

Introduction

Wildfires are an increasing human health concern. In 2020 there were nearly 10,000 fires in California including five of the six largest wildfires ever recorded in the state, burning 4.1 million acres. In addition to the known risks of direct burn and inhalation injury, extreme heat exposure, and psychological stress, there are underrecognized infectious risks associated with exposure to the living components of smoke such as mould, due to spore activation. Fungal elements travel great distances in the air, and smoke significantly alters the number and diversity of fungal particles in affected geographical regions. We hypothesized that people hospitalized for burn injury during wildfire season would have more invasive mould infections and that this risk would be further increased by wildfire related injury.

Aims

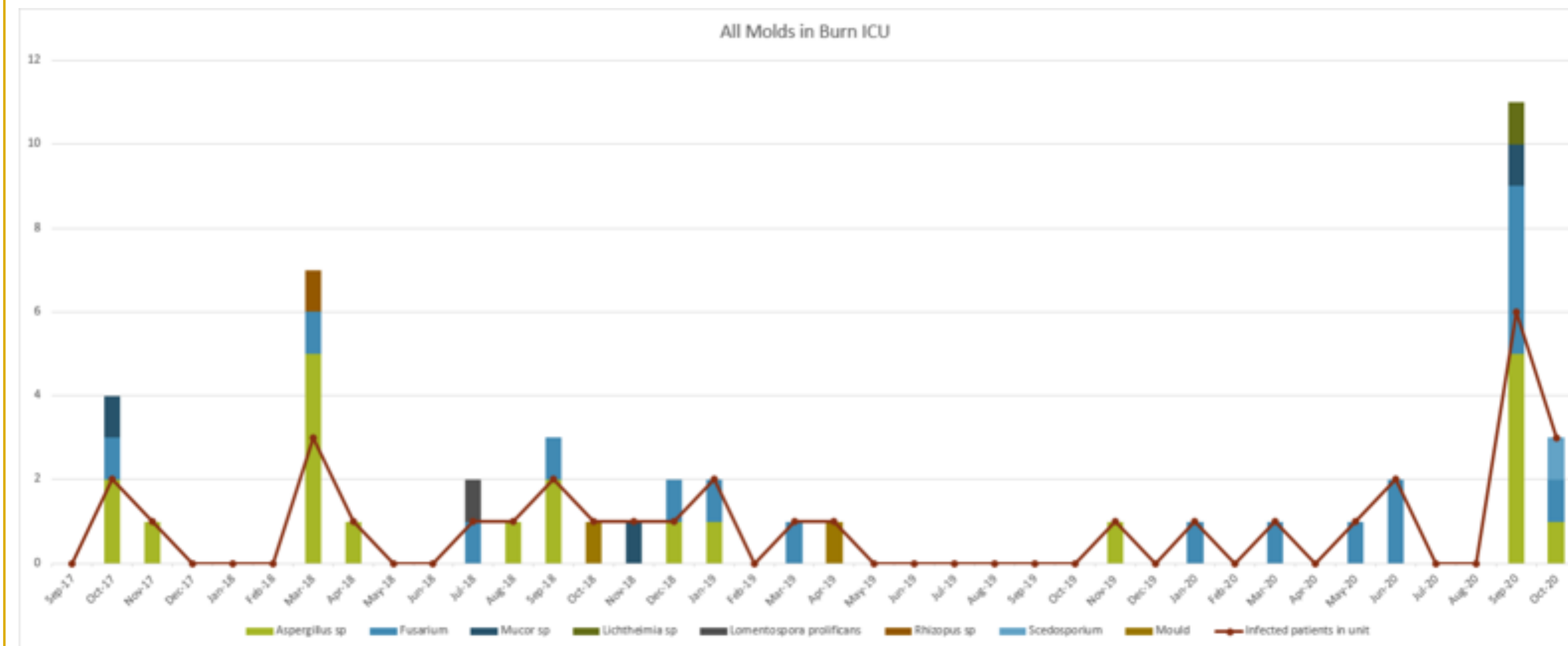
To analyze the incidence and contributing factors for mould infections in hospitalized burn patients in the fall of 2020, during the peak of wildfire season.

Methods

We reviewed the electronic medical records for all patients admitted with burns in the fall of 2020 and recorded demographics, treatment, and outcomes. Data was stored in a secure electronic database.

Results

Of the 10 patients admitted with wildfire related burns, 4 developed mould infections. Two additional cases were diagnosed in patients burned in a plane crash and a house fire. The first four cases of invasive mould infections were diagnosed among patients admitted within three days of each other, soon followed by three additional cases. Five of the seven patients (71%) were men; patients had a mean age of 37.7 years (range 24-56 years); mechanism in four of the seven was direct wildfire exposure (57.1%); mean total body surface area (TBSA) burned was 69% (range 44-90%). Mould infection was identified on or after hospital day 14 in all patients. A total of five mould genera were isolated including *Aspergillus*, *Fusarium*, *Lichtheimia*, *Mucor*, and *Scedosporium*, with *Aspergillus* mould genus isolated from six patients (85.7%). All seven patients (100%) were treated with at least two days of antibacterials before identification of mould infection; four (57.1%) of the patients died before leaving the hospital. Following this period, mould cases decreased to baseline low levels of <10% for all burn sizes.



Conclusions/Further Study

Wildfires across the western United States have had a devastating effect on the ecosystem and on human health. Several studies have shown a relationship between wildfire smoke exposure and respiratory infections. We suspect that wildfires may increase the risk of invasive mold infections in wildfire burn patients, as well as in all burn patients with ambient wildfire smoke exposure. We observed a disproportionate number of invasive mould infections in hospitalized burn patients during large wildfires, which may have a significant impact on the seasonal treatment of burn patients. The relationship between wildfires and fungal infection warrants future investigation.

References

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