

COVID-19. His best corrected visual acuity was 10/10 in both eyes, and no pathologic manifestations were noted on biomicroscopic examination. A fundus examination revealed a splinter-retinal hemorrhage around the optic nerve of the right eye (Fig. 1A), but the left eye was clear. Optical coherence tomography (OCT) revealed several vitritis-like hyperreflective dots in the posterior vitreous of the right eye (Fig. 1B). Three weeks later, the floaters had disappeared, the splinter-retinal hemorrhage regressed (Fig. 1C) and the dots were reduced (Fig. 1D).

#### CASE 2

A 10-year-old female presented with conjunctival hyperemia and a peri-orbital rash in both eyes. Her past history was unremarkable, but she tested positive 1 month previously on a 2019-nCoV real-time PCR test using a swab sample taken from the nasal and oral regions. Her best corrected visual acuity was 10/10 in both eyes. A biomicroscopic examination revealed nonpurulent conjunctivitis in both eyes, and a fundus examination revealed dilatation and minimal tortuous increase in the retinal arteries and veins of both eyes (Fig. 2A). OCT imaging revealed several vitritis-like hyperreflective spots in the posterior vitreous of both eyes (Fig. 2B). Three days later, the conjunctivitis had regressed spontaneously. At the 2-week follow-up, the dilatation and tortuosity in the retinal arteries and veins had decreased in both eyes (Fig. 2C), but there was only minimal regression of the hyperreflective dots (Fig. 2D).

MIS-C may cause conjunctivitis in the eye, but the posterior segment findings of the eye are unknown.<sup>4</sup> Recently, reports have emerged regarding the involvement of the posterior segment of the eye in adult with COVID-19.<sup>5,6</sup> Subtle cotton wool spots and retinal hemorrhages have also been detected on color fundus photography.<sup>7</sup> Zago Filho et al<sup>8</sup> detected hyperreflective pinpoint at the posterior vitreous hyaloid level on OCT in a 57-year-old patient with COVID-19 and demonstrated that COVID-19 can cause vitritis. Invernizzi et al<sup>5</sup> evaluated the retinal arteries and veins around the optic disc in adults with COVID-19 and found retinal dilated veins and tortuous vessels; observed that both the retinal artery and vein diameters were larger in patients with COVID-19 than in the controls.

To the best of our knowledge, this is the first report of ocular findings of associated with MIS-C. While no pathologic manifestations were observed on the

anterior segment in case 1, nonpurulent conjunctivitis and a Kawasaki disease-like periorbital rash on the eyelids were detected in case 2. There was a splinter-retinal hemorrhage observed around the optic nerve of one eye in case 1 and dilatation and minimal tortuous increase of the retinal arteries and veins in both eyes in case 2. Vitritis-like hyperreflective dots were observed in the posterior vitreous in both cases, and they persisted in case 2 despite the decrease in dilatation and tortuosity. Other ocular findings regressed in both cases.

In conclusion, various ocular findings affecting both the anterior and posterior segments of the eye may develop in children with MIS-C, and their long-term effects are unknown. Therefore, future studies are required.

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## Pyomyositis of the Iliopsoas and Piriformis Muscles Caused by Panton-valentine Leukocidin-positive *Staphylococcus aureus*

#### To the Editors:

We read with great interest the report by Pedoto et al regarding primary pyomyositis due to methicillin-resistant *Staphylococcus aureus* (MRSA) in 2 children.<sup>1</sup> Pyomyositis is a purulent infection of skeletal muscles, mostly caused by *S. aureus* and commonly affecting children in tropical regions.<sup>2</sup> However, as stated in this report,<sup>1</sup> the incidence of pyomyositis has recently raised significantly among healthy children living in temperate regions, which is thought to be associated with the emergence of Pantone-Valentine leukocidin (PVL) toxin-producing community-acquired MRSA strains.<sup>2,3</sup> PVL is a staphylococcal virulence factor associated with severe pneumonia, skin and soft tissue and musculoskeletal infections.<sup>3</sup> Herein, we describe a case of pyomyositis of the left iliopsoas and piriformis muscles caused by PVL-positive MRSA, which resolved after the addition of clindamycin to treatment.

A previously healthy 15-year-old boy presented with a 4-day history of fever, left hip pain and inability to weight bear on that side. There was no history of recent trauma or infection. On examination, the patient had fever up to 39.4 °C, and toxic-looking. The movements of the left hip joint were restricted and painful. Laboratory tests showed elevated C-reactive protein (29 mg/dL) and erythrocyte sedimentation rate (48 mm/h), with normal leukocyte count (5400/mm<sup>3</sup>) and creatine phosphokinase level (154 U/L). After blood cultures were obtained, treatment with empirical intravenous ceftriaxone and vancomycin was started for presumed septic arthritis of the left hip. Contrast-enhanced magnetic resonance imaging (MRI) revealed the myositis

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and myonecrosis of the left iliopsoas-priformis muscles, with no findings compatible with septic arthritis (Fig.1). On day 3, 2 sets of blood cultures grew clindamycin-susceptible MRSA, which was subsequently typed as PVL-positive. Due to persistent fever, severe hip pain and elevated CRP level (320 mg/dL), intravenous clindamycin was added to treatment on day 6. Echocardiographic examination showed no evidence of infective endocarditis. Repeat MRI demonstrated the similar findings with the previous one. He became afebrile within 24 hours after the addition of clindamycin and his hip pain gradually resolved over the next days. On day 14, the patient was able to walk without support, and acute phase reactants were back to normal values in 20 days. He completed 3 weeks of parenteral antibiotic therapy and was discharged without sequelae.

Pyomyositis involving the muscles around the hip joint can mimic septic arthritis. The disease has been divided into three clinical stages: invasive, suppurative (abscess formation), and late (septicemic). The management depends on the stage of the disease. In the early invasive stage, it can be treated with antibiotics alone. However, most of the patients (>90%) present at the suppurative stage, and therefore require computed tomography or ultrasound-guided percutaneous drainage of the abscesses in combination with antibiotic therapy. Surgical drainage may be required in the setting of extensive muscle involvement with necrosis or deep-seated infection.<sup>4</sup>

Empirical antimicrobial therapy for pyomyositis will depend on local resistance patterns and antibiotic efficacy. As the frequency of community-acquired MRSA has increased in recent years, empirical treatment should cover these strains. It is important to suspect PVL-positive MRSA disease if infection is associated with a necrotizing process and fails to respond to initial empirical treatment.<sup>2,3</sup> The addition of clindamycin to the treatment regimen may be helpful in patients with necrotizing pyomyositis due to PVL-positive MRSA, as it has previously been shown to inhibit the production of the PVL toxin.<sup>5</sup>

Clindamycin has been approved by the US Food and Drug Administration for the treatment of staphylococcal infections.



**FIGURE 1.** Contrast-enhanced magnetic resonance imaging demonstrates diffuse edematous signal changes and marked contrast enhancement in the left iliopsoas-priformis muscles (arrow).

Although not specifically approved for treatment of MRSA infection, it has been successfully used for the treatment of invasive susceptible CA-MRSA infections in children. Clindamycin penetrates well into the bone and abscess cavities. However, because of its bacteriostatic nature, it should not be used if there is concern for endovascular infections, such as infective endocarditis or septic thrombophlebitis.<sup>6</sup> The other concerns regarding the clindamycin use are the increasing rate of clindamycin resistance among CA-MRSA isolates and the development of resistance during the treatment with clindamycin.<sup>7</sup> Future studies are needed to examine whether clindamycin administration could improve the outcome of severe infections caused by PVL-positive MRSA strains.

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