

Resuscitation of avalanche victims

Evidenced based guidelines of the international commission for mountain emergency medicine.

Colorado's beautiful mountain terrain is one of the most avalanche prone in the country. As we head into the winter season, avalanche awareness demands that we be prepared to operate in this environment. In addition, it is possible that we will provide patient care to patients suffering from avalanche related injuries. This brief summary contains the evidenced based guidelines of the international commission for mountain emergency medicine (ICAR MEDCOM) for the prehospital treatment of buried avalanche victims. The recommendations appeared in the September 2012 issue of Resuscitation and provide an algorithmic approach towards assessment and treatment based on length of burial and core temperature.

Overall survival of buried avalanche victims is up to 77% in some case series studies. The survival depends primarily on the duration of burial, asphyxia, the presence of trauma and the degree of hypothermia. Asphyxia was found to be the most common factor leading to death. Trauma, principally chest trauma, was found to be either a leading cause of death or a secondary cause depending on where the data was obtained. Western Canada avalanche victims were reported to have higher incidences of death due to trauma, whereas European victims were reported to have higher rates of death due to asphyxia. These two findings suggest that a scene survey is of great importance. Was the patient swept through a stand of trees or were they discovered buried above treeline?

Time of burial seems to be the most important factor regarding survival. In numerous case control studies victims buried greater than 35 minutes with an airway obstructed by snow and/or ice did not survive. Using this 35 minute time frame, the resuscitation guidelines fall into several pathways.

The first priority, in addition to rescuer safety, is to determine airway patency and burial time. If the patient has suffered lethal injuries or the body is frozen then resuscitation is withheld. If burial time is uncertain then core temperature can be used as a surrogate measure as explained in the article. The initial approach is as follows.

For victims buried < 35 minutes or core temp >32 C and in cardiac arrest, presume asphyxia and initiate CPR.

For victims buried > 35 minutes in non-asystolic cardiac arrest with a patent airway and a temp >32 C begin CPR. The guidelines suggest considering termination of efforts in a normothermic patient after 20 minutes of ALS without success.

For victims buried >35 minutes and core temp. <32 C, with a patent airway then presume hypothermia with a recommendation that patients in cardiac arrest be transported to a center capable of ECMO/CPB rewarming with ongoing CPR if no vital signs.

For victims buried > 35 minutes in asystolic cardiac arrest with an obstructed airway, then CPR can be begun and ceased if unsuccessful.

So CPR for pretty much everyone it would seem! The avalanche management algorithm then proceeds down numerous pathways that suggest different treatments including active rewarming, ECMO, and measurement of serum potassium levels depending upon patient presentation and response to resuscitation. The approach can seem a bit confusing so the best recommendation would be to study the recommendations, carry a laminated copy of the algorithm, follow your CPGs and utilize medical control. These scenes are often confusing, take place in harsh weather conditions and can present hazards to the rescuers. In addition the Colorado Avalanche Information Center provides a great resource with daily weather and avalanche forecasts. Incorporating a quick look at the site's daily forecast is a good way to maintain situational awareness. Be safe and keep warm!

Operate