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Research Paper

A PROSPECTIVE STUDY ON AURICULAR BURNS

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Introduction: The ear is one of the organ that is most commonly involved in thermal burns. As there is absence of subcutaneous tissue in the ears, which makes the cartilage vulnerable to burns leading to chondronecrosis. The study was conducted to document the nature of injury, early detection and management of auricular burns and chondritis. **Methods and Methodology:** It is a prospective study from September 2012 to February 2013, a total of 50 patients with 74 auricles were included in the study. All the ear burns were treated with local antibiotic cream and dressing. The patients who had chondritis were undertaken for surgical intervention. **Results:** A total of 74 auricles were studied. Anterior surface was involved in 60 auricles and 14 auricles had both the surfaces. Chondritis developed in 12 auricles. Total ear loss occurred in 4 cases. **Conclusion:** Auricular burns can lead to chondritis and ear deformity. It is difficult to treat once chondritis sets in. The incidence of chondritis and ear deformity can be reduced by topical application of antibiotics and regular dressing. Once the chondritis develops, surgical management is indicated.

Key words: Auricular burns, Chondritis, Thermal burns, Ear deformity

INTRODUCTION

The ear is one of the organ that is most commonly involved in thermal flame burns associated with facial burns. As there is absence of subcutaneous tissue in the ears, which makes the cartilage vulnerable to the thermal burns leading to chondronecrosis and secondary infection. 52.7% of patients admitted to burns ward sustained burns to one or both ears was reported by Mills *et al* (1998). Bhandari stated that 90% of patients with cervicofacial burns will have ear burns and 30% of ear burns develop chondritis (Bhandari, 1998). Many theories are described

for pathology of post burns chondronecrosis. Prominent theories are cartilage has no intrinsic blood supply, a full-thickness injury of the skin and perichondrium exposes the cartilage with the subsequent risk of chondronecrosis and secondary infection (Dowling *et al.*, 1992). The other theory was that following partial-thickness burn injury, burn oedema results in thrombosis of central vessels. The possibility was that chondritis develops from bacterial invasion through damaged skin (Kamal *et al.*, 2004). Chondritis presents as dull ear pain which rapidly increases in intensity, not relieved by analgesics.

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Auricle will be warm, tender on palpation and increased cephaloconchal angle. Most commonly involved part of ear is helix. Chondritis if not diagnosed and treated early can lead to unwanted cosmetic deformities, hyperpigmentation, hypertrophic scarring, and total loss of the ear. The incidence of complete loss of ear in a series of 100 ear burns was 13% (Goel *et al.*, 1983).

All the auricular burns are treated use of local antiseptic and antibacterial protection in order to exclude any possible source of contamination. If chondritis is set in, surgical management requiring early excision of necrotic tissues and immediate coverage with skin graft or, in deeper and less extensive injuries, with local flaps.

MATERIALS AND METHODS

It is a prospective study from September 2012 to February 2013 a total of 50 patients with 74 auricles was included in the study. The study was conducted at burns ward, MBCC, Victoria hospital, BMCRI, Bangalore. Patients of age group 18-60 years (mean age 30+10 years) with thermal burns less than 30% (10-30%) TBSA with auricular burns were taken into the study. Patients with medical co-morbidity were not included in the study. All the patients were carefully examined and burns degree was assessed. All the ear burns were treated with local antibiotic cream and dressing. The patients who had chondritis were undertaken for surgical intervention.

Bivalve technique. An incision is made along the helical margin and the ear is split in bivalve fashion with all necrotic tissue being removed. A single layer of fine mesh gauze soaked in an antibacterial solution is placed between the skin flaps of the ear to reduce the risk of progressive infection. A light dressing is applied over the ear without pressure, and the fine mesh gauze is

changed daily until healing by secondary intention.

