

Sauna-related burns: a review of 154 cases treated in Kuopio University Hospital Burn Center 1994–2000

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Abstract

Bathing in sauna has been customary for Finnish people for centuries. However, there are no actual reviews on sauna-related burns in the literature. This 7-year retrospective analyses of 598 burn patients treated in Kuopio University Hospital Burn Unit revealed that every fourth burn in our unit was sauna-related, giving a total of 154 cases. Most of these burns were minor but 54% required operative treatment. A total of 71% of patients were male and 40% of all patients were under the influence of alcohol. The incidence of sauna-related burns in Finland according to our material is 7/100,000, giving a total of 357 patients annually. Hence, there is one sauna-related burn per day requiring hospitalization in Finland. © 2002 Elsevier Science Ltd and ISBI. All rights reserved.

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1. Introduction

It is estimated that there are at least 1.6 million saunas in Finland. This is a significant number in a country of 5.1 million people. Finnish people go to sauna usually about once a week, but during summer some people bathe every day. Most saunas are in private houses or summer cottages by a lake. In new apartment houses even small apartments have a sauna of their own. In addition to private saunas, there are public saunas in hotels, gyms and even some at work. Some decades ago, all saunas were so called smoke saunas, whereas nowadays sauna stoves are electric or may be chimney equipped which are heated with burning wood. The chimney equipped saunas mostly have a water tank around the hot stove to heat water to a temperature up to 90–100 °C. This hot water is mixed with cold water from the lake and then used for washing. A total of 70% of Finnish children have their first sauna bath before the age of one [1]. The temperature in the sauna room is usually 80–90 °C (176–194 °F) but often exceeds 100 °C (212 °F). It is estimated that the consumption of alcohol is a contributing factor in some 20–25 sauna-related deaths every year, mostly due to arrhythmias [2]. There are no previous reports found on sauna-related burns in the literature, except for one case report [3] where the cause of burn was hot air only.

The aim of this study was to review the background to sauna-related burns, describe an extended case series and makes an attempt to determine the incidence of sauna-related burns.

2. Materials and methods

All patients charts of burn patients admitted to Kuopio University Hospital (KUH) Burn Center during 1994–2000 were reviewed retrospectively.

3. Results

During the time period examined, a total of 598 burn patients were treated in our unit. Annually, 15–26 burns were sauna-related giving a total of 154 sauna-related burns during 1994–2000. The average TBSA of burns was 71% (range: 0.5–40%) and most burns (126) were 10% or less in size (Fig. 1). The average age of patients was 43 years (range: 1–94 years). Twenty-four patients were children <10-years-old. This age group together with patients between 41 and 50 years formed the two peak incidences in different age groups (Fig. 2). The smallest incidence of burns was in the age groups 11–20 years and over 80 years. The average hospital stay was 9.7 days (range: 1–91).

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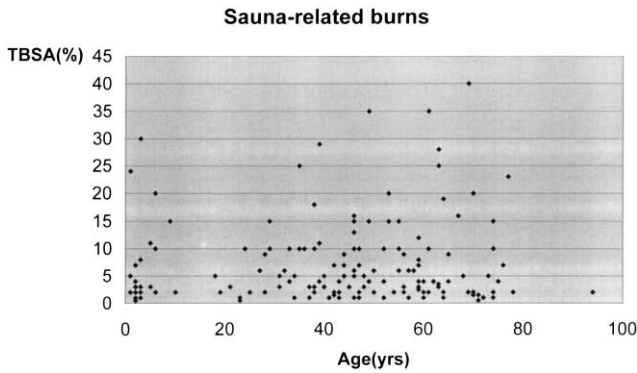


Fig. 1. Sauna-related burns.

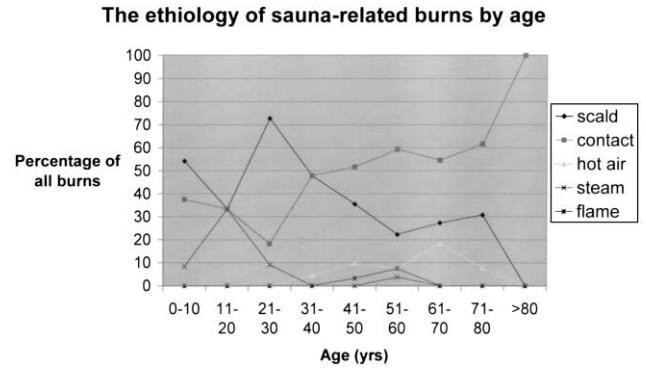


Fig. 3. The etiology of sauna-related burns by age.

