

Features of the Burn Disease Course in Older Adult Patients

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ABSTRACT

OBJECTIVES: In this study, we investigated the course of burn disease in older adult patients.

MATERIALS AND METHODS: Our study group included 160 older adult patients with burn injuries who were treated in the burn department of the Republican Research Center of Emergency Medicine from 2010 to 2020. Data were obtained from retrospective examination of medical records. The age of patients ranged from 60 to 86 years, with average age of 68.4 ± 7.8 years. We divided patients into younger-old ($n = 128$ patients [80%]; 60-74 years old) and older-old ($n = 32$ [20%]; 75-89 years old) groups. There were 92 men (57.5%) and 68 women (42.5%).

RESULTS: Older adult patients do not always seek medical help in a timely manner. In our patient group, 75 patients were admitted within the first 6 hours after receiving a thermal injury and 38 patients were admitted from 7 to 24 hours after injury. However, 23 older adult patients were hospitalized 1 to 3 days after injury, and 24 were hospitalized more than 3 days after injury. As a rule, late presentation of our younger-old and older-old patients for specialized care was as a result of both social and subjective factors, including insufficient attention of relatives to the fact of injury or the absence of a permanent caregiver nearby, underestimation of the severity of the injury, decreased pain sensitivity in the deep burn zone, and unwillingness to be hospitalized.

CONCLUSIONS: Burn injury in younger-old and older-old patients showed an aggravated and complicated course of

burn disease, mainly because of age-related involuntional changes and a high frequency of concomitant chronic diseases involving mostly the cardiovascular, respiratory, and central nervous systems. This category of older adult patients requires preventive measures against exacerbation of concomitant diseases and the need for early treatment after burn injury to avoid complications.

KEY WORDS: *Baux index, Comorbid diseases, Elderly*

INTRODUCTION

Patients of older age groups are characterized by involution of all organs and systems, primarily the skin. Atrophy and thinning of the skin and reduction of the microvascular network complicate the early diagnosis of the true depth of the burn lesion and contribute to a sharp slowdown of reparative processes in the wound.^{1,2}

The prognosis of the course of burn disease and the required therapeutic tactics, along with age and the total area of the burn, are significantly affected by the area of deep burns, the presence of a thermoingalation lesion, the interval between injury and admission to the burn center, and the concomitant pathology.³⁻⁶ Concomitant diseases occur in 54% to 89% of older age patients with burn injuries.^{7,8}

Complications of burn disease in older adult patients are more common than among middle-age adults, making up 28% to 42.4% of hospitalized patients.^{2,6,7} Indeed, the course and outcomes of burn disease in older adult patients are comparable to those shown in younger patients with similar indicators with twice the lesion. The most common complication of burn disease among adult patients in older and oldest age groups is pneumonia.^{9,10}

Mortality rates among younger-old and older-old adult patients with burn injuries are high in all countries (21%-60%) and even greater with increasing severity of injury and age.^{8,11} In this study, we investigated the course of

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burn disease in younger-old and older-old adult patients (that is, 60-74 years old and 75-89 years old, respectively) seen at our center in Uzbekistan.

MATERIALS AND METHODS

Our study included 160 younger-old and older-old adult patients with burn injuries who were treated at our burn department in the Republican Research Center of Emergency Medicine from 2010 to 2020. Data were obtained from a retrospective examination of medical records. Age of patients ranged from 60 to 86 years, with average age of 68.4 ± 7.8 years. We divided patients into younger-old ($n = 128$ patients [80%]; 60-74 years old) and older-old ($n = 32$ [20%]; 75-89 years old) groups. There were 92 men (57.5%) and 68 women (42.5%).

We assessed the severity of the condition of our older adult patients with the Baux index, which has not only diagnostic but also prognostic value.

An integral component of the Baux index is measurement of areas of superficial and deep burns. Among our study patients, the total area of burns ranged from 7% to 80% of the body surface, with average of $22.5 \pm 6.4\%$. When assessing the total area, degree of burn (second, third, and fourth) was also considered.

