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Injury, hospitalization, and operation rates are low in aerial sports

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ABSTRACT

Objectivess: Aerial sports can cause serious injuries. The rate of injuries is nevertheless reasonably low, contrary to popular belief. This study aimed to evaluate the rate and severity of injuries to ASI patients presented to our Emergency Department (ED).
Material and methods: The study was held at a university medical center. The patients who were presented or transferred to the ED in a four year period were retrospectively reviewed.
Results: 73.2% of patients were male. The mean age of patients was 28.6. The distribution of injury rates by activity was as follows: 1.46% in parachuting, 0.35% in paragliding, and 0.04% in hang-gliding. 75.6% of patients were trainees. In 82.9% of patients, the injury occurred during the practical session of training. The most common injury is soft tissue and ligamentous (ST/L) injury (41.5%). 25 patients (61%) had isolated lower extremity injuries (13 of them had fractures). Other isolated injuries were head trauma in 2 (4.9%) and vertebral fractures in 3 (7.3%) patients. 4 (9.8%) patients were diagnosed with multiple injuries. The overall rate of hospitalization was 0.07% (0.16% in parachuting, 0.08% in paragliding, and 0.03% in hang-gliding). The need for operation in overall activities was 0.04% (0.08% in parachuting, 0.03% in paragliding, and 0.03% in hang-gliding). The mortality rate was found to be zero in the region.
Conclusion: Aerial sports are considered dangerous sports activities, but the injury, hospitalization, and operation rates are low.
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1. Introduction

Every day, more and more people are engaged in risky sports activities without paying attention to safety measures. Sports safety is influenced by many factors including age, type of sport, behavior of individuals, weather conditions or quality of sports gears. However, some sports activities are more prone to serious injuries than others, such as skiing, climbing, and aerial sports.

The World Aerial Sports Federation (FAI - Fédération Aéronautique Internationale) is the particular organization responsible for governing aerial sports since 1905. Today, the FAI lists thirteen different activities as air sports, including ballooning, hang gliding, paragliding, micro-lighting, and parachuting. The FAI has more than 100 member countries, and Turkey is one of the active members. Aerial sports centers in Turkey host many sportive activities for visitors from Turkey and other countries. One of the major centers is located 20 km away from the city center. There are approximately 3400 flights in a regular season (5 months a year) in the area.

Human beings have been creating and popularizing new air sports activities since 1905, and there are some aerial sports in the world that are not included in the FAI official list yet, such as wingsuit flights. Increasing types of air sports activities is associated with increasing the number of people involved in these sports. With the increasing number of participants, the number of related injuries has also increased gradually.[1] Safety, as an aviation standard, is crucial for aerial sports. Special gear; well-designed, secure equipment; and high-quality flight training in those sports are critical to decreasing the number of serious injuries. Aerial sports can cause serious injuries. However, the rate of injuries is reasonably low contrary to popular belief. One of the most challenging aerial sports activities is skydiving. Barrows et al. reported that the

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injury rate for skydiving is 0.17%, and two-thirds of the injuries were minor injuries that were managed with simple first aid.[2]

We are faced with air sports injuries (ASI) every summer in our region. There have so far been no studies on the rate and severity of these injuries in the region and country. Therefore, we aimed to evaluate the rate and severity of ASI patients presenting to our Emergency Department (ED).

2. Material and methods

2.1. The study design and setting

This is a retrospective study was held in the emergency department of the university hospital, which is a tertiary care center for trauma patients.

2.2. Patient selection

The patients who presented or were transferred to the ED for ASI for four consecutive years, were included in the study group. The patients having incomplete files (see data collection) or who were transferred to a different facility were excluded from the study.

2.3. Data collection and measurements

A list of the patients was obtained from the hospital information system retrospectively. The detailed medical information of patients was found in electronic health records and archived patient files. Total number of flights was taken from the aerial sport center. Descriptive data of patients including age, gender, month of presentation, type of air sport, injured part of the body, need for hospitalization and operation, and mortality was recorded for the purpose of this study. Furthermore, we asked whether the injured patient was a trainee or an instructor, and also whether the accident happened during the practice session of training or in a competition.

