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Обзорная статья

АКТУАЛЬНОСТЬ ОКАЗАНИЯ ПЕРВОЙ И МЕДИЦИНСКОЙ ПОМОЩИ ПОСТРАДАВШИМ И БОЛЬНЫМ НА ГОРНОЛЫЖНЫХ КОМПЛЕКСАХ

Н.Н.Баранова[1,2], А.С.Старков[1]

[1] ФГБУ «ГНЦ - Федеральный медицинский биофизический центр им. А.И.Бурназяна» ФМБА России, Москва, Россия
[2] ФГБОУ ДПО «Российская медицинская академия непрерывного профессионального образования» Минздрава России, Москва, Россия

Резюме. *Цель исследования* – проанализировать причины, уровень и структуру травматизма и обострения заболеваний у туристов на горнолыжных комплексах (ГК) в России и за рубежом; рассмотреть проблемы оказания первой и медицинской помощи пострадавшим и больным и проведения их медицинской эвакуации на горнолыжных комплексах России.
Материалы и методы исследования. Нормативную и эмпирическую базу научного исследования составили содержащиеся в трудах российских и зарубежных ученых аналитические материалы, посвященные травматизму и нетравматическим происшествиям у туристов, а также материалы по организации оказания первой и медицинской помощи пострадавшим и больным на ГК. Кроме того, были проанализированы нормативные правовые акты в сфере организации оказания первой и медицинской помощи пострадавшим и больным, содержащиеся в двух ведомственных приказах.
Методы исследования: литературно-аналитический и статистический методы, метод непосредственного наблюдения. Их применение позволило комплексно проанализировать предмет исследования, сделать теоретические обобщения и сформулировать выводы.
Результаты исследования и их анализ. Результаты исследования показали необходимость дальнейшего изучения специфических условий оказания первой и медицинской помощи пострадавшим и больным в условиях ГК, а также совершенствования организационных мероприятий по оказанию им первой и медицинской помощи и проведению медицинской эвакуации.

Ключевые слова: *больные, горнолыжные комплексы, горнолыжный туризм, «золотой час», медицинская помощь, первая помощь, пострадавшие, травматизм*

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Review article

PROVISION OF FIRST AID AND MEDICAL ASSISTANCE TO INJURED AND SICK AT SKI RESORTS

N.N.Baranova[1,2], A.S.Starkov[1]

[1] State Research Center – Burnasyan Federal Medical Biophysical Center of Federal Medical Biological Agency, Moscow, Russian Federation
[2] Russian Medical Academy of Continuous Professional Education, the Ministry of Health of the Russian Federation, Moscow, Russian Federation

Summary. *The aim of the study* is to analyze causes, level and structure of traumatism and exacerbation of diseases among tourists at ski resorts in Russia and abroad; to consider problems of providing first and medical aid to injured and sick people and of conducting their medical evacuation at ski resorts in Russia.
Materials and research methods. Normative and empirical base of the scientific research consisted of analytical materials of Russian and foreign scientists, devoted to traumatism and non-traumatic accidents in tourists, as well as of materials on the organization of first and medical care to the injured and sick at ski resorts. In addition, normative legal acts on rendering first and medical aid to the injured and sick, contained in two departmental orders, were analyzed.
Research methods: literary-analytical and statistical methods, method of direct observation. Their use allowed a comprehensive analysis of the subject of research, also it allowed to make theoretical generalizations and to formulate conclusions.

Results of the study and their analysis. The results of the study have shown the need for further study of the specific conditions of first aid and medical assistance to injured and sick in the conditions of ski resorts, as well as the need to improve organizational measures to provide injured and sick with first aid and medical evacuation

Keywords: *first aid, "golden hour", injured, medical care, patients, ski resorts, ski tourism, traumatism*

Conflict of interest. The authors declare no conflict of interest

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Контактная информация:
Старков Алексей Сергеевич – ассистент кафедры «Медицина катастроф» Медико-биологического университета инноваций и непрерывного образования ФМБЦ им. А.И. Бурназяна ФМБА России
Адрес: Россия, 123098, Москва, ул. Живописная, 46
Тел.: +7 (962) 923-06-49
E-mail: Astarkov2012@yandex.ru

Contact information:
Aleksey S. Starkov – Assistant of the Department of Disaster Medicine of Medico-Biological University of Innovation and Continuing Education of Burnazyan FMBC of FMBA of Russia
Address: 46, Zhivopisnaya str., Moscow, 123098, Russia
Phone: +7 (962) 923-06-49
E-mail: Astarkov2012@yandex.ru

Introduction

Unlike professional skiing with its strict discipline and strict control over the health of athletes, ski tourism attracts people of different ages, different levels of training, with various comorbidities, which creates preconditions for dangerous situations when skiing.

