Severe Morbidity and Mortality From Coronavirus Disease 2019 in Hmong Individuals With Gout

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ABSTRACT

Background: Given the disproportionate impact of coronavirus disease 2019 (COVID-19) on patients with comorbidities – including gout – and on diverse populations such as the Hmong community, it remains unclear whether a combination of these factors lead to more severe COVID-19 outcomes.

Methods: We reviewed the outcomes of 21 Hmong patients with coexisting gout and COVID-19 admitted to 2 tertiary care centers from March 1, 2020, through December 31, 2021.

Results: Seven patients required low-flow nasal cannula oxygen, 3 required high-flow nasal cannula, 1 required noninvasive ventilation, and 10 (48%) required mechanical ventilation. The 30-day mortality rate was 57% (n=12).

Discussion: The findings highlight a potentially disproportionate burden of severe COVID-19 outcomes among Hmong patients with gout. The high observed mortality raises questions about the role of comorbidities, vaccination disparities, and structural factors contributing to poor outcomes in this population.

BACKGROUND

The Coronavirus disease 2019 (COVID-19) pandemic brought unprecedented challenges to health care systems worldwide, impacting comorbidities and mortality rates and revealing disparities in disease outcomes among different populations. A large post-pandemic cross-sectional study determined that there were more than 1.38 million all-cause excess deaths (observed-to-expected ratio, 1.15 [95% CI, 1.12-1.18]), corresponding to approximately 23 million years of potential life lost.[1] COVID-19 also demonstrated a disproportionate burden on individuals with underlying comorbidities, such as rheumatologic diseases, cardiovascular conditions, and respiratory disorders. These comorbidities are associated with more severe illness and higher mortality rates among COVID-19 patients.[2]

An additional and often overlooked risk factor for severe COVID-19 disease outcomes is gout. Recent studies demonstrate that gout, as a comorbid condition, poses significant risk for severe COVID-19, including death, even when adjusted for other diseases and vaccination status.[3,4] In addition to comorbidities, diverse population groups faced unique challenges during the pandemic. The Hmong community, in particular, faced unique challenges. With strong representation throughout the Midwest, the Hmong community encountered multiple barriers, including access to health care, limited health literacy, and differing cultural approaches to medicine. In a 2020 report of COVID-19 deaths in Minnesota, Hmong Americans accounted for 49% of deaths within the Asian American community.[5]

In addition to being significantly affected by COVID-19, the Hmong population is also especially susceptible to hyperuricemia and gout. Previous studies have shown higher serum uric acid concentrations in the Hmong population, and genetic alleles linked to hyperuricemia are found more frequently among the Hmong individuals compared with non-Hmong patients.[6] Evidence suggests the Hmong population is at risk for developing gout almost a decade earlier than non-Hmong patients, despite similar rates of diabetes, hypertension, and mortality.[7]

Given the disproportionate impact of COVID-19 on patients with comorbidities including gout and the impact on diverse populations like the Hmong, it remains unclear if the combination of

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these factors leads to more severe outcomes. Therefore, a etrospective case series of Hmong patients with gout and severe COVID-19 was performed to evaluate how these combined factors affected clinical outcomes.

METHODS

In this retrospective chart review, 21 Hmong patients with a clinical diagnosis of gout and severe COVID-19 outcomes who presented at 2 tertiary care centers between March 1, 2020, and December 31, 2021, were identified. Hmong identity was determined by an open-ended self-identification question. An Institutional Review Board-approved COVID-19 registry was used to identify patients who were aged 18 years and older, had documented COVID-19 infection, and required oxygen. Of the 591 patients meeting this criteria, 54 patients had gout and 22 identified as Hmong. Twenty-one of these patients had a clinical diagnosis of gout and were included in the final case series. One patient was excluded due to self-reported gout without description of symptoms, prior uric acid levels, or treatment history. Descriptive statistics were used for analysis.

RESULTS

Of the 107 Hmong patients in the registry with COVID-19, 21 (20%) had gout and were included in this study. The average age was 62.9 years. Fourteen patients (63.6%) were male, with an average body mass index of 28.9. Most were unvaccinated (n = 19), one had received 1 dose of a COVID-19 vaccine, and one had received at least 2 doses. Nineteen of the 21 patients required an interpreter.

