References

1. Grasegger K, Strapazzon G, Procter E, Brugger H, Soteras I. Avalanche survival after rescue with the RECCO Rescue System: a case report. *Wilderness Environ Med.* 2016;27:282–286.
2. Techel F, Zweifel B. Recreational avalanche accidents in Switzerland: trends and patterns with an emphasis on burial, rescue methods and avalanche danger. *Proceedings of the International Snow Science Workshop.* Oct 7–11, 2013; Grenoble – Chamonix Mont-Blanc, France. Available at: <http://arc.lib.montana.edu/snow-science/item/1844>. Accessed: May 16, 2016.

In Reply to Drs Pasquier, Gnaegi, and Hugli

CrossMark

To the Editor:

We thank Drs Pasquier, Gnaegi, and Hugli¹ for the interesting case report and the valuable comments. Regarding the comment about analysis of the survival rate, we would like to emphasize that the case series listed in the Table were, as clearly stated in the subtitle, “selected cases.”² Thus, by definition these data were not expected to be complete. Being well aware of this selection, we did not calculate (or report) any survival rate in the article and did not pretend that the case series could be generalizable.

Thirty-five minutes is the threshold of time after which a patent airway is needed for long-term survival.^{3,4} In our case series, 7 of the 14 cases with known duration of burial were located by RECCO Rescue System within 35 minutes; 6 of them (86%) presented with vital signs at extrication. In contrast, of the remaining 7 victims who were found after >35 minutes of burial only 2 (29%) had vital signs, which reflects the poor survival after this time period. Interestingly, all victims with a short duration of burial (≤ 35 minutes) were off-piste skiers, whereas 5 of the 7 victims with a long duration of burial (>35 minutes) were other recreationists who were obviously found away from ski areas. This indicates, in our opinion, that the vicinity of the accident sites to the secured ski areas was one of the reasons for the prompt extrication and high survival of the off-piste skiers.

We agree that the survival rate of the presented case series may be overestimated compared with previously published systematic retrospective analyses,⁵ but survival analysis was neither the aim of the study nor stated in the article. However, we do not assume that the manufacturer intentionally preselected cases with good outcome as suspected by the authors, but we agree with them that there will be a good number of not-reported cases. This bias applies to all observational studies on mountain accidents in which cases with good outcome may be underreported.⁶

We support the suggestion of Drs Pasquier, Gnaegi, and Hugli¹ that a systematic data collection of cases rescued with the RECCO Rescue System, or even a comprehensive international avalanche registry, will be needed to estimate its effect on survival. Moreover, it will also help to identify those groups of recreationists who have the best benefit from the additional use of the RECCO Rescue System by organized rescue teams.

Hermann Brugger, MD
Institute of Mountain Emergency Medicine, EURAC
Research, Bolzano, Italy
International Commission for Mountain Emergency
Medicine ICAR MEDCOM

Katharina Grasegger, MD
Institute of Mountain Emergency Medicine, EURAC
Research, Bolzano, Italy
Faculty of Medicine, LMU Munich, Munich, Germany

Inigo Soteras, MD, PhD
Cerdanya Hospital, Puigcerdà, Spain
Faculty of Medicine, Girona University, Girona, Spain
International Commission for Mountain Emergency
Medicine ICAR MEDCOM

Giacomo Strapazzon, MD, PhD
Institute of Mountain Emergency Medicine, EURAC
Research, Bolzano, Italy
International Commission for Mountain Emergency
Medicine ICAR MEDCOM

References

1. Pasquier M, Gnaegi A, Hugli O. Response to RECCO in avalanche rescue by Grassegger et al. *Wilderness Environ Med* 2016;27:533–534.
2. Grasegger K, Strapazzon G, Procter E, Brugger H, Soteras I. Avalanche survival after rescue with the RECCO Rescue System: a case report. *Wilderness Environ Med.* 2016;27:282–286.
3. Brugger H, Durrer B, Adler-Kastner L, Falk M, Tschirky F. Field management of avalanche victims. *Resuscitation.* 2001;51:7–15.
4. Procter E, Strapazzon G, Dal Cappello T, et al. Burial duration, depth and air pocket explain avalanche survival patterns in Austria and Switzerland. *Resuscitation.* 2016;105:173–176.
5. Brugger H, Paal P, Boyd J. Prehospital resuscitation of the buried avalanche victim. *High Alt Med Biol.* 2011;12:199–205.
6. Haegeli P, Falk M, Procter E, et al. The effectiveness of avalanche airbags. *Resuscitation.* 2014;85:1197–1203.