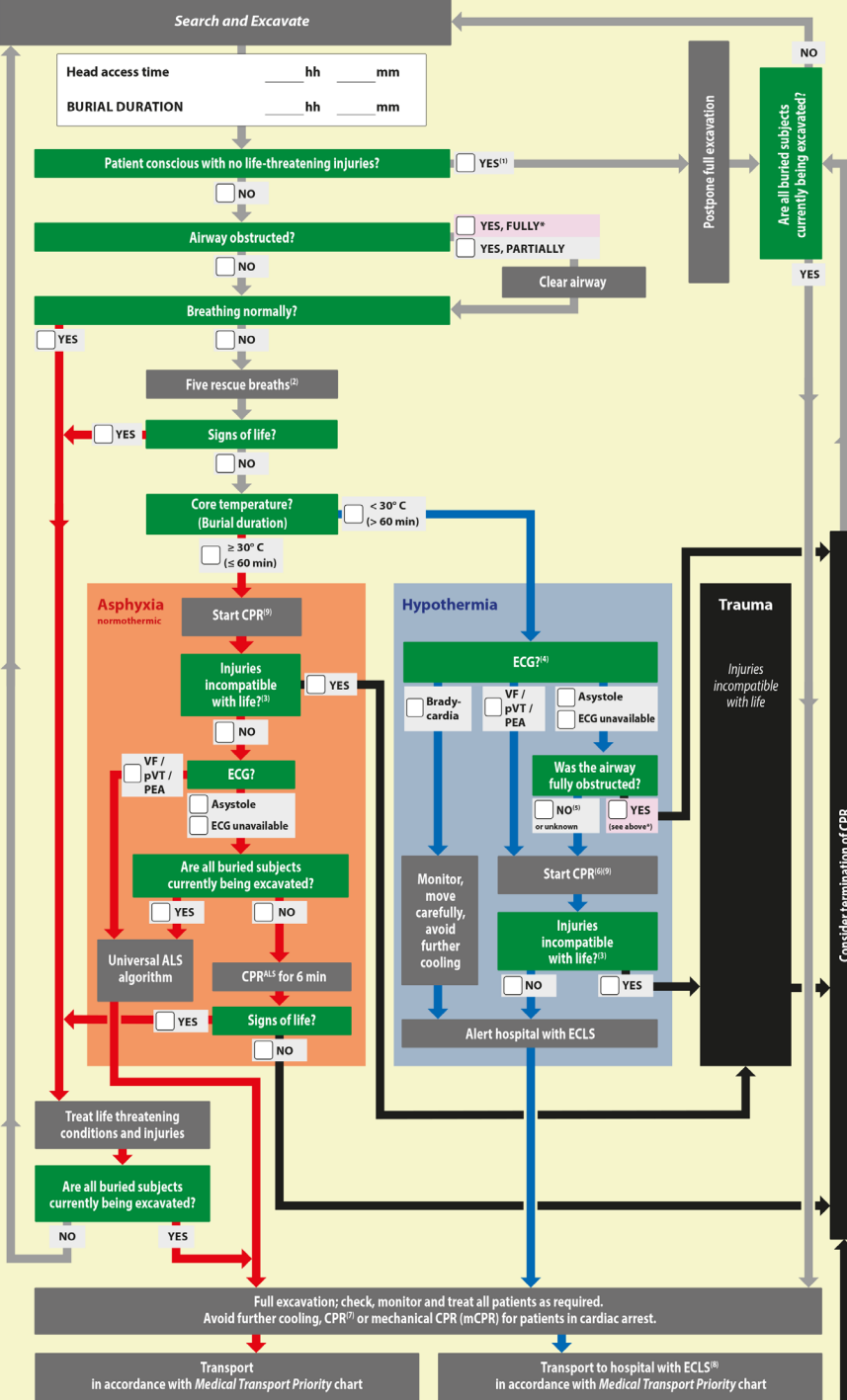


ACCIDENT TIME hh mm ALARM TIME hh mm PATIENT ID

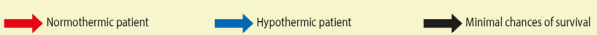
Avalanche Accident – Out-Of-Hospital Medical Treatment



