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A study of unusual burns at a tertiary burn unit: a prospective study

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ABSTRACT

Background: Unusual burns are not uncommon. They occur in the industrial as well as the domestic side. These are mainly burns due to chemicals, tar, fire walk and lightning burns. These burns occur as a result of improper handling of chemicals with poor safety measures or due to accidents. Here, we discuss about these burns, their epidemiology with treatment and preventive measures.

Methods: The study was conducted at a tertiary care burn centre for a period of two years from Jan 2009 to Jan 2011. Forty-four patients with unusual burns were admitted and evaluated with a thorough history and clinical examination. Initial resuscitation was done followed by specific therapy in each of the cases.

Results: The forty-four patients with unusual burns were categorized into chemical burns, lightning burns, tar burn, camphor burns, fire walk burns and miscellaneous types. These burns mostly involved adult males and were generally due to domestic reasons. 93% were due to accidents of which most of them were of the miscellaneous type (83%).

Conclusions: Unusual burns are an important to know as these are occurring with regular frequency in the present days. These burns are usually accidental occurring in industries and in household setups. Proper education and safety measures could reduce the incidence of these unusual burns.

Keywords: Camphor, Chemical, Fire walk, Lightning, Tar, Unusual burns

INTRODUCTION

Apart from usual mode of burn injury caused by flame and electricity, there is another group of burn injury that lack specific guidelines in acute care and in chronic burn wound care. These burns do not occur very commonly when compared to flame and electrical burns. They are chemical burns, lightning burns, tar burns and other unusual modes of burn injury like camphor burn, fire walk burns, mobile phone burns, etc.

Chemical burns are common in our society both in the domestic and in the industrial set up. In the domestic side, it is mainly due to lack of knowledge about chemical used for household purposes and poor handling. In industrial setup it is mainly due to negligence of appropriate safety measures by workers and failure to provide essential safety gears to workers by the industry management. Lightning burns are not uncommon, both in urban and rural population. Tar burns, common in road laying workers, is yet another injury caused by negligence of safety measures. Unusual burns like camphor burns, burns due to fire walk which are peculiar to our society is because of religious belief and are an act of penance for their mistake.

This study is mainly focused on management of unusual pattern of burns that are admitted in our unit and to chart out effective guidelines for their management in our setup.

Objective of the present study are uncommon pattern of burns admitted in our department, to define factors contributing to morbidity and mortality, to analyse treatment and outcome and to discuss prevention and precautionary measures.

METHODS

A prospective study of patients admitted to Department of Burns, Plastic and Reconstructive Surgery, Kilpauk Medical College and Hospital from January 2009 to January 2011 presenting with unusual pattern of burns like chemical burns, tar burns, lightning burns, camphor burns, burns due to fire walk and uncommon mode of burns was done. On admission, a thorough evaluation was done which included history and clinical examination. Assessment of total burnt surface area, pattern of distribution and depth of burns was done using Lund and Browder Chart. Fluid resuscitation with crystalloid solution was done using the formula 3mlxTBSA % x weight of patient in kilogram per 24 hours. Patient was catheterized, and vitals were monitored.

Following initial resuscitation burn wound care was done which included washing the wound with saline or any appropriate agent followed by collagen application or open or closed dressing. Antibiotic was started on basis of the antibiotic policy of department for that month. All routine investigations done immediately on admission and repeated on 3rd and thereafter every week.

Wound culture was taken on 3rd day routinely from wound. Blood culture was taken if there was a clinical indication of sepsis. Nutritional requirement of the patient was calculated on daily basis by nutritional therapist and adequate nutrition maintained. Oral feeds are encouraged, but for patients with severe facial burns nasogastric tube feeding was done. Total parenteral feeding was given to patients if required. Packed cell and fresh frozen plasma were given to indicated patients. Antibiotics were changed based on culture reports. Depending on degree of depth of burns, surgical interventions in the form of debridement, escharotomy, escharotomy, early excision and skin grafting was done. For prevention of deformities, rehabilitation was started on admission in the form of positioning, splintage followed by physiotherapy and pressure garments.

