

 <p>ISSN NO. 2320-5407</p>	<p>Journal Homepage: -www.journalijar.com</p> <p>INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)</p> <p>Article DOI:10.21474/IJAR01/5592 DOI URL: http://dx.doi.org/10.21474/IJAR01/5592</p>	
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RESEARCH ARTICLE

BURNS IN EPILEPTICS: TEN YEARS EXPERIENCE AT A TERTIARY CARE HOSPITAL.

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Manuscript Info

Abstract

Manuscript History

Received: 11 August 2017
Final Accepted: 13 September 2017
Published: October 2017

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Introduction:-

Epilepsy is characterized by repeated unprovoked seizures and are due to abnormal excessive transitory electrical discharges by nerve cells (1). These patients have an increased risk of accidents and injuries when compared to the general population (2-3). Trauma, burns, cuts, and fractures are among the most frequent injuries. The most common site of injury in patients with epilepsy is the head (4). The risk associated with this is an important factor in managing such patients (5). Epileptic patients pose a threat to themselves and to others during the peri-ictal period (6, 7). The attack of epilepsy comes without any warning signs, leading to loss of consciousness, therefore the relationship between epilepsy and burn injury is obvious, especially if the attack takes place in the vicinity of burn agents. It is important to identify this high risk group of patients and provide them with specific treatment. Such burn patients must be treated in collaboration with a neurologist to provide targeted antiepileptic treatment and develop prevention strategies.

In this series we studied 454 patients with epilepsy, who sustained burn injuries. The type of epileptic disorder, type of burn injury sustained, burn severity, site involved, morbidities, operative procedures conducted, and measures to prevent or reduce the frequency and morbidity of such injuries in epileptic patients were evaluated.

Material and Methods:-

The study period was from March 2007 to Feb 2017. Only those patients who sustained burns as a result of an epileptic seizure were included. The study included 454 patients who sustained burn injuries, accounting for about 5% of total burn admissions. Patient records were retrospectively analysed, history related to burn injury and type of seizures was obtained from admission record files, and size (TBSA), distribution and burn depth were determined by using the Lund and Browder chart.

Results:-

A total of 9069 patients were admitted with burns during the study period. Four hundred and fifty four patients were admitted with burn injuries as a result of epileptic seizure, corresponding to 5.006% of the total admitted patients. Out of these 320 patients (70.5%) were females and 134 patients (29.5%) were males (Male: Female ratio was 1:2.3).

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The age of the patients ranged from 15 to 55 years and median age was 25 years. The hospital stay ranged from 10 to 30 days and median duration of hospital was 3 weeks. Three hundred and forty five patients (75.99%) were aware of their epilepsy prior to burn injury but only eighty five patients (24.6%) were on antiepileptic treatment (Table 1).

Table 1:- Patient profile

Patients with epileptic burns	454
Sex ratio(male: female)	1: 2.3
Median age	25 year
Median duration of epilepsy	10 years
Median hospital stay	3 weeks
No of patients on treatment for epilepsy	85

Most of the patients (200) sustained burn injury due to contact with kangri (44.05%) local fire pot used to provide warmth to the body during winter months, and majority of female patients (40.81%) had a burn injury while cooking when they had a seizure attack and fell on fire (chulla). Forty patients sustained burns due to contact with hot liquids, twenty three patients sustained burns due to contact with heat convector, seventeen patients had burns due to electric blanket, twenty nine patients had a burn due to gas bukhari, twenty patients had burn due to coal bukhari and ten of our patients had burns due to contact with hot water bottle (Table 2).

Table 2:- Etiology

Etiology	No of patients	Percentage
Kangri	200	44.05%
Chulla (flame)	115	25.33 %
Scald	40	8.82 %
Gas bukhari	29	6.38%
Heat convector	23	5.07%
Coal bukhari	20	4.40%
Electric blanket	17	3.75%
Hot water bottle	10	2.20 %
Total	454	100 %

Seventy six patients sustained burn injuries involving head and neck, forty five involving trunk, one hundred ninety eight involving hand, sixty involving upper limb (excluding hand), thirty five involving lower limb (excluding foot), and forty patients had burns involving feet (Table 3).