In-Hospital Medical Treatment



- (1) In case of severe shortage of rescuers, people who were caught by the avalanche and rescued may assist in the rescue of the remaining buried subjects. The criteria for the decision if and for what purpose they can be included in the rescue are:
1. Effort to fully excavate them, 2. Their potential to assist the rescue and 3. Continuous assessment of their condition.
- (2) Rescue breaths HIGHLY recommended as avalanche patients often asphyxiate. No rescue breaths → no oxygen → no return of spontaneous circulation → no survival.
- (3) Obvious evidence of severe mechanical impact/high fall/severe collision with trees or rocks or a head/trunkal body position incompatible with life.
- (4) Use additional tools for detection of vital signs (end-tidal etCO₂, arterial oxygen saturation (SaO₂), ultrasound) if available.
- (5) If airway was patent, the additional presence of an air pocket is a strong **out-of-hospital** predictor for survival.
- (6) Core temperature < 30° C: no epinephrine, do not defibrillate more than 3 times. Further defibrillation attempts, as well as use of epinephrine with intervals prolonged to 6 - 10 min, only when core temperature is ≥ 30° C.
- (7) Core temperature < 28° C or burial duration > 60 min in circumstances where continuous CPR is impossible: See ICPR chart.
- (8) Also transport patients with core temperature < 30° C AND life threatening hemodynamic instability to a hospital with ECLS.
- (9) Firm surface crucial.



Hypothermia Staging

Hypothermia Staging Core Temperature and Revised Swiss System

Stage	Measured core temperature	Symptoms	Measures
1	35 - 32° C	Alert, clear answers ⁽¹⁾	Active rearming by moving, warm sugary drinks
2	< 32 - 28° C	Impaired consciousness, responds to verbal stimulation ⁽¹⁾	Avoid further cooling, move carefully, warm sugary drinks
3	< 28° C	Unconscious , signs of life might be minimal ⁽¹⁾	Avoid further cooling, move carefully, monitor
4	Variable ⁽²⁾	No signs of life	Apply Avalife Out-Of-Hospital Medical Treatment algorithm

(1) Consciousness may be impaired by trauma or drugs.
 (2) Hypothermic cardiac arrest in young, healthy persons occurs < 30° C, in older persons and persons with pre-existing diseases already < 32° C. Some persons still have vital signs < 24° C.

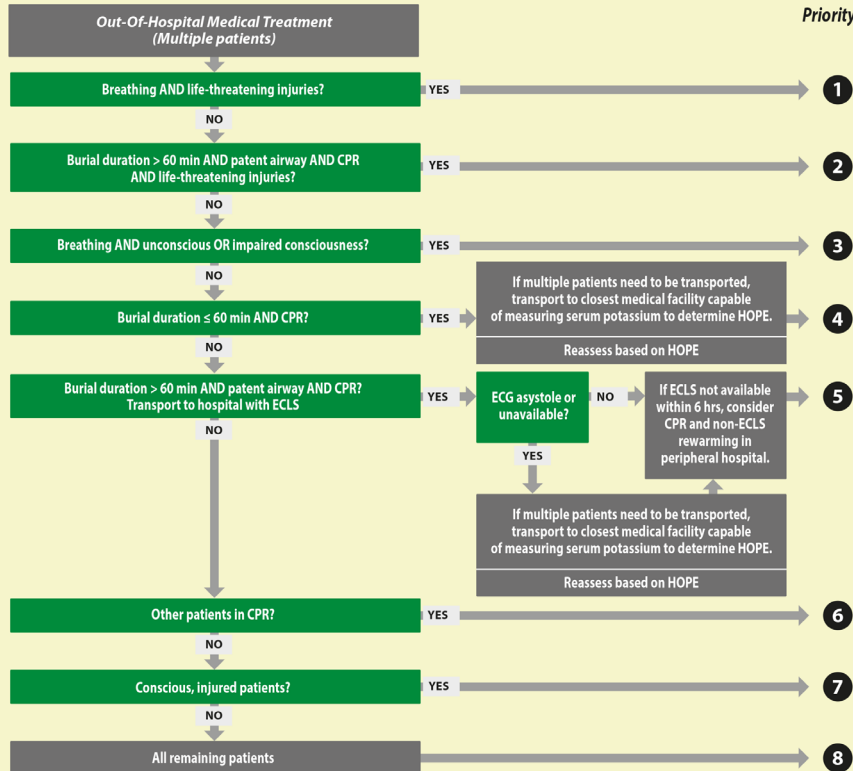
iCPR

Intermittent CPR: Mean of Last Resort!