RESULTS

A total of 50 patients with 74 auricles were studied (Table 1). Anterior surface was involved in 60 auricles and 14 auricles had both the surfaces. Average age for patients of auricular burn was 32 years. Flame burns were seen in 39 patients, 8 patients sustained scald burns, and 3 patients had electrical flash burns (Table 2). The degree of burn was as follows: 20 ears (27%) were of superficial partial thickness burn, 46 ears (62.2%) were of deep partial thickness and 8 ears (10.8%) were of full thickness burn (Table 3). Chondritis developed in 12 auricles (Table 4) (Figure 1). The average time of healing was 7 weeks (range 5-8 weeks). The incidence of deformity post chondritis was as follows (Figure 2); complete loss of external ear occurred in 3 auricles. Moderately deformed with more than 50% of the auricle involved where the antihelix, its posterior crura and upper half of the auricle are missing in 4 auricles. Mild deformity with less than 50% of

Table 1: Demographic Data of Patients

Total no of patients with burned ear.	50
No burned auricle.	74
No of auricle involved one side.	60
No of auricle involved both sides.	14
Mean age of patient	32yrs

Table 2: Etiological Agents of Auricular Burns

Agents	Number	Percentage
Flame	39	78
Scalds	8	16
Electrical Flash	3	6
Total	50	100

Table 3: Degrees of Burns Among Auricle

Degree of burns	No	Percentage
Second degree sup	20	27
Second degree deep	46	62.2
Deep	8	10.8
Total	74	100

Figure 1: Post Burn Ear With Chonritis



Figure 2: Deformed Ear Following Chondritis



the auricle involved with loss of helix and upper auricle in 5 auricles (Table 5).

DISCUSSION

The skin of the ear is attached to the perichondrium without any subcutaneous tissue for protection so it is highly vulnerable to the burns. Third degree burns are more common because outer skin of the auricle is thin and densely adherent to the perichondrium. Ear has a unique position on the face which makes it more prone for the thermal burns on anterior side (Mills *et al.*, 1988; Dowling *et al.*, 1983). In our study, all the patients with burns were treated according to the protocol. Burns with less than 30% BSA were taken into the study. Patients with auricular burns were assessed, mupirocin ointment and Vaseline gauze dressing was done. The most common cause of burns in our study was flame burns followed by scald burns and electrical flash burns. 60 auricles had anterior surface burns and 14 auricles had both surface burns. 20 (27%) auricles had superficial partial thickness burns, 46 (62.2) auricles had deep partial thickness burns and 8 (10.8) auricles had full thickness

Table 4: Chondritis Among Auricles

Chondritis	Number	Percentage
Yes	12	16.21
No	62	83.78
Total	74	100

Table 5: Degrees of Auricular Deformity

Deformity	Number	Percentage
Mild	5	41.6
Moderate	4	33.3
Severe	3	25
Total	12	100

burns. The distribution is consistent with studies conducted at other burns institute. The incidence of chondritis following burns is 5-25 % in various studies Mills *et al.*, 1988; Dowling *et al.*, 1983, Skedros *et al.*, 1992).

In literature, many topical antibiotic application have been used for prevention of chondritis (Pickus *et al.*, 2002; Yoo *et al.*, 2000).^{9,10} We used topical mupirocin for dressing the burned auricle. Patient was advised about the avoidance of pressure on the burned auricle. In our study 50 patients with 74 auricular burns, 12 auricles had chondritis. Burns involving both the surfaces developed burns because of involvement of blood supply to the cartilage. The patient with established chondritis had a painful swollen auricle with an obtuse auriculocephalic angle. The pain is severe and throbbing, and the patient is irritable and unable to sleep. It is important to diagnose the chondritis at the early stage because the cartilage involvement will invariably be necrosed and result in partial or total loss of the auricle. Pain and auricle springing sign are the earliest features of the chondritis (Kamal *et al.*, 2004)

Once the chondritis is set in, auricle is surgically (bivalve technique) treated and cartilage is debrided (Yoo *et al.*, 2000).

Auricles without infection did not had any deformity. Out of 12 chondritis auricles 5 (41.6%) auricles had mild deformity with less than 50% of the auricle involved with loss of helix and upper auricle. 4 (33.3%) auricles had moderate deformity with more than 50% of the auricle involved where the antihelix, its posterior crura and upper half of the auricle are missing. 3(25%) auricles with complete loss of external ear. The results of our study are comparable with other

studies (Kamal *et al.*, 2004; Skedros *et al.*, 1992; Bentrem *et al.*, 1996; Purdue and Hunt, 1986).

CONCLUSION

Auricular burns most commonly seen following flame burns. It can lead to chondritis and ear deformity. Auricular burns difficult to treat once chondritis sets in. The incidence of chondritis and ear deformity can be reduced by avoidance of pressure, topical application of antibiotics, and regular dressing. The diagnosis of chondritis should be done early by the ear springing sign. Once the chondritis develops and surgical management is indicated.

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