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### CVST As A Rare Complication of Acute Pediatric COVID-19

Erin Bolen

*Children's Mercy Hospital*

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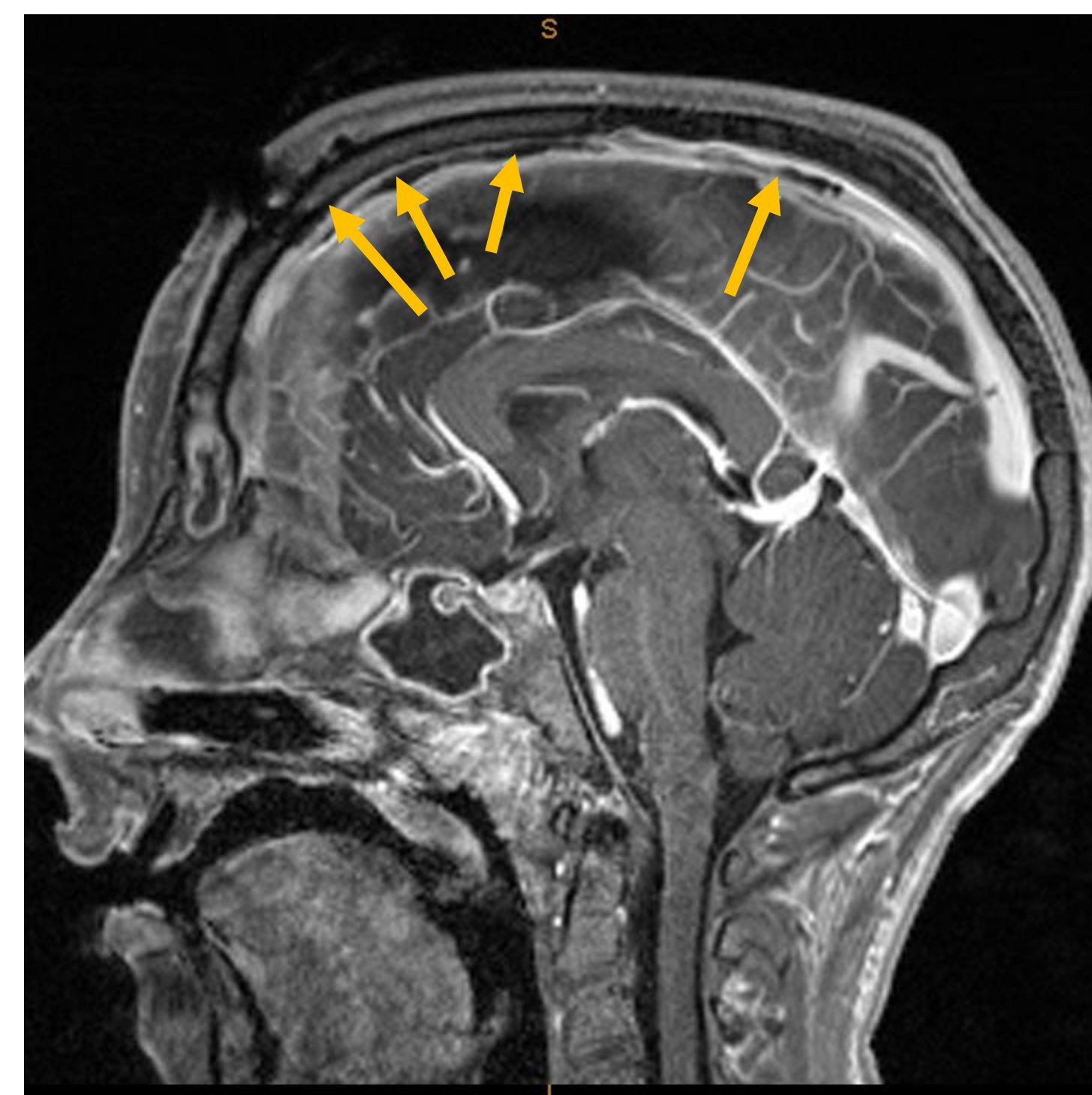
# CVST As A Rare Complication of Acute Pediatric COVID-19