ONLY apply if transport is unavoidable and effective CPR impossible, or in cases where continuous CPR is impossible because of extremely limited resources.

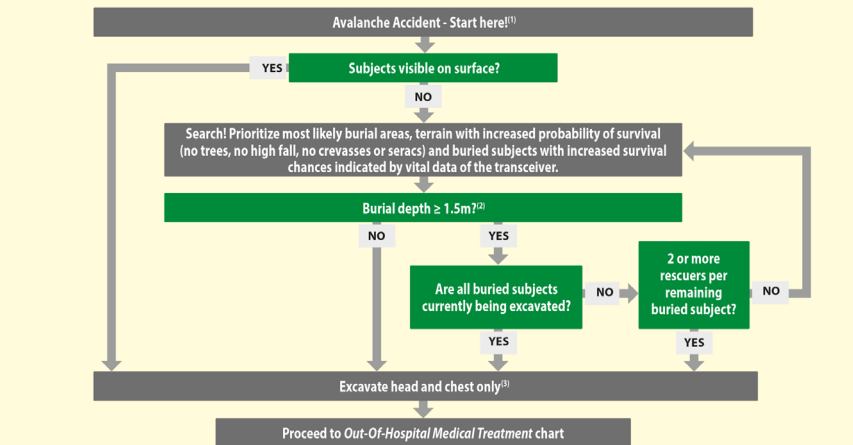
Burial duration	Measures	Measured core temperature
≤ 60 min	No intermittent CPR, preferably apply mCPR	≥ 28° C
> 60 min: Before iCPR, ALWAYS perform uninterrupted CPR for 1/3 of the burial duration	At least 5 min of CPR followed by max 5 min without CPR	< 28° C
	At least 5min of CPR followed by max 10min without CPR	< 20° C

Avalanche Accident – Medical Transport Priority



(1) Transport priority is based on probability of survival and the urgency of treatment to preserve the chances of survival. Priorities may change based on means of transport and their availability, transport times to appropriate medical facilities, weather conditions and out-of-hospital treatment options.

Search and Excavate



(1) Consider risk of rescuers and residual survival chances of buried subjects. Consider helicopter-based search and helicopter-attached "scoop and run" excavation. Limit number of exposed rescuers. Use additional personal protection equipment. Mitigate danger or postpone rescue if survival chances of the buried subjects are low compared to the risk of the rescue mission.
 (2) Excavate immediately regardless of burial depth if finding additional buried subjects is unlikely, requires probe lines, or a similarly time-consuming search.
 (3) Consider immediate evacuation in case of:
 1. Considerable risk for rescue personnel.
 2. Risk of delayed evacuation due to deteriorating weather or flying conditions.
 3. Terrain conditions which make effective on-site treatment impossible.

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 Survival Chance Optimized Procedures in Rescue and How to Minimize Injuries During Excavation; Genovese M, ISSW2013; 1408-1417 | A concept for optimizing avalanche rescue strategies using a Monte Carlo simulation approach; Selinger L, Genswein M, Paul P, Schweizer J (2017); <https://doi.org/10.1371/journal.pone.0175877> | Hypothermia outcome prediction after extracorporeal life support for hypothermic cardiac arrest patients: The HOPE score; Pasquier M, Hugli O, Paul P, Darocha T, Blancher M, Husby P, Silfvast T, Caron P, Rousson V (2018); [resuscitation. 2018;101:202-208](https://doi.org/10.1016/j.resuscitation.2018.02.026). Epub 2018 Mar 2. | Hypothermia outcome prediction after extracorporeal life support for hypothermic cardiac arrest patients: An external validation of the HOPE score; Pasquier M, Rousson V, Darocha T, Bouzat P, Kosiński S, Sawamoto K, Champigneulle B, Wiberg S, Wanschler MCL, Brodman-Mueller M, Paul P, Hugli O (2019); [resuscitation. 2019;104:10-18](https://doi.org/10.1016/j.resuscitation.2019.03.017). Epub 2019 Mar 30. | Guidelines for Cardiac arrest in special circumstances 2020; Lott C, Truhlar A, Alfonso A, Borelli A, Gonzalez-Salvado V, Hinkelbein J, Nolan J, Paul P, Perkins G, D, Thies K-C, Yeung J, Zidegan D A, Soar J (2020); European Resuscitation Council 2020.