Impact of para-neurologic and para-mental premorbidities on burn injury patients

Yanık hastalarında nörolojik ve mental morbiditelerin etkisi

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BACKGROUND
The aim of this article was to determine whether there are differences in the progression, mortality and morbidity of these premorbid patients compared to normal burn injury patients.

METHODS
In this study, 26 premorbid cases (8 males, 18 females; mean age: 30.8 years; range: 3-74 years) hospitalized in the Dicle University Burn Center between July 2007 and November 2009 were evaluated.

RESULTS
Appreciation of the pathophysiological basis of the premorbidity in burn patients is important. When the treatment for premorbid burn patients is planned, the associated co- or premorbidity must be kept in mind. To improve the outcome of the treatment, considerable attention must be paid to these patients.

CONCLUSION
This article gives an overview of the current literature regarding premorbid patients in the Turkish population and draws attention to this specific topic.

Key Words: Burn; complication; premorbidity.

Burn injury is a multisystemic trauma characterized by a devastating effect on the human body. Burn injury can be observed with an additional premorbid disease in burn injury patients. The pathophysiological mechanisms of the burn injury may aggravate and influence the progression of the premorbid disease. Additionally, existing systemic diseases can change the progression of the burn injury.[1,2]

Patients with weak mental and motor functions are at greater risk than those with normal burn injuries. Victims having sensorimotor deficits are likely to be exposed to more severe burn injuries for a longer period.[3,4]

We focus on burn injury cases with pre-existing para-mental and para-neurological premorbidities.
The aim of this article was to determine whether there are differences in the progression, mortality and morbidity of these premorbid patients compared to normal burn injury patients. We also aimed to ascertain whether there are differences in the treatment principles of burn patients with premorbidities.

**MATERIALS AND METHODS**

Twenty-six premorbid cases (8 males, 18 females; mean age: 30.8 years; range: 3-74 years) hospitalized in the Burn Center between July 2007 and November 2009 were evaluated. Psychiatric premorbid cases, such as those with personality disorders and psychosis, were not included in the study. The main premorbid etiologies were seizures (11 cases), mental retardation (5 cases), Down syndrome (3 cases), paraplegia (3 cases; caused by pes equinovarus deformity in 1 case and motor neuron disease in 2 cases), Parkinson’s disease (3 cases), and Alzheimer’s disease (1 case) (Table 1). When the medical history and previous records of these patients were examined, nine of the epileptic cases showed tonic-clonic epilepsy and two showed absence epilepsy. Eight cases were under Epdantoin and the other three were under carbamazepine drug therapy. Six were under regular medication and five were under irregular antiepileptic medical therapy.

The burn etiologies were flame (5 cases), scalding (13 cases), stove contact (2 cases), electrical injury (2 cases), falling into the tandir (clay cooker) (2 cases), and water heater (2 cases). Most of the cases were exposed to burn injury while undertaking routine home activities.

**RESULTS**

Based on the total body surface area (TBSA), the average burn area was 16.3% (5-30). The burn defects were determined to be second-degree in 16 cases (4 superficial, 12 deep defects) and third-degree in 10 cases. The defects were primarily localized in the upper extremities in 14 cases (Fig. 1). Premorbid cases accounted for 4% of all the patients (22/541) admitted to our facility during the study period.

In the course of the follow-up period, two of the patients had an aggravated petit mal convulsion due to the devastating effect of the burn injury.

Twenty-four patients underwent surgery, and one patient’s defect healed secondarily. One case with Down syndrome had a ventricular septal defect confirmed by echocardiography. The family of this patient rejected surgical treatment.

A perusal of the medical histories of subnormal

<table>
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mental cases revealed that congenital infections or teratogens may be the etiologic cause. Down syndrome was confirmed by the medical reports submitted by the family. Patients with Down syndrome ranged in age between 3 to 6 years; unfortunately, IQ scores were not obtained in these cases. The rest of the mental retardation cases were over 6 years old, with an IQ level of 70-75.

In 14 of the premorbid cases, early tangential excision and grafting were performed. Full thickness skin grafting was applied to seven cases and split thickness skin grafting to 17 cases (Fig. 2). In two cases with mental retardation, 8% graft loss was observed due to the hyperactivity of the patients and non-compliance (Fig. 3). In one geriatric case, a 10% graft failure was attributed to Staphylococcus aureus infection. The overall graft failure ratio was 11.5%. The average hospital stay of premorbid cases was 33.4 days.

**DISCUSSION**

Premorbidity can be simply defined as a condition or ailment that occurs or exists before the occurrence of a physical disease or emotional illness. In psychiatry and neurology, the term “premorbid personality” is used to determine the psychological risk factors for the development of a particular disorder. In this article, we investigated the impact of para-neurologic and para-mental premorbidities. The psychotic cases were excluded from our study.

There is a strong association between premorbid cases and burn injury. The premorbid condition can influence the etiologic reasons and the severity of the burn injury.[3] Geriatric and pediatric cases are both prone to burn injury. When neurological or para-neurological premorbid diseases are present, the morbidity and mortality will increase. It is reported in the literature that the severity of the injury is important and the hospital stay is longer.[5]

Intellectual disability is characterized by the limitations from a specific emotional or psychological disability. Intellectual disability may also be used to describe dementing conditions such as Alzheimer’s disease.