Erin Bolen, MD; Jonathan Ermer, MD; Mukta Sharma, MD

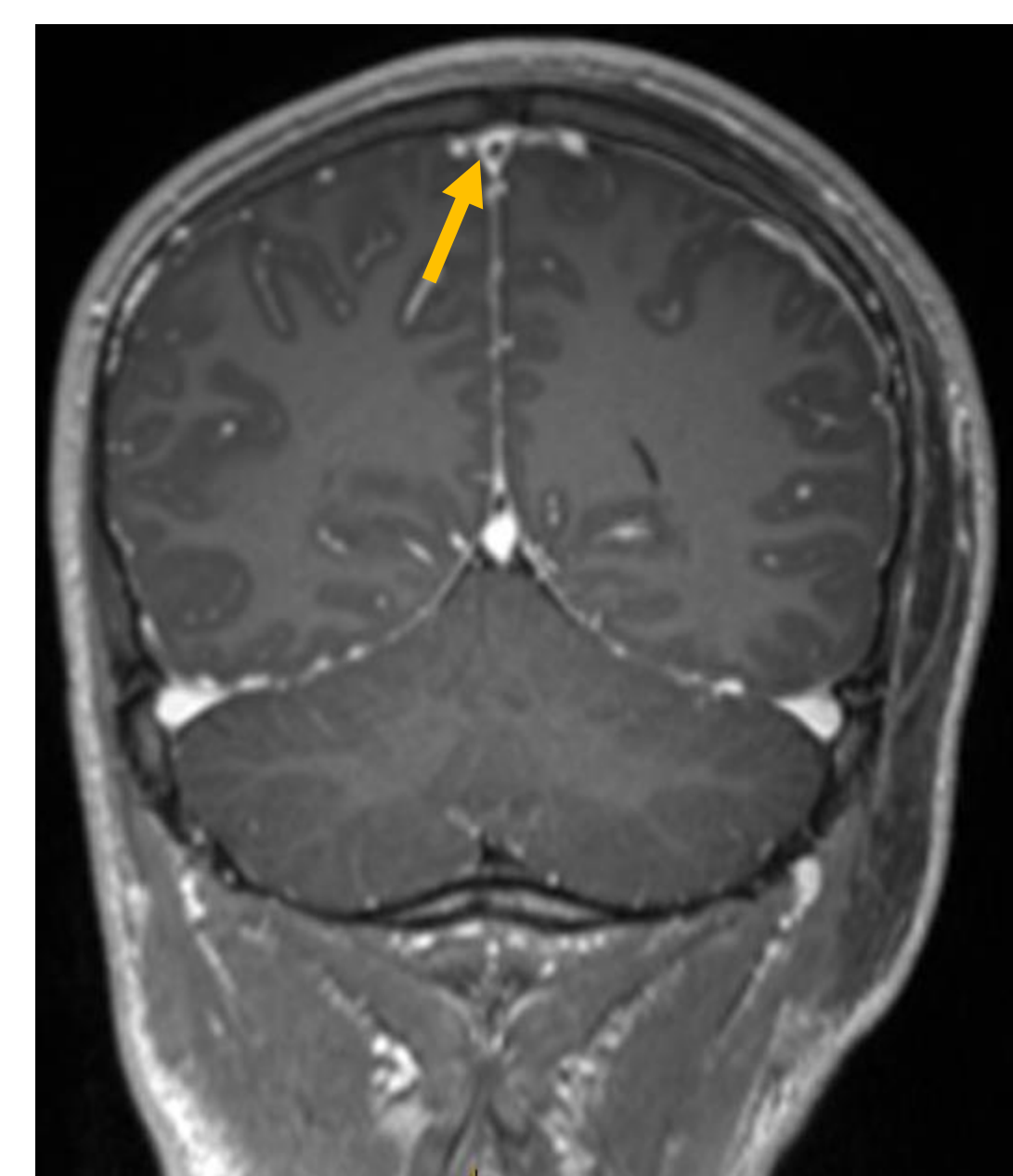
Children's Mercy Hospital, Kansas City

## Background

- Previously healthy 13-year-old male with bacterial superinfection in the setting of recent COVID-19, including orbital cellulitis and pansinusitis with subgaleal, epidural, and subdural empyema
- Found to have occult, non-occlusive cerebral venous sinus thrombosis (CVST) along the length of the superior sagittal sinus



Sagittal view of the superior sagittal sinus on an MRV, with arrows highlighting the filling defect from CVST



Coronal view of the sagittal sinus on MRV, with the delta sign present in the superior sagittal sinus indicating the presence of a thrombus

## Objective

To evaluate the reported cases of CVST as a potential complication of recent COVID-19 in the pediatric population and identify meaningful trends in demographics, presentation, and diagnostic course.

