

Mortality Analysis of Adult Burn Patients

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Backgrounds: Among burn patient, adult patient in productive age took a large number in statistic. Fire related to domestic accident and in workplace are the main source of burn incidences. A careful review of burn mortality of adult patient in Burn Unit of Ciptomangunkusumo Hospital is presented in this paper. The aim is to make a critical analysis of mortality in our burn centre with a view to finding possible ways of improving the care given to our patients and suggesting ways of reducing mortality.

Patients and Method: A descriptive analysis study was done to analyze data collected by the review of medical records of the patients hospitalized to our Burn Center for burn injury from Januari 2011–Desember 2012. Parameters investigated include patients' demographics, data for etiology and extent of burn injury, cause of death and the mortality were tabulated, computerized and analyzed.

Result: During this 2-year period, 275 patients were admitted, 203 patients were adults. Number of death in adult patient were 76 patients (27,6%). Among the died patients, seventy-eight percent caused by flame, electrical burn injury (14%), hot water (4%), chemical (3%), metal (1%). Almost all burn extent was deep dermal (2nd degree) and full thickness (3rd degree). The cause of death including septicaemia (42,1%), multiple organ failure (31,6%), systemic inflammatory response syndrome (17,6%), and acute respiratory distress syndrome (8,7%).

Conclusion: In order to implement a successful burn injury prevention program, it is important to focus on selected issues. A few specific recommendations can be suggested based on these epidemiological features. Our ongoing efforts are to promote and support prevention program and look for changes in the incidence of burn injury.

Keywords: *Burn injury, cause of death, mortality, etiology*

Latar Belakang: Diantara pasien luka bakar, sebagian besar pasien adalah pasien dewasa. Penyebab luka bakar paling utama yaitu berasal dari api kecelakaan domestik maupun kecelakaan di tempat kerja. Pada paper ini disajikan *review* secara teliti mengenai mortalitas pada pasien luka bakar dewasa di Burn Unit RS Ciptomangunkusumo. Tujuannya yaitu untuk membuat analisis kritis mengenai data mortalitas di unit luka bakar untuk meningkatkan perawatan terhadap pasien dan mengurangi angka kematian.

Metode dan Pasien: Studi analisis deskriptif dilakukan untuk menganalisa data dari rekam medis pasien yang dirawat di Unit Luka Bakar RSCM dari Januari 2011 – Desember 2012. Parameter yang diinvestigasi adalah data dermografis pasien, etiologi dan luas luka bakar, penyebab kebakaran, dan mortalitas. Data tersebut disajikan dalam bentuk tabel, dikomputerisasi, dan dianalisis.

Hasil: Terdapat 275 pasien, 203 diantaranya dewasa. Jumlah kematian pada pasien dewasa yaitu 76 pasien (27.6%). Diantara pasien yang meninggal, 78% disebabkan oleh api, luka bakar listrik (14%), air panas (4%), kimia (3%), dan metal (1%). Hampir semua luas luka bakar adalah *deep dermal* (Derajat 2) dan *full thickness* (Derajat 3). Penyebab kematian yaitu septicaemia (42.1%), kegagalan organ multipel (31.6%), *systemic inflammatory response syndrome* (17.6%), dan *acute respiratory distress syndrome* (8.7%).

Kesimpulan: Untuk mengimplementasikan program pencegahan cedera luka bakar, sangat penting untuk fokus pada problem tertentu. Rekomendasi spesifik dapat disarankan berdasar pada temuan epidemiologis ini. Upaya berkelanjutan yang kami lakukan adalah upaya mempromosikan dan mendukung program pencegahan dan pencarian untuk perubahan pada angka insidensi luka bakar.

Kata Kunci: *Burn injury, cause of death, mortality, etiology*

Received: 25 May 2013, Revised: 9 June 2013, Accepted: 20 June 2013.
(*Jur.Plast.Rekons.* 2013;2:96-100)

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Presented in the 17th IAPS Scientific Meeting, Bandung, West Java, Indonesia.

Globally, burns problem. An estimated are a serious 195.000 deaths occur public health each year from fires

Disclosure: *The authors have no financial interest to disclose.*

alone, with more deaths from scalds, electrical burns, and other forms of burns, for which global data are not available. Fire-related deaths alone rank among the 15 leading causes of death among children and young adults 5-29 years. Over 95% of fatal fire-related burns occur in low- and middle-income countries. South-East Asia alone accounts for just over one-half of the total number of fire-related deaths worldwide and females in this region have the highest fire-related burn mortality rates globally.(1)

Since 2010, Burn Unit in Cipto Mangunkusumo Hospital Jakarta is referral hospital from other town surround Jakarta and also one of burn case referral hospital in Indonesia. Our Burn Unit is equipped with intensive care unit (with ventilator), operation room and multidisciplinary treatment. As one of burn center in Indonesia, we must face many challenges to improve patient care and reduce mortality.(2)

Among burn patient, adult patient in productive age took a large number in statistic. Fire related to domestic accident and in workplace are the main source of burn

incidences. They suffer from burn and ended as survivor or non-survivor. Complicated systemic and local response due to burn cause serious problem and need comprehensive treatment. The survivor with their morbidity and disability affect the quality of life of themselves and also their family.

