



# International Commission for Alpine Rescue

## 2022 Approved ICAR Medical Management of Avalanche victims

Prepared for the AOD and amended March 2023 following peer-reviewed publication of the ICAR MedCom recommendations by John Ellerton (MedCom President)

These ICAR recommendations are designed for rescuers operating at a Basic Life Support (BLS) level and organised rescue services. For full details of the update and the recommendations relevant to Advanced Life Support (ALS) providers, please refer to the full ICAR MedCom paper. This is available at: <https://doi.org/10.1016/j.resuscitation.2023.109708>

Recommendations have a grade (ie 1B) for the evidence underlying the statement. The American College of Chest Physicians grading system is used. This measures the importance of the recommendation and strength of the supporting evidence. (Table 1) 1A is the highest grade; 2C is a weak and poorly evidenced recommendation.

Comments are welcome; please send them to:  
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## Recommendations:

### For companions/bystanders:

1. Companions should locate and extricate buried victims expeditiously (1B).
2. Professional rescue should be mobilised early (1B).

### For providers of avalanche rescue courses:

3. Appropriate First Aid and Basic Life Support skills for avalanche incidents should form part of every course.

### For organised mountain rescue/ski-patrol services:

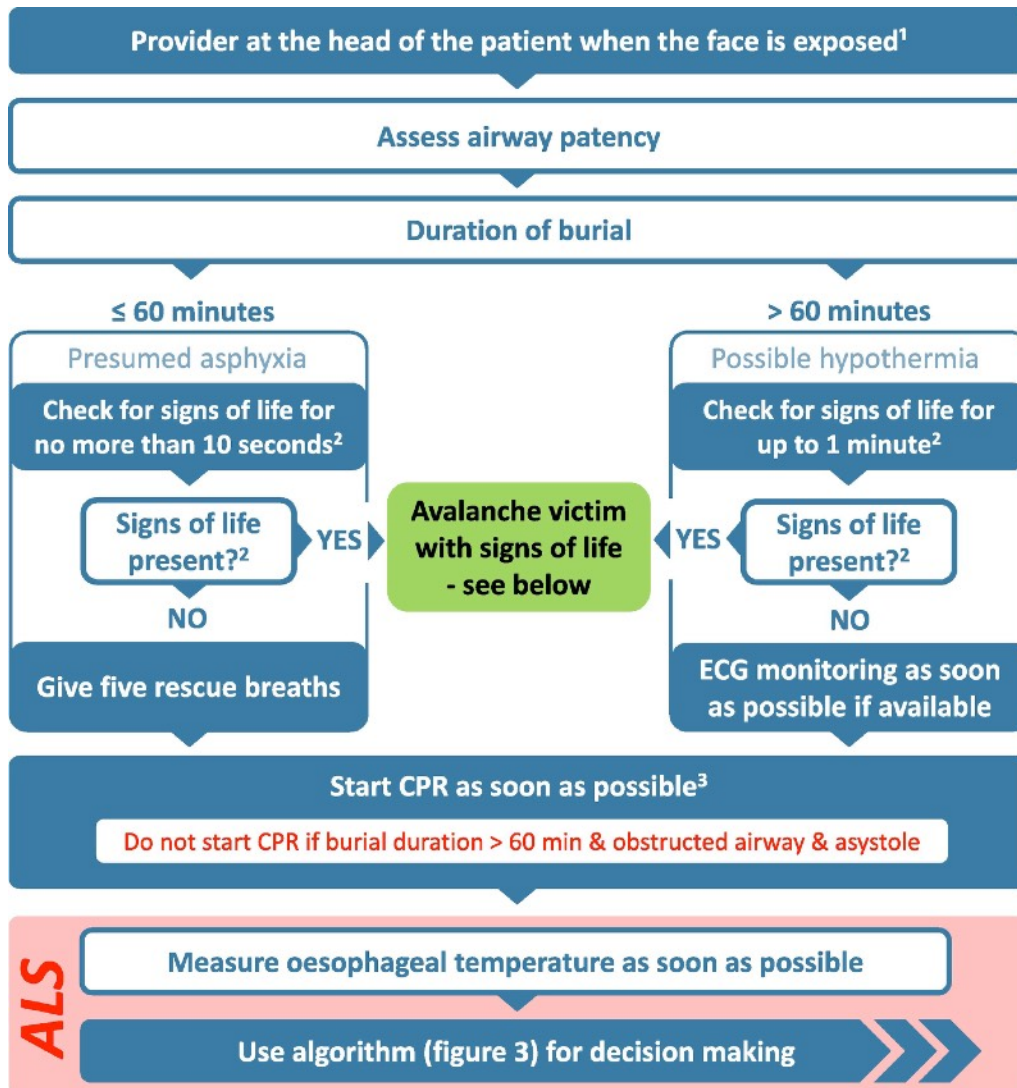
4. Practical training should be done regularly and, where possible, should include all local/regional parties involved in the incident. For example, professional guides, ski patrol persons, terrestrial and helicopter-based mountain rescue teams, dispatch centres, receiving health care facilities could be involved with the aim of optimising the chain of survival.

