

Original Research Article

Epidemiology of contact Burns

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Abstract

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Contact burns are one of the most prevalent burns all over the world. It is one of the major causes of burns in specialized burn centers. Carelessness and not using the safety measures would result in contact burns which are usually of deep III and IV degree burns and would have many complications. We prospectively surveyed all of the contact burn patients who came to our hospital during last 5 years. Most of them were burns with hot metals, especially hot exhaust of the motorcycles. Age, sex, demographic data, length of stay, mode of treatment, result of treatment and outcomes were inserted in a special questionnaire and data was analyzed with SPSS 19. P values less than 0.05% was considered significant. During 5 years we had 4302 burn patients, of them 96 patients had contact burn (2.2%). 55.2% were male and 44.8% were female. Mean age was 40 years (from 9-80 years old). All had III and IV degree burns. Mean age for men was 26 years old and mean age for women was 44 years old. 36 patients had contact burn with hot pipe of exhaust of the motorcycles. Of them 55.5% were male and 44.5% were female. And all of these burns were in inner side of the legs. Percentage of burn was from 1 to 3 % and all of them were treated with early excision and skin grafts. Length of stay was from 1-5 days. And after that patients were discharged and they went back to work after 3 weeks, we had only one hematoma and one infection in the graft site with partial skin loss. All of female patients were seated in the back seat of the motorcycle. Contact burn is usually of deep nature and almost all of them can be treated early with early skin graft. And the result are excellent and without keloids or hypertrophic scar. Loss of work force is minimal with early excision and grafting.

Keywords: Burns, Complication, Contact, Early excision, Exhaust burn, Hot pipe burn

INTRODUCTION

Many cases of burns happened every year in our country. It is reported that more than 100,000 burns occurred annually and about 8000-9000 cases are admitted each year in specialized burn centers.

Contact burns are one of the prominent cases with very deep burns, namely III and IV degree burns with necrosis of deeper tissues.

One the major concerns is about the treatment of these cases, time of treatment and their outcome. In this study, we surveyed prospectively the epidemiology of contact burns and their outcome.

MATERIALS AND METHODS

During more than 5 years, we prospectively gathered the data of our contact burn patients and inserted the data in a special questionnaire with age, sex, demographic data, the length of time from injury to medical care or hospital, accompanying traumas, previous medical history and illnesses, and place of burn, presence or absence of parents (unsupervised children), anatomic distribution of burn, seasonal variation, cause of burn, ignition of clothing, mode of extinguishing the fire, extend of 3rd and

Table 1. Frequency of contact burns according to sex

Sex	Frequency	Percent
Female	43	44.8%
Male	53	55.2%
Total	96	100%

Table 2. Frequency of contact burns according to degree of burn

Degree of burn	Frequency	Percent
3 rd degree	42	43.75%
4 th degree	54	56.25%
Total	96	100%

Table 3. Frequency of contact burn according to cause of burn

Cause of burn	Frequency	Percent
Exhaust	36	37.5%
Stove	29	30.2%
Iron	3	3.1%
Hot charcoal	4	4.2%
Hot kettle	1	1%
Others	23	24%
Total	96	100%

4th degree burn, previous clinical condition, any treatment for burn at home, medical staff pre-hospital care, serum therapy before hospital, length of hospital stay, mode of therapy and operative intervention, infection, culture of burn wounds (if any), Antibiotics that were used, result of treatment, Lab tests, percentage of burn (TBSA), complications and outcome of them. Follow up was from 12-15 months. The result of treatment were asked from the patients and the patients categorized the results as: poor, fair, good and very good

The results were analyzed with SPSS 19 software and p values less than 0.05% was considered significant.

RESULTS

We had 4302 burn patients during more than 5 years who were admitted to the hospital. Of them 96 patients had contact burns with hot objects, mostly hot metals. 55.2% (53 patients) were male and 44.8% (43 patients) were female.

Mean age of patients was 40 years old. Age range was from 9 to 80 years old. TBSA of patients was from 1 to 3 percent of body surface area. Mean age of men was 26 years old and mean age of women was 44 years old.

We had 36 patients who had contact burn with hot exhaust of motorcycle. And 20 (55.5%) patients were male and 16 (44.5%) patients were female.

Percentage of burn was from 1 to 3 % and all of them were treated with early excision and skin grafts. Almost all of exhaust hot pipe burns were in the inner part of

legs. And most of graft donor sites were upper thighs. Medium and thick Split thickness skin grafts were removed and after excision of burn Eschar and debridement and hemostasis, the graft were placed over it and fixed with staples and nylon sutures. Sometimes 1 to 2 sessions of debridement were needed before skin grafting.

Length of stay was from 1-5 days. And after that patients were discharged. The dressings were changed every other day with Vaseline gauze and splint and they went back to work after 3 weeks. We had only one hematoma and one infection in the graft site with partial skin loss.

All of female patients were seated in the back seat of the motorcycle. Outcome of the patients were excellent and 96% of patients classified the result as very good. None of them developed keloids in the burn area of skin grafts. 11 (11.4%) patients had hypertrophic scar in surrounding of the skin graft area that were treated with silicone sheets and pressure garments during following 12 months.

DISCUSSION

Burn injuries are one of the major trauma in our country and it occurs in more than 100,000 patients every year. Of these about 6-8% is admitted to specialized burn centers and general hospitals.