A careful review of our burn mortality in adult patients is presented in this paper. The aim is to make a critical analysis of mortality in our burns centre with a view to finding possible ways of improving the care given to our patients and suggesting ways of reducing mortality.

PATIENT AND METHODS

Data were collected by the review of medical records of the patients hospitalized to our Burn Center for burn injury from Januari 2011 – Desember 2012. We define adult patient as age over 18 year old. For those not available or deficient, data from the limited durations were selected for analysis and presented to complete the report. Burn patients treated as outpatients, patients admitted for later multiple reconstructive surgeries, and patients who did

Table 1. Demographic data

Year	2011	2012	Total
Number of burn patient (all age)	129	146	275
Number of burn patient (adult age)	97 (75,2%)	106 (72,6%)	203 (73,8%)
Number of death (all age)	43 (33%)	50 (34%)	93 (33,8%)
Number of death (adult age)	38 (29,4%)	38 (26%)	76 (27,6%)
18-30 yo	9	13	22
31-40 yo	18	13	31
41-50 yo	8	9	17
51-60 yo	2	1	3
61-70 yo	1	1	2
>70 yo	0	0	0
Mean	36,47 (\pm 13,06)	37,42 (\pm 9,43)	
Male	29 (76,3%)	29 (76,3%)	
Female	9 (23,7%)	9 (23,7%)	



not complete the treatment in the Burn Center, were excluded from the study.

Parameters investigated include patients' demographics, data for etiology and extent of burn injury, cause of death and the mortality were tabulated, computerized and analyzed. The estimation of burn injury extent was determined by classic Lund and Browder chart. Statistical analysis was conducted with SPSS Version 11.5 for Windows (SPSS1, Chicago, IL, USA). Descriptive analysis was mostly performed. Mean and SD with range were presented to improve interpretability of the data. Pearson's correlations were applied whenever appropriate. Probability value of <0.05 was considered statistically significant.

RESULT

During this 2-year period, 275 patients were admitted and 203 patients are adult. Number of death in adult patient were 76 patients (27,6%). The age of patients ranged from 18 to 68 year with mean of 36,47 year ($\pm 13,06$) in 2011 and 37,42 year ($\pm 9,43$) in 2012. Twenty—nine were males and 9 were females in both year, with ratio 3,2 : 1. (Table 1).

Among the died patients, they suffer from vary etiology. Seventy-eight percent caused by flame (domestic accident or in workplace), electrical burn injury (14%), hot water (4%), chemical (3%), metal (1%).(Figure 1)

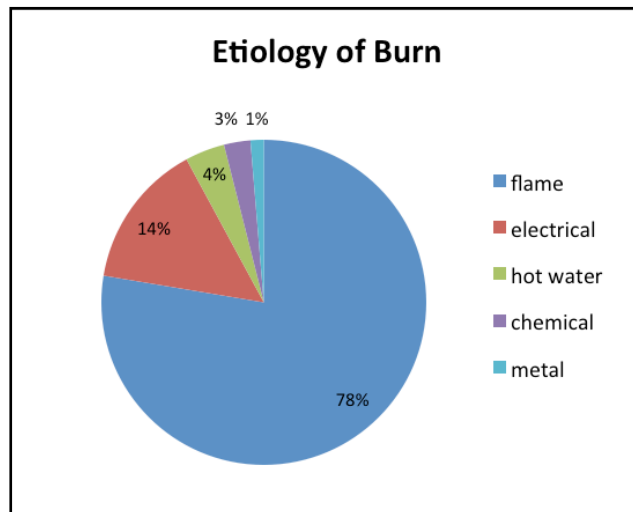


Figure 1. Etiology of burn

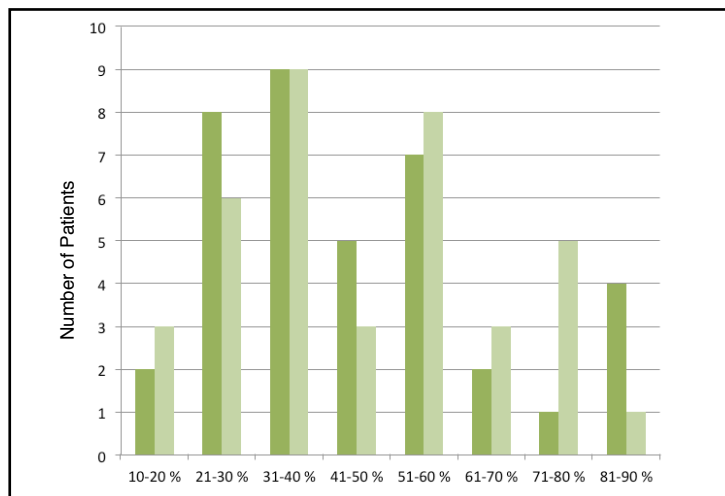


Figure 2. Burn surface area in died patient. Number of died patients varied on each group of burn surface area