RESULTS

During the study period from January 2009 to January 2011, 44 cases with unusual pattern of burns were admitted in our unit. Patients were categorized into chemical burns, lightning burns, tar burns, camphor burns, burns due to fire walk and miscellaneous types. Miscellaneous unusual burns topped with 19 cases, followed by 12 patients of chemical burns, 4 cases of fire walk burns, and burns due to lightning, tar and camphor were 3 cases each (Figure 1).

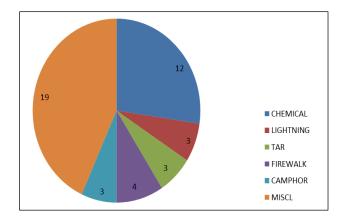


Figure 1: Types of unusual burns.

Male cases predominated with 31 against 13 female cases (Figure 2).

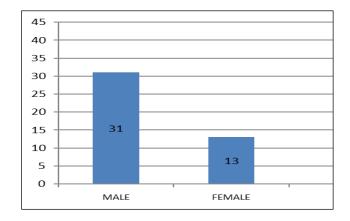


Figure 2: Sex distribution.

Among these 44 cases, 40 were adult and only 4 cases were paediatric (Figure 3).

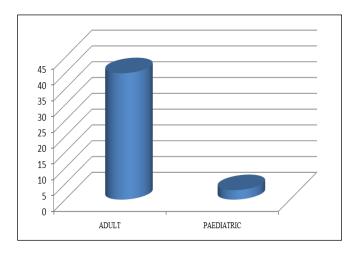


Figure 3: Adult Paediatric Ratio.

Patients were also analyzed on basis of type of accident, whether domestic type or associated with their occupation. On analysis of the type of accident, 27 patients were due to domestic reasons while 17 patients

sustained unusual pattern of burns due to their occupation (Figure 4).

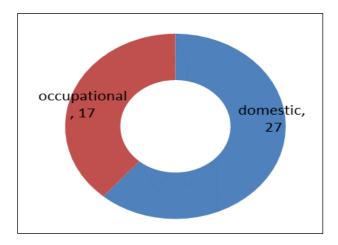


Figure 4: Occupational Domestic Ratio.

Patients were also analyzed for the mode of injury as accidental, suicidal, homicidal. Regarding the mode of injury, out of a total of 44 cases, 41 were accidental burns, two were due homicidal attack and only one was suicidal burns (Figure 5).

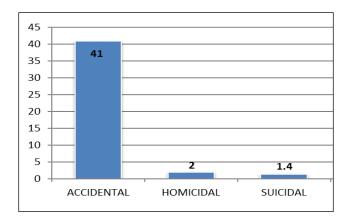


Figure 5: Accidental, homicidal and suicidal ratio.

Out of 44 patients, 28 patients have sustained burns below 20% only (Figure 6).

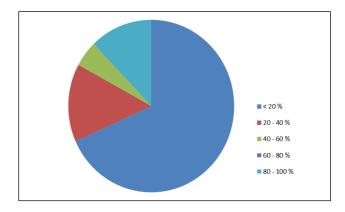


Figure 6: Total body surface area burned.

These figures suggest that these uncommon burns are mostly non-fatal in nature and are mostly due to negligence of safety measures.

Chemical burns

Around twelve patients were admitted with chemical burn injury during the study period, comprising of nine male and two female patients. All the cases were adults, with ten patients due domestic type of injury and two cases with chemical injuries associated with their occupation. Nine patients were due accidental injury, two cases of homicidal attack and one case of suicidal burns. Common agents were Lysol (Figure 7) and hydrochloric acid used for toilet cleaning in case of domestic and accidental type of burns.



Figure 7: Lysol Burns (A) before treatment (B) after treatment.

In the two cases of occupational chemical burns, one was due to spillage of sodium hydroxide in pharmacy factory and the other was due spillage of nitric acid from a drum in a gold factory (Figure 8).



Figure 8: Nitric acid burns involving both lower limbs.

In two homicidal cases, one was due to nitric acid attack and another with an unknown agent. One suicidal attempt was done with lysol. There was no case of acid ingestion during the study period. On analyzing the distribution pattern commonly face, trunk and upper limbs were involved.