According to Rostourism, during the 2015-2017 ski seasons, the number of tourists at Russian resorts and recreation centers was over 6 million people per year. According to a very rough estimate of the average level of injuries at Russian ski resorts — there are 3 cases per 1 thousand visits , up to 18 thousand traumatic accidents related to ski tourism in Russia annually[1].

Such an "additional" flow of patients increases the load on the territorial medical infrastructure in the regions where ski resort operates, and requires the creation of an organized scheme of first aid and medical care for the injured from the moment of injury until discharge from the hospital.

The aim of the study is to analyze causes, level and structure of traumatism and exacerbation of diseases among tourists at ski resorts in Russia and abroad; to consider problems of providing first and medical care to injured and sick people and conducting their medical evacuation at ski resorts in Russia.

Materials and methods of research. The normative and empirical base of the scientific research consisted of the works of Russian and foreign scientists, devoted to traumatism and non-traumatic accidents in tourists, as well as of materials on the organization of first and medical care to the injured and sick at ski resorts. In addition, normative legal acts related to the provision of first and medical aid to the injured and sick, contained in two departmental orders, were analyzed[2,3].

Research methods: literary-analytical and statistical methods, method of direct observation. Their use allowed a comprehensive analysis of the subject of the study, to make theoretical generalizations and to formulate conclusions.

Results of the study and their analysis. According to the staff responsible for providing first aid on the ski slopes, the most frequent causes of injuries are:

- overestimation of one's abilities;
- poor physical training, improper skiing technique;
- wrong equipment, wrong bindings, bad or no protective equipment;
- lack of culture of rest and staying in the mountains;
- violation of rules of behavior on the slope, including listening to music through headphones (with or without helmet) while skiing, skiing outside prepared slopes, drinking alcohol before or during skiing;
- a constant risk factor on the ski slope in the form of possible collisions with other skiers [1- 7].

The data presented in the Russian literature on the frequency of certain types of injuries among tourists on ski slopes indicate the predominance of injuries of mild and moderate severity, the share of which is up to 70.0% in total [8, 9].

According to a number of researchers, skiers and snowboarders have a higher incidence of head, spine, and spinal cord injuries in the total number of severe injuries, the highest frequency of which is associated with performing stunts [10-13].

According to Shealy J. (2017) research group, the overall injury rate in the United States in 2017 was: for skiers, 1.55 cases per 1,000 visits; for snowboarders, 6.1 cases per 1,000 visits. According to the authors, such a significant difference in injury rates for snowboarders and skiers is related both to the increasing popularity of snowboarding and, consequently, to the increasing

[1] [1] https://tourism.gov.ru/contents/press-sluzhba/vystupleniya-doklady-i-intervyu/publikatsii-2017-goda/razvitie-gornolyzhnoy-industrii-v-rf-stanet-vozmozhnym-za-schet-kooperatsii-i-deshevykh-kreditov/

[2] On the Approval of the Procedure for the Provision of Emergency, Including Emergency Specialized, Medical Care: Order of the Ministry of Health of Russia dated June 20, 2013 No. 388n (In Russ.).

[3] List of First Aid Measures. Order of the Ministry of Health and Social Development of Russia Dated May 4, 2012 No. 477n. Application No. 2 (In Russ.).

number of snowboarders who are not prepared for slope skiing, and to the increase in average downhill speed due to new skiing equipment designs [14].

According to a group of authors led by Zacharopoulos A. (2014), in Greece at the Parnassus resort in 2007-2013 (6 seasons) the overall rate of injuries in skaters was 4.1 cases per 1,000 visits [15].

In Austria, according to the information collected by a group of authors, in 26 ski resorts for the 2012/2013 season the injury rate was 0.6 cases per 1 thousand visits [16].

The total level of injuries at Mizuho resort near Hiroshima (Japan) for 5 years of observations (2009-2014): skiers — 0.44 cases; snowboarders — 0.57 cases per 1 thousand skiers [17].

In Russia, there is no centralized collection of statistical data on accidents in skiing, which makes it difficult to analyze the situation. The data, retrieved by us in the course of research from employees of the largest ski complexes of our country (Rosa, Khutor, Gorki Gorod, Gorny Vozdukh, Sheregesh, etc.), are close to foreign — from 1.56 to 4.81 cases per 1 thousand visits.

When analyzing the statistics of accidents associated with skiing or snowboarding a separate group of tourists with exacerbation of somatic diseases should be identified. A sharp change of climate upon arrival from a flat area to the mountainous region, climbing to altitude, physical stress when skiing, etc contributes to the risk of diseases exacerbation.

According to a number of authors, mountain sports (intensive physical activity, cold and altitude) are the cause of increased risk of out-of-hospital cardiac arrest [18, 19].

The data of research group from Austria confirm the thesis about danger of sudden cardiac arrest among visitors of mountain ski resorts: analysis of reasons of deaths among fans of winter holidays in Alps for 5 years has shown, that 52.7% of deaths had non-traumatic character, and the majority (73.0%) in this group were cases of sudden cardiac arrest [16].

