

A 17-Year-Old with Schizophrenia and Uncontrollable Anxiety After a Suicide Attempt

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A 17-year-old boy with a history of schizophrenia, asthma, and Crohn's disease was brought to the emergency department (ED) by his aunt after a suicide attempt in which he lit his bedroom on fire. After 20 minutes in the burning room, he aborted the attempt and jumped out of the second-story window. It was the patient's second suicide attempt in 8 months. His first attempt was precipitated by auditory command hallucinations, persecutory delusions, and disorganized thinking, which led to a 2-month psychiatric hospitalization and a diagnosis of schizophrenia.

In the ED, the patient was very anxious. His initial testing includ-

ed a physical examination, chest X-ray, and routine laboratory tests, which were within normal limits. His vital signs were unremarkable. There was no evidence of burns to his eyebrows, eyelashes, or nose hairs, and there was no singeing of the hair on his head. He had soot around his mouth but was not coughing.

The patient denied any pain. He had mild shortness of breath, which was attributed to underlying anxiety. The patient was medically cleared and subsequently transferred to a stand-alone inpatient psychiatric hospital with a primary diagnosis of "schizophrenia status post-suicide attempt."

Eight hours after his presentation to the ED, the patient arrived at the psychiatric hospital. He was noted to be increasingly anxious and progressively short of breath. The nursing staff attempted breathing exercises to calm him. Vital signs showed blood pressure of 147/87 mm Hg, heart rate of 116 beats per minute, body temperature of 100.2°F, and a respiratory rate of 40 breaths per minute. A lung examination revealed rasps and coarse rales. The patient's escalating respiratory distress and new lung findings resulted in his transfer to the nearest ED.

Twelve hours after his initial presentation to the ED, the patient arrived at another ED (the one nearest to the psychiatric hospital) in acute respiratory distress. He was tachycardic with a pulse ranging from 116 to 140 beats per minute. His respiratory rate increased to 40 to 50 breaths per minute with an oxygen saturation of 78% on a 100% non-rebreathing mask. The respiratory therapist determined that he was at high risk for sudden clinical deterioration. He was placed on bilevel positive airway pressure, sedated with morphine, given 125 mg of methylprednisone, and transferred to the intensive care unit (ICU). A repeat chest X-ray revealed perihilar

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fuzziness. Repeated laboratory testing revealed a rise in white blood cell count from $18.1 \times 10^9/L$ to $23.7 \times 10^9/L$ overnight. His arterial blood gas had a pH of 7.4, partial pressure of carbon dioxide was 30 mm Hg, partial pressure of oxygen was 62 mm Hg, and lactic acid was 1.58 mmol/L.

DIAGNOSIS

Smoke Inhalation Injury

The patient spent 3 days in the ICU for acute respiratory failure secondary to smoke inhalation. On hospital day 4, he was diagnosed with hospital-acquired pneumonia and treated empirically. On hospital day 7, he underwent fiber-optic bronchoscopy, which showed airway ulcers at the glottis, soot in the small airways, and bronchial plugging in the lower lungs. On hospital day 10, the patient underwent fiber-optic laryngoscopy, which revealed edematous and erythematous vocal cords that were treated with supportive measures. The patient required 2 to 4 L of oxygen per minute via nasal cannula, which was gradually weaned until hospital day 12, when he became stable on room air and was discharged back to the inpatient psychiatric hospital after 14 total days.

After another 14 days at the inpatient psychiatric facility, the patient was discharged to his aunt. He no longer had suicidal ideations, his depression had improved, and he denied hallucinations. His medications at the time of discharge were 450 mg of lithium carbon-

ate extended-release at night, 0.5 mg of benztropine at night, 5 mg of aripiprazole twice a day, and 400 mg of quetiapine every night.

DISCUSSION

The patient sustained smoke inhalation injury that was not apparent on initial chest X-ray, physical examination, or vital signs; therefore, his high respiration rate was assessed to be caused by anxiety secondary to an underlying psychiatric condition. This decision to transfer the patient complied with a recent recommendation for discharge after 4 to 6 hours if vital signs and physical examination are normal.¹ However, this patient's symptoms worsened in our facility 8 to 10 hours after smoke exposure and necessitated admission to the nearest ED.

We believe the case presented here is important because smoke inhalation injury, which is the leading cause of death in civilian fires,² can be seen in various ways in the psychiatric population—the patient with Alzheimer's who accidentally causes a kitchen fire, the teenager with conduct disorder who enjoys lighting fires (pyromania), the patient with drug addiction whose home-made "lab" erupts into flames, and, as in this case, the patient with depression or schizophrenia who attempts suicide via fire. Of note, approximately 0.4% of all suicide attempts in 2012 involved fire.³

When a smoke inhalation injury does occur in a patient with a psychiatric condition, they are often unable or unwilling to give a good history. Therefore, it is especially important in this patient population

to have a high index of suspicion, as the physical signs and symptoms of injury can be delayed for up to 48 hours after the smoke exposure.⁴ Clinical suspicion should be heightened by smoke exposure in a closed room, any physical signs of burns, singed hair, soot on the face, dyspnea, cyanosis, and neurological signs such as altered consciousness, vertigo, nausea, and vomiting.⁴ The patient spent an estimated 20 minutes in an enclosed burning room, which was enough time to produce a smoke inhalation injury that revealed itself approximately 10 hours after exposure.

The morbidity and mortality for patients with smoke inhalation injuries are extremely high. Those that progress to acute respiratory distress syndrome have a mortality rate of 50% to 60%,^{4,5} so early recognition and treatment are key.

In this case, it is also worth asking if the patient's established diagnosis of schizophrenia and previous suicide attempts played a role in his prompt transfer to a psychiatric facility. If he did not carry this diagnosis, would his "anxiety" symptoms have been further examined?

As noted in many previous articles, psychiatric patients are often treated differently in the ED.^{6,7} As Bazemore et al.⁶ wrote "the stigmatization of the mentally ill is a pervasive societal issue, and medical providers are far from immune to this." As a counterpoint, it is often hard to know if any patient with a complaint of anxiety is having a cardiopulmonary issue versus an anxiety attack. Physicians are responsible for both "treating all patients equally" and for not putting

patients through unnecessary or expensive diagnostic testing. Anxiety can be an early indicator of cyanide poisoning or hypoxia;⁸ pragmatically, those who have presented with anxiety in the past will most likely experience it again.

There is no algorithm for how much smoke exposure or how many presenting signs or symptoms should qualify for vigilant observation, but we suggest that if there is a high clinical suspicion, especially in a non-communicative patient, a 24-hour surveillance in a facility capable of supportive measures (such as airway management and intravenous fluids) should be considered. In hindsight, a longer observation period may have been reasonable before transfer, although it remains unknown whether this would have ultimately changed the course of illness.

CONCLUSIONS

Identifying and treating smoke inhalation injury among other comorbid psychiatric conditions is complex and crucial for both ED

and psychiatric providers who work together to transfer patients after smoke exposure. Rapid identification of pulmonary damage is essential for patient survival and is also a predictor of patient prognosis to full recovery. Extended monitoring for up to 24 hours should be considered, especially in unreliable patients, even if respiratory symptoms are not, at first, obvious.⁹ Finally, previous suicide attempt is known to be the strongest clinical predictor of suicide completion,¹⁰ so the most effective way to prevent patients from enduring experiences such as this one is psychiatric intervention and effective treatment of mental illness.

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