The THAI *Journal of* SURGERY

Official Publication of the Royal College of Surgeons of Thailand

Vol. 30 January - June 2009 No. 1-2

Mortality in Patients with Necrotizing Fasciitis of the Extremities at Phayao Hospital

Chopong Sukpromson, MD

Phayao General Hospital, Thailand

Abstract ***Background:*** **Necrotizing fasciitis (NF) of the extremities is one of the most important problems in Phayao General Hospital due to its high mortality. This study aimed to find the risk factors associated with mortality in order to manage properly.**

Methods: **The medical records of 45 patients who admitted with NF between January 2005 and June 2007 were retrospectively reviewed. Demographic data and several potential risk factors were collected. The risk factors were analyzed by Chi-squared test and Fisher's Exact Test.**

Results: **The overall mortality rate was 22.22%. The risk factors that were significantly associated with high mortality were patients with renal insufficiency (plasma creatinine > 2.0 mg/dl) and patients needed to be treated in the intensive care unit.**

Conclusion: **Patients with renal insufficiency and patients needed critical care were associated with high mortality. Such patients should be intensively observed and treated.**

Necrotizing fasciitis (NF) represents a rapid, extensive infection of the fascia deep to the adipose tissue. NF was less common than subcutaneous abscess and cellulitis but NF is a much more serious condition than the others because of difficulty in diagnosis at the early phase. These infections are markedly absence of clear local boundaries or palpable limits. The visible degree of involvement is substantially less than that of underlying tissues.[1,2]

The outcome predictors in patients with necrotizing fasciitis remain poorly defined. Several studies have indentified factors to predict mortality such as age, streptococcal toxic shock syndrome, immune status,[3] high serum urea, high serum creatinine, low hemoglobin level[4] and early operative debridement[5], but it is still uncertain. The accepted modality to reduced mortality and essential for a favorable outcome are accurate early diagnosis, aggressive resuscitation,

Correspondence address : *Chopong Sukpromson, MD, Department of Surgery, Phayao General Hospital, Phayao 56000, Thailand; E-mail: csuk_son@yahoo.com*

using proper intravenous antibiotics, early and extensive surgical debridement.[6-15]

NF of the extremities is one of the most critical problems in Phayao General Hospital due to its high mortality. We therefore aimed to identify the risk factors associated with mortality to manage it properly.

Methods

Retrospective review of inpatient charts in patients diagnosed necrotizing fasciitis between January 2005 and June 2007 was reviewed. The data included demographic data, underlying diseases, onset, vital sign, plasma blood urea nitrogen, creatinine, complete blood count and bacteriological report. Outcomes such as mortality, complication and death were also collected. We used Chi-square test or Fisher exact test in the analysis of categorical data by using SPSS ver.15 statistical software. P value less than 0.05 was considered statistically significant.

Results

Forty five patients were included in this study. Mean age was 62.73 years (range from 10-94 years old). There were 25 males (55.6%) and 20 females (44.4%). There were 8 patients (17.8%) who had inotropic drugs during admission. Mean creatinine was 1.87 mg/dL (range 0-7 mg/dL). There were 28 patients (62.22%) who had underlying diseases (Table 1).

There were 24 patients (53.3%) who were first diagnosed as NF, others patients were diagnosed as other condition initially. Affected organs were upper extremities in 3 patients (6.7%) and lower extremities in 42 patients (93.3%). There were just 18 patients (40%) who had history of injury. The bacterial cultures from wound in 10 patients (22.22%) were growth (2 gram- negative bacilli, 2 Streptococcus group D, 3 Staphylococcus Aureus, 1 Streptococcus Group A and 2 other bacterial types).

Table 1 The percentage of underlying diseases

Underlying disease	Frequency	Percent
Diabetes mellitus	16	35.56
Hypertension	12	26.67
Chronic renal failure	8	17.78
Cirrhosis	3	6.67

Table 2 Showed percentage of morbidity

Morbidity	Frequency	Percent
Limb loss	7	15.56
Pneumonia	3	6.67
Acute renal failure	3	6.67
Catheter urinary tract infection	2	4.44

Table 3 Presented outcome

Status of discharge	Frequency	Percent
Improved	8	17.8
Out patient treatment basis	25	55.6
Death	10	22.2
Referral	2	4.4

Mean duration time from onset of symptom to admission was 101.89 hours (median 72 hours). Mean duration time from admission to surgery was 20.16 hours (median 7 hours). Mean duration time from onset of symptom to surgery was 15.67 hours. Mean hospital stay was 18.53 days (range 1-93 days). Morbidity occurred in 16 patients (35.56%) (Table 2). Ten patients (22.22%) died after discharge from hospital (Table 3).

There were 10 patients (22.22%) who died due to necrotizing fasciitis. Patients with creatinine more than 2 mg/dl were associated with mortality than those with creatinine less than 2 (P = 0.01). Similarly history of admission in the intensive care unit (ICU) was associated with higher mortality than those without such history (Table 4).

