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Continuous Positive Airway Pressure: An early intervention to prevent phosgene-induced acute lung injury

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Highlights

- **Early use of CPAP, a commercially available system, increased 24 hour survival**
- **CPAP could be used to treat large numbers of casualties in the prehospital setting**
- **CPAP may reduce pre-hospital morbidity and mortality easing transport of casualties to definitive care**

Abstract

Exposure to toxic industrial chemicals such as phosgene may occur through accidental or deliberate release. Inhalation may result in an acute lung injury which manifests as hypoxaemia with insufficient oxygen being delivered to the tissues resulting in hypoxia, respiratory failure and death. No effective pharmacological therapy currently exists and treatment remains supportive, often requiring intensive care facilities. In a mass casualty scenario the logistical burden of managing exposed individuals would rapidly overwhelm healthcare systems. This highlights the need to develop post exposure therapeutic strategies to minimise injury severity and increase survival in individuals exposed to toxic chemicals.

Our research objective was to investigate a commercial off the shelf (COTS[1]) therapy; ambient air continuous positive airway pressure (CPAP) support, initiated 1 hour post exposure to explore the concept that early intervention with positive airway pressure would reduce or ameliorate lung injury following exposure to phosgene.

This study has demonstrated that CPAP, initiated before overt signs of exposure become manifest, significantly improved survival as well as improving some clinically relevant physiological measures of phosgene-induced acute lung injury over 24 hours.

[1] Abbreviations: COTS, commercial off the shelf; CPAP, continuous positive airway pressure; TIC, toxic industrial chemical; ALI, acute lung injury; ARDS, acute respiratory distress syndrome; IPPV, intermittent positive pressure ventilation; PEEP, positive end