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Prehospital Assessment of Cold Exposure in Casualties Following a Chairlift Malfunction

Telesiyej Arızası Sonrası Kazazedelerin Soğuk Maruziyeti Açısından Hastane Öncesi Değerlendirilmesi

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ABSTRACT

Aim: Hypothermia is a preventable condition frequently encountered in emergency medical services at high-altitude ski resorts. This study aimed to evaluate the demographic and clinical characteristics of patients affected during a high-altitude cable car malfunction and prehospital management priorities after cold exposure caused by a chairlift malfunction.

Methods: In this retrospective observational study, 18 adult victims exposed to temperatures between –7°C and –24°C for 90–180 minutes at altitudes of 2.230–2.507 meters were analyzed. Body temperature was measured using a non-contact infrared thermometer. Patients were categorized as cold stress (35–37°C) or mild hypothermia (32–35°C). Vital signs, symptom distribution across 30-minute exposure intervals, hospital arrival times, and triage codes were statistically compared ($p<0.05$). Refusal of on-site medical assessment was recorded only as an operational note and was not analyzed as a clinical variable.

Results: Mild hypothermia developed in 22.2% of patients and occurred exclusively in females. Cutis marmorata and facial erythema were significantly associated with lower body temperature ($p<0.001$). Exposure beyond 150 minutes was strongly associated with facial and extremity erythema (91.7%, $p=0.004$). Heart rate showed a borderline increase with longer exposure duration ($p=0.085$). Dyspnea peaked in the intermediate exposure group ($p=0.004$). Although triage codes were not statistically correlated with measured temperature, no patient classified as green had a body temperature below 35°C.

Conclusion: In high-altitude prehospital settings, peripheral clinical findings may provide critical risk stratification when core temperature cannot be measured. Continuous monitoring, dynamic triage reassessment, and early external warming are essential to prevent progression toward cardiovascular and neurologic compromise. The study highlights the importance of rapid triage, proper thermal management, and EMS preparedness in mass cold-exposure events.

Keywords: Accidental hypothermia, cold exposure, emergency medical services, prehospital triage, high altitude rescue.

ÖZ

Amaç: Hipotermi, yüksek irtifa kayak merkezlerinde acil tıbbi hizmetlerde sıklıkla karşılaşılan önlenebilir bir durumdur. Bu çalışma, yüksek irtifa teleferik arızası sırasında etkilenen hastaların demografik ve klinik özelliklerini ve teleferik arızası nedeniyle oluşan soğuk maruziyetinden sonra hastane öncesi yönetim önceliklerini değerlendirmeyi amaçlamıştır.

Yöntem: Bu retrospektif gözlemsel çalışmada, 2230-2507 metre irtifada 90-180 dakika boyunca -7°C ile -24°C arasındaki sıcaklıklara maruz kalan 18 yetişkin hasta analiz edildi. Vücut sıcaklığı temassız kızılötesi termometre kullanılarak ölçüldü. Hastalar soğuk stresi (35-37°C) veya hafif hipotermi (32-35°C) olarak sınıflandırıldı. Yaşam belirtileri, 30 dakikalık maruz kalma aralıklarındaki semptom dağılımı, hastaneye varış süreleri ve triyaj kodları istatistiksel olarak karşılaştırıldı ($p<0.05$). Yerinde tıbbi değerlendirmeyi reddetme durumu yalnızca operasyonel bir not olarak kaydedildi ve klinik bir değişken olarak analiz edilmedi.

Bulgular: Hastaların %22.2'sinde hafif hipotermi gelişti ve bu durum yalnızca kadınlarda görüldü. Cutis marmorata ve yüz eritemi, düşük vücut sıcaklığıyla anlamlı derecede ilişkiliydi ($p<0.001$). 150 dakikadan fazla maruz kalma, yüz ve ekstremite eritemiyle güçlü bir şekilde ilişkiliydi (%91.7, $p=0.004$). Kalp atış hızı, daha uzun maruz kalma süresiyle sınırda bir artış gösterdi ($p=0.085$). Nefes darlığı, orta düzeyde maruz kalma grubunda zirve yaptı ($p=0.004$). Triyaj kodları ölçülen sıcaklıkla istatistiksel olarak ilişkili olmasa da, yeşil olarak sınıflandırılan hiçbir hastanın vücut sıcaklığı 35°C'nin altında değildi.