RESULTS

Older adult patients tend not to seek medical help in a timely manner. We found that 75 of our patients were admitted within the first 6 hours after receiving a thermal injury and 38 were admitted from 7 to 24 hours after injury. However, 23 of our patients were hospitalized 1 to 3 days after injury and 24 were hospitalized more than 3 days after injury (Figure 1).

In general, the late presentation for specialized care among our younger-old and older-old patients was due to social and subjective factors, including insufficient attention of relatives to the fact of injury or the absence of a permanent caregiver nearby, the underestimation of the severity of the injury, decreased pain sensitivity in the deep burn zone, and unwillingness to be hospitalized.

We found that 84 (52.5%) of total patients in our study were hospitalized with burn shock, 33 (20.6%) were hospitalized with symptoms of acute burn toxemia, and 43 (26.9%) had septic toxemia of burn disease.

Among total patients, 71.9% were admitted to the clinic for extensive burns. As shown in Table 1, there were 45 patients (28.1%) with limited burns having a total area of less than 10% of the body and 64 patients (40%) with burn areas from 10% to 20% of the body surface. The numbers of patients with widespread burns from 20% to 40% of the

body surface and from 40% to 80% of the body surface were 34 (21.3%) and 17 (10.6%), respectively. Deep burns occurred in 52 patients (32.5%). Deep burns to 5% of the body surface were observed in 50.2% of study patients, from 5% to 10% of the body surface in 28.5%, from 10% to 20% of the body surface in 13.4%, and in more than 20% of the body surface in 7.9% of patients.

Most patients in our study group had Baux index values of over 81 units (Table 2). We observed that 69 patients (43.1%) had a favorable prognostic index (Baux index up to 80 units) and 59 patients (35.6%) had a more doubtful prognosis (Baux index of 81-100 units). However, 34 patients (21.3%) had an unfavorable prognosis (Baux index over 100 units).

Among total older adult patients, those with doubtful and unfavorable prognosis of burn disease (for Baux index >80 units) made up 41.5%; however, when we only considered

FIGURE 1. Admission Time of Study Patients After Burn Injury

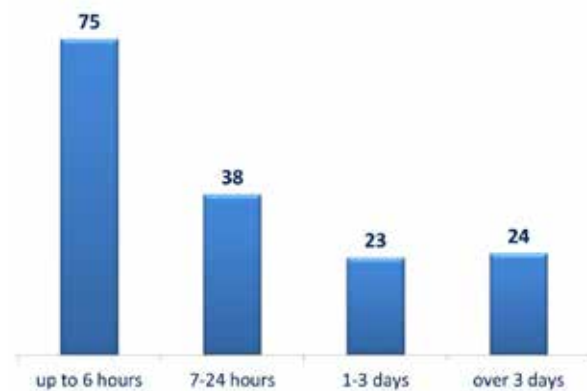


TABLE 1. Lesion Area of Burns in Study Patients

	Younger-Old and Older-Old Patients (N = 160)	
	Number	Percent
Up to 10% of body area	45	28.1
11% to 20% of body area	64	40.0
21% to 40% of body area	34	21.3
41% to 60% of body area	17	10.6

TABLE 2. Distribution of Patients by Baux Index

Baux Index, Unit	Younger-Old and Older-Old Patients (N = 160)	
	Number	Percent
Up to 80	69	43.1
81 to 100	57	35.6
Over 100	34	21.3

the older-old group (75-89 years old), 78% had doubtful and unfavorable prognosis. In other words, the older the patient, the worse the prognosis of the disease.

Serious concomitant diseases were observed in 90 patients (56.2%). Of these, 39 patients (43.3%) had 2 or more concomitant diseases. These patients included 46.7% with coronary heart disease, 38.9% with arterial hypertension, and 23.3% with history of acute cerebrovascular accident. In addition, 20% had diseases of the respiratory system, 17.8% had diabetes mellitus, and 15.6% had diseases of the digestive system. Chronic alcoholism (14.4%), kidney disease (6.7%), and malignant neoplasms (5.6%) were also diagnosed (Table 3).

Complications of burn disease developed in 56 patients, including pneumonia in 46.4%, burn exhaustion in 25%, and sepsis in 17.9%. Nine patients had 2 or more complications (Figure 2).