### For BLS trained persons (companions and organised rescue persons):

5. The medical management of critically buried avalanche victims may benefit from the use of an evidence based algorithm such as the one appended.
6. Trauma should be considered as a potential cause of cardiac arrest in avalanche victims. (1B)
7. Severe trauma should be expected in avalanches over steep terrain or rocks, or through forests. Rescuers should provide adequate spinal motion restriction during extrication, packaging and transportation of avalanche victims. (1C)
8. For victims with a burial time of  $\leq 60$  minutes with no vital signs, presume asphyxia and provide rescue breaths as soon as possible regardless of airway patency. (1A)
9. If the burial time is  $> 60$  minutes, airway patency should be determined upon exposure of the face. Check carefully for vital signs for up to one minute. If the airway is patent or undetermined, presume a primary hypothermic cardiac arrest. Unless core temperature can be measured to exclude hypothermia, the victim should be resuscitated and transported to the hospital. (1B)
10. Chest compressions can be provided effectively even in atypical position before complete extrication. (2A)
11. Information about the presence or absence of an air pocket, the snow density or the burial depth should not be used to change the victim's management (1C).
12. Hypothermic cardiac arrest despite a burial duration of  $\leq 60$  minutes may be considered, at the rescuer's discretion, where there is a possibility of very fast cooling (e.g. thin clothes, lean victims, a fast cooling environment). (2C)
13. Consider hypothermia as a likely cause of a **witnessed** cardiac arrest for victims buried for  $> 60$  minutes. Unless a core temperature excludes hypothermic CA, the victim should be resuscitated and transported to a hospital with ECLS rewarming capabilities.
14. Observation at a health care facility should be considered for all completely buried victims. (1C)

## Algorithm: Initial management of critically buried avalanche victims

(This does not apply in a triage situation.)



### Critically buried avalanche victim with signs of life

- ECG monitoring as soon as possible (ideally before handling or moving the patient)
- Gentle handling and consider potential trauma
- Transfer to the most appropriate hospital
- Consider transfer to an ECLS hospital for hypothermic patients with:
  - Core temperature <30°C or ventricular arrhythmia or systolic blood pressure <90 mmHg
- The management of medical conditions which are not specific to avalanche victims (e.g. hypothermia, trauma) should follow the most recent recommendations

1. Assess for lethal injuries: decapitation; truncal transection; whole body decomposed. If present, do not start CPR.

2. Signs of life include any of the following: A, V or P from AVPU (alert, responsive to verbal stimuli, responsive to pain, unresponsive) or Glasgow Coma Scale >3, any visible movement, respirations, or a palpable carotid or femoral pulse (for experienced ALS providers).

3. Standard compression / ventilation rates. Drug dose and defibrillation depending on core temperature or, if not available, burial duration. If ventricular fibrillation persists after three shocks, delay further attempts until the core temperature is ≥30°C. Withhold epinephrine (adrenaline) if the core temperature is <30°C.

## The Grading System of the American College of Chest Physicians

| Grade | Description   | Benefits vs risks and burdens   | Methodological quality of supporting evidence   |
|-------|---|---|---|
| 1A    | Strong recommendation, high-quality evidence                    | Benefits clearly outweigh risks and burdens or vice versa   | RCTs without important limitations or overwhelming evidence from observational studies      |
| 1B    | Strong recommendation, moderate-quality evidence                | Benefits clearly outweigh risks and burdens or vice versa   | RCTs with important limitations or exceptionally strong evidence from observational studies |
| 1C    | Strong recommendation, low-quality or very low-quality evidence | Benefits clearly outweigh risks and burdens or vice versa   | Observational studies or case series  |
| 2A    | Weak recommendation, high-quality evidence                      | Benefits closely balanced with risks and burdens  | RCTs without important limitations or overwhelming evidence from observational studies      |
| 2B    | Weak recommendation, moderate-quality evidence                  | Benefits closely balanced with risks and burdens  | RCTs with important limitations or exceptionally strong evidence from observational studies |
| 2C    | Weak recommendation, low-quality or very low-quality evidence   | Uncertainty in the estimates of benefits, risks, and burden; benefits, risk, and burden may be closely balanced | Observational studies or case series  |

American College of Chest Physicians classification scheme for grading evidence and recommendations in clinical guidelines. RCT, randomized controlled trial. Source: Guyatt et al. Chest 2006;129:174-81.