The management of geriatric burn victims is also a major challenge. In this study, we included six senior patients who were ≥65 years old with pre-existing conditions. The pre-burn functional status and premorbid conditions of these geriatric patients are useful tools for developing an interdisciplinary treatment protocol. The premorbid geriatric burn victims have a higher mortality rate than geriatric patients.[6] In deciding burn treatment, we also needed to focus on the associated pathophysiological conditions. Six of our patients were in the geriatric age range; of these, three
had Parkinson’s disease, two had paraplegia and one had Alzheimer’s. Four suffered scalding injury.

The ability of elderly patients to grasp or hold objects decreases because of aging tremors and other weaknesses. In addition, their cognitive functions and reflex response to hazardous events wanes and may contribute to burn injuries. The risk increases when premorbidity is also taken into account. In our community, in the presence of cold temperatures, people frequently stand with their extremities close to a burning stove. This is a hazardous action that may cause contact burns. Burns were localized on the lower extremities in premorbid geriatric cases. The mean burn total area was 21% (range: 10-30%). The depths of these injuries were almost the same as with the pediatric cases, but the total area was wider. The mean hospital stay was 35.1 days (32-36 days).

A sub-average intellectual ability is manifested through learning difficulties and social adaptation problems.[7] In the literature, it is reported that 2-3% of the total population is mentally retarded. An IQ level of <50 is prevalent in 3.6/1000 live births in the United States population. An equivalent IQ level percentage has not been reported for the Turkish population.[8] Oyeckin,[8,9] in a study limited in number, reported that this rate was about 2.5%. There may be different etiological reasons, such as chromosomal abnormalities, genetic metabolic disorders and genetic neurological disorders.[10]

Pediatric cases with neurosensorial motor deficits such as mental retardation or seizures are also at risk for burn injuries. These handicaps make the pediatric population more vulnerable to frequent and serious burn injuries. Of 15 pediatric cases aged between 3 and 17 years, seven cases had scalding burn injury from hot liquids. The epidemiology of pediatric burn injuries in the literature suggests that the most common cause of burns in Turkey is scalding, and the ages of these cases ranged from 1 to 6 years.[11] Children, especially toddlers, are naturally curious and attempt to taste and touch things around them. This instinct can be more intense and often unmanageable in premorbid pediatric cases.[12-14] In this respect, these cases had greater exposure to home accidents compared to the normal pediatric population. Most of our pediatric patients were injured by scalding. There may be different etiological causes for these injuries. However, in the Turkish pediatric population, non-bath scalding is related to contact with the traditional tea-making systems.[15,16] Injuries were usually localized on the upper extremities. The mean total burn area was 14.1% - 5-30%. The total hospital stay was 32.8 days (27-38 days).

Of the 15 pediatric cases, nine were admitted from rural or urban areas with ignorant parents as the primary caregivers. It is known that children who live in the rural areas of Turkey are at a greater risk for serious burns than those in the cities. Our results indicate that premorbid pediatric patients are highly vulnerable to frequent burn injuries.

Epileptic cases are prone to injuries, fractures, lacerations, and burns.[17,18] In the literature, 42% of injuries are associated with cooking, which is also more common among females because of their domestic responsibilities.[19-21] In most of our cases, the injuries occurred during bathing. Use of different types of boilers is common in Turkey. However, the majority of water heaters installed in bathrooms are not controlled effectively; some of these devices work with LPG tubes.[22] As excessive heat and humidity may trigger an epileptic attack, scalding injuries may result from the accidental spilling of hot water.[18,23,24] Some of the patients used electric heaters immersed in water; however, these instruments can be dangerous and may cause scalding injuries.

Burn injury was observed frequently on the upper extremities and on the trunk in epileptic cases. These cases were exposed to burn injury while undertaking domestic activities such as having a bath. The mean total burn area was 16.1% (range: 7-30%). The total hospital stay was 32.7 days (30-34 days).

The longer hospital stay observed among premorbid patients is associated with several factors.[5] The average hospital stay of premorbid cases in our study was 33.4 days. To our knowledge, there is no detailed study about premorbid cases and the length of their hospital stay. Further in-depth research is needed. Moreover, special care should be taken in the treatment of the burn injury cases with premorbidity.

Prevention measures also need to be integrated with day-to-day activities. For example, the tubs used must have levers to regulate the water temperature. In the event of a seizure attack, the victim can hit the lever arm and avoid exposure to hot water. A scalding injury is more likely when the water is warmer than 43 °C.[21] Safety devices that limit the water temperature are recommended. In the homes of pediatric premorbid patients, water heaters should be set at 37.7 °C (100 °F); in the case of other adults, these devices can be set to 48.8-51.6 °C (120-125 °F).[25]

Special care and additional measures should be taken in the treatment of burn injury patients with premorbidity. Psychological, neurological and geriatric causes are factors that may affect recovery from the burn injury or the success of the operation. A detailed evaluation of coexisting disorders and additional care are key points in the treatment of comorbid burn patients. Burn prevention materials targeting the premor-
bid patient population remain relatively scarce in Turkey. Therefore, health organizations need to focus on providing basic and lifesaving information to patients and their families.

REFERENCES