2.4. Outcomes

Hospitalization, need for a surgical operation, morbidity, and mortality were defined as outcome measures of the study.

2.5. Analysis

Chi-Square and Fisher's exact tests were used for descriptive analyses. When the p-value is under 0.05, the results were considered statistically significant. Descriptive statistics were presented as mean and standard deviation (SD) for normally distributed variables. Statistical Package for the Social Sciences (SPSS, version 18) was used for statistical analyses.

2.6. Conflict of interest

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

3. Results

There were 44 patients in the hospital information system database in four consecutive years. 41 of those met the inclusion criteria. Table 1 presents descriptive information on the patients, injuries, and types of activity causing injury.

Table 1
General distribution of patients.

	Parachuting	Paragliding	Hang-gliding
Total number of flight	1225	5660	6603
Male	12	15	3
Female	6	5	none
Mean age	24.9 [SD: 5.2]	31.4 [SD: 11.9]	32.0 [SD: 11.2]
Trainee	13	16	2
Instructor	5	4	1
Upper extremity ST/L injury	3	2	None
Upper extremity fracture	None	1	1
Lower extremity ST/L injury	8	3	1
Lower extremity fracture	9	3	1
Head injury	None	2	None
Vertebral injury	None	3	None
Multiple injury	1	3	None
Need for hospitalization	2	5	2
Need for operation	1	2	2
Mortality	None	None	None
Accident during launching	None	2	None
Accident during flight	None	None	None
Accident during landing	20	16	3

3.1. Age and gender

30 (73.2%) of patients were male. The mean age of patients was 28.6 (SD: 9.87, range 17–56). Male patients were older than female patients (30.9 [SD: 10.4] vs. 22.4 [SD: 4.25], $p = 0.013$). The patients injured during parachuting activities had a lower mean age than those injured during paragliding and hang-gliding (24.9 [SD: 5.2], p = NS). The mean age of patients with head trauma (39.0 [SD: 19.7]) was higher than that of patients with upper extremity fracture (36.0 [SD: 14.1]), multiple trauma (33.5 [SD: 9.8]), vertebral fracture (31.6 [SD: 14.3]), lower extremity trauma (27.4 [SD: 9.4]), and ST/L injury (25.7 [SD: 5.4]), p = NS.

3.2. Month of presentation

The distribution of patients according to the month they presented was as follows: 16 (39%) of patients in August, 11 patients (26.8%) in both June and July, two patients (4.9%) in September, and a patient (2.4%) in May.

3.3. Types of activity causing injury

Parachuting, paragliding, and hang-gliding were the three leading causes of ASI in the region. In the present study, 18 patients were injured in parachuting (43.9%), 20 patients in paragliding (48.8%) and three patients in hang-gliding (7.3%). During the period of the study, 1225 parachuting, 5660 paragliding, and 6603 hang-gliding flights were completed in the region. The injury rates by activity were 1.46% in parachuting, 0.35% in paragliding, and 0.04% in hang-gliding.

Level of experience (trainee or instructor), time of the incident (during training or competition), Safety Regulations.

Thirty-one (75.6%) patients were trainees. Of those, 23 (74.2%) were male. There were 10 injured instructors, and 7 (70%) of them were male. Thirty-four (82.9%) patients were injured during the practical session of training (PST). All seven patients (17.1%) who were injured in a competition accident were instructors. Trainee injuries were 72.2% in parachuting, 80.0% in paragliding, and 66.7% in hang-gliding. The majority of injuries occurred during practical sessions of training (83.3% in parachuting, 80.0% in paragliding, and 100% in hang-gliding).

Three of seven (42.9%) injuries that occurred in the competition were simple soft tissue injuries, while the remaining four patients

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