Q3 COVID Croup

There is compelling evidence to support the hypothesis that the omicron variant causes laryngotracheobronchitis.

❍ 1. True
❍ 2. False

Educational Point: As severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has evolved, so has its effects on the pediatric population. Although early variants typically resulted in lower respiratory infections, the recently identified omicron variant may exhibit a predilection for the upper airways. The relatively smaller upper respiratory tract in children compared to adults has been thought to predispose them to more severe clinical presentations resembling laryngotracheobronchitis, or croup. Caused by viral-induced subglottic airway inflammation, croup is classically characterized by sudden onset "barking cough," inspiratory stridor, and respiratory distress. Endemic coronaviruses have been linked to croup; however, only sparse case reports have described croup specifically associated with SARS-CoV-2, and it remains unclear if croup cases constitute a causative relationship or result of coinfection with another virus. To address this knowledge gap, the authors performed a retrospective analysis of the incidence and clinical characteristics of croup associated with SARS-CoV-2 infection at a large freestanding children's hospital.

A retrospective analysis of a freestanding children's hospital found that the incidence of croup co-occurring with SARS-CoV-2 infection sharply increased in December 2021, strongly correlating with emergence of the omicron variant. Other spikes in COVID-19 were not associated with increased diagnoses of croup. Interestingly, the observed rates of hospitalization and redosing of croup-directed therapies may indicate a more severe phenotype compared to other viral etiologies. **Taken together; the authors' preliminary findings lend compelling evidence to the hypothesis that the omicron variant causes laryngotracheobronchitis.** This tropism shift may stem from differences in protein expression between cells of the lower respiratory versus upper respiratory tract, although variant-specific mechanistic studies remain an active research area.

Between March 1, 2020 and January 15, 2022, a total of 75 children were diagnosed with COVID-19–associated croup, 81% of whom presented during the omicron period. There was a significant difference in median weekly cases between the pre-omicron (0 [interquartile range (IQR) 0–0]) and omicron periods (11 [IQR 2–17]) ($P < .001$). Most patients were male (72%) and discharged from the emergency department (88%). All children tested for other viral infections were negative except for one with rhinovirus. Dexamethasone was administered to 97% of patients. Whereas 100% of hospitalized patients received racemic epinephrine, it was given to only 25% of patients treated in the emergency department. Among hospitalized patients, the median length of stay was 1.7 days (IQR 1.3–2.3 days), and the median number of dexamethasone and racemic epinephrine doses was 6 (IQR 4–9) and 8 (IQR 2–10), respectively. Four patients required intensive care, with one escalating to helium-oxygen mixture and continuous positive airway pressure. No patients required invasive ventilation or died.

Two years into the COVID-19 pandemic, the pathogenicity, infectivity, and manifestations of new variants of SARS-CoV-2 have been dynamic and unique. Croup may represent yet another such novel presentation. Further research is needed to characterize the underlying mechanisms of COVID-19–associated croup, differences in clinical features from other viral etiologies, and appropriate management strategies in the SARS-CoV-2 era.

The correct answer is 1.

Reference: Brewster RC, Parsons C, Laird-Gion J, Hilker S, Irwin M, Sommerschield A, et al. COVID-19-Associated Croup in Children. *Pediatrics*. 2022 Jun 1;149(6):e2022056492.

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