Discussion

Factors that predicted mortality in NF from this study were blood creatinine more than 2 mg/dl and history of admission in ICU. Thus, to decrease mortality in such patients, physician should give early diagnosis, early alert to any serious problems, early aggressive surgical debridement, early proper intravenous antibiotics and proper resuscitation. Many studies reported the prognostic factors that determine outcome in patients with NF such as old age, streptococcal toxic shock syndrome, immune status, high serum urea, high serum creatinine, low hemoglobin level and early operative debridement.[3-5] High mortality, high morbidity and prolonged length

Table 4 The mortality rate in each risk factors (Univariate analysis)

	Number of patients	Number of death (Mortality rate)	P value
Age (>60 yrs)	26	8 (30.1)	0.154
Male	25	4 (16.0)	0.301
History of Diabetes	16	4 (25.0)	0.726
History of chronic renal failure	8	4 (50.0)	0.059
History of Cirrhosis	3	1 (33.3)	0.539
History of Inotropic uses	8	3 (37.5)	0.349
Systolic blood pressure (<90 mmHg)	5	1 (20.0)	1.000
Pulse rate (>100 beat per minutes)	13	4 (30.8)	0.441
Hemoglobin (<10 g/dl)	11	2 (18.2)	1.000
White blood cell count (>15,000 cells/mm^3)	19	6 (31.6)	0.281
Creatinine (>2)	12	6 (50.0)	0.013
Onset (>100 hrs)	14	4 (28.6)	0.700
Timing to surgery after admission (>7 hrs)	22	4 (18.2)	0.722
History of admission in intensive care unit	8	6 (75.0)	0.001

of stay of NF patients are our cause for concern about this disease. To prevent this disease, early detection, early treatment, multidepartmental care, good rehabilitation, good psychosocial support are the important clues to take care of NF patients.

The limitation of this study is small sample size to make a certain statistical analysis. Also it is a retrospective study, which is prone to bias and error. However we are going to collect more data in a prospective manner.

Conclusion

Necrotizing fasciitis is one of the most disastrous problems in our hospital with high mortality (22.22%), high limb loss rate (15.56%), high morbidity (35.56%) and prolong length of stay. We may decrease morbidity and mortality of necrotizing fasciitis by paying more attention to these patients. Surgeons should keep patients, especially those with creatinine more than 2 mg/dl and history of ICU admission, under close observation. They should be fully resuscitated and properly managed.

REFERENCES

1. Daniel A. Anaya E. Surgical infections and choice of antibiotics. In: Townsend CM, et al, editors. Sabiston Textbook of Surgery, 17th ed. Philadelphia: B Saunders, 2004:264-6.
2. Hansen SL, Mathes SJ, Young DM. Skin and subcutaneous tissue. In: Brunicardi FC, et al, editors. Schwartz's Principles of Surgery, 8th ed. New York; McGraw-Hill Companies, 2005: 434-5.
3. Golger A, Ching S, Goldsmith CH, Pennie RA, Bain JR. Mortality in patients with necrotizing fasciitis. Plast Reconstr Surg 2007;119:1803-7.
4. Kwan MK, Saw A, Chee EK, et al. Necrotizing fasciitis of the lower limb: an outcome study of surgical treatment. Med J Malaysia 2006;61(Suppl A):17-20.
5. Wong CH, Chang HC, Pasupathy S, Khin LW, Tan JL, Low CO. Necrotizing fasciitis: clinical presentation, microbiology, and determinants of mortality. J Bone Joint Surg Am 2003;85-A: 1454-60.
6. Hefny AF, Eid HO, Al-Hussona M, Idris KM, Abu-Zidan FM. Necrotizing fasciitis: a challenging diagnosis. Eur J Emerg Med 2007;14:50-2.
7. Rieger UM, Gugger CY, Farhadi J, et al. Prognostic factors in necrotizing fasciitis and myositis: analysis of 16 consecutive cases at a single institution in Switzerland. Ann Plast Surg 2007;58:523-30.
8. Ozalay M, Ozkoc G, Akpinar S, Hersekli MA, Tandogan RN. Necrotizing soft-tissue infection of a limb: clinical presentation and factors related to mortality. Foot Ankle Int 2006;27:598-605.
9. Schroeder JL, Steinke EE. Necrotizing fasciitis—the importance of early diagnosis and debridement. AORN J 2005;82: 1031-40.
10. Legbo JN, Shehu BB. Necrotizing fasciitis : a comparative analysis of 56 cases. J Natl Med Assoc 2005;97:1692-7.
11. Tillou A, St Hill CR, Brown C, Velmahos G. Necrotizing soft tissue infections: improved outcomes with modern care. Am Surg 2004;70:841-4.
12. Bilton BD, Zibari GB, McMillan RW, Aultman DF, Dunn G, McDonald JC. Aggressive surgical management of necrotizing fasciitis serves to decrease mortality: a

retrospective study. Am Surg 1998;64:397-400.
13. Majeski JA, Alexander JW. Early diagnosis, nutritional support, and immediate extensive debridement improve survival in necrotizing fasciitis. Am J Surg 1983;145:784-7.
14. Meng Y, Chi CY, Ho MW, et al. Microbiology and factors affecting mortality in necrotizing fasciitis. J Microbiol Immunol Infect 2005;38:430-5.
15. Sudarsky LA, Laschinger J, Coppa G, Spencer F. Improved Results from a standardized approach in treating patients with necrotizing fasciitis. Ann Surg 1987;206:661-5.