In one case of industrial accident, both the lower limbs were only involved. On admission, patients were treated according to standard protocol of large volume lavage and then treated based on the degree of depth of injury. Three patients with superficial burns were treated by collagen application. Early excision and split skin grafting was done for four patients, two of them were victims of vitriolage, one due to industrial accident and other was an interesting case where the patient tried to remove the tattoo in his arm using the household acid and sustained deep dermal burns. Four patients with deep burns were treated by closed dressing alone.

On morbidity grounds, one patient had severe ophthalmic injury, there was no vision loss but suffered severe upper eyelid injury for which skin grafting was done. In one patient below elbow amputation was done as he presented with gangrene of hand and lower third of forearm to our department five days after chemical burns. There was no mortality.

Tar burns



Figure 9: Tar burns involving (A) palmar and (B) dorsum of right hand.

Patients presented with tar burns were only three among the total of 44 patients in the study. All the patients were male, road laying workers injured at the workplace. Two patients sustained injury to lower limb only and in the third patient, both the upper and lower limbs were involved as he fell into molten tar (Figure 9).

Degree of burn injury was between deep dermal to full thickness burns. In all cases tar was solid and was stuck well to skin of the lower limb (Figure 10), when they were brought to the department. Saline wash given and no attempt to remove tar was made.

Silver sulphadiazine ointment was applied over the tar and closed dressing done. Dressing was changed every 6 hours and tar was allowed to peel spontaneously. In all patient's wounds healed with conservative management.



Figure 10: Hot tar burns involving both feet of a road laying worker.

Lightning burns

Three cases presented to the department with lightning injury during the study period. Two patients were females and one was male. All of them were outdoor at the time of injury. Two patients sustained lightning injury due to direct strike; clothes caught fire in one patient and sustained burns (Figure 11).



Figure 11: Lightning burns in a young adult female.

The third patient sustained injury due to flash discharge lightning as she was standing beneath a tree (Figure 12).



Figure 12: Lightning burns of the scalp.

All were of partial thickness burns. In two cases the distribution pattern was involving face and trunk and in third, the injury involved only lower limbs. All were

treated conservatively by collagen application and wound settled well. Female patient developed right lower limb weakness after two months.

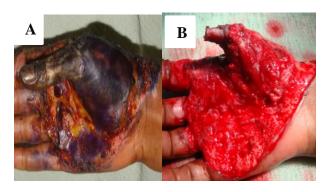
Camphor burns

Three patients were admitted with camphor burns, one male and two females. Two patients lit camphor for religious ritual and the other patient as an act of penance for her mistake. In all the cases injury was involving right hand (Figure 13).



Figure 13: Camphor burns of the right palm in a female due to religious practice.

All the patients were treated outside and referred to us after a week. In the male patient, the injury was deep dermal involving center of palm, treated by debridement and split skin graft.



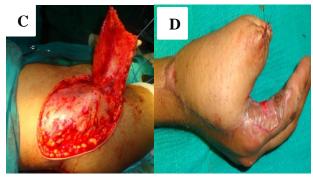


Figure 14: (A) Gangrene of right thumb following camphor burn, (B) Picture after debridement, (C) Groin flap raised and (D) After 6 weeks postoperation.

Both female patients had gangrene of digits. One patient lost her digits partially, index and middle fingers disarticulated at proximal interphalangeal joint, ring and little disarticulated at distal interphalangeal joint, palm debrided and covered with a split skin graft.

Another female patient presented with deep burns of the palm with gangrene of the thumb (Figure 14A). Amputation of thumb done through the proximal phalanx, preserving the metacarpophalangeal joint (Figure 14B). Groin flap cover given for the thumb stump and split skin graft for palm (Figure 14C, 14D). Later, ulnar bone graft was used to lengthen the stump.

Fire walk burns

Three female cases and one male case of fire walk burns were admitted during the study period. Among them, one was 12 years old girl with injury to face. Two female patients sustained injury to foot only (one patient involving both dorsum and sole, other only sole of foot) and they came to our unit three days after injury (Figure 15).