In an analysis of skiing-related accidents — according to Strambo D., Sirimarco G., Inácio N., Eskandari A., Michel P. (2019) — the cause of most strokes associated with skiing was arterial dissection with previous minor trauma sustained during skiing, which was significantly higher compared to the causes of stroke in control group patients [20].

In our opinion, based on the analysis of literature data and our own observations, all risk factors of trauma or exacerbation of internal disease in tourists at ski resorts can be conventionally divided into 3 large groups:

1) Objective factors of natural character — wind, air temperature, relief, etc. It is impossible to influence on these factors, but they can be monitored and taken into account — to limit the admission to the trails when the weather changes, to design structures for protection against landslides and avalanches, not to allow beginners to go on the trails of high complexity.

2)Factors of organizational and service character — quality of trail preparation, lighting, signs, soft mats on supports of elevators, catching nets, etc. The factors of this group are quite clearly regulated by normative documents.

3) Subjective factors, depending on the person — level of training, alcohol intake, adequate assessment of one's capabilities, compliance with safety regulations, etc. These factors are the least manageable and are the source of the largest number of accidents.

According to researchers who have studied the problems of ski injury treatment, the time factor has a significant impact on the prognosis of the outcome for an injured person. Hospitalization of the injured person and initiation of specialized medical care within one hour of injury increases the chances of recovery. If in traumatic shock the circulatory disorder is eliminated later than 1 h after the trauma, severe disorder of the life-support systems of the organism may become irreversible [21-24].

The remoteness of ski resort areas, poor weather conditions, and difficult road conditions increase the time it takes the ambulance crew to reach the place of the event. That results in a late start in providing patients with the necessary amount of medical care. The analysis of 325 cases of first-aid and medical aid rendering in 8 Russian regions which resulted in medical evacuation of a patient to medical treatment institution showed that in 176 cases (54,15%) the time spent on searching the injured person on a slope, rendering first aid, transfer along the slope and medical evacuation by ambulance crew to medical treatment organisation exceeds 60 minutes ("golden hour") and makes on average (62.81±1.078) minutes. With such delay of the beginning of medical care, modern approaches to intensive therapy of polytrauma require implementation of antishock measures in a greater volume, than in first aid.

The organization of primary health care (emergency and urgent) on the territory of ski resorts requires licensing for medical activity by a relevant organization. Since the process of obtaining such a license is very complicated and financially expensive, many ski resorts in Russia — 19 (76.0%) of the 25 largest ski resorts surveyed — do not have such a license. Only some of them, which combine not only skiing but also a recreational/medical cluster on their territory, obtain a license for medical activities.

None of the 6 ski resorts that provide medical assistance to injured people have a medical worker participating in searching for the injured person on the slope and in assisting the injured at the site of the event. Thus, even in those ski resorts, where medical aid is provided to the injured before the arrival of the ambulance team, it takes place in a special room, where the injured person is delivered by non-medical workers. Such, sometimes prolonged, movement of an injured person down a slope is accompanied by a risk of disruption of the patency of the upper airways, deepening of hypoxia and hypothermia, complicates the search for and stopping of bleeding, provokes development of hypovolemic syndrome.

The analysis of 1016 cases of first aid in 8 ski resorts of Russia that ended with the transfer of the patient to the medical specialists showed that when the event is far away on the route from the point of meeting with medical specialists (first-aid station, arrival site of ambulance team) the duration of such transportation can be up to 213 minutes. The described conditions give rise to special requirements for transport immobilization, means of transportation and provision of patency of upper airways to prevent complications and to reduce pain syndrome.

Conclusions

1) The analysis of the data from literature and our own observations allows to classify ski tourism to potentially dangerous to health types of outdoor activities associated with an increased risk of injury or exacerbation of diseases. The scheme of rendering primary medical and sanitary aid in urgent and emergency forms, as well as emergency, including specialized emergency, medical aid to injured and sick people in the territory of ski resorts, established in Russia, requires studying such specific conditions, as exposure to low temperatures; altitude hypoxia; need to move the injured for considerable distances to the territory of ski resort; difficulties in conducting full examination of the injured; remoteness of ski resorts, areas from medical treatment organizations, etc.

2) The set of organizational measures to provide first and medical aid to victims and patients in ski resorts and to conduct their medical evacuation requires improvement. In this situation, expansion of the existing list of measures of first aid at the territory of ski resorts which can be performed by non-medical staff, waiting for the arrival of ambulance crew, including diagnostic, antishock measures and elements of medical therapy will reduce the likelihood of severe complications in patients [25, 26]. There is also a need to work out the issues of determining the specific measures in the provision of "extended first aid" in the ski resorts conditions, as well as the composition of kits needed to perform these activities.

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