Guideline for Smoke Inhalation Management

Smoke inhalation

Smoke inhalation occurs following a fire in an enclosed space. Smoke contains low levels of oxygen and raised levels of carbon dioxide, carbon monoxide, particles, and other chemicals. Cyanide poisoning is not a common consequence of smoke inhalation but should be suspected if there is profound metabolic acidosis and no other explanation. Smoke inhalation causes decreased conscious level at the time of the injury and subsequently causes lung injury and worsens the inflammatory consequences of burns. The combination of smoke inhalation and burns increases fluid requirements and increases mortality compared to burn injury alone.

Diagnosis of Smoke Inhalation

Recommendation: Smoke inhalation should be suspected in fire victims who have a history of altered level of consciousness, have respiratory symptoms or were rescued from a fire in an enclosed space.

Recommendation: All burn patients with suspected smoke inhalation should have an arterial or venous blood sample analysed for carboxyhaemoglobin.

Recommendation: Smoke inhalation should be diagnosed by the presence of an elevated carboxyhaemoglobin level. A level greater than 10% of total Haemoglobin is diagnostic.

Routine bronchoscopy for the diagnosis of treatment of smoke inhalation is not recommended as there is not prospective study that demonstrates benefit. A retrospective study of a national database suggested a possible benefit of bronchoscopy but no statistically significant mortality benefit. As retrospective studies have numerous limitations a well designed prospective study is required before routine bronchoscopy can be recommended as a standard of care.

Treatment of smoke inhalation

Numerous treatments have shown promise in animal experiments but only high flow oxygen and possibly heparin appear to be of benefit in humans.

Recommendation: All patients with suspected or confirmed smoke inhalation should receive high flow oxygen until the carboxyhaemoglobin is less than 10% of total Haemoglobin.
Recommendation: All smoke inhalation victims should receive routine thromboprophylaxis with according to local hospital protocols.

Recommendation: Routine administration of cyanide antidotes is NOT recommended.

There are well-established criteria for diagnosing severe lung injury and international agreements regarding management approaches in patients requiring ventilation with severe lung injury. These are routinely applied in Scottish intensive care units and should be followed in patients with lung injury following burns and smoke inhalation.

Recommendation: All smoke inhalation victims that require ventilation should have lung protective strategies based on current guidelines to prevent high airway pressures.

Background information:


