218
Improvised Automatic Lung Ventilation for Use in Disasters

Sommer D, Fisher JA
Mount Sinai Hospital
Toronto, Ontario, Canada

Background: Large-scale disasters, such as accidental chemical spills or strategic use of nerve gas, may result in great numbers of casualties requiring mechanical ventilation. The number of ventilators required may exceed the supply.
Objective: To develop improvised breathing circuits that extend the capability of a single ventilator to provide ventilation support to several patients during critical emergencies.
Methods: Two types of circuits were assembled from readily available, inexpensive components. One delivers the tidal volume (V_t) directly to the patient and the other does so through a number of secondary circuits in parallel. Both types require an additional source of fresh gas flow (FGF) for each patient. An examination was made of the role of ventilator V_t, inspiratory time, frequency, and FGF on delivered V_t using mechanical lung simulators.
Results: Each circuit type can provide individual patient V_t, inspired oxygen concentration, and positive end-expiratory pressure (PEEP). The secondary circuit configuration is more efficient in terms of FGF usage, but is more complex with respect to mode of operation.
Conclusions: A description is provided of two breathing circuits assembled from easily accessible components. Each can provide automatic ventilation to several patients with a single ventilator during emergencies.

219
Intraosseous Infusions through Non-Trochared Needles

Totten VY
Emergency Medical Department, The Brooklyn Hospital
Brooklyn, New York, USA

Objective: A pilot study on the feasibility of intraosseous infusions through a non-trochared needle.
Methods: Eight elderly cadavers were penetrated in three locations: sternal; proximal tibia; and distal tibia; with each of three needles: a Frantzen bone marrow aspiration needle; an 18-gauge and a 14-gauge needle. If penetration succeeded, methylene blue was infused.
Results: There was no statistically significant difference in rate of penetration or rate of infusion for the three needles.
Conclusion: An ordinary, non-trochared steel hypodermic needle can be used successfully for intraosseous injection in elderly cadavers.

220
Intraosseous Sites and Techniques

Totten VY, Torrey SP
Emergency Medical Department, The Brooklyn Hospital
Brooklyn, New York, USA

Objective: To illustrate techniques for intraosseous injections and infusions at various sites. To illustrate available needles and methods to secure the needles.
Method: Photographs and illustrations of sternal, manubrial, and tibial sites are provided with commentary. Photographs of commercially available needles in use in the United States will be accompanied by manufacturers' names and addresses. Photographs of methods to secure the needles will be supplemented by text.
Results: These photographs and illustrations will assist persons inexperienced in the technique of intraosseous infusions to learn and apply the technique.
Conclusion: Visual demonstrations add to the understanding and dissemination of emergency medical procedures.

221
The Effect of Full Protective Gear on Intubation Performance by Hospital Medical Personnel

Hendler I, Ziv I,* Nahtomi O,* Segal E,** Robinson A,* Pearl A,** Wiener M,* Meyerovitch J**
* NBC Branch Medical Corps, Israel Defence Force
** Anesthesiology Department, Sheba Medical Center
Israel

Objective: Respiratory arrest is the main complication of severe nerve gas poisoning. Endotracheal intubation and mechanical ventilation are crucial steps in its medical management. However, upon arrival at the hospital, prolongation of intubation performance is likely because protective gear is required for medical personnel.
Methods: To assess intubation performance with protective gear, measures were made of time and quality of serial intubations performed in intubation models by medical personnel (an anaesthesiologist and a nurse), with and without protective gear.
Results: Total intubation time was 47.3 ±16.7 sec (mean ±SD). Protective gear caused a significant prolongation of 46% on average ($p < .05$), up to 69.2 ±20.8 sec. Moreover, 62.5% of the intubators assessed their performance without protective gear as very good, while this self-assessment was reported only by 6.25% of those with protective gear ($p < .05$). Tube fixation was the time-limiting step when performed with full protective gear, as it was prolonged by 74% ($p < .05$) and was assessed by 81% of the intubators as the most problematic stage.
Conclusion: Study results emphasize that even though protective gear causes a significant prolongation of intubation time, it still can be performed effectively. However, to improve initiation of respiratory assistance for chemical warfare casualties, development of better appliances for tube fixation is required.