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ORIGINAL RESEARCH

Identification Of Acute Necrotizing Soft Tissue Infections Through Clinical Indicators

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ABSTRACT

Background: Necrotizing soft tissue infections (NSTIs) are a quickly deadly illness whose prognosis is dependent on early detection and treatment.

Methods: The study included 626 patients, 378 of whom were men and 248 of whom were women, ranging in age from 19 to 67 years. The research was carried out at Department of General Surgery, LSK Hospital, Kishanganj, Bihar for 5 years. The study's samples were taken from patients who came to the hospital with Necrotizing fasciitis. These individuals are undergoing clinical, radiological, and laboratory examinations. Tissue samples are taken for bacterial culture and sent to a laboratory for identification and antibiotic sensitivity testing. The area was examined using X-rays and CT scans. Blood samples were also obtained and sent to a laboratory for a full blood analysis.

Results: In compared to the control group, severe cases have the lowest mean value of WBC (7.1806±1.95788), the lowest mean value of haemoglobin (6.9260±2.25653), and the highest blood levels of creatinine (145.9758±2.33841), glucose (13.8547±1.71067), and the lowest serum sodium (94.0986±0.22220). At the 0.05 level, the mean difference is significant ($P<0.05$).

Conclusion: A necrotising soft tissue infection is a fatal disorder. It is critical to focus on the aetiology of such a problem in order to begin treatment as soon as possible in order to avoid mortality.

Keywords: Blood parameters, Mortality, Microbial culture pattern, Necrotizing soft tissue infections

INTRODUCTION

Necrotizing soft tissue infections (NSTIs) are fulminant infections of any soft tissue compartment that cause extensive necrosis, systemic toxicity, and a high mortality rate if not treated promptly. The biggest problem in treating individuals with NSTI is establishing a diagnosis, and understanding of all available methods is essential for early and correct diagnosis. [1-3] Aggressive soft tissue infections are uncommon, difficult to diagnose, and necessitate rapid surgical intervention as well as antibiotic therapy. Failure to do so results in a very high mortality rate (80 to 100%), and even with prompt detection and management, current mortality rates are around 30 to 50%.

Based on microbiological characteristics, the Food and Drug Administration (FDA) has divided skin and soft tissue infections into two categories. [4,5] Type I infections, such as Fournier's gangrene and Ludwig's angina, are the most common, accounting for 80% or more

of all NSTIs. [6] The majority of these illnesses are polymicrobial in nature (caused by both aerobes and anaerobes). Type II infections are typically monomicrobial (caused by Streptococcus or S. aureus) and occur after a minor injury, accounting for 10-15% of all NSTIs. [7-10]

Individual risk factors for NSTI mortality include growing age, diabetes, peripheral vascular disease, obesity, chronic renal failure, HIV, alcohol misuse, IV drug usage, abscess, blunt or piercing trauma, insect bite, surgical incision, and delaying surgical debridement, among others. [11-13] Unfortunately, the small number of patients reported in most NSTI series has made definitive identification of risk variables for mortality impossible. [14] The purpose of this study was to investigate the clinical characteristics, risk factors, and microbial culture pattern involved in the pathogenesis of NSTI, as well as to examine the outcome and therapy of the disease.

METHODS

The study covers 626 patients, 378 males and 248 females ranging in age from 19 to 67 years. The research was carried out at Department of General Surgery, LSK Hospital, Kishanganj, Bihar for 5 years. The study sample was collected from patients who came to the hospital with Necrotizing fasciitis after a surgically corrected open fracture of the femur and other follow surgical procedure in premium, scrotum, and other operation related to lower part of body and patients who came for similar complaint who underwent surgical amputation of lower limb for the same reason. The study sample was divided into the following categories based on disease severity:

Group1: Health control with normal value of WBC, Hb, serum glucose and sodium and creatinine.

Group2: Mild cases with WBC>25 cell/mm3, Hb>13.5 g/dl, serum glucose>7 mmol/l, serum sodium 120 mmol/l, creatinine 50 mmol/l.

