

The impact of seasonal temperature variation on the incidence of pernio during the COVID-19 pandemic



To the Editor: There remains controversy regarding the association of pernio and COVID-19 infection.¹⁻³ Between March 2020 and March 2021, a cohort was established of 29 pernio patients who presented to dermatology clinics in Salt Lake County. All patients were evaluated and followed up for a 6-month period. Recorded variables included exposure to COVID-19, baseline polymerase chain reaction results, and baseline and repeat qualitative or semiquantitative antibody tests (repeated >6 weeks following the initial presentation) (Table I). No patients had preceding autoimmunity. The variability in studies performed reflects inconsistent access during the pandemic. Pernio cases were temporally plotted in relation to temperature and the COVID-19 incidence rate in Salt Lake County (Fig 1). The “strict” quarantine period was defined as March 16, 2020, until May 15, 2020 (correlating with Salt Lake County Public Health Orders January 2020 and July 2020). To establish trends for seasonality, our institutional dermatopathology database was queried for all histopathologically diagnosed pernio cases between January 2016 and January 2020.

Within this cohort, 55.2% received a polymerase chain reaction test at diagnosis, and none were positive. 27 of 29 patients received either qualitative or semiquantitative COVID-19 immunoglobulin testing at baseline. Of those, only 2 demonstrated positivity. No patients experienced recurrence of symptoms at 6 months, and no patients who were previously negative on baseline antibody testing demonstrated seroconversion after a minimum of 6 weeks—though only performed in 7 of the 29 patients. Most presented within the “strict” quarantine period where case incidence was low, though there is potential for inadequate case identification. Within the preceding 5 years at our institution, the histologic diagnosis of pernio demonstrated a distinct cyclic seasonality. This was preserved as only 1 new case was identified during the period of July 2020 to November 2020 when the average temperature often exceeded 75 °F.

These data parallel the results of a study conducted within the Kaiser-Permanente Northern California

Table I. Summary of patient demographics and testing results for the SARS-CoV-2 (COVID-19) virus within our cohort

Patient characteristics	All patients (n = 29)
Female gender	15 (51.7%)
Age at diagnosis	17 (8-25), 7 (25-42), 4 (42-59), 1 (59-76)
History of pernio	1 (3.4%)
Reported COVID-19 exposure	
Yes	3 (10.3%)
No	14 (48.3%)
Uncertain	12 (41.4%)
PCR performed	16 (55.2%)
PCR (+)	0 (0%)
Baseline qualitative ab	10 (35.7%)
Positive	0 (0%)
Baseline semiquantitative ab	17 (60.7%)
Positive	2 (11.7%)
Repeat qualitative ab	6 (26.1%)
Positive	0 (0%)
Repeat semiquantitative ab	1 (4.5%)
Positive	0 (0%)

PCR, Polymerase chain reaction.

system. In this retrospective cohort study, the incidence of chilblains was also calculated during the pandemic and compared to incidence in the preceding years. While the incidence of chilblains increased during the pandemic, this only correlated weakly to SARS-CoV-2 case incidence. This cohort also demonstrated preservation of the region’s typical seasonality.⁴

Limitations include a small cohort size, inability to correlate with population level incidence or prevalence. The presentation of the “COVID-19 toes” phenomenon in the lay press may have also resulted in fewer referrals later in the pandemic. Lack of uniform and complete testing at initial and repeat time points is also notable. Finally, some patients who are infected with the SARS-CoV-2 virus may exhibit robust clearance without seroconversion resulting in false negatives within our cohort.⁵

The relationship between the SARS-CoV-2 virus and pernio remains unclear at this time. This cohort supports the findings of a larger Northern California population as both demonstrate a preservation of typical seasonality in pernio incidence, as well as a lack of correlation with COVID-19 case incidence, during the course of the viral pandemic.⁴ Preservation of this finding in a distinct geographic