Table 3:-Anatomic Area Involved

Site	No of patients	Percentage
Head and Neck	76	16.75 %
Trunk	45	9.91 %
Hand	198	43.61 %
Upper Limb	60	13.21 %
Lower limb	35	7.71 %
Feet	40	8.81%
Total	454	100 %

Sixty nine patients developed superficial partial thickness burns, one hundred sixty five patients sustained full thickness burns, one hundred and thirty patients had deep dermal burns, and there were mixed burns in ninety (Table 4).

Table 4:- Burn Depth

Depth of burn	No of patients	Percentage
Superficial partial thickness	69	15.20 %
Deep dermal	130	28.64%
Full thickness	165	36.34%
Mixed	90	19.82%
Total	454	100 %

In three hundred and sixty one patients, TBSA involved was less than 20% while as in ninety three patients more than 20% of TBSA was involved (Table 5).

Table 5:-TBSA Involved

TBSA	No of patients	Percentage
<20%	361	79.52%
>20%	93	20.48%
Total	454	100%

In one hundred and Forty five patients burn wounds were excised and covered with graft (STSG), in eighty seven patients burn wounds were debrided and covered by STSG. Seventy patients required amputation of gangrenous digits in hand, thirty seven patients required amputation of gangrenous toes, in twenty eight patients VAC was applied to the burn wound then STSG was done and in eighteen patients flaps were used to cover the wound. The amputation stumps healed spontaneously with dressings in forty five patients (11.68%), STSG was done in thirty seven patients (9.61%) and primarily closed in twenty five patients (6.50%) Table 6.

Table 6:-Surgical Procedures Performed

Procedure	No of patients	Percentage
Burn wound excision and grafting(STSG)	145	37.66%
Wound debridement followed by STSG	87	22.60%
Amputations of digits	70	18.18 %
Amputation of toes	37	9.61 %
VAC application followed by STSG	28	7.27%
Excision with flap cover	18	4.68 %
Total	385	100 %

The commonest complications observed were partial graft loss in seventy one patients (18.44%), wound infection in fifty two patients (13.50%), and partial flap dehiscence in four patients (1.03%). In fifty one patients there was minor graft loss (10%) and in twenty one patients there was major graft lost (10 to 20%). In patients with minor graft loss (<10%), the residual raw areas healed spontaneously with regular dressings. Patients with major graft loss (10 to 20%) required another sitting of grafting for complete healing of burn wounds. Rest of patients who developed infection and dehiscence of flaps were managed conservatively and successfully by regular dressings and antibiotics. All patients were evaluated by neurologist. Baseline EEG was done in 378 patients, CT/MRI brain was done as advised by neurologist. All patients were put on antiepileptic drugs. Three hundred and twenty patients (70.48%) were diagnosed as generalized tonic clonic seizure, ninety two patients (20.27%) had absence seizures and forty two patients (9.25%) were having complex partial seizures (Table 7).

Table 7:-Type Of Epilepsy

Type	No of patients	Percentage
Generalized tonic clonic	320	70.48%
Absence seizure	92	20.27%
Complex partial seizure	42	9.25%
Total	454	100%

Discussion:-

Burns are serious but under recognized complications of epilepsy. The most commonly associated seizure type are, generalized tonic clonic followed by absence and complex partial seizures. In a retrospective study Jang Young Chul et al (8) concluded that; females were commonly affected, there were more seizures in morning hours and epileptic patients should be classified as high risk group. In our study similar results were seen as GTCS was common seizure type (70.48%) followed by Absence seizures (20.27%) and 9.25% patients had complex partial seizures.

Epileptic patients may sustain severe burn injuries during the acute episodes. These patients must be identified, provided with specific treatment, and educated to prevent an unpredictable attack that may lead to burn injuries. It is important for patients and those treating them to realise that because of the impaired conscious level, the skin is exposed to the burning agent for longer time, resulting in usually a deep burn than would occur in a conscious

patient. Therefore, referral to a burns unit should be considered earlier when treating such patients. Severe burns as a result of epileptic seizures requiring surgical interventions are published by authors who treat such patients (7, 9, 10). These studies correspond to our results showing deep burns in 385 out of 454 patients (84.80%) as compared to burn injuries in non-epileptic patients, where the percentage is usually lower.

