The online version of this article is located at http://www.minervamedica.it
Minerva Anestesiologica 2016 March;82(3):371-2

Extracorporeal membrane oxygenation in avalanche victim with deep hypothermia and circulatory arrest

Dear Editor,

trying to save the life of someone buried by an avalanche is a moral obligation. This case report testifies the first extracorporeal rewarming tried in Abruzzo, Italy, on a deep hypothermic avalanche victim.

During a sunny day, following several days of snowfalls, two snowboarders decided to descend off-slope. The slope angle of 33°-35° showed previous descent tracks. The first snowboarder, 32 years old, on descending triggered an avalanche and got overwhelmed. The second snowboarder started searching with avalanche beacon. He located the victim at 1.5 m under the snow, shoveled immediately, without a precise probe detection and found the victim upside down. The victim appeared without vital signs, airway patency preserved. Cardiac massage and pulmonary resuscitation (CPR) was not performed by occasional rescuers. At the arrival of the helicopter rescue team, he was in circulatory arrest. After cervical spine immobilization, the patient received CPR, while 45 minutes elapsed from the accident. With 26° C of epitympanic temperature and asystole confirmed by DAE monitor, the extra corporeal life support (ECLS) protocol was activated. The patient underwent endotracheal intubation, 1 mg of adrenalin intravenous was administered. After 12 minutes of flight, the patient was transported directly in the hospital cath-lab, epitympanic temperature of 28° C, serum potassium 5.6 mmol/L. The patient was connected to extracorporeal membrane oxygenation (ECMO, Maquet Cardiohelp, Cinisello Balsamo, Milan, Italy), right femoral vein and artery were cannulated with cannulas 17F and 21F, respectively, plus cannulation of right antegrade femoral artery approach with a 7F catheter to allow distal territory perfusion (FiO_2 0,6). Once the central temperature of 30° C was reached, the heart re-

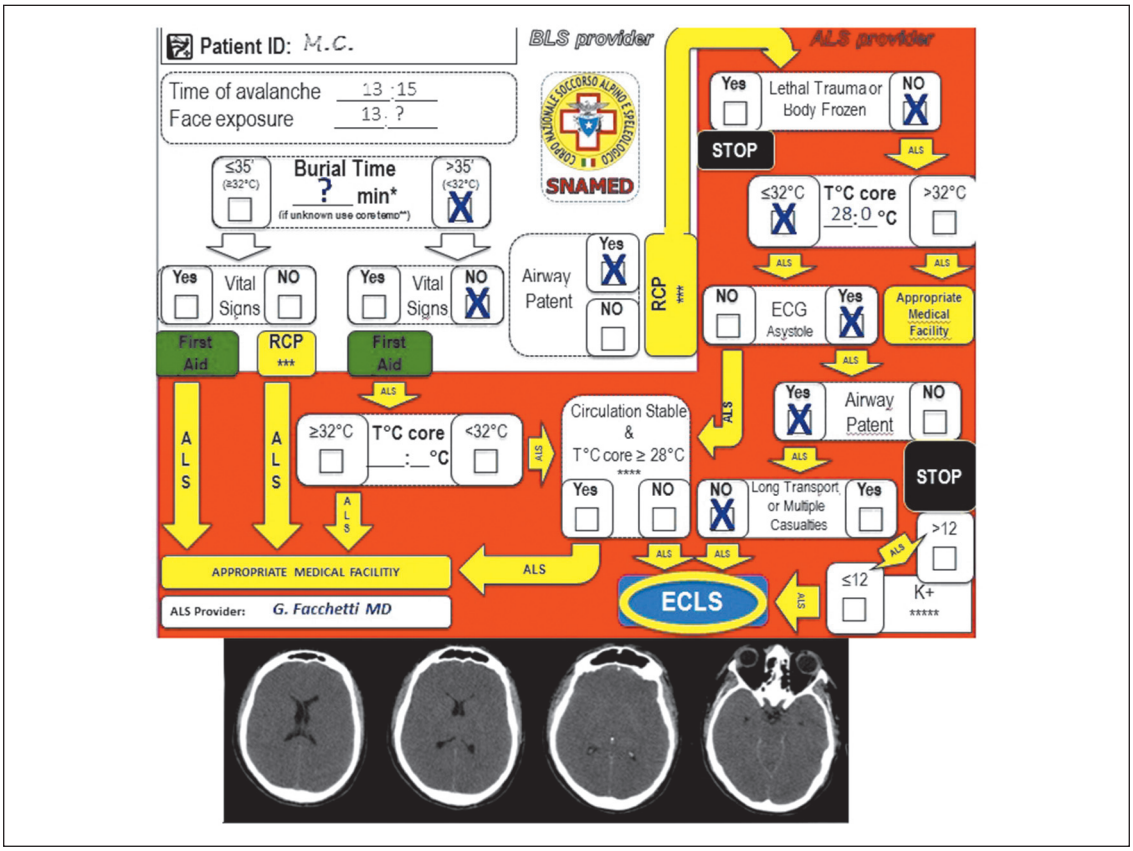

Figure 1.— ICAR-MedCom Checklist optimized by SNAMED (National Medical School) and CNSAS (National Corps for Mountain and Speleological Rescue). In the part below the Brain CT Scan is shown.

