



Asthma attack in a spa pool: what could be the cause?

Commentary by

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A 65-year-old woman experiences an asthma attack after turning on the bubbles in a spa pool. Was this an acute episode of asthma or could there have been a direct toxic effect of chlorine on this woman's airways?

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CASE SCENARIO

June, a 65-year-old woman, was in good general health. She had been taking an ACE inhibitor for the past 10 years for hypertension, which had been well controlled. She had experienced only occasional episodes of postinfectious asthma that had quickly responded to her inhaler. Three days prior to her presentation, June had completed her regular swim in the pool in her apartment complex and then, as usual, had hopped into the warm spa pool. However, almost as soon as she turned on the bubbles in the spa, she started to feel her chest tightening up, started to wheeze and cough uncontrollably and she became dyspnoeic. She managed to get out of the spa and return to her apartment where she used her inhaler almost continually for the next hour until her symptoms settled somewhat. When the incident was investigated later that day, it was found that there had been a malfunction of the chlorine probe and the warm spa water had contained a high concentration of chlorine.

Has June experienced an acute episode of asthma or could there have been a direct toxic effect of chlorine on her airways?

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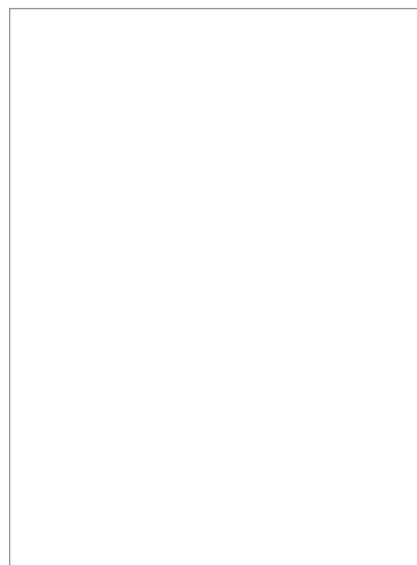
COMMENTARY

It is most probable that June had experienced acute bronchoconstriction following chlorine exposure. People with asthma, even when well controlled as described in June's case, have persisting airway hyper-responsiveness and the potential to develop bronchoconstriction to a range of irritant particles, fumes and vapours. Although she used her inhaler almost continually after exposure before getting relief from her symptoms, it is possible the persisting symptoms were due to airway irritation rather than bronchoconstriction, which would normally settle after four to six puffs of salbutamol if administered with an acceptable technique.

Panic and apprehension may have contributed to less than ideal aerosol delivery in June's situation, but chlorine is known to be an intense irritant and hypersecretion and cough would often be prominent features. It is therefore quite possible that June experienced symptoms of mucosal irritability from intense chlorine exposure in addition to her asthma. It is quite possible that inhaled corticosteroids would help to reduce this irritability as well as the propensity to wheeze, while the inflammation fully resolved. The asthma symptoms should be short lived, generally settling with increased use of a bronchodilator and inhaled corticosteroids over the following 24 hours. The mucosal symptoms may take several days to fully resolve depending on the dose and intensity of the exposure.

The health risks of excessive exposure to chlorine derivatives can be short or long term. Chlorine is an irritant, and can cause acute irritation to mucous membranes, with hypersecretion, skin and conjunctival irritation, upper and lower airway irritability, intense cough and chest discomfort in normal patients. Reactive airways dysfunction syndrome, or irritant-induced asthma, has been described in workers exposed to toxic

fumes from chlorine exposure in industrial accidents.¹ This is a syndrome that leaves subjects with asthma-like symptoms after one or more exposures to a high concentration of an irritant substance. Cough and wheeze with chest tightness and airway obstruction can occur, with a six- to eight-week period



of increased respiratory symptoms associated with transient airway hyper-responsiveness in patients with reactive airways dysfunction syndrome. These symptoms usually spontaneously resolve but occasionally progress to more typical asthma symptoms.

Chronic chlorine exposure to the irritant environment of indoor swimming pools has been associated with a higher prevalence of respiratory symptoms among swimming pool attendants. The prevalence of asthma among elite swimmers is also higher than among other elite athletes, although it has been argued that as swimming is a form of exercise believed to be 'good' for children with asthma, asthmatic children are more likely to acquire swimming competency that may enhance their capacity to become competitive swimmers.

There has been considerable concern about the risks of long-term exposure to

low levels of chlorine in swimming pools encountered by children training, in particular in indoor pools, with some reports initially suggesting that chlorine exposure could increase their risk of developing asthma. Reassuring information comes from a recently published study assessing the risk of new-onset asthma associated with swimming pool attendance during childhood.² The authors followed up 5738 British children from birth to age 10 years and showed that attending swimming pools did not increase their risk of developing asthma. In fact, regular attendance was associated with better lung function and fewer respiratory symptoms, particularly in children with asthma.

People with asthma should carry their reliever bronchodilator with them at all times, in case an unexpected exposure or attack occurs. June does not necessarily need to avoid spas, as her asthma worsening occurred due to more intense exposure to chlorine resulting from a malfunction. However, June should revise her asthma management plan with her GP to be sure she is currently on optimal treatment and using her inhalers correctly.

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REFERENCES

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COMPETING INTERESTS: None.