Sonuç: Yüksek rakımlı hastane öncesi ortamlarda, çekirdek sıcaklığı ölçülemediğinde periferik klinik bulgular kritik risk sınıflandırması sağlayabilir. Kardiyovasküler ve nörolojik bozulmaya doğru ilerlemeyi önlemek için sürekli izleme, dinamik triyaj yeniden değerlendirmesi ve erken dıştan ısıtma şarttır. Çalışma, kitlesel soğuk maruziyeti olaylarında hızlı triyajın, uygun termal yönetimin ve acil tıbbi hizmetlerin hazırlığının önemini vurgulamaktadır.

Anahtar kelimeler: Kazara hipotermi, soğuğa maruz kalma, acil sağlık hizmetleri, hastane öncesi triyaj, yüksek irtifa kurtarma.

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Introduction

High-altitude ski centers are environments where cold exposure poses a significant risk for visitors. "Cold stressed (but not hypothermic)" and hypothermia are defined according to the measured internal body temperature (core temperature) [1]. Hypothermia, defined as a core body temperature below 35°C, can develop rapidly in situations such as equipment failures or prolonged exposure. Accurate measurement of core body temperature is essential in the management of hypothermia, but it remains challenging in pre-hospital settings.

The need for special equipment and invasive techniques renders routine core temperature assessment largely impractical outside hospital environments. Indirect methods, including tympanic, axillary, or oral mucosa measurements, often fail to reflect the true core temperature, especially under extreme environmental conditions. Moreover, assessments conducted in outdoor environments where the patient is exposed to wind, light, or ambient temperature fluctuations are highly susceptible to measurement errors.

An important task of emergency medicine is to recognize pre-hospital vital conditions in the field, initiate mandatory treatment at the scene, or transfer the patient to an appropriate hospital [2]. When temperature measurement is not possible, pre-hospital healthcare providers must estimate the severity of hypothermia based on clinical signs. However, considering the variability in individual responses to hypothermia, any clinical staging system can only provide a rough estimate of the clinical course [3].

This study aims to evaluate the demographic and clinical characteristics of patients affected by a high-altitude cable car malfunction and to identify the factors associated with hypothermia development.

Methods

This retrospective observational study evaluated adult victims exposed to cold following a chairlift malfunction at Palandöken Ski Center on December 14, 2024.

The ski center is located at an altitude of 3.271 meters. The altitude of the malfunctioning ski lift was between 2.230 and 2.507 meters (>2500m is considered high altitude).

During the incident, ambient temperatures ranged between −7°C and −24°C . At the time the malfunction was first noticed, the ambient temperature was -13.5°C. Rescue operations began within five minutes after the malfunction was identified. The rescue team, consisting of two separate units, included eight rescue personnel from the Ejder 3200 company, nine gendarmerie officers, eight health personnel from 112 emergency services, and eight firefighters. Three snowmobiles and two snow-tracked vehicles were used during the rescue phase, and four land ambulances were used during the transport phase. Two ambulances were kept on standby at the scene for transporting the injured to hospitals.

Patients older than 18 years who were evaluated by Emergency Medical Services (EMS) after cold exposure were included. Pregnant patients, history of alcohol or substance use during the day and individuals with incomplete clinical records were excluded.

Among 39 rescued individuals, 18 patients met the inclusion criteria and had sufficient clinical documentation for analysis. The remaining individuals either refused hospital transfer or had incomplete records.

Demographic characteristics, exposure duration, vital signs, physical examination findings, triage codes, treatments, and transport times were retrospectively obtained from standardized EMS forms routinely used in prehospital patient care.

The study protocol was approved by the Atatürk University Clinical Research Ethics Committee (Approval No:B.30.2.ATA.0.01.00/347 , Date: 02/05/2025). The study was conducted in accordance with the Declaration of Helsinki and good clinical practices.

