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Ocular Involvement in Thermal Facial Burns

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ABSTRACT

Aim: *To know percentage, demographic, clinical profile of ocular involvement in thermal facial burns.* ***Methods:*** *60 patients with thermal facial burns were examined prospectively during a period of 1 year. Age, gender, mode and place of injury, ocular signs at time of presentation were noted.* ***Results:*** *A total of 60 patients were included. 48.3% patient shad ocular involvement in thermal facial burns in which 36.6% had bilateral ocular involvement. 34 eyes (66.6%) of 51 involved eyes had adnexal injuries with lid skin burns, 14 eyes (27.4%) had conjunctival and corneal epithelial involvement, and 3 eyes (14.2%) had stromal involvement. Ocular involvement was more in males (30%) and pediatric age group (11.6%). Burns due hot liquids occurring in home accidents (37.7%) was the common mode of injury followed by flames and hot liquid burns at work place (20.6%). Most of the ocular injuries were associated with second degree skin burns.* ***Conclusion:*** *Ocular adnexal injuries were common in thermal facial burns. Ocular surface involvement is less common. Home accidents were common mode of injury. Males and pediatric age group were affected.*

Keywords: Thermal burns, Facial burns, Ocular involvement, Bilaterality

INTRODUCTION

Thermal injuries are potentially blinding accounting 16% of ocular burns [1]. 15-20% of patients with facial burns exhibit ocular injury [2]. Two Indian studies showed incidence as 5% and 10% [3,4]. Usually burns are bilateral, affects young males, at work place [5]. Extent of ocular surface damage is a prognostic indicator of recovery mandating early examination [6]. The consequences of thermal eye injuries are not as well described as chemical injury [7]. This impairment can lead to reduced quality of life [8].

This study was done to know demographic details, clinical profile percentage of ocular involvement in thermal facial burns as most of the studies were retrospective.

MATERIALS AND METHODS

The study was prospective observational study done for a period of 1 year. As this is a time bound study which could not be extended for more than a year, all patients with thermal facial burns who were examined on OPD basis and

admitted in burns ward during study period were included. Patients with previous established eye diseases like Steven Johnson's syndrome, cicatricial pemphi gold, chemical injury were excluded.

The study has been approved by institutional ethical committee and adhered to tenets of Declaration of Helsinki. A written informed consentis taken from all those who were included in study. Patients' demographic profiles were noted; age and gender. A detailed history regarding place and mode of thermal injury was taken. Nature of facial burn was described. Eyes examined for any involvement and ocular signs at the time of presentation were noted. Sometimes due to tense lid edema in extensive facial burns globe examination often posed difficulty. In such situations patients were reviewed after edema decreased. Vitally unstable patients were also seen later and not at the time of presentation.

Slit lamp examination, fluorescein staining of ocular surface, intraocular pressure testing with rebound tonometer, fundus examination in clear media were done. In bed ridden patients slit lamp examination was not done at least until patient is mobile. Ocular signs were classified as; adnexal burns, ocular surface burns, deep stromal burns. The last two was qualified based on Roper hall classification.

Medical management was started based on clinical sings. Adnexal thermal burns were treated with silver ointment. Superficial involvement was treated with topical antibiotic (moxifloxacin), lubricating drugs (CMC). Cycloplegia, occlusive dressing, glass rod swiping was advised when needed. Some cases needed debridement of surface particles. Topical steroids were used in case of anterior chamber reaction and severe conjunctival inflammation. Anti-glaucoma medication initiated when required. Appropriate treatment was initiated if there was secondary infection of cornea. Patient followed up every three days for first week, every week for next five weeks. Ocularre sponses and complications if any were noted at end of 1st, 3rd and 6th week. Treatment was modified according to the response.

Statistical analysis

Chi-square test of Independence in software SPSS v 16 is used.

RESULTS

In 1 year of study period 60 patients with thermal facial burns were evaluated. 43 (71.6%) were inpatients, 17 (28.3%) were from outpatient department. 29 patients (48.3%) showed ocular involvement, in which 22 (76%) patients had bilateral ocular involvement. Age and sex distribution is shown in Table 1.

Table 1 Age and sex distribution of thermal facial burns

	Male>16 Y	**Female>16 Y**	**Children**
Ocular involvement	18 (30%)	4 (6.6%)	7 (11.6%)
Without ocular involvement	14 (23.3%)	6 (10%)	11 (18.3%)
Total	32 (53.3%)	10 (16.6%)	18 (30%)

Males are more affected (30%) with thermal facial burns with ocular involvement followed by children. Of 29 patients with ocular involvement most common mode of injury was due to fall of hot liquids/water at home and work place as given in Table 2.