Figure 15: Fire walk burns in a 54 year old female involving both the plantar aspects.

Degree of injury in both patients were deep dermal. Both were treated conservatively with closed dressing and the wound healed well. Later, the patient with wound in dorsum of foot developed hypertrophic scar, treated by excision and grafting. The 12-year-old girl was treated outside and referred to us after three months with hypertrophic scar of face. Hypertrophic scar was excised, and wound was skin grafted. The male patient had 30% TBSA injury involving upper and lower limb of mixed degree of injury. Early excision and skin grafting was done.

Miscellaneous types

Pattern of burns which occur very rarely, and which is of totally different nature were included in this category. Miscellaneous unusual burn category had nineteen patients during the study, including both male and female, adult and paediatric, domestic and occupational groups. A seven-year-old girl sustained scalds of lips and oral cavity due to consumption of hot oil kept in a tumbler by her mother, treated conservatively with antibiotics and anti-edema measures.

Two female children sustained flame burns following burst of deodorant can which was thrown inside the flame. Degree of burn was superficial, treated with collagen application and wound healed well in both patients. A young male was admitted for burns due to electrical burns from a mobile phone. The patient was using the mobile phone while it was charging until it got short circuited, sustained an electrical shock and fell down with mobile phone instrument over his chest. Mobile phone caused second degree deep burns (Figure 16). Wound was debrided and covered with SSG.



Figure 16: Mobile phone burns involving the chest and left palm.

Mass burns involving seven adult males following blast in steel factory, sustained thermal injury due to spillover of hot molten steel. Five patients sustained 100% deep burns and died within 24 hrs of burns. Another patient had 50% deep burns involving face, trunk and upper limbs, died on day two. One patient had 27% second degree superficial burns, treated with collagen application and discharged. A young male following road traffic accident (RTA) with both legs got caught between the crumpled vehicle parts and sustained deep scalds to both his feet due to spill of hot radiator water. He had no other injury due to RTA. Burn wound initially treated with closed dressing, was debrided later and covered with SSG.

Other cases were of two patients, father and son with burns due welding flame, another with burns due to molten plastic, flame burns following seizures, burns due to mosquito coil while sleeping and an unusual cracker burn. All the above patients had only superficial burns, treated conservatively with collagen, closed dressing and discharged. On analysis of 44 patients during the study, 90% were adult, only 10% were paediatric, 70% male and 30% female, 61% due to domestic injury and 39% due to occupational associated injuries. In individual category, miscellaneous accounts for about 44%, chemical 27%, other types of about 9 % each.

Mortality was 12% out of 44 patients due to industrial accident and morbidity was 9%. Morbidity was based on disability caused, due to loss of digits in case of camphor burns, below elbow amputation in chemical burns. Another patient with prolonged hospital stay for three months following chemical burn to his legs and he

required multiple sitting of SSG for wound cover. Out of the 44 patients, 93% were due to accidental injuries mainly following human error.

DISCUSSION

Chemical burns

All burn wounds whether thermal or chemical in nature cause denaturation of proteins in the skin. Chemicals acts upon the three-hydrogen bond structure of protein in the skin and render it ineffective. In addition, chemical acts in a systemic way and produces metabolic toxity.^{1,2} Severity of chemical injury depends on concentration of the agent, quantity of the agent, duration of contact of the agent with the skin, penetration capacity of the agent and mechanism of action. Traditionally chemical burn injury is classified as acid burns or alkali burns. Acid produces coagulation necrosis with of the proteins. Ability of the acid to cause injury is predicted by amount of neutralizing agent required to correct pH of acid to neutral.²⁻⁴

Contrary to the belief, alkali causes more injury than acids, because acid produces liquefaction necrosis allowing it to penetrate deeper into the tissues. Organic solution causes destruction of lipid membranes of cell walls leading to disruption of cellular architecture. Inorganic solutions remain on the exterior of cell, but act as a vehicle to carry toxic agents that denature proteins.² Chemical burn injuries are also classified into six groups based on the mechanism of tissue destruction. They are Reducing agents, Oxidizing agents, Corrosive agents, Protoplasmic poisons, Vesicants and Desiccants.