Body temperature measurements were obtained from the temporal region at a distance of 5-15 cm using an Endostall Infrared Thermometer. The device, capable of measuring temperatures from 32-42.9°C, could measure ambient, body, and surface temperatures. As none of the victims

required advanced airway and intubation, core temperature measurement could not be performed in the prehospital setting.

Exposure duration was categorized into three groups:

* 90–120 min

* 121–150 min

* 151–180 min. Thirty-minute intervals were calculated by averaging the physiological study data of Acosta FM et al. After acute cold exposure exceeding 2 minutes, for exposures >2 hours and <24 hours, 30-minute intervals were preferred [4].

For body temperature assessment patients were classified as:

* cold stress (35–37°C)

* mild hypothermia (32–35°C) [3].

Symptoms observed in the injured were analyzed under six categories: cutis marmorata, facial erythema, erythema of extremity ends, numbness of extremity ends, dyspnea, and abdominal pain.

SPSS version 25.0 was used for statistical analysis. Normality was assessed using the Kolmogorov–Smirnov test. Appropriate parametric and non-parametric tests were used according to data distribution. A p-value < 0.05 was considered statistically significant.

Results

After obtaining the relevant ethical approvals, 18 injured individuals were included in the study. Of these participants, 10 were male and eight were female. The mean age of the participants was 26.39 ± 7.35 years. No statistically significant difference was found between participants with body temperatures below and above 35°C in terms of age (p=0.859). These findings indicated that hypothermia developed independently of age. However, all participants whose body temperature decreased below 35°C were female.

Figure 1 presents the distribution of the vital signs of the injured individuals. When the vital signs were compared according to age and gender, no statistically significant differences were observed.

The mean body temperature was 35.75 ± 0.72°C, mean heart rate was 91.22 ± 9.94/min, mean peripheral oxygen saturation was 95.83 ± 9.94%, mean systolic blood pressure was 109.17 ± 10.39 mmHg, and mean diastolic blood pressure was 67.72 ± 7.31 mmHg.

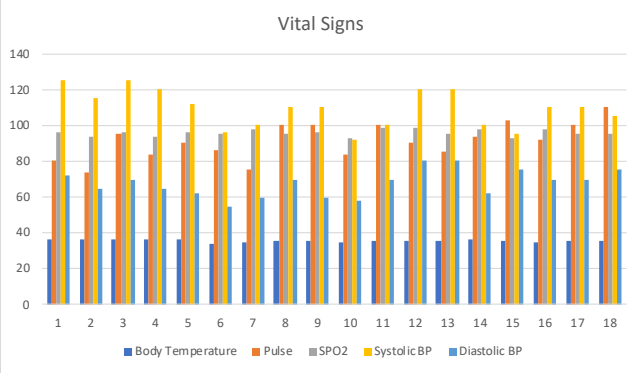


Figure 1. Distribution of vital signs (SpO_2: peripheral oxygen saturation BP: blood pressure)

Epidemiological and clinical variables according to body temperature groups are presented in Table 1. In the mild hypothermia group, systolic blood pressure (p=0.071) and diastolic blood pressure (p=0.080) values were lower compared with those in the cold stress group; however, these differences were not statistically significant. The epidemiological and clinical variables of the participants according to their body temperatures are presented in Table 1.

Of the 18 affected individuals, six refused hospitalization, stating that they felt well and had no life-threatening findings on physical examination or vital sign assessment. One of the individuals who refused transport was admitted to the hospital two hours later due to abdominal pain. Common symptoms among those refusing transport included facial and auricular erythema, erythema of the distal extremities, and numbness of the extremities, which were observed in three cases.

When body temperatures and triage codes were compared, no statistically significant association was found (p=0.376). However, none of the patients classified as green triage code had a body temperature below 35°C. This finding suggests that lower body temperatures may be associated with higher urgency categories, including yellow and red triage codes. Additionally, patients with red triage codes were transported to the hospital

more rapidly than those with yellow and green triage codes.