sumed a spontaneous rhythm. Central temperature was gradually heated to 37° C, with a constant flow of 3.5 l/min. Radiological examinations demonstrated: a C2 cervical amyelic lesion, a widespread cerebral edema, an hypovolemic reduction of the aorto-caval district, endobronchial liquid, pulmonary contusions and endoalveolar hematic material, peritoneal and retroperitoneal fluid. The patient presented diffuse bleeding, serious vasoplegic state with hypotension refractory to inotropic and vasopressor infusion, anuria, severe pulmonary edema and an intracranial pressure (ICP) of about 30 mmHg. After left femoral vein cannulation, hemofiltration was performed. Under continuous ECMO treatment the patient was substantially stable, but presented neurological deterioration with ICP raised to 39 mmHg. Subsequently the ICP was enhanced to 45 mmHg, accompanied by hemodynamic and metabolic aggravation. The patient died after three days due to multiple organic failure syndrome (MOFS).

ECMO is the rewarming method with the highest survival rate for deep hypothermic treatment,[1] but despite careful application of actual guidelines,[2, 3] chances of survival for buried by avalanche, extracted in cardiac arrest, remain low.[4] This case was treated according to the ICAR-MedCom guidelines [2] and after application of the related flow-chart (Figure 1),[5] but despite of an independent heartbeat retrieval, the patient survival was not allowed. Cortical suffering highlighted by CT scan showed anoxic damage (Figure 1), established before hypothermia, which has affected the prognosis. The avalanche victim, despite the preserved airway patency, did not receive immediate CPR. The asphyxia caused the circulatory arrest; the absence of immediate CPR worsened the anoxic damage.

Gianluca FACCHETTI [1] *, Nadia CARBUGLIA [2], Valter BUCCI [1], Francesco TARASCHI [3], Saro PAPARONI [4], Aglaia GYRA [5], Franco MARINANGELI [5]

[1]National Medical School of the National Mountain Rescue Corps, Milan, Italy; [2]Abruzzo Helicopter Rescue Unit, Pescara, Italy, [3]Unit of Anesthesia and Post Operative Intensive Care Cardiac Surgery, Teramo, Italy, [4]Unit of Cardiology II, Teramo, Italy, [5]Department of Anesthesia and Resuscitation, Universty of L'Aquila, L'Aquila, Italy

*Corresponding author: Gianluca Facchetti, National Medical School of the National Mountain Rescue Corps, Milan, Italy. E-mail: g.facchetti@yahoo.it

References

1. Ruttmann E, Weissenbacher A, Ulmer H, Müller L, Höfer D, Kilo J, *et al*. Prolonged extracorporeal membrane oxygenation-assisted support provides improved survival in hypothermic patients with cardiocirculatory arrest. J Thorac CardiovascSurg 2007;134:594-600.
2. Brugger H, Durrer B, Elsensohn F, Paal P, Strapazzon G, Winterberger E, *et al*. Resuscitation of avalanche victims: evidence-based guidelines of the international commission for mountain emergency medicine (ICAR MEDCOM): intended for physicians and other advanced life support personnel. Resuscitation 2013;84:539-46.
3. Brown D, Brugger H, Boyd J, Paal P. Accidental Hypothermia. N Engl J Med 2012;367:1930-8.
4. Boué Y, Payen JF, Brun J, Thomas S, Levrat A, Blancher M, *et al*. Survival after avalanche-induced cardiac arrest. Resuscitation 2014;85:1192-6.
5. Kottmann A, Blancher M, Spichiger T, Elsensohn F, Létang D, Boyd J, *et al*. The Avalanche Victim Resuscitation Checklist, a new concept for the management of avalanche victims. Resuscitation 2015;91:e7-8.

Conflicts of interest.—The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Article first published online: 2015, November 5. - Manuscript accepted: November 4, 2015. - Manuscript revised: October 27, 2015. - Manuscript received: 2015, July 22.

(*Cite this article as*: Facchetti G, Carbuglia N, Bucci V, Taraschi F, Paparoni S, Gyra A, *et al*. Extracorporeal membrane oxygenation in avalanche victim with deep hypothermia and circulatory arrest. Minerva Anestesiol 2016;82:371-2)

The online version of this article is located at http://www.minervamedica.it
Minerva Anestesiologica 2016 March;82(3):372-3

Incidence and laryngoscopic grade of adult patients with Mallampati class zero airway

Dear Editor,

The Mallampati classification of four grades as modified by Samsoon and Young is an accepted method for predicting a difficult airway.[1] Ezri *et al.* proposed addition of new airway Mallampati class zero, in which the epiglottis is seen on mouth opening and tongue protrusion, and suggested that this class was the easiest for performing tracheal intubation among the five classes.[2] However, the difficulty of tracheal intubation in those patients remains unclear. Then, we investigated the incidence of Mallampati class zero airway in adult patients and the relationship with a difficult airway. The Mallampati classification was assessed by the same anesthesiologist prior to surgery. Laryngoscopy was performed using a Macintosh blade with a muscular relaxant and under general anesthesia. The difficulty of endotracheal intubation was assessed by the attending anesthesiologist using the Cormack and Lehane grading scale.

We analyzed 1200 surgical patients (584 males). A Mallampati class zero airway was noted in 8 (0.7%, 95% confidence interval: 0.3-1.3%) of the patients (4 males), all of whom had an easy airway (Cormack grade