Reducing agents act by binding free electrons in the tissue proteins like hydrochloric acid, nitric acid and alkyl mercuric agents. Oxidizing agents like sodium hypochlorite, potassium permanganate and chromic acid are oxidized on contact with tissue proteins. The toxic byproducts continue to react with surrounding tissue causing damage. Corrosive agents denature proteins on contact. Eschar formation and shallow ulcer represent their injury. Examples include phenols, cresols, lyes, sodium metals and white phosphorus.

Protoplasmic poisons like acetic acid, formic acid, oxalic acid and hydrochloric acid, bind or inhibit calcium and other organic ions necessary for tissue viability and function. Vesicants produce ischemia with anoxic necrosis at the contact site like dimethyl sulfoxide (DMSO), mustard gas and lewisite. Desiccants like sulphuric acid, muriatic acid or concentrated hydrochloric acid cause damage by dehydrating tissue and produce exothermic reaction to release heat into the tissue.³⁻⁶ The treatment is removing the inciting agent from contact with the patient. Copious irrigation with water-lavage with water to dilute the agent in contact with the skin and to prevent additional agent from being exposed to skin, for a period of 30 min to 2 hrs may be necessary. Usage

of neutralizing agents strongly discouraged as they produce exothermic reaction that liberate large amount of heat causing further thermal damage in addition to the existing chemical injury. No agent has been found to be more effective than plain water for irrigation. Monitoring of the urine output as an assessment of adequacy of end organ perfusion is mandatory. Large volume lavage might put the patient at potential risk for hypothermia which should be closely watched. Copious irrigation of eyes with water and immediate ophthalmology opinion for further management for ophthalmic injury. 5.6

Lightning burns

The power of lightning has been a subject of awe since primitive times. Ancient Greeks saw it as an expression of the wrath of god Zeus. Lightning is a natural atmospheric electrical discharge that occurs between regions of net positive and net negative electric charges. A cloud-to-ground lightning strike is the most destructive form of lightning and occurs when the electrical difference between a thunder cloud and the ground overcomes the insulating properties of the surrounding air. Worldwide, lightning causes serious injuries in 1000-1500 individuals every year. Persons struck are typically males aged 15-44 years.⁷

Lightning causes death in 30% of its victims and permanent sequelae in up to 70% of survivors. Factors that appear related to a fatal outcome are leg burns, head burns, and immediate cardiopulmonary arrest. The power of lightning is an estimated 10,000-200,000 amperes (A) of current and 20 million to 1 billion volts. There are two types of lightning namely streak lightning which is the flash of lightning from cloud to ground and is the most frequent type of lightning and accounts for human injuries. Sheet lightning travels within a cloud and gives the cloud the appearance of a white sheet. There are five mechanisms of injury: Direct strike, Flash discharge (splash), Contact, Ground current (step voltage), and Blunt trauma.

Direct strikes occur when the victims are outside and, often, carrying metal objects, such as an umbrella. Although not always fatal, direct strikes are associated with high morbidity because they frequently involve the head. Lightning strikes near the head may enter the eyes, ears, and mouth to cause multiple problems. Flash discharge - More commonly, the victim is struck by a flash discharge from another struck object. This type of "splash" injury occurs, for example, when someone seeks shelter beneath a tree that subsequently is struck by lightning. Because the resistance to direct current flow in the air between the tree and victim is less than that to direct current flow in the tree, and lightning seeks the path of least resistance, it will jump from the tree to the victim. Splash injury also occurs from person to person when several people are standing close together. Contact injury occurs when a person is touching an object that is either directly hit or splashed by lightning.