Group3: Moderate cases with WBC 15-25 cell/mm3, Hb 11-13.5/dl, serum glucose >11 mmol/l, serum sodium 100 mmol/l.

Group4: Severe cases WBC 14 mmol/l, serum sodium 141 mmol/l.

Table 1 shows the mean values of age, WBC, Hemoglubin, serum glucose, serum sodium, serum creatinine, and bacterium type among the study groups.

RESULTS AND DISCUSSION

Our research is centred on the multimicrobial aetiology of the severe soft tissue infection "Necrotizing fasciitis." Is a surgical emergency that necessitates quick intervention and treatment to avert the dangerous consequences including mortality caused by rapidly spreading infection and septic shock. Lower extremities, abdominal wall, and pernium are frequently afflicted. It also occurs in the maxillofacial region [15].

Variables	Severe	Moderate	Mild	Healthy	P-Value
Age±SD	47.47±7.60	34.94±4.11	27.03 ±2.95	17.46±2.87	<0.05*
Time of onset±SD	72.38±.23	48.47±.27	24.47±.27	0.50±0.23	<0.05*
BMI±SD	11.92±.26	13.81±.39	16.84±.36	20.69±1.88	<0.05*
Type of Bacteria	3.82±2.17	3.44±2.11	3.30±1.97	0.00±0.00	<0.05
WBC±SD	7.18±1.95	20.1±2.64	34.99±9	7497 ±3190	<0.05*
Hemoglobin±SD	6.92±2.25	12.48±.95	13.71 ±.13	14.36±1.62	<0.05*
Serum sodium±SD	94.09±.22	110.5 ±1.2	120.0±2.8	146.69±4.92	<0.05*
Serum creatinine±SD	146 ±2.3	100.4 ±.63	50.4 ±4.4	0.92±.07	<0.05*
Serum glucose ±SD	13.85±1.7	10.37±.40	7.57±1.16	5.33±.82	<0.05*

*: Highly significant; NS: Non-significant; P-value<0.05; SD: Standard deviation; WBC: White blood cell

The absence of identifiable components involved in illness aetiology or recognised portal access for bacteria makes the diagnosis of necrotizing fasciitis problematic [16]. The natural symptom is divided into three stages: initial, progressing, and critical. Initial phases in the first (24 hours) with flulike symptoms and clinically wound site with extreme exaggerated pain, redness, and swelling may be misdiagnosed as cellulitis [17]. After 2-4 days, the skin becomes hard, edematous, shiny red, and bleeding purpura.With anaesthesia, the skin thins due to nerve injury and fluctuating pressure from gas-forming microorganisms [18]. Then, within 24 hours, septic shock with symptoms of fever, tachycardia, hypotension, and tachypnea, followed by death owing to septicemia and increasing tissue destruction [19,20].
The statistical results in Table 1 show that the severe group had the lowest mean value of WBC count (7.1806±1.95788) in comparison to the control ($P<0.05$). History of any trauma surgery connected to the area, as well as medical history of comorbidities such as diabetes, renal disease, and so on [21]. This diagnosis is critical for controlling the condition and improving quality of life. Blood culture, complete blood count with differential, basic metabolite test to role the diagnosis, imaging CT, MRI, and ultrasound should be used [22]. To differentiate Necrotizing fasciitis from other types of soft tissue infection cellulitis, use the Laboratory indicator for risk of Necrotizing fasciitis.This approach assigns points based on Hb value, WBC count, serum creatinin, glucose, salt, and C-reactive protein [23]. Once a diagnosis is made, treatment should begin as soon as possible to avert morality by surgical debridement and antibiotic therapy, as well as fluid therapy to restore hemodynamic state and blood pressure. Vancomycin plus carbapenem, ceftrizone, or fluroquinolone plus metronidazole are examples of combined antibiotic treatments [24,25].

CONCLUSION

A surgical emergency is necrotizing soft tissue infections. The keys for successful management are high clinical suspicion of such infection in its early stages and early and vigorous surgical treatment. If NSTI is detected and intravenous antibiotics fail to control the infective process within 24 hours, vigorous therapy should be initiated immediately to obtain a favourable outcome.