Gout was included on the problem list of all the patients; 11 met American College of Rheumatology (ACR) classification criteria. The other 10 patients were treated with allopurinol and had documented symptoms with elevated uric acid. Eighteen had uric acid levels recorded prior to admission; 15 were above 6 mg/dL. The average pre-admission uric acid level was 8.02 mg/dL. Six patients had a history of tophaceous gout, and 3 had uric acid nephrolithiasis. Fourteen were receiving allopurinol prior to admission. Other comorbidities included chronic lung disease (n = 4, 19.0%), chronic heart failure (n = 3, 14.2%), renal disease (n=5, 23.8%), and diabetes with end organ damage (n = 7, 33.3%). No patients had coexisting connective tissue diseases. Only 3 reported prior tobacco use or vaping history.

In the hospital, 66.7% of patients were febrile. Seven patients received low-flow nasal cannula oxygen, 3 required high-flow nasal cannula, 1 required noninvasive ventilation, and 10 (48%) required mechanical ventilation. The average duration of mechanical ventilation was 15.5 days (range, 2-34 days). Laboratory studies revealed the following maximum averages: D-dimer, 3.63 mg/L; C-reactive protein, 19.8 mg/L; lactate dehydrogenase (LDH), 602.8 U/L, and ferritin, 2550.8 ng/mL. The average length of stay was 12.1 days. Seventeen patients received steroids, 6 received remdesivir, and 1 received tocilizumab. Eleven patients transitioned to comfort care. The 30-day mortality for this cohort was 57% (n = 12).

DISCUSSION

In this limited case series, 10 of 21 Hmong patients with gout hospitalized for COVID-19 required intubation and were subsequently transitioned to comfort care, with a 30-day mortality rate of 57%. The reasons for these outcomes are likely a combination of physiological differences, cultural factors, and disparities in health care access and treatment.

Previous studies show that Hmong individuals tend to have elevated serum uric acid levels and increased rates of tophaceous gout and uric acid nephrolithiasis.[7,8] In this series, the average serum uric acid level was elevated (8.02 mg/dL), and nearly one-third of patients had clinical evidence of tophaceous gout. Gout is an independent risk factor for COVID-19-related mortality,[3,4] and hyperuricemia has been independently linked to the development of other metabolic diseases. A study of more than 860 000 people with gout found that women had an 88% higher risk of cardiovascular disease, while men had a 49% higher risk, compared to those without gout.[9] Given that cardiovascular disease and other comorbidities, such as older age, diabetes, and obesity, are strongly associated with worse COVID-19 outcomes, gout may contribute to increased COVID-19 severity indirectly through its relationship with these conditions.[2] In this series, 20% to 30% of patients had underlying chronic heart failure, chronic kidney disease, or diabetes, and only 1 patient was fully vaccinated. These factors likely contributed to the high mortality rate observed.

Communication barriers and differences in medical perspectives may also have played a role. Nineteen of the 21 patients required an interpreter. Language barriers can lead to communication disconnects and decrease quality of health care, particularly for the Hmong population, as many Western medical terms lack direct translations.[10,11] Additionally, Hmong individuals may hold differing views on chronic disease management compared to Western medicine, which can result in variable medication and dietary adherence.[12,13]

This study is hypothesis-generating due to its small sample size, lack of a control group, and retrospective design, which limit causal inference. The high mortality may reflect selection bias, as the analysis included only hospitalized patients, likely representing only those with more severe illness. The study was also reliant on a self-reported open-ended question that could lead to underreporting or misclassification. The absence of a comparator group limits the ability to determine whether outcomes differ significantly from other ethnic populations with similar clinical profiles. The high burden of comorbid conditions also likely contributed to the poor outcomes observed. Furthermore, lower vaccination rates within the Hmong community during the study period may have further increased vulnerability.

Rather than providing definitive conclusions, the findings highlight a potentially disproportionate burden of severe COVID-19 outcomes among Hmong patients with gout. This raises questions about the role of comorbidities, vaccination disparities, and structural factors that may contribute to poor outcomes in this population. Further investigation in larger, controlled studies is needed. Additionally, these findings emphasize the need for health care systems to improve chronic disease management, outreach, and education for diverse racial and ethnic groups affected by gout.

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