Table 1.Epidemiological and Clinical Variables According to Participants' Body Temperatures

	Cold Stress (n=14)	Mild Hypothermia (n=4)	p-value
Age (year)	25.50 (12.00 - 37.00)	22.50 (20.00 - 32.00)	0.859
Gender			0.069
Male (%)	8 (44.4%)	1 (5.6%)	
Female (%)	6 (33.3%)	3 (16.7%)	
Vital Sign			
Body Temp (°C)	36.06 ± 0.33	34.65 ± 0.62	< 0.001
Heart Rate (bpm)	93.21 ± 9.93	84.25 ± 7.04	0.475
SpO2 (%)	95.79 ± 1.81	96.00 ± 2.45	0.630
Systolic BP (mmHg)	111.93 ± 9.51	99.50 ± 7.72	0.071
Diastolic BP (mmHg)	69.71 ± 6.39	60.75 ± 6.50	0.080
Exposure Duration (min), Median (Range)	160 (95-161)	153 (95-161)	
Triage Code			0.376
Green (n=6) (%)	6 (33.3%)	0 (0%)	
Yellow (n=7) (%)	5 (27.7%)	2 (11.2%)	
Red (n=5) (%)	3 (16.6%)	2 (11.2%)	
Clinical Finding			
Abdominal Pain (%)	1 (5.5%)	2 (11.1%)	0.056
Dyspnea (%)	1 (5.5%)	1 (5.5%)	0.314
Extremity Redness (%)	12 (66.6%)	1 (5.5%)	0.172
Extremity Numbness (%)	13 (72.2%)	2 (11.1%)	0.442
Cutis Marmorata (%)	11 (61.1%)	2 (11.1%)	<0.001
Facial/Ear Redness (%)	11 (61.1%)	2 (11.1%)	<0.001

When patients were evaluated according to duration of cold exposure, heart rate differed across exposure duration groups (p=0.085) (Table 2). No statistically significant difference was found in body temperature according to duration of cold exposure (p=0.413) (Table 2). Systolic blood pressure values also varied according to exposure duration (p=0.182) (Table 2).

When the relationship between duration of cold exposure and symptoms was evaluated, 91.7% of participants exposed to cold for more than 150 minutes exhibited facial and extremity erythema. This increase was statistically significant (p=0.004). These findings indicate that vasodilation during prolonged cold exposure demonstrates a distinct clinical progression associated with exposure duration.

Late-onset findings, including cutis marmorata and numbness in the extremities, were observed only in the group with the longest exposure duration (151–180 minutes).

Dyspnea (p=0.004) was predominantly observed in participants exposed to cold for 121–150 minutes (Table 2).

Table 2. Comparison of Vital Signs, Progression of Symptoms and Body Temperature Across 30-Minute Exposure Intervals

	90–120 min (n=3)	121–150 min (n=3)	151–180 min (n=12)	p-value
Vital Signs				
Body Temperature (°C)	35.8±0.8	35.4±0.9	35.8±0.7	0.413
Heart Rate (bpm)	81.7 ±4.0	88.3±4.5	94.6±10.4	0.085
Systolic BP (mmHg)	110.0±10.0	106.3±11.2	111.4±9.4	0.182
Diastolic BP (mmHg)	71.6±5.0	68.6±6.2	70.2±6.1	0.764
SpO2 (%)	95.6±1.5	94.7±2.5	95.9±2.0	0.892
Symptoms (Presence - %)				
Facial Redness	0 (0%)	1 (33.3%)	11 (91.7%)	0.004
Extremity Redness	0 (0%)	1 (33.3%)	11 (91.7%)	0.004
Cutis Marmorata	0 (0%)	0 (0%)	5 (41.7%)	0.177
Extremity Numbness	0 (0%)	0 (0%)	5 (41.7%)	0.177
Dyspnea	0 (0%)	2 (66.7%)	0 (0%)	0.004
Abdominal Pain	1 (33.3%)	0 (0%)	0 (0%)	0.071
Body Temperature (°C) [Median]	36.2	36	36.1	0.225

Except for one victim, all participants received supportive treatment, including external warming using blankets and heaters, as well as administration of warm sweet fluids. One participant, whose only complaint was foot pain after falling while walking following exit from the ski lift, received only external warming without warm fluid supplementation.

