WILDERNESS & ENVIRONMENTAL MEDICINE (2017) ▮, ▮▮▮–▮▮▮

BRIEF REPORT

# Knowledge of the Avalanche Victim Resuscitation Checklist and Utility of a Standardized Lecture in Italy

Giacomo Strapazzon, MD, PhD; Daniel Migliaccio, MD; Diego Fontana, MD; Agnieszka Elzbieta Stawinoga, PhD; Mario Milani, MD; Hermann Brugger, MD

*From the Institute of Mountain Emergency Medicine, Eurac Research, Bolzano, Italy (Drs Strapazzon and Brugger and Ms. Stawinoga); the Corpo Nazionale Soccorso Alpino e Speleologico, National Medical School (CNSAS SNaMed), Milan, Italy (Drs Strapazzon and Milani); the International Commission for Mountain Emergency Medicine (ICAR MEDCOM), Kloten, Switzerland (Drs Strapazzon, Milani, and Brugger); the Department of Emergency Medicine, Stanford University, Stanford, CA (Dr Migliaccio); the Interdepartmental Center of Sport Medicine, Gallarate, Italy (Dr Fontana); and the Department of Emergency Services, Ospedale di Lecco, Lecco, Italy (Dr Milani).*

**Objective**—To explore baseline knowledge about avalanche guidelines and the Avalanche Victim Resuscitation Checklist (AVReCh) in Italy and the knowledge acquisition from a standardized lecture.

**Methods**—Standardized lecture material discussing AVReCh was presented during 8 mountain medicine courses from November 2014 to April 2016 in different regions of Italy. To determine the knowledge acquisition from the lecture, a pre- and postlecture survey was utilized.

**Results**—A total of 193 surveys were analyzed. More than 50% of the participants had never participated in lectures/courses on avalanche guidelines, and less than 50% of the participants knew about the AVReCh before the lecture. The correct temporal sequence of reportable information in the basic life support section of the AVReCh was selected by 40% of the participants before the lecture and by 75% after the lecture ($P < 0.001$). Within subgroups analysis, most groups saw significant improvement in performance ($P < 0.05$). The selection of the correct burial time increased from 36% to 84% ($P < 0.05$).

**Conclusions**—Health care providers and mountain rescue personnel are not widely aware of avalanche guidelines. The standardized lecture significantly improved knowledge of the principles of avalanche management related to core AVReCh elements. However, the effect that this knowledge acquisition has on avalanche victim survival or adherence to the AVReCh in the field is yet to be determined.

*Keywords:* avalanche burial, hypothermia, checklist, ALS provider, BLS provider

## Introduction

With increases in winter sport participation, there has been increased exposure to avalanche danger. In an avalanche, demands for field rescue commonly overwhelm resources, leading to increased morbidity and mortality. The International Commission for Mountain Emergency Medicine (ICAR MEDCOM) has published official consensus guidelines for the onsite treatment of avalanche victims,[1] and the International Liaison Committee on Cardiopulmonary Resuscitation has included specific recommendations in cardiopulmonary resuscitation guidelines[2] to provide guidance to health care providers and mountain rescue personnel. The Wilderness Medical Society has also recently published practice guidelines for prevention and management of avalanche snow burial accidents.[3]

A recent study performed in the European Alps found poor compliance with the ICAR MEDCOM guidelines from 1996–2009, with insufficient transfer of information from the accident site to the hospital.[4] The 2 principal concepts in avalanche survival are burial time and airway patency with presence of an air pocket.[2,5] From early data on avalanche survival, it is evident that most victims die from asphyxiation within 35 minutes of burial.[6] Recently, core temperature (≤30°C) and serum potassium (≤8 mmol/L) have been included in the guidelines as prognostic factors for survival.[2,3,7] Based on the guidelines,

Corresponding author: Giacomo Strapazzon, MD, PhD, Institute of Mountain Emergency Medicine, Eurac Research, Viale Druso 1, I-39100 Bolzano, Italy; e-mail: giacomo.strapazzon@eurac.edu.

Submitted for publication April 2017.
Accepted for publication August 2017.

the ICAR MEDCOM created an Avalanche Victim Resuscitation Checklist (AVReCh) in 2014 in an attempt to improve the quality of prehospital patient care (Figure 1).[8,9] The checklist concept has been promoted by the World Health Organization since 2008 due to its potential to improve quality of patient care, being a robust and widely applicable tool.[10] AVReCh details a low probability of survival in avalanche burial victims with completely obstructed airways, a burial time of >60 minutes, and/or serum potassium >8 mmol/L.[2,3,9] Strict adherence to the AVReCh (basic life support [BLS] and advanced life support [ALS] sections) can streamline avalanche victim management.