Burn surface area among died patients were vary, in 2011 (mean 45.85%, SD 20.15) and in 2012 (mean 48.69%, SD 18.47). Almost all burn extent were deep dermal (2nd degree) and full thickness (3rd degree). (Figure 2)

The cause of death including septicaemia (42,1%), multiple organ failure (31,6%), systemic inflammatory response syndrome (17,6%), and acute respiratory distress syndrome (8,7%). (Figure 3)

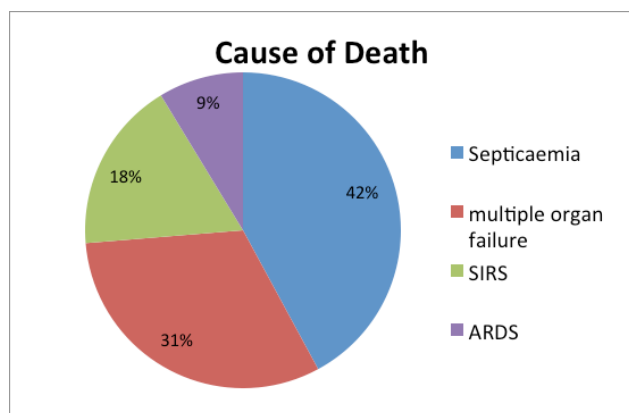


Figure 3. Cause of Death

DISCUSSION

This paper presents a comprehensive overview of data from an 2-year period in Burn Unit Cipto Mangunkusumo Hospital Jakarta. We have not analyzed the changing trends in terms of outcome and we recognize that this is a centre and not population based study. In 2011, our Burn Unit improved the facilities and multidisciplinary care. We developed intensive care unit with intensivist, nutrition specialist, psychiatrist, and medical rehabilitation. We struggled to maintain the complementary of our facilities and human resources. Nevertheless, there are several distinctive features of our burn experience that do allow more focused preventive strategies to be identified. There was no seasonal variation in burn admission shows, the incidences caused by domestic accident and in workplace. Handling indoor cooking devices with particular gas cookers were highly precaution.

Close to half of the patients were self-referred to the hospital, implying the importance of lay public as well as emergency medical technicians' education on injury

prevention, who provide first aid on the scene of accident (3). Fire prevention programs, have to be maintained in the high-level schools and further into the workplaces. Significantly large number of referrals from other medical institutes indicates more intensive medical personnel educational efforts focused at these institutions. Socialization of emergency burn care equipments for these hospitals also should be emphasized.

In adults, burn injuries were predominantly found in males in the fourth and fifth decades of life. At this stage, males are usually more active and exposed to higher environmental risks such as in workplace. This finding is similar to other reported cases of male predominance in burn mortality.(4) Female preponderance in burn mortality has been reported from India(5) and Iran.(6) Thereafter, female burn injuries predominated as at this time of life the females were more active in indoor cooking than males.

The flame burns associated with explosions in the workplace tended to be more serious in nature and were associated with longer hospital stays including time in the intensive care unit and poorer prognosis.(7) This underlies the need for continual training and education in workplace safety as well as Health and Safety Legislation to ensure appropriate job training and environmental controls to decrease risks of accidents.(8) The number of assaults or homicide victims by burn injury was about 1%, a probable under-representation of actual figure.

As already mentioned, the cause of death including septicaemia (42,1%), multiple organ failure (31,6%), systemic inflammatory response syndrome (17,6%), and acute respiratory distress syndrome (8,7%). Septicaemia have been reported as the main causes of death in burn patients.(9,10)

As in other reports, mortality was proportional to the extent of body surface area of burns, reaching 55.1% in 70–79%, 70.6% in 80–89%, and 82.6% in >90% TBSA burn (11,12,13). However, our data failed to show any significant correlations with increasing age although mortality indeed increased in older age group. In less severe burns, the lethal outcome appeared to be relatively lower, but lack of available data for the annual changes

and causes of mortality rate preclude the accurate assessment of annual impact of improved medical care during this period.

CONCLUSION

The changes in the mortality rate depend not only on one factor, but various factors have to be assessed. In order to implement a successful burn injury prevention program, it is important to focus on selected issues (14). A burn unit is required to provide progress both generally and specifically for each of the cause of the mortality in burn injury. A few specific recommendations can be suggested based on these epidemiological features. Our ongoing efforts are to promote and support prevention program and look for changes in the incidence of burn injury. In addition, we want to study further the implications of changes in management protocols and policies on the outcomes of our treatment. It would only be such endeavours that the provision of appropriate care for our patients will improve.

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