Discussion

In the literature, ski lift systems are described as comfortable and reliable means of transportation [5,6]. However, despite their overall safety, malfunctions and accidents occurring in ski lift systems may result in serious consequences [6,7].

Compared with ski lift accident data reported in Türkiye in 2024, shorter rescue and transport durations were observed in the present incident

[8]. In the ski lift incident that occurred in April 2024, the rescue operation lasted approximately 24 hours, whereas the maximum rescue duration in the present study was 161 minutes [9]. The relatively short rescue and transport times in the present incident may have contributed to the preservation of stable clinical conditions among the victims. All victims were conscious, had Glasgow Coma Scale (GCS) scores of 15, and their clinical findings were compatible with cold stress rather than advanced hypothermia [3].

Gender-related differences in thermoregulation and thermal balance during cold exposure are largely associated with anthropometric characteristics and body composition [10], while shivering sensitivity is reported to be similar between males and females [11]. In addition, although women may have similar subcutaneous fat thickness, their body surface area is proportionally greater and total body mass is lower than that of men. Therefore, heat loss during resting cold exposure may occur more rapidly in women, even under similar insulation conditions [12,13]. Consistent with the findings reported by McArdle et al., all Stage 1 hypothermia cases in the present study were female.

A decrease in environmental temperature, particularly reductions in skin and core body temperature, triggers thermoregulatory responses such as vasoconstriction and shivering. These responses are mediated through peripheral and central thermal receptors that transmit signals to the hypothalamus. In response to cold exposure, the body attempts to preserve heat production through shivering and increased thyroid, catecholamine, and adrenal activity. Sympathetically mediated vasoconstriction also reduces peripheral blood flow and minimizes heat loss from tissues exposed to cooling [14,15].

The initial physiological response to cold exposure is cutaneous vasoconstriction, which decreases skin blood flow and skin temperature. Peripheral vasoconstriction additionally reduces convective heat transfer between the body core and peripheral tissues, thereby increasing thermal insulation and helping maintain core body temperature [16]. During prolonged cold exposure, the body attempts to regulate thermoeffector responses through reduced sensory input from cutaneous thermoreceptors, altered central processing of afferent signals, and changes in autonomic and peripheral responses [17]. The facial and distal extremity erythema and numbness observed in the present study may reflect these physiological adaptation mechanisms associated with prolonged cold exposure.

Norepinephrine is the primary neurotransmitter responsible for most cold-induced reflex vasoconstriction in cutaneous vessels [18], while neuropeptide Y also contributes to this process [19]. Clinical manifestations associated with cold exposure include hyperventilation, tachypnea, tachycardia, ataxia, dysarthria, impaired judgment, shivering, and cold diuresis. With prolonged exposure, heart rate, cardiac output, and respiratory rate may progressively decrease, accompanied by central nervous system depression, hyporeflexia, and reduced renal blood flow. Shivering generally ceases when body temperature decreases to approximately 30°C (86°F).

In the present study, facial and distal extremity erythema became more frequent as exposure duration increased. In addition, cutis marmorata, facial and auricular erythema, abdominal pain, and dyspnea were among the clinical findings associated with prolonged cold exposure and lower body temperatures. Dyspnea complaints became more prominent after prolonged exposure durations and subsequently decreased. Castellani et al. reported that psychological stress may negatively affect cold adaptation processes by impairing concentration and mental focus [20,21]. The temporal increase in dyspnea observed in the present study may therefore be associated with elevated stress responses during prolonged exposure. Collectively, these findings reflect the clinical manifestations associated with cold stress and hypothermia.

When vital signs were evaluated according to exposure duration, changes in heart rate and blood pressure values were observed with increasing duration of cold exposure. Cardiovascular involvement in hypothermia typically begins with tachycardia, increased cardiac output, and elevated systemic vascular resistance. As

hypothermia progresses, bradycardia resistant to atropine, decreased cardiac output and blood pressure, atrial and ventricular arrhythmias, and eventually asystole may occur. Similar to the findings reported by Pasquier et al., the cardiovascular effects of thermal stress became more apparent as exposure duration increased and core body temperature decreased [22]. In the present study, systolic and diastolic blood pressure values decreased while heart rate values increased. When these alterations in vital signs are considered together with the clinical symptoms observed in the victims, the importance of close and frequent monitoring in patients exposed to cold environments becomes evident.