Seventy-one percent of patients were male. The main causes of burns was contact with the hot stove (49%), scald (38%), hot air (7%), hot steam (3%) and flame (2%). Contact burns mostly happened due to accidental slipping and falling against the hot stove. Hot water burns were mostly accidental pouring of hot water instead of cold water on oneself. Hot air burns were due to loss of consciousness during the stay in the hot sauna room either due to illness or use of alcohol. Forty percent of all burns happened under the influence of alcohol. The incidence of scald burns decreased and the incidence of contact burns increased as the age of the patients increased (Fig. 3).

Eighty-three patients (54%) needed operative treatment. Operative treatment was needed in 60% of contact burns, 67% of flame burns, 82% of hot air burns and 40% of both scald or steam burns. Contact burns needed more fascial excisions compared to scald burns that required more tangential excisions.

Thirteen patients (8.4%) needed intensive care on admission due to burn trauma. The total mortality of sauna-related burns was 1.9% (three patients). One of these patients disclosed a brain tumor at autopsy that was the cause of unconsciousness during the stay in the sauna. She died due to irreversible changes induced by prolonged hyperthermia:

DIC, mass gastro-intestinal bleeding and metabolic acidosis. The second patient was a 77-year-old female with a 23% full thickness burn. No active treatment was given. The third patient died suddenly at postburn day 8. Autopsy revealed acute myocardial infarction.

4. Conclusion

The Burn Unit in Kuopio University Hospital treated 154 sauna-related burns during 1994–2000. Out of these patients, 26 came from a district served by another central hospital. Hence, 128 patients were treated from our own district of 260,000 people. Therefore the incidence of sauna-related burns is $\approx 7/1,100,000$ which equals 357 patients per year in Finland. This means one sauna-related burn per day that requires hospitalization. This may seem a lot, but considering the amount of sauna-visits in 1.6 million saunas annually, the figure is rather small.

The distribution of causes of burn in relationship with age (Fig. 3) shows that the incidence of contact burns increases with age. This can be explained with the increased risk of slipping due to illnesses or weakness due to older age. The high incidence of scald burns in younger patients has two explanations: either the children themselves or their parents poured hot water on the child by accident. Especially the latter is always a dramatic experience both to the child and the parent. The other reason is usually due to the influence of alcohol.

Every fourth burn in our unit was sauna-related. Most of these burns were small in size, but 54% needed operative treatment and the average stay in hospital was 10 days. Due to their special appearance, the depth of burns caused by hot air was more difficult to evaluate than other burns. They are often multicolored, appear in a spotty fashion and are often considered to be more superficial than they really are. The fat is generally non-vital and the burn needs a fascial excision. These are burns caused by a very long exposure time to hot air, even several hours.

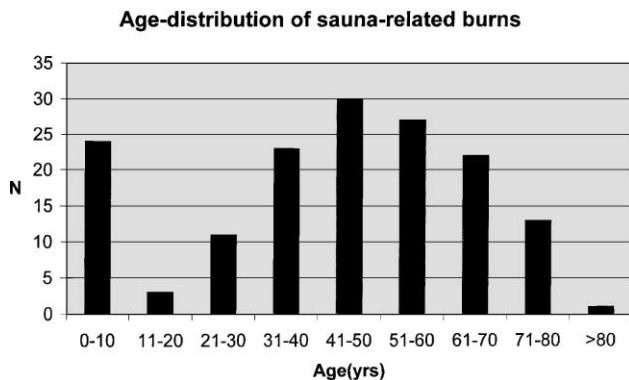


Fig. 2. Age distribution of sauna-related burns.

The reason for the higher incidence of men among the sauna-related burns is due to the fact that men bathe more often than women and alcohol has a bigger role during bathing in men than in women.

Although burn wounds do occur in saunas, the incidence is quite small considering the amount of visits to sauna. This is probably due to the fact that Finnish people bathe in sauna all their lives and have learned how to be careful. However, most of these burns need surgery and a rather long hospital stay and hence are of great economic importance.

More attention must be addressed to prevention, as virtually all these injuries appear to be avoidable.

References

- [1] Viinikka I. Sauna and Health. Publication of the Finnish Sauna Society.
- [2] Ylikahri R, Heikkonen E, Soukas A. The sauna and alcohol. *Ann Clin Res* 1988;20(4):287–91.
- [3] Morris AM, Rai S. Sauna bath burn. *Br Med J* 1978;1(6117): 894–5.