

# ICAR MEDCOM

Commission for Mountain Medicine  
of the International Commission for Alpine Rescue

[www.alpine-rescue.org](http://www.alpine-rescue.org)



## APPROVED ICAR RECOMMENDATION – RESCUER SUMMARY

Suspension syndrome (also called suspension trauma or harness hang syncope) describes a potentially life-threatening event induced by passive hanging on a rope or in a harness system in a vertical or near-vertical position. Victims can develop symptoms of dizziness or feeling sick, or present with a sudden loss of consciousness and a cardiac arrest. This can occur within 10 minutes of passive hanging. Thus any victim that is passively hanging must be regarded as needing immediate action to relieve it. Although numerous cases are reported, the exact incidence of the suspension syndrome is not known. It is rare because the particular circumstances that cause the cardiac arrest are unusual in normal situations. The cause of the syndrome is controversially though recent experiments have added to our understanding and gave reason to release this recommendation. These recommendations are based on an unanimous consensus opinion of ICAR Medcom. Unusually we are publishing these before a definitive peer reviewed article has been published. We feel this deviation from our normal practice is important for the safety of patients.

The full ICAR MedCom recommendations are available at: <http://www.icar-med.com/Recommendations/Current-Recommendations/Suspension-Syndrome/index.php/>

## Recommendations

Nr.		Grade
1	<p>We suggest the following classification for acute suspension syndrome:</p> <ul style="list-style-type: none"> <li>a) Near suspension syncope (characterised by light-headedness, pale skin, warmth, blurred vision or nausea)</li> <li>b) Suspension syncope (loss of consciousness)</li> <li>c) Suspension cardiac arrest (after exclusion of other causes of cardiac arrest, e.g. myocardial ischaemia, trauma, hypothermia)</li> <li>d) Post-suspension cardiac arrest within 60 min after rescue</li> </ul>	2C
2	Rope work should never be conducted alone.	1A
3	Persons suspended in a harness should be rescued as soon as possible, even if the casualty is asymptomatic, as time to near or actual syncope and cardiac arrest is variable and unpredictable	1A
4	While awaiting rescue, persons suspended freely on a rope should move their legs in order to reduce venous pooling.	2B
5	If no adjoining structures are in reach, foot loops should be used to step in and increase the activation of the muscle pump.	2B
6	If the casualty is no longer able to act and it is safe to do so, the first rescuer reaching the casualty should raise the victim's legs to create a more horizontal position while measures are taken to lower the patient to the ground.	2C
7	Once the casualty is on the ground, the casualty should be positioned supine. Assessment and treatment should follow standard advanced life support algorithms. Reversible causes of cardiac arrest, including hyperkalaemia and pulmonary embolism, should be considered and managed appropriately.	1A

8	After prolonged hanging (>2 hours), monitoring of serum potassium and creatine kinase should be established and renal replacement therapy considered in patients with acute kidney injury.	2C
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## Selected references

Pasquier M, Yersin B, Vallotton L, Carron PN. Clinical update: suspension trauma. *Wilderness Environ Med.* 2011;22(2):167-171.

Mortimer RB. Risks and management of prolonged suspension in an Alpine harness. *Wilderness Environ Med.* 2011;22(1):77-86.

Rauch S, Schenk K, Strapazon G, et al. Suspension syndrome: a potentially fatal vagally mediated circulatory collapse—an experimental randomized crossover trial. *European Journal of Applied Physiology.* 2019.

Thomassen O, Skaiaa SC, Brattebo G, Heltne JK, Dahlberg T, Sunde GA. Does the horizontal position increase risk of rescue death following suspension trauma? *Emerg Med J.* 2009;26(12):896-898.

Soar J, Nolan JP, Bottiger BW, et al. European Resuscitation Council Guidelines for Resuscitation 2015: Section 3. Adult advanced life support. *Resuscitation.* 2015;95:100-147.

American College of Chest Physicians Classification scheme for grading evidence and recommendations in clinical guidelines. Guyatt et al. *Chest* 2006;129:174-81.

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