Lightning also can result in harmful ground current that causes mass casualties in fields or other open areas. Severity of ground current injuries decreases with distance from the point of the lightning strike. Ground is a good insulator, while a person is a good conductor; therefore, a person standing with his feet spread may create a potential difference large enough to create a circuit between the legs and ground. This method of injury, account for the high mortality (30%) of lightning victims with leg burns. Blunt trauma occurs when a person is thrown by a massive opisthotonic contraction caused by the lightning strike. ^{8,9}

Severity of injury are of three types: mild, moderate and severe lightning injury. In mild lightning injury, the persons struck often report loss of consciousness, amnesia, confusion, tingling, and numerous other nonspecific symptoms. Burns are invariably rare and mostly superficial and have little or no deep-tissue damaging effects. Moderate lightning injury may cause seizures, respiratory arrest, or cardiac standstill, which spontaneously resolves with resumption of normal cardiac activity. Superficial burns are much more common, both initially and in a delayed fashion. These patients may have lifelong symptoms of irritability, sleep disorders, and paresthesias. Severe lightning injury usually present with cardiopulmonary arrest. Survival is rare in this group unless a bystander expeditiously begins CPR.

Although rare, serious lightning injuries are likely to primarily cause cardiac and neurologic injury. Otologic injury and cutaneous burns have also been noted as frequent sequelae of these events. Cataract formation resulting from lightning injury typically occurs within days to weeks of injury. This complication has been reported as late as 2 years afterward but commonly occurs within the first week. Cardiopulmonary complications include electrocardiographic changes, myocardial injury, dysrhythmia, transient asystole, atrial and ventricular fibrillations.

Neurologic complications are loss of consciousness, hemiplegia, paraplegia, confusion, quadriplegia, retrograde amnesia, aphasia, coma and seizures. Dermatologic complications include cutaneous burns. Ophthalmic complications are cataracts, corneal lesions, vitreous hemorrhage, retinal detachment and optic nerve injury. Otologic complications include ruptured tympanic membrane and temporary hearing loss. Intra-abdominal complications present with gastric perforation.¹⁰ Indications of lightning injury noted on physical examination include cold, pulseless extremities which are a sign of vasomotor instability, confusion, amnesia, paralysis, and loss of consciousness are a result of the direct passage of current through the brain, temporary hearing loss is caused by the shock wave created by the accompanying thunder, hypotension most likely signals intra-abdominal or thoracic hemorrhage, fractured pelvis, extremity fractures, rupture of internal organs, or spinal cord injuries, prolonged paresis or paralysis of the extremities indicates possible spinal cord injuries. Fixed and dilated pupils are typically a result of transient autonomic disturbances and not serious head injuries. Lichtenberg figures, also known as fern pattern, may be noted in the skin of lightning strike victims.⁸⁻¹⁰

Tar burns

Tar or asphalt, a residue of petroleum refining, is a dark brown or black, solid or semisolid cementitious material. It is composed of paraffinic and aromatic hydrocarbons and heterocyclic compounds containing sulphur, nitrogen and oxygen. When heated to 93 deg C, it becomes a liquid. In liquid form, it is used in paving roads and in the commercial roofing industry. However, paving roads requires tar temperatures from 275-300°F, while roofing demands higher tar temperatures of 450-500°F.

At this temperature hot liquified tar that contacts skin produces deep burns. Burns from hot tar are a challenging clinical problem, but two thirds of these burns involve only 3% to 5% of the body surface, and only one third involve 10% or greater. Mechanisms of injury include cauldron explosion, falling from buildings, trucks rolling over, pipe explosion, spillage from buckets, and industrial accidents. Hot molten tar that contacts skin transfers heat to cause burn injury. Tar then cools and solidifies on the skin surface, making removal difficult. 11-13 When hot tar contacts skin, it rapidly cools and solidifies. It is important to facilitate this cooling process by adding cold water to the tar at the scene of the accident. Cooling tar with cold water limits the amount of tissue damage and prevents the spread of tar. Tar should be continually washed with water until it has cooled and hardened. If the injured person has tar in eyes, flush with cool, clean, lowpressure water. All eye injuries should be evaluated by a physician as soon as possible. Do not remove adherent tar at the scene of the accident. Using gasoline to remove tar should be discouraged. Shift the patient to nearby hospital.12

In the casualty, definitive care of tar burn injury involves early removal of tar. Once the tar is firm, it should be picked, peeled, and debrided from the underlying tissue. Tar that is part of an obvious burn, blister, or tissue loss should be removed. Tar on the conjunctiva should be removed by an ophthalmologist. Polymicrobial antibiotic ointment, petroleum jelly, or mineral oil, application can facilitate tar removal. Broad-spectrum antibiotic ointments such as bacitracin (400 U/g), polymyxin B (5000 U/g), and neomycin (5 mg/g) also lower the incidence of infection. The process of tar removal usually takes 12-48 hours. Antibiotic ointment has been used successfully to remove even tar layered over corneas and conjunctivas. Liquid organic solvents such as kerosene, gasoline, acetone and alcohol have been found to be generally ineffective in removing tar and can damage the local tissues and occasionally produce systemic toxic effects from absorption and hence must not be used.