## Methods

- Literature search with combinations of the following terms, always including "COVID": "pediatric," "adolescent," "CVST," "cerebral venous sinus thrombosis," and "sinus thrombosis."
- Articles individually reviewed

## Published Cases

Author/Country	Age/Sex	Initial COVID symptom timeline	Presenting symptoms	Imaging modality	Sinuses Involved	Days from presentation until diagnosis
Ippolito Bastidas et al/Spain <sup>1</sup> (2020)	13 F	1 week prior	Altered mental status, headache	MRA	Bilateral transverse sinus, right sigmoid sinus and internal jugular	0
Dakay et al/United States (2020) <sup>2</sup>	17 M	14 days prior	Headache, emesis, blurred vision, papilledema	MRV	Straight sinus, torcula, left transverse and sigmoid sinus, right transverse sinus, superior sagittal sinus and left vein of Labbe	0
Anvekar et al/India <sup>3</sup> (2021)	12 M	3 days prior	Altered mental status, headache, papilledema	MRV	Left sigmoid, lateral, and jugular venous sinuses	0
Bolen et al/United States (2022)	13 M	10 days prior	Proptosis, periorbital edema, orbital cellulitis, emesis	MRV	Superior sagittal	2
Essajee et al/South Africa <sup>4</sup> (2020)	2 F w/TB	N/A	L-sided weakness, lethargy, altered mental status, cervical lymphadenopathy	CT	Superior sagittal, transverse	0
Whitworth et al/United States <sup>5</sup> (2021)	12-14 M w/cancer	N/A	Not available	N/A	Not available	N/A

<sup>1</sup> Ippolito Bastidas H, Márquez-Pérez T, García-Salido A, et al. Cerebral Venous Sinus Thrombosis in a Pediatric Patient With COVID-19. *Neurol Clin Pract.* 2021;11(2):e208-e210.  
<sup>2</sup> Dakay K, Cooper J, Bloomfield J, et al. Cerebral Venous Sinus Thrombosis in COVID-19 Infection: A Case Series and Review of The Literature. *J Stroke Cerebrovasc Dis Off J Natl Stroke Assoc.* 2021;30(1):105434.  
<sup>3</sup> Anvekar P, Lohana P, Kalaiger AM, Ali SR, Galinde RS. The Unfamiliar Case of COVID-19 Induced Cerebral Venous Sinus Thrombosis in a Pediatric Patient. *Cureus.* 2021;13(8):e17209  
<sup>4</sup> Essajee F, Solomons R, Goussard P, Van Toorn R. Child with tuberculous meningitis and COVID-19 coinfection complicated by extensive cerebral sinus venous thrombosis. *BMJ Case Rep.* 2020 Sep 14;13(9):e238597.  
<sup>5</sup> Whitworth H, Sartain SE, Kumar R, et al. Rate of thrombosis in children and adolescents hospitalized with COVID-19 or MIS-C. *Blood.* 2021;138(2):190-198.

## Results

- Six identified cases, including index case
- Four previously healthy, one had cancer, one had tuberculosis meningitis
- Ages 2-17; five were at least 12 years old
- Four of six were males
- Five had identified COVID timelines; one had asymptomatic COVID while other four presented 3-16 days after initial symptoms
- Most common symptoms were altered mental status, headache, papilledema, and emesis
- Four identified using MRA/MRV, and four were identified on initial presentation; one did not have imaging or timeline discussed
- Our patient did not have common presenting symptoms others than emesis and had a three-day lag in diagnosis

## Conclusion

These cases highlight the importance of consideration of CVST as a potential late sequelae of COVID-19 infection in the pediatric population. They remind clinicians to consider the heightened risk of serious thrombotic complications in the immediate post-COVID period and to have a low threshold for vascular imaging in these children.