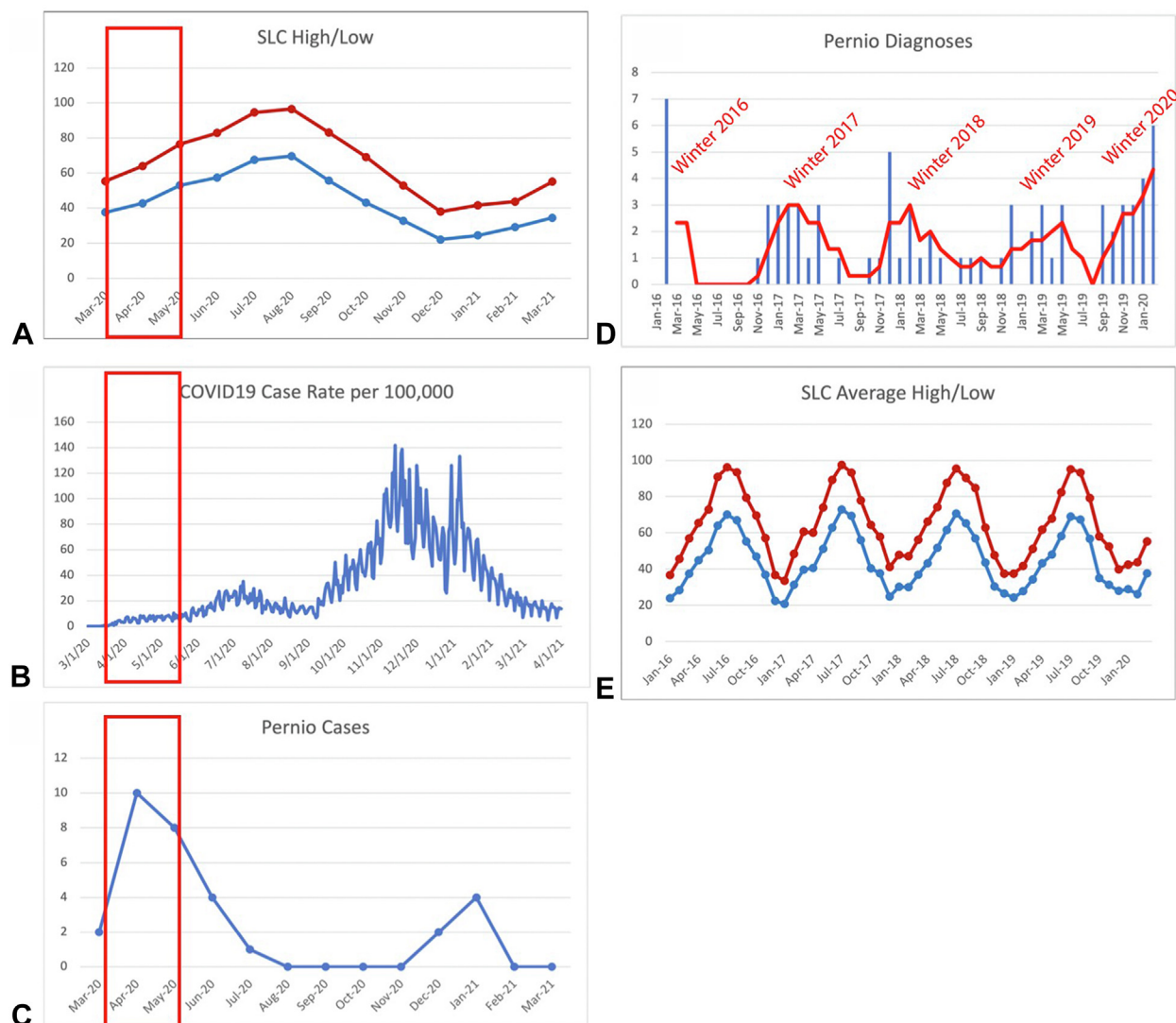


Fig 1. **A**, Monthly high and low temperatures during the year of March 2020 to March 2021 in Salt Lake City, Utah (National Weather Service). **B**, COVID-19 incidence case rate in Salt Lake City, Utah, from March 2020 to April 2021 (Utah Department of Health daily COVID-19 case rate report as reported by local health department [LHD]. <https://coronavirus.utah.gov/case-counts/>. Accessed June 30, 2021). **C**, Pernio cases within our cohort of patients from March 2020 to March 2021. **D**, Institutional case rates of pernio from January 2016 to January 2020. **E**, Average monthly high and low temperatures from January 2016 to January 2020 in Salt Lake City, Utah (National Weather Service).

climate further supports the importance of seasonality in presentation.

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and online and with the understanding that this information may be publicly available.

Key words: COVID-19; epiphenomenon; pernio; seasonal; temperature.

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Conflicts of interest

None disclosed.

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