained antibodies against SARS-CoV-2 IgG at a titre of 1:640 (S/Co = 5.1). Due to a decreasing hemoglobin of 7.3 g/dL with high FiO₂ of 80% requirement on day 3, we transfused one unit (250 mL) leuko-depleted packed red blood cells (PRBC) each on day 3 and day 4. Between day 4 and 6, we were able to taper-off the inotropes. The child responded to the CCP therapy and from day 5 improvement of clinical features and laboratory values were noted. She was weaned off from mechanical ventilation to room air by day 7, alongwith improvement in hematological, biochemical and inflammatory markers. Remdesivir was continued for 10 days in view of critical COVID-19. Repeat echocardiography suggested normal cardiac function. Child was discharged on day 10 on tapering oral prednisolone for 14 days. Child is doing well with no sequelae and currently on no medication except nutritional rehabilitation.

Presenting with classic symptoms of COVID-19, our patient deteriorated rapidly and developed septicemia and progressed to septic shock despite initiating standard therapy. Deranged haematological, biochemical and inflammatory markers with changing X-ray findings in the child were likely to be associated with increased severity or worse outcomes of COVID-19. Such association in adults has also been demonstrated by previous authors [7]. The treatment of severe COVID-19 in children is close monitoring and supportive care. Antiviral or adjunctive therapy is a suggestion for selected patients in clinical trials [4]. Figlerowicz, et al. [5] from Poland reported a 6-year-old girl with severe COVID-19, in whom SARS-CoV-2 was successfully eliminated after convalescent plasma transfusion. As our primary goal was to retard the

disease process, improve the clinical features, and save the child, we considered transfusion of CCP in recommended doses, which not only improved the clinical features and laboratory findings, but also helped complete recovery of the child within 10 days of admission in the hospital.

We conclude that complete information on clinical manifestations of COVID-19 in children and appropriate management are still evolving. Thus, individualization of COVID-19 treatment must be considered, depending on clinical features, laboratory findings and severity. CCP transfusion in children has the potential to slow down the COVID-19 disease process and improve clinical manifestations of rapidly.

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REFERENCES

1. Meena J, Yadav J, Saini L, Yadav A, Kumar J. Clinical Features and Outcome of SARS-CoV-2 Infection in Children: A Systematic Review and Meta-analysis. *Indian Pediatr.* 2020;57:820-26.
2. Zimmermann P, Curtis N. Coronavirus infection in children including COVID-19: an overview of the epidemiology, clinical features, diagnosis, treatment and prevention option in children. *Pediatr Infect Dis J.* 2020;39:355-68.
3. Chiotos K, Bassiri H, Behrens E, et al. Multisystem inflammatory syndrome in children during the COVID-19 pandemic: A case series. *J Pediatric Infect Dis Soc.* 2020;9:393-98.
4. Ye Z, Rochwerg B, Wang Y, et al. Treatment of patients with nonsevere and severe coronavirus disease 2019: An evidence-based guideline. *CMAJ.* 2020;192:E536-41.
5. Figlerowicz M, Mania A, Lubarski K, et al. First case of convalescent plasma transfusion in a child with COVID-19-associated severe aplastic anemia. *Transfus Apher Sci.* 2020; 102866.
6. Duan K, Liu B, Li C, et al. Effectiveness of convalescent plasmatherapy in severe COVID-19 patients. *Proc Natl Acad Sci USA.* 2020;117:9490-96.
7. Velavan TP, Meyer CG. Mild versus severe COVID-19: Laboratory markers. *Int J Infect Dis.* 2020;95:304-07.