CASE REPORT

Air Duster abuse causing rapid airway compromise

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SUMMARY

Inhalant abuse is potentially life-threatening and has resulted in many complications such as central nervous system depression, cardiac dysrhythmia and hypoxia. Inhalant abuse causing angioedema is rarely reported in the medical literature. In this report we present a case of rapidly progressive airway compromise following recreational huffing. Our patient required intubation and intensive care unit admission with complete recovery after 5 days. The aetiology of airway compromise is postulated to be due to commonly reported frost bite injury and rarely reported angioedema. To the best of our knowledge this the second case reporting angioedema secondary to huffing Air Duster.

BACKGROUND

Inhaling, or huffing, is common among teenagers and adolescents. However, it can occur in any age group. The side effects can be life-threatening. Physicians need to be aware of inhalant abuse and the potential for airway compromise when evaluating these patients, as rapid action can be lifesaving.

CASE PRESENTATION

A 40-year-old man presented to the emergency department (ED) via ambulance with numbness and tingling of his lips and tongue 4 h after huffing Air Duster in a local public bathroom. Per EMS report, the condition of the patient was rapidly evolving with significant swelling of upper and lower lips and oropharynx during transport. He reported difficulty in breathing and swallowing at the time of presentation to the ED. Vitals at that time included a blood pressure of 136/100 mm Hg, pulse of 83 bpm and oral temperature of 36.1°C, respiratory rate of 22 breaths/min and oxygen saturation of 100%. On examination, he was noted to be in distress with a swollen lower lip (right more than left) and blistering of the oral mucosa with posterior oropharyngeal oedema. A code airway was called and the patient was taken to the OR for intubation with the means to perform a surgical airway if necessary. The patient was easily intubated at that time, without complication or need for a surgical airway. He was placed on mechanical ventilation, and admitted to the intensive care unit (ICU). On presentation to the ICU, he was noted to have significant swelling in the right neck with erythema and weeping blisters which had developed within half an hour of the patient presenting to the unit (figure 1). There was no discernible area of fluctuance. It was difficult to palpate carotid pulses given swelling. His medical history is significant for depression and suicidal ideation for which he had been admitted to a behavioural health

inpatient unit the same month as this episode. He admitted to huffing Air Duster, 1 can/day for 3–4 years. The day of admission, he had huffed three cans. At the time of evaluation, the patient was unemployed. He smoked cigarettes, 1 pack/day, and huffed Air Duster, 1 can/day. He denied any alcohol or other substance use. Home medications include fluoxetine at 20 mg/day and buspirone at 15 mg twice daily.

INVESTIGATIONS

Laboratory work was performed on admission to ICU. White cell count was 16 800 cells/ μ L with a normal differential and no bands. Electrolytes and blood gas performed following intubation were unremarkable. Owing to the significant swelling, which developed over a short period of time, and a rapidly evolving erythema covering a significant portion of the right neck area, a CT of the neck was done which showed extensive soft tissue swelling with oedematous changes over the right side of the upper neck concerning for cellulitis versus angioedema (figure 2).

DIFFERENTIAL DIAGNOSIS

Frostbite injury is a known adverse event from huffing Air Duster. However, it was thought that the rapid progression of airway compromise was unlikely to be due to frostbite injury alone. There is one reported case in the literature of angioedema following Air Duster inhalation, and this was the initial primary concern in our patient. Once he was extubated, towards the end of the hospitalisation, the patient reported that he believed the can had ‘exploded’ in his face. However, he could not remember the episode in any more detail and the can he had been using was brought in with him, fully intact.

Figure 1 The patient's face and neck showing significant swelling in the right neck and lips.

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Figure 2 CT of the soft tissues of the neck showing extensive soft tissue swelling.

TREATMENT

In the ICU, he was started on broad-spectrum antibiotics with the concern that there may be a rapidly evolving soft tissue infection. With the possibility of angioedema in mind, he was started on solumedrol, benadryl and famotidine. Antibiotics were discontinued within 24 h.

OUTCOME AND FOLLOW-UP

Repeat CT of the neck demonstrated improvement in the inflammation. Clinically, neck swelling improved and the patient was noted to have an air leak around the endotracheal tube. He tolerated a trial of continuous positive airway pressure and was successfully extubated after 5 days of mechanical ventilation (figure 3). At that time, he mentioned he thought the Air Duster canister had exploded on him. He denied any thoughts of self-harm or suicide, and felt that his prior hospitalisation and medication adequately treated his depression. He was slowly started on a clear liquid diet which was advanced as tolerated.

Figure 3 The patient's face after extubation.

He remained afebrile and haemodynamically stable. The swelling and blistering noted over his right neck gradually improved. The blistering was treated with bacitracin. Home medications were resumed once the patient was tolerating oral intake. He did well and was discharged home in stable condition.

DISCUSSION

1,1-Difluoroethane is an organofluorine compound. This colourless gas is used as a refrigerant, in gas duster and many consumer aerosol products. Higher exposures may lead to irritation of nose, throat and lungs. It may also cause temporary alteration of the heart electrical activity and sudden death.^{1 2} Management is mainly supportive, concentrating on airway and breathing.

Inhalant abuse refers to the deliberate inhalation, sniffing, dusting or bagging of common products found in homes and communities with the purpose of getting high.³ Inhalants are easily accessible, legal, everyday products. When intentionally misused, they can be deadly.

Inhalants are addictive and considered to be gateway drugs because children often progress from inhalants to illegal drug and alcohol abuse. The National Institute on Drug Abuse reports that one in five American teens have used inhalants to get high. Experts estimate that there are several hundred deaths each year from inhalant abuse, although under-reporting is still a problem.^{4 5}

To the best of our knowledge there was only one reported case of angioedema associated with inhalant abuse.⁶ In our patient, the rapid airway compromise was ultimately thought to be a combination of partial frostbite injury in addition to angioedema. The concern for explosion was a valid one, given the patient report; however the details are not clear, the can was intact which would not be expected if the high-pressure contents had in fact exploded during use.

Learning points

- ▶ Inhalant abuse is common among adolescents, but all age groups have the capability of inhaling.
- ▶ Inhaling poses life-threatening risks, which include airway compromise and sudden death.
- ▶ The differential diagnosis of rapid airway compromise may include frostbite injury, angioedema or explosion of the can.
- ▶ Physicians need to be aware of inhalant abuse and the potential risks among all age groups.

Contributors AW and AK were directly involved in the care of the patient. GB reviewed the literature.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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