Table 2 Mode of injury of thermal facial burns with ocular involvement

Place of injury	**Mode of injury**	**Males**	**Females**	**Children**
Home	Hot liquids	5 (17.2%)	2 (6.8%)	4 (13.7%)
	Cooker blast			1 (3.4%)
	Cylinder blast	2 (6.8%)		

	Candle burns			2 (6.8%)
Work place	Flames	6 (20.6%)		
	Hot liquids	5 (17.2%)	1 (3.4%)	
	Acid attack		1 (3.4%)	
Total		18 (62%)	4 (13.7%)	7 (24.1%)

Only adnexal injuries were seen in 34 eyes (66.6%) out of 51 involved eyes. Adnexal injuries were in form of peri orbital burns (eyelid, eyelash, eyebrow burns). 14 eyes (27.4%) and 3 eyes (14.2%) had ocular surface (conjunctival and corneal epithelial involvement only) and corneal deep stromal injuries respectively. Both these were associated with adnexal burns. 10 eyes (19.6%) had Roper hall classification grade 1 injury, 4 (7.8%) eyes had grade 2, 2 (3.9%) eyes had grade 3, 1 (1.9%) patient had grade 4 [9,10]. 23 patients (79.3%) with ocular involvement were associated with second degree skin burns, 4 (13.7%) and 2 (6.8%) patients were with third and first degree skin burns respectively. Complications observed were corneal ulcer, persistent epithelial defect, ectropionand symblepharonin one patient each. These were associated with second-third degree cutaneous burns.

DISCUSSION

Diagnosis and treatment of thermal ocular injuries are often delayed because facial burns are usually associated with life threatening injuries requiring more immediate intervention. In addition, intense periorbital edemamay make ophthalmic examination difficult for the physician caring for the burn patient, and significant eye injuries may be overlooked [7]. In presence of burning symptoms, it is sometimes difficult to perform the initial clinical exam [1]. Damage due to thermal burns occurs at the time of injury [11,12].

Estimates of ocular injury associated with thermal burns range from 7.5% to 27% of patients admitted to burn units [7]. In this study most of the patients seen with thermal facial burns were admitted as inpatient with second degree cutaneous burns. Almost 50% cases had ocular involvement thus mandating ophthalmic consultation for facial burns. Most of the studies done till date include both chemical and thermal burns thus may not stress on ocular involvement only in thermal burns. In one retrospective study by Charles, SB et al. 10.6% of burns ward patients needed ophthalmic consultation which is due to both facial involvement and obvious ocular injury [7]. Bilateral ocular involvement is most common in facial burns as found in many other studies [5,7,13].

Males are mostly affected especially in work place in this population as they do more outdoor works thus mandating protective wears [11]. Flame injuries were commoner. A restrospective study by Edmund F et al. found males were affected more in thermal injuries, flame injuries being more [14]. Females are mostly affected in homes due to domestic causes. Due to playful and exploring nature of children facial burns due to thermal flames like candle burns and hot water/liquids do occur thus adult supervisory is needed [15].

The study found periorbital injury to be the most common type of injury as shown in other studies [7,13,16,17]. The eyelids typically bear the majority of burn injury to the face because of reflex closure of the lids on exposure to intense heat. Winking speed and Charles Bell's phenomenon protect the eyeball thus limiting damage due to burns to eyelashes, eyebrows and eyelids [1]. Degree of skin burns correlate with amount of damage to eye, [7,12] where corneal stromal involvement is more with third degree burns with P-value 0.001.

Most of ocular surface injuries will respond better to medical management only. Thus early ophthalmic consultation and institution of treatment is recommended in all patients with thermal facial burns. Because the eyelids are thin and delicate, thermal injury tends to be full thickness, causing contracture, which may result in corneal exposure [5]. Grade 3-4 Roper hall classified injuries might result in persistent epithelial defect, secondary infection causing corneal ulcer, sympblepharon; all these require additional surgical intervention.

Any patient exposed to intense heat, smoke, or fumes without eyelid burns should receive ophthalmic evaluation, as these patients may have unrecognized injuries [14]. Even though initial examination may not be done completely due to above mentioned factors like tense lid edema, painful burns, unstable vitals; frequent follow up would help in treatment plan and timely or early intervention.

Limitation: Visual acuity recording would help in baseline function, any deterioration, monitoring of response. This is not done in this study as most of the patients were inpatient admitted in burns ward. In addition to medical management surgical intervention is indicated in few patients who help in early restoration of ocular surface and visual function. Due to non-availability of resources study limited itself to medical management. The study duration is hort making study population lesser.

CONCLUSION

To conclude, all facial burn patients have to be seen by ophthalmologist to check for ocular involvement which may be overlooked. Adult supervision of children, workplace safety measures for adults to be stressed to prevent such injuries. Owing to protective ocular structures and mechanisms, deeper injuries are uncommon and if it does it occurs with severe morbidity. Frequent follow up emphasised to prevent and treat complications.

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