Common household agents, such as mayonnaise, butter, sunflower seed oil, and baby oil, have been used to remove tar, but they carry the risk of promoting wound infection or allergic reaction. ^{13,14} Bacterial or fungal growth can occur if the tar is not completely removed and the organic agent is not completely rinsed off.

Camphor and fire walk burns

Camphor is a waxy, white or transparent solid with a strong, aromatic odour. It is found in wood of the camphor laurel (Cinnamomum camphora), a large evergreen tree found in Asia particularly in Borneo and Taiwan. The chemical formula is $C_{10}H_{16}O$. Its physical properties are a colourless to white stable solid with a pronounced and characteristic smell having a specific gravity of 0.99 with a melting point of 177°C and boiling point of 204°C. This material readily sublimes (that is, turns directly from solid into vapour). Camphor is harmful if you swallow it.

Camphor burns readily, so must be kept away from flames. Once it starts to burn, vapour is generated very rapidly and burning is vigorous. Among the Indian communities, especially those who originate from South India, particularly the Hindu community, there is a practice of presenting their requests or as an act of penance for their mistakes before their gods, the devotees place 'camphor' on their palms and set it on fire. These burns usually result in full thickness burn in the palm. 15 Another type of rare and unusual pattern of burn in south Indian Hindu community is fire walk. Same as camphor burns the devotees as a request or an act penance walk over the red-hot coal or red-hot firewood in temple festivals and sustain thermal burns to the sole of the foot. Injury ranges from partial thickness to full thickness burns. Principles of treatment of both camphor burns wound and burns due to fire walk are same as thermal burns, requiring debridement and split skin grafting of the wound as most of them are deep dermal and full thickness burns. Very few wounds heal by conservative management.16,17

Miscellaneous Types

Burns due to epilepsy are also known to occur. They generally occur as they forget to take the anti-epileptic medication. They have seizures which can be dangerous when the person is cooking or in the industrial region like a metal factory. These burns are usually full-thickness and have to be treated vigorously. Another rare cause of burns is due to explosion of mobile phone, especially during charging. They usually cause burns of the hand and face, and of the partial thickness type. They heal well conservative treatment. 20,21

CONCLUSION

In domestic side awareness about the chemical agents used in households, safety storage of chemical agents,

particularly out of reach to children should be stressed. Chemical agents should not be stored at higher place where there is more chance of injury while taking it from a height, since most of the patients in the study sustained injury particularly to face due to the above-mentioned factor. Product manufacturer should provide pamphlet giving information regarding handling, safety measures and first aid measures. In the industrial side, workers should be provided with safety gadgets and awareness of potential risk if they don't use those devices. Company should adhere to strict regulations by the routine inspection and appointing a dedicated officer for safety measures monitoring. Workers should be made aware of nature of chemicals they are dealing with and should be educated regarding the first aid measures.

All the industry dealing with chemicals and other risk associated work should have a in house hospital equipped with doctor and paramedics to handle first aid and emergency procedures. Company should have a wellequipped ambulance for safe and quick transport of the victim to nearby burns unit. Burn unit should have a standard protocol for treatment to avoid mismanagement. Lightning burns is very much preventable. One should avoid outdoor activities during heavy rain and should avoid standing beneath the tree. Public initiatives like creating awareness through media like television, radios, internet campaign, pamphlets, school programs. This can be done by government as well as private sector in both urban and rural sides at various levels. Prevention is better than cure is very apt for burns victims and precious life can be saved if it is followed and can contribute to the growth of the family and society.

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