Introduction

Burn injuries have an impact on the quality of life of patients in terms of suffering, disability, life-threatening injuries and financial costs. Worldwide, morbidity and mortality due to alcohol abuse is increasing. It results in 2.5 million deaths each year globally. Nine percent of deaths in young adults (15-29 years old) are alcohol related. The harmful use of alcohol is a global problem which compromises both individual and social development. Alcohol is the world’s third largest risk factor for premature mortality, disability and morbidity; it is the leading risk fac-
tor in the Western Pacific and the Americas, and the second largest in Europe.

The most recent data collected on alcohol consumption in Italy show a change from the traditional Mediterranean pattern of drinking, i.e. moderate and daily consumption of mainly wine, to a more complex model including spirits and other types of alcohol, reflecting the influence of Northern European countries. “Binge drinking” is the typical drinking mode of Northern Europe and involves the consumption of many units and types of alcohol (spirits, liquors or cocktails) in a short period of time. In the last ten years this type of alcohol consumption in men aged 18-24 years has increased from 33.7% to 41.9% and among the youngest, 14-17 years, from 14.5% to 16.9%. Among girls of this age binge drinking has almost tripled over the past fifteen years.

These new drinking habits are undoubtedly a worrying phenomenon, as they involve the exposure of the population to new alcohol-related risks in addition to those related to traditional consumption. New risks arising from new ways of drinking endanger more easily not only the health of the individual drinker, but can also be a wider social issue when the consumption of alcohol occurs in contexts and situations such as driving or carrying out work activities.

Flaming drinks are becoming vastly popular, providing a source of entertainment in restaurants, bars and clubs, and have become a fashion statement. “High-proof” alcohol is mainly used in making these flaming drinks, aiming to ensure that flames are controlled when ignited. However, severe burn injuries have been reported in literature. Bar staff usually mix the drinks before lighting them and serve them after putting out the flames. However, a bartender may shake the drink before lighting it which can result in an explosive flame. If additional alcohol from the bottle is added to a still burning drink, flames may spread up the stream of alcohol into the bottle and cause a flash of flame out the bottle’s neck. Moreover, these flaming drinks are often consumed by those who are already under the influence of alcohol, with the resultant clouded judgment and delayed reaction to danger. Meanwhile, with the aim of attracting a larger attendance, bottles are brought to tables with lit fireworks which, when managed by intoxicated people, can be dangerous both for those who handle them and others around them. Thus, a stress-free night can dramatically transform into a potentially life-threatening one, or be the cause of permanent lesions.

We present five cases of burn injuries sustained under the aforementioned circumstances from 2009 to 2013 which were treated at the Accident and Emergency (A&E) Department, CTO Turin Hospital. We describe the spectrum of severity at presentation, the treatment and the outcomes.

### Methods and results

A retrospective observational study has been conducted on patients with burn injuries caused by flammable agents used in night clubs who came to the A&E department of CTO Turin Hospital, from 2009 to 2013. The characteristics of the study population are given in [Table I](#). The total number of patients was five: three males and two females with an average age of twenty. All injuries happened in night clubs during the evening or in the night. In four patients the injury was caused by flaming cocktails and in one patient by contact with sparks.

This study highlights that there is a higher probability of burn injuries during the summertime: two injuries happened in July and the other three occurred in May, August and October respectively.

Each patient had burn injuries to the face and three also to the upper arms. The medium total burned area (TBA) was 8% with 2% of minimum extension in two patients and 20% of maximum extension in one patient. The depth of the burns was mainly partial thickness (second degree) in all cases, with some deeper areas.

Three patients required admission to the Plastic Surgery Department. Two patients with minor burns were treated in the outpatient clinic. These two were treated with collagenase and hyaluronic acid preparations. The first patient needed four appointments in the outpatient clinic with total re-epithelization after twenty-one days; the second needed two appointments with total re-epithelization after 10 days. These two patients didn’t develop pathologic scars.
but mild dyschromia (Figs. 1-2).

The TBA of the admitted patients was 3%, 15% and 20% respectively. All of these needed preventive oro-tracheal intubation. Two patients with more severe injuries required surgery on the upper arms, involving surgical debridement of the burned areas, dressings with Alginate when the TBA was 20%, or surgical debrideament and covering with split-thickness skin grafts (SSG) when TBA was 15%. There were no post-operative complications and the patients were discharged on days 11 and 15 respectively, with an appropriate follow-up in the outpatient clinic.

The patient admitted with head, neck and hand burns (Patient 3, see Table I), who didn’t require any surgical treatment, was discharged after two days, with a follow-up in the outpatient clinic for alginate dressing changes for ten days until the whole area was covered. This patient developed three hypochromic areas that we have continued to follow. The two patients (Patients 4 and 5) treated surgically needed one and two appointments respectively in the outpatient clinic and achieved total re-epithelization after 20 days. Patient 4 was surgically treated with SSG on one of his upper arms; he is still treated with

Fig. 1 - Patient 1. A - Second degree neck burn caused by contact of sparks in twenty-one year old female. B - Complete re-epithelization after 21 days without surgery. C - Dyschromia.

Fig. 2 - Patient 2. A - Second degree face burn caused by flaming cocktail in twenty-five year-old male. B - Complete re-epithelization after 10 days without surgery. C - Dyschromia.
silicone gel due to a hypertrophic scar on his upper arm. Patient 5, who required debridement and dressings with alginate, is still under follow-up, having developed dystrophic scars and dyschromic areas.

Discussion

Over the past few years, many preventive plans aimed at reducing the number of burns cases have been implemented. Prevention in this particular field has lead to significant improvements in our society; this could be highlighted by analyzing and comparing the details and features of the injuries sustained by our patients and those suffered by patients who live in medium or low income countries (MLIC).

Sometimes an increase in new burns cases can arise due to changes in behavior and life-style. In Italy, the economic crisis has brought about changes in behavior in our daily lives as well as in our leisure activities. Night clubs stay open later and later, even after midnight when people are already tired. Moreover, many have started offering new features in which fire plays a central role. Thus, there is now an increased demand for flaming cocktails. Some places provide a free table if the customers buy at least one bottle; this increases alcohol consumption. This bottle is brought with fruits and fireworks or free dangerous sparks. Within such settings, the combination of tiredness and high blood alcohol levels can lead to burn injuries.

Our study of the last four years shows that burn injuries, although rare, can happen in night clubs. Our study population is made up of young people with an average age of 20 years, all of whom arrived at the A&E department on various Saturday nights during summer periods. All five patients suffered facial injuries with post-burn oedema that led to hospitalisation and preventive tracheal intubation in three (Fig. 3). Three also presented with injuries to their upper arms. Advanced medications were required for treatment, including collagenase for debridement, alginate for the post-burn oedema, and hyaluronic acid to improve re-epithelization. Even so, permanent sequelae, including dyschromia and pathologic scarring were evidenced.

Conclusion

This retrospective study shows that there is a probability of suffering burn injuries while out clubbing. Over the past few years, night clubs have developed features based around alcohol consumption. This small study aims to show the risk of burn injuries that can sometimes be severe and require surgical treatment. Prevention becomes a priority and the unsafe use of fireworks, flaming cocktails and drinks brought with sparks should be avoided and reported to an appropriate authority to reduce potentially dangerous consequences.

BIBLIOGRAPHY