Among burn complications to internal organs, complications in the lung were the most frequent and severe. Pneumonia in younger-old and older-old patients,

according to the literature, ranks first among all other complications of burn disease, with frequency varying from 12.1% to 36.8%.^{2,9} Of total number of older adult patients in our study, pneumonia was observed in 26 patients (16.2%).

With regard to pathogenesis, features of the clinical course and outcomes should be distinguished by examining primary versus secondary pneumonia in burn disease. When determining the frequency of pneumonia as a complication of burn disease, it is necessary to differentiate whether pneumonia developed because of thermal inhalation trauma. That is, it is impractical to attribute this type of reason for pneumonia to a complication of burn disease primarily because pneumonia is seen as a result of direct exposure to the thermal inhalation agent (hot air, steam, etc.) on the respiratory tract and lung tissue. Secondary pneumonia develops without direct connection of a burn to the respiratory tract and is observed mainly in the period of burn infection or burn exhaustion. The frequency of secondary pneumonia is closely related and depends on the extent and localization of a deep burn.

Among total patients examined, burn exhaustion was observed in 14 patients (8.8%). Diagnosis of burn exhaustion is not difficult, as its main criterion is loss of body weight in the patient. In patients with severe exhaustion, weight loss often reaches half or more of normal. Elimination of all manifestations of burn exhaustion is possible only with complete epithelization of burn wounds.

Burn sepsis was observed in 10 patients (6.3%), with 7 patients developing burn sepsis in the first 2 weeks after thermal trauma, which is the period when the granulation barrier has not yet formed for the penetration of bacteria into the body. Sepsis mainly developed in those patients with deep burns with an area of 6% or more of the body surface.

Among our study patients, fatal outcomes occurred in 26 patients (16.3%). In 20.8% of patients, death occurred in the period of burn shock, in 68.4% in the period of acute toxemia of burn disease, and in 10.2% in the period of septic toxemia of burn disease. All patients who died had developed pneumonia, but it was the direct cause of death in 12 patients. Cause of death was acute heart failure on the background of acute myocardial infarction in 4 patients and pulmonary embolism in 2 patients.

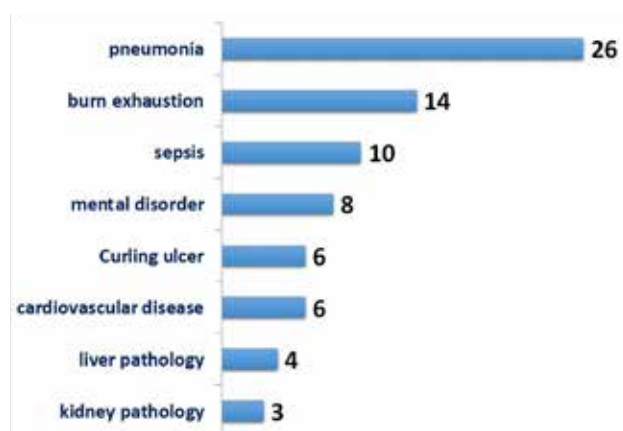
CONCLUSIONS

Patients in the younger-old (60-74 years old) and older-old (75-89 years old) age groups with burn injuries have an aggravated course of burn disease, mainly because of age-related involutional changes and a high frequency of concomitant chronic diseases of the cardiovascular,

TABLE 3. Concomitant Diseases in Study Patients

Concomitant Disease	Younger-Old and Older-Old Patients (N = 160)	
	Number	Percent
Cardiac ischemia	42	46.7
Arterial hypertension	35	38.9
Consequences of stroke	21	23.3
Respiratory disease	18	20
Diabetes	16	17.8
Disease of digestive system	14	15.6
Chronic alcoholism	13	14.4
Kidney disease	6	6.7
Malignant diseases	5	5.6

FIGURE 2. Type of Complication in Study Patients After Burn Injury



respiratory, and central nervous systems. These age groups have a complicated course of burn disease, which requires preventive measures against exacerbation of concomitant diseases and the need for early treatment after burn injury to avoid complications.

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