REFERENCES

1. Mishra SP, Singh S, Gupta SK. Necrotizing Soft Tissue Infections: Surgeon's Prospective. Int J Inflam. 2013;2013:609-28.
2. Charles Brunicardi F. Surgical Infections. In: Schwartz Principles of Surgery. Chapter 5. 8th edition. USA: Mc Graw Hill; 2006:93.
3. Guidance for industry. Uncomplicated and complicated skin and skin structure infections: developing antimicrobial drugs treatment. US Department of Health and Human Services, Food and Drug Administration, Center for Drug Evaluation and Research; 2010.
4. Stevens DL, Bisno AL, Chambers HF. Practice guidelines for the management of skin and softtissue infections. Clin Infect Dis. 2005;41(12):1373- 406.
5. Ustin JS, Malangoni MA. Necrotizing soft-tissue infections. Critical Care Med. 2011;39(9):2156-62.
6. Centers for Disease Control and Prevention (CDC) Invasive group a streptococcal infections United Kingdom, 1994. Morb Mortal Weekly Rep. 1994;43(21):401-2.
7. Ogilvie CM, Miclau T. Necrotizing soft tissue infections of the extremities and back. Clin Ortho Related Res. 2006;447:179-86.
8. Kalaivani V, Hiremath BV, Indumathi VA. Necrotising soft tissue infection: risk factors for mortality. J Clin Diagn Res. 2013;7(8):1662-5.
9. Adam DB, Robert Z, Eliza HC (2014) Necrotizing fasciitis: Diagnosis and management. Emergency Medicine 76: 65-87.

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10. Anaya DA, Dellinger EP (2007) Mangement Necrotizing tissue infection. J Ophth 44: 127-144.
11. Anton H (2018) Treatment of Necrotizing fasciitis. Advanced Emergency Care 44: 78-89.
12. Bernnan MR, LeFervre F (2019) Diagnosis of fasciitis infection. Critical Care 16: 10- 19.
13. Lin TY, Ou CH, Tzai TS (2014) Amplification of Fournier's gangrene severity index. Int J Urol 36: 66-87.
14. Wong CH, Khin LW, Heng KS, Tan KC, Low CO (2004) Laboratory risk indicator for Necrotizing infection. Crit Care Med 22: 1376-1387.
15. Borschitz T, Schlicht S, Siegel E, Hanke E, Von SE (2015) Improvement in clinical score of Necrotizing fasciitis severe. PLoS One 15: 167-178.
16. Fustes MA, Gutierrez CP, Tamayo SL, Ruiz MR (2002) Necrotising fasciitis: A report of 39 pediatric patients. Arch Dermatol 12: 156-166.
17. Holmstorm B, Grimsley EW (2000) Necrotizing fasciitis and toxic shock syndrome. South Med J 44: 55-78.
18. DeBoer SL, Zeglin D (2001) Necrotising fasciitis mortality rate 45%. American Journal of Nurse 23: 45-89.
19. Korhan T, Hakan Y (2007) Stratigies for diagnosis and management. World Journal for Emergency Surgery 23: 56-98.
20. Catena F, La DM, Ansaloni L, Argusti S, Taffurelli M (2004) Necrotizing fasciitis: An emergency surgicay. Eur J Med 33: 77-99.
21. Childers BJ, Potyondy LD, Nachreiner R, Roger ER (2002) Necrotizing fasciitis: Retrospective study. Am Surg 22: 67-98.
22. Zdravko R, Zeljka R, Dario M, Davor L (2011) Necrotizngfasciitis:Review of literature. World Journal of Emergency Surgery 33: 143-220.
23. Morgan MS (2010) Approach in diagnosis of Necrotizing fasciitis. J Host Infec 88: 55-98.
24. Cai Y, Gan Y, Yu C, Tang J, Sun Y (2018) The success of treatment of Necrotizing fasciitis after surgery. Medicine 54: 145-260.
25. Bellapianta JM, Ljungquist K, Tobin E (2009) Necrotizing fasciitis. J am Acad Otho Ped Surg 44: 77-98.