Epilepsy is three times more likely to be associated with burns; with woman being five times more likely to be burned as revealed by Ansari et al (11). In our study group, more female (70.5%) than male subjects (29.5%) were burnt with a ratio 1:2.3. Majority of female patients (35.93%) had a burn injury while cooking they had seizure attack and fell on fire (chulla). This is probably because women tend to do more domestic work than men. Similar observations have been made by others (12, 13). These results also reflect that our society is still gender biased, females are not being given the same level of care as compared to other sex. So programs like BETI BACHOV, BETI PADAV (save girl child and educate the girl child) could make a significant difference in reducing the morbidity and mortality of epileptic female patients.

Most of the patients in our study (44.05%) sustained burn injury due to contact with kangri (n: 200). Similar observations have been made by Meirelles et al. (14) who noticed that a large number of patients had visual contact with the flame prior to the accident, suggesting that fire could be a photo stimulator for the onset of seizure attack. The risk factors for the increased incidence of burns in epileptic patients are the duration of the epileptic episode, the frequency of seizure attack (15, 16). Napoli et al. concluded that burning agents are important predisposing factor for seizures in epileptic burn patients; the burn agent emits light stimuli that trigger the onset of epileptic seizures (17).

In our series, all of the patients with deep burns required operative interventions. In two hundred sixty patients burn wounds were excised/debrided and covered with graft, seventy patients required amputation of gangrenous digits in hand, thirty seven patients required amputation of gangrenous toes, and in eighteen patients flaps were used to cover the wound. Pedicled groin flap was used in twelve patients, reverse sural artery flap in four patients, and reverse radial forearm flap in two patients. Most of our patients (84.80%) had deep burns and required operative intervention in the form of grafting, flap cover and amputation of gangrenous digits, this is because most of our patients had burns due to kangri, chulla or contact with a heat convector or a bukhari. Kangri is a fire pot filled with burning charcoal and used to provide warmth to body in winter months. During seizure episode patient loses consciousness and hands come in contact with kangri resulting in a deep burn and even gangrene of digits.

Most of patients admitted to our burn unit with epileptic burns where not receiving antiepileptic treatment continuously and thus treatment interruption resulted in recurrence of seizure and subsequent burn injury. Similar observations have been made in Saudi Arabia (18). Majority of patients did not seek any medical treatment for their seizures, rest of them took medication for some period of time and once the seizures got controlled they quit it. Similar non compliance issues have been reported by Manktelow (19). In our study three hundred and forty five patients (75.99%) were aware of their epilepsy prior to burn injury but only eighty five patients (24.6%) were on antiepileptic treatment. The reasons for noncompliance are low socioeconomic status, patients living in rural areas are less health conscious, lack of education and lack of awareness programs. Some of our patients did not take drugs because they could not afford the same. It is recommended that a national epileptic register be maintained for all patients, and all patients be provided with cheap/free antiepileptic medications to increase the compliance to treatment. Some uneducated people believe that this disease is caused by evil forces and hence it is not possible to get cured through modern medicines, therefore instead of going to physician they seek advice and help from local quacks or any spiritual icon. This was the case with many of our patients and same has been reported by other authors in African countries like Nigeria (20).

Various authors report the incidence of burn injury in epileptic patients accounting for 5% (21) and 10% (22) of total admissions to a burn unit. Compared to these studies our study reveals a tendency towards a lower percentage of burn injury in epileptic patients in our centre (5.006%). What we see in our centre is tip of the ice berg, as most patients with epileptic burns are managed locally. Very less percentage of patients are referred for definitive treatment. Most of these patients are either managed by quacks or spiritual icons.

Burn injury in epileptic patients can be prevented by taking simple measures including the use of fire and radiator guards, flame retardant clothing (23). In the kitchen, the incidence of burn injuries can be prevented by use of microwave ovens, insulated plastic kettles, and cooker guards (24). Holding regular community awareness programs

in far flung areas explaining the nature of disease, its treatment and removing various taboos and stigmas associated with epilepsy will go in a long way to improve compliance and outcome in such patients.

Conclusion:-

Lack of proper education regarding epilepsy is the most important factor that causes difficulties in management of epileptic burn patients. This situation can be made better if social welfare schemes to discourage gender bias, provision of cheap/free antiepileptic medications, maintaining National Register for all epileptic patients and medical awareness programs in rural areas to remove taboos associated with epilepsy by trained professionals. This will help in improving the compliance with treatment. Female epileptics should not enter in kitchen alone. This approach will assist to avert avoidable deformities and reduce morbidity as a result of burns sustained by epileptics.

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