Cold exposure may lead to substantial physiological alterations, particularly involving the respiratory and cardiovascular systems. Within the respiratory system, suppression of the cough reflex, accumulation of bronchial secretions, decreased oxygen consumption, and reduced carbon dioxide production secondary to hypoventilation may occur. More severe complications include pulmonary edema and apnea [23].

Limitations: The limited number of cases and the short duration of hypothermia restrict the generalizability of findings regarding vital signs, symptoms, physical examination findings, and overall clinical assessment. The fact that body temperature, not core temperature, was measured in the victims is an important limitation for the study.

Conclusion

Prolonged cold exposure following a chairlift malfunction was associated with progressive peripheral skin findings and neurovascular symptoms including facial and extremity erythema, numbness in the extremities, dyspnea, and cutis marmorata in the prehospital setting. All individuals with body temperatures below 35°C were female, and none of the patients with green triage codes had body temperatures below this threshold. As the duration of cold exposure increased, changes in heart rate and blood pressure values were also observed. While more comprehensive studies are needed, these clinical findings may support clinical assessment, especially in prehospital settings where core temperature measurement is unavailable.

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Data Availability Statement: The datasets generated and/or analysed during the current study are not publicly available due to patient confidentiality and institutional restrictions but may be obtained from the corresponding author upon reasonable request.

Ethics Committee Approval: In this study, national and international ethical rules are observed. The study was initiated following approval from the Clinical Research Ethics Committee of Atatürk University. Non-Interventional Clinical Research Ethics Committee, Date: 02.05.2025/Number: B.30.2.ATA.0.01.00/347

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ORCID and Author Contributions: A.Ç. (0000-0002-7031-2689): Conceptualization, methodology, investigation, data curation, formal analysis, visualization, writing – original draft, writing – review & editing, and project administration.

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REFERENCES

1. Lott C, Truhlář A, Alfonzo A, Barelli A, González-Salvado V, et al. European Resuscitation Council Guidelines 2021: Cardiac arrest in special circumstances. Resuscitation. 2021;161:152-219. doi: 10.1016/j.resuscitation.2021.02.011. Erratum in: Resuscitation. 2021;167:91-92. doi: 10.1016/j.resuscitation.2021.08.012.
2. Kantar Y, Baykan N, İpekten F, İmamoğlu M. Comparison of Pre-Hospital Preliminary Diagnosis and Definitive Diagnosis in Emergency Department. Acta Med Alanya 2024;8(1):37-42 doi: 10.30565/medalanya.1443645
3. Dow J, Giesbrecht GG, Danzl DF, Brugger H, Sagalyn EB, et al. Wilderness Medical Society Clinical Practice Guidelines for the Out-of-Hospital Evaluation and Treatment of Accidental Hypothermia: 2019 Update. Wilderness Environ Med. 2019;30(4S):S47-S69. doi: 10.1016/j.

wem.2019.10.002.