The aim of the current study was to explore baseline knowledge about avalanche guidelines and the Avalanche Victim Resuscitation Checklist in Italy and knowledge acquisition from a standardized lecture about the AVReCh.

## Methods

After the ICAR MEDCOM released standardized lecture material discussing the AVReCh, a 1-hour lecture (based on ICAR MEDCOM material) was presented during 8 mountain medicine courses organized by either the CNSAS-Italian Mountain Rescue or SIMeM-Italian Society of Mountain Medicine. The lecture included information about the BLS and ALS management of avalanche victims and practical training (ie, inserting essential information from standardized examples in a training AVReCh). Specifically, 1 pilot lecture was held at the end of 2014 in Trentino Alto-Adige, Italy, and the other 7 lectures were consecutively held in the winter season of 2015–2016 in different regions of Northern and Central Italy (Abruzzo [1], Emilia Romagna [2], Piemonte [1], Trentino Alto-Adige [2], and Veneto [1]). The lecture was presented by the same member of the ICAR MEDCOM (G.S.).

To determine the knowledge acquisition resulting from this lecture on avalanche resuscitation guidelines, all participants received a pre- and postlecture survey that was developed by the authors. The evaluation time was 15 minutes each. The survey was anonymous, and participants were given an identifying number to facilitate pre- and postanalysis. Based on the study methods presented, the study was exempted from needing the approval of the local ethics board approval (0078304-BZ).

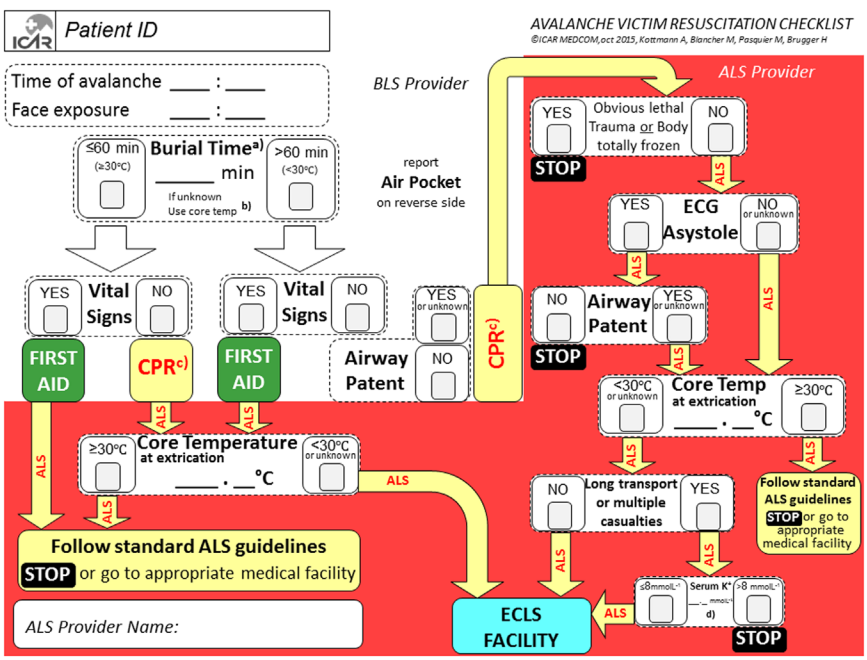


**Figure 1.** Avalanche Victim Resuscitation Checklist. The white section is addressed to a basic life support–trained first responder, the red section to an advanced life support–trained health care provider. Patient ID, patient identity; CPR, cardiopulmonary resuscitation; BLS, basic life support; ALS, advanced life support; ECLS, extracorporeal life support (cardiopulmonary bypass/extracorporeal membrane oxygenation). a) Time between burial and uncovering the face. b) If duration of burial is unknown, core temperature using an esophageal probe may be substituted in patients in cardiac arrest. c) Cardiopulmonary resuscitation can be withheld if there is an unacceptable level of risk for the rescuer, total body freezing, or obvious lethal trauma (decapitation, truncal transection). d) If potassium at hospital admission exceeds 8 mmol/L, consider terminating resuscitation (after excluding crush injuries and consideration of the use of depolarizing paralytics). Modified from Kottmann et al.[8,9] with permission from Elsevier.