Contact burns are one the deep burns that usually would produce several complications and are difficult to

treat. Some of them would have a long term complications and would suffer from these complications for a long time (Gabbe et al., 2014; Othman et al., 2015; Chipp and Pape, 2013; Zangi et al., 2014; Kemp et al., 2014; Bukovčan and Koller, 2013).

Most of reports about contact burns are in children and most of them are below 4 years old. The patients are usually infants or toddlers who by accident touch and grip the hot objects and would have deep burn in hands, face or feet (Sarginson et al., 2014; Sivam et al., 2013; Laitakari et al., 2014; Teo et al., 2012; Rajan et al., 2011).

Some of the contact burns are in the lower legs. And without proper treatment they would develop hypertrophic scar with itching and burning sensation, cracking and bleeding for a long time and inability to wear a proper shoe or walk. So many of these patients will come to plastic and reconstructive surgery clinic for reconstruction and treatment. Some of them may need 3-5 sessions of surgery for better results.

There are several types of contact burns; such as burn with iron, hot pipe exhaust, hot charcoal, hair straightener, Barbecues, oven, stoves, fireplace doors, hot kettles and so on (Chipp and Pape, 2013; Rajan et al., 2011; (Lai et al., 2002; Mohammadi and Johari, 2010; Cahill et al., 2008; Winfield et al., 2008; Sarginson et al., 2014; Wilson et al., 2008; Vermaak et al., 2012; Lai et al., 2002; Hammig and Henry, 2011; Laitakari et al., 2014; Duke et al., 2011; Baryza et al., 2013; Martin et al., 2014).

Most of the contact burns would treat as out-patients but about 20-30% of them require admission. In a study in Taiwan most of contact burns in adults were with hot exhaust and 75% of them were adult female (Lai et al., 2002).

In other reports most of contact burns with something other than motorbike exhaust were in children especially below 4 years old. Infants, toddlers and small children may suddenly and carelessly touch the hot objects. Majority of these burns are in hands and sometimes when walking over hot sands or charcoals are in feet.

Interestingly iron is the major cause of contact burn in both children and in adults too (at both groups). Using safety measures would reduce the incidence of contact burn with hot iron (Chipp and Pape, 2013).

In our study it was revealed that most of contact burns are out-patients and about 2-5% would need admission. Among those who admitted most of them are adults. This is a good sign which means that careful supervision is expressed by parents and guardian when attending small children. So we have lower frequency of contact burns in our children.

Also 55% of patients are men and most of them had burn due to work. So it is concluded that safety measures should be considered during the work and in the work places by the men workers.

There are some reports about contact burn with hair straighteners, this is fortunately very uncommon in our country (Sarginson et al., 2014; Wilson et al., 2008).

Moreover there are some reports of contact burn with fireplace and fireplace doors, these also found in our report but again it is not common in our country (Baryza et al., 2013; Hammig and Henry, 2011; Duke et al., 2011).

Barbecues and disposable barbecues are frequent cause of contact burns, in these cases, children would walk over hot sands or hot charcoals which are still hot and would burn the sole of their feet (Laitakari et al., 2014; Vermaak et al., 2012; Cahill et al., 2008; Winfield et al., 2008; Martin et al., 2014).

Burn due to treadmill belt friction is also a new type of contact burn and it is seen in un- standard treadmills. The patients are mostly children below the 3 or 4 year old of age that put their hands inside the belt. These hand burn mostly are deep and requires admission and Surgical treatment (Davidson and Eadie, 2009).

One of the interesting types of contact burn is motorbike exhaust burn. These burns on the contrary to other contact burns would happen mostly in adults. These are mostly severe and deep burn that needs admission and surgical treatment. And we found that men are more injured. It is more occurred in the summer and/or late in spring, more in rush hour and more in bare legs (Lai et al., 2002; Kahn et al., 2013).

In our study it was found that the most affected part of body is lower legs and inner part of it and in those who admitted to hospital, it is of third or fourth degree deep burn. The patient mostly has a thick Eschar and of about 1-3 % of TBSA.

Most of these patients need 1-2 sessions of debridement and early skin graft .After 1-5 days in hospital, the patient can be discharged and after 3 weeks he can go back to his job. So, the lengths of "off-days" are minimal and the patient will go back to work soon. Therefore the length of unemployment is very short. And financial burden for the patient and for his company is not very high.

In our study we found that most of women were those who seated in the back seat of motorbike, so it is recommended that safety measures be emphasized for 2nd rider of the bike and especially for those who are not familiar with motor riding and are not familiar with exhaust and how hot can it be. These people should be aware of the place of exhaust and keep their leg from coverage of exhaust.

Our patients classified the result of their treatment as very good. So objective and subjective measurement of the result is excellent and we think that early excision and grafting has a major positive effect on outcome of the 3rd and 4th degree exhaust burns.

Other authors, as a preventive comments, advise motorbike riders to wear trousers and not to be in bare leg, be careful in rush hours especially during the

summers, be careful of the coverage of the exhaust, and do not park in the close vicinity of other motorbikes (Lai et al., 2002).

Conflicts of Interest and Source of Funding

There are no conflicts of interests among authors.

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CONCLUSION

Contact burns are not very frequent in our country, but they are of deep 3rd and 4th degree nature and most of them need admission and surgical treatment. Early excision and early skin grafting is one of the best treatment for deep degree contact burns. It will result in early go back to work, minimal length of unemployment and minimal financial burden to patients and their employers.

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