4. Acosta FM, Martinez-Tellez B, Sanchez-Delgado G, Alcantara JMA, Acosta-Manzano P, et al. Physiological responses to acute cold exposure in young lean men. PLoS One. 2018;13(5):e0196543. doi: 10.1371/journal.pone.0196543.
5. Foltýnová HB, Vejchodská E, Rybová K, Květoň V. Sustainable urban mobility: one definition, different stakeholders' opinions. Transp Res D Transp Environ. 2020;87:102465 doi: 10.1016/J.TRD. 2020.102465.
6. Escobar GDA, Sarache W, Jiménez-Riaño E. The impact of a new aerial cable-car project on accessibility and CO2 emissions considering socio economic stratum. A case study in Colombia. J Clean Prod. 2022;340:130802. doi: 10.1016/J.JCLEPRO.2022.130802.
7. Olgun A, Mazlum U. Recommendations on cable car accident, licensing andmaintenance. New Era International J Interdisciplinary Social Res. 2024;9(24):43–53. doi: 10.5281/zenodo.12535260
8. Ersunan G, Bılır O, Balık MS. Primitive cable car "varangel" accidents in the Black Sea region of Rize in Turkey. J Exp Clin Med. 2016;33(2). doi: 10.5835/jecm.omu.33.02.003.
9. Usta G, Torpuş K, Gündüz F, Atalay E. Evaluation of cable car accidents and rescue operations. Disaster Med Public Health Prep. 2024:18:e319. doi: 10.1017/dmp.2024.322.
10. Toner, M. M, and W. D McArdle. "Human Thermoregulatory Responses to Acute Cold Stress with Special Reference to Water Immersion." In Fregly MJ, Blatteis CM, Eds. Environmental Physiology, Vol. 1. New York: Published for the American Physiological Society by Oxford University Press, 1996.
11. Glickman-Weiss EL, Cheatham C, Caine N, Blegen M, Marcinkiewicz J, Mittleman KD. The influence of gender and menstrual phase on thermosensitivity during cold water immersion. Aviat Space Environ Med. 2000;71(7):715-22. PMID: 10902935
12. McArdle WD, Magel JR, Gergley TJ, Spina RJ, Toner MM. Thermal adjustment to cold-water exposure in resting men and women. J Appl Physiol Respir Environ Exerc Physiol. 1984;56(6):1565-71. doi: 10.1152/jappl.1984.56.6.1565.
13. McArdle WD, Magel JR, Spina RJ, Gergley TJ, Toner MM. Thermal adjustment to cold-water exposure in exercising men and women. J Appl Physiol Respir Environ Exerc Physiol. 1984;56(6):1572-7. doi: 10.1152/jappl.1984.56.6.1572.
14. Durrer B, Brugger H, Syme D, and the International Commission for Mountain Emergency Medicine. The medical on-site treatment of hypothermia: ICAR-MEDCOM recommendationHigh Alt Med Biol. 2003;4(1):99-103. doi: 10.1089/152702903321489031.
15. Jolly BT, Ghezzi KT. Accidental hypothermia Emerg Med Clin North Am. 1992;10(2):311-27. PMID: 1559471
16. Veicsteinas A, Ferretti G, Rennie DW. Superficial Shell insulation in resting and exercising men in cold water. J Appl Physiol. 1982;52(6):1557–64. doi: 10.1152/jappl.1982.52.6.1557.
17. Kozyreva T. Neurophysiological aspects of the long-term adaptation to cold in mammals: the role of central and peripheral thermoreceptors. J Therm Biol. 2006;31(1–2):105–114. doi: 10.1016/j.jtherbio.2005.11.003.
18. Charkoudian N. Mechanisms and modifiers of reflex induced cutaneous vasodilation and vasoconstriction in humans. J Appl Physiol (1985). 2010;109(4):1221-8. doi: 10.1152/japplphysiol.00298.2010.
19. Stephens DP, Saad AR, Bennett LA, Kosiba WA, Johnson JM. Neuropeptide Y antagonism reduces reflex cutaneous vasoconstriction in humans. Am J Physiol Heart Circ Physiol. 2004;287(3):H1404-9. doi: 10.1152/ajpheart.00061.2004.
20. Castellani JW, Young AJ. Human physiological responses to cold exposure: Acute responses and acclimatization to prolonged exposure. Auton Neurosci. 2016;196:63-74. doi: 10.1016/j.autneu.2016.02.009.
21. Young AJ, Castellani JW, O'Brien C, Shippee RL, Tikuisis P, et al. Exertional fatigue, sleep loss, and negative energy balance increase susceptibility to hypothermia. J Appl Physiol (1985). 1998;85(4):1210-7. doi: 10.1152/jappl.1998.85.4.1210.
22. Pasquier M, Cools E, Zafren K, Carron PN, Frochaux V, Rousson V. Vital Signs in Accidental Hypothermia. High Alt Med Biol. 2021;22(2):142-7. doi: 10.1089/ham.2020.0179.
23. Castellani JW, Tipton MJ. Cold Stress Effects on Exposure Tolerance and Exercise Performance. Compr Physiol. 2015 Dec 15;6(1):443-69. doi: 10.1002/cphy.c140081.