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Microbiological Aspects of Necrotising Fasciitis Among Type II Diabetes Mellitus in a Tertiary Care Hospital

Zaara Ahmed [1], Mahanth H M [1], Sachin Subbaraya [2], Vidya K R *[3]

[1]Assistant Professor, Department of General Surgery, Rajarajeswari Medical College and Hospital, Bangalore, Karnataka India.
[2]Associate professor, Department of General Surgery, Rajarajeswari Medical College and Hospital, Bangalore, Karnataka India.
[3]Assistant Professor, Department of Community Medicine, Shri Atal Bihari Vajpayee Medical College and Research Institute, Bangalore, Karnataka India.

*Corresponding Author: Vidya K R; *vidya.287@gmail.com*

Abstract

Objective: To Elucidate the microbiological aspect of necrotizing fasciitis among type 2 Diabetes Mellitus patients. ***Design:*** This is a prospective descriptive study conducted in a tertiary care centre in a metropolitan city. ***Subjects/Patients:*** adult with type II diabetes mellitus patients who were diagnosed to have necrotizing fasciitis. ***Methods:*** Tissue for culture and histopathology was sent and work up for sepsis done. All details were entered in the Performa designed for entering the data, recording of treatment, antibiotics used, surgical procedures and outcome of every patient was recorded and analysed. ***Results:*** There were a total of 61 patients enrolled in our study, out of which there 43.5% had controlled sugars. The mean average age was 56.6±10.22 years. Cultured organism the most common organism grown in our clinical set up being beta-hemolytic streptococci. Sensitivity pattern most commonly was sensitive to clindamycin. ***Conclusion:*** Necrotizing fasciitis is a common condition encountered in our setup and high degree of suspicion is required acutely swollen limb in a diabetic patient. A detailed foot care is essential in these patients as they are prone for more severe infection than those followed foot care. start on 3rd generation cephalosporins and an extensive debridement.

Keywords: ***Diabetes Mellitus, Necrotizing fasciitis, Antibiotic sensitivity.***

Introduction

Necrotizing fasciitis is a potentially lethal illness that progresses quickly. It is distinguished by widespread necrosis of the fascia and subcutaneous tissue as well as increasing inflammation [1]. In 1848, necrotizing fasciitis was initially reported. Meleney discovered 20 Chinese patients in 1920 when hemolytic streptococcus was the only bacteria present. Wilson identified no particular pathogenic bacteria associated with necrotizing fasciitis, the name he first used in 1952. Necrosis-causing soft tissue infections are particularly dangerous due to their high fatality rates and tendency to cause severe tissue loss [2,3]. Necrotizing soft tissue infections have a complicated nomenclature. When it comes to diagnosis or initial therapy, attempts to distinguish these infections based on predisposing factors, discomfort, toxic conditions, fever, crepitus, skin and subcutaneous tissue look, and bullae are not very helpful. Because bacteria rarely respect anatomical barriers, myonecrosis is typically not restricted to muscle and necrotizing fasciitis is rarely restricted to fascia.

Bacteria called streptococcus pyogenes, occasionally it can be caused by staphylococcus aureus, clostridium perfringens, C. septicum, P. aerogenosa, vibrio species and some fungi cause the commonest and most serious infections. Rarely it as result of non-group A streptococci, S. pneumonia, or H. influenza B infections. Sometime bacteria that are aerobic or anaerobic are facultative act together to cause tissue necrosis.

Necrotizing fasciitis is linked to severe systemic toxicity and is brought on by a polybacterial infection. characterized by widespread tissue necrosis beneath healthy skin; the only outward manifestations of this condition could be necrotic skin patches, fluid-filled vesicles, and severe sepsis [4]. Since the death rate linked to this clinical entity is almost 70% in the majority of the literature, it is crucial to understand the different presentations and the organisms related with our setup in order to identify it and provide patients with the right treatment. Early detection, intensive surgical therapy, and the initiation of broad-spectrum antibiotics all affect the prognosis of necrotizing fasciitis [5].

In diabetes mellitus type II, necrotizing fasciitis has a similar prognosis if it is not identified early and treated appropriately. For a

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comprehensive treatment of necrotizing fasciitis in diabetes, comprehensive information about the clinical presentation, the organisms causing it, and other factors involved in necrotizing fasciitis is therefore required to aid in the correct diagnosis, management, and ultimate outcome of the disease. So current study was planned to Elucidate the microbiological aspect of necrotizing fasciitis among type 2 DM patients.

Methods

This is a prospective descriptive study conducted in a tertiary care centre in a metroplitian city. Institutional ethical committee clearance was obtained prior to start the study. Inclusion criteria was all adult with type II diabetes mellitus patients admitted to an RAMAIAH HOSPITAL from MAY 2015 to JUNE 2016 who were diagnosed to have necrotizing fasciitis. Patients other than diabetes mellitus type II admitted in a RAMAIAH HOSPITAL who were diagnosed to have necrotizing fasciitis were excluded. The study population consists of total of 61 patients with Type II diabetes mellitus and necrotizing fasciitis involving the extremities.

Patients were informed consent taken as per the institution rules and no additional test or procedure done apart from the standard treatment procedure. The procedures followed were in accordance with the Helsinki Declaration of 1975, as revised in 2000. Patient's admitted with necrotizing fasciitis were evaluated in detail with respect to patient's history, examination and chart reviews. All patients were ruled out for peripheral vascular disease and deep vein thrombosis. Tissue for culture and histopathology was sent and work up for sepsis done. All details were entered in the Performa designed for entering the data, recording of treatment, antibiotics used, surgical procedures and outcome of every patient was recorded and analyzed.

Data analysis done using Pearson's chi square statistic to identify univariate differences with respect to diabetic status and variables with respect to morbidity and mortality. The Statistical software namely SPSS 11.0 and Systat 8.0 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

Results

There were a total of 61 patients enrolled in our study, out of which there 43.5% had controlled sugars. The mean average age was 56.6±10.22 years. The study group consists of 61 type II diabetic patients out of whom 48(78.7)% were male patients and 13(21.3%) female's patients [**Table 1**].

All the patients in the study group required first debridement ie.61 patients and re-debridement was necessary in 21 patients and 2 patient required below knee amputation. Cultured organism the most common organism grown in our clinical set up being beta-hemolytic streptococci 24 (39.34%), E.coli 15 (24.59 %), Klebsiella 12(19.67%) and pseudomonas 10(16.66%).

Sensitivity pattern most commonly was sensitive to clindamycin 21 (34.44%), followed by Linezolid 15(24.59%) and ciprofloxacin 12(19.67%). Repeat culture were predominantly gram negative bacilli rather than cocci [**Figure 1**].

All of them had underwent a initial debridement and 8% also underwent disarticulation along with it and 1 also underwent transmetatarsal amputation. 37.7% of the patients needed to be operated again after the initial surgery. Patients presenting with necrotic patch of skin had 50% chances of second surgery and extensive surgical debridement, similarly patients presenting with superficial ulcer and cellulitis. 50% of the population with fascia involvement at initial debridement required another debridement. But patients with involvement of muscle had more extensive procedure 9% below knee amputation. But the end result most of them recovered 25% of the study population, 72 % required a surgical procedure for healing.

Table 1: Socio demographic factors of participants

Variable		Frequency	Percentage
Age	**<45**	**14**	**22.95**
	46-55	**24**	**39.34**
	56-65	**15**	**24.59**
	>65	**8**	**13.11**
Gender	Male	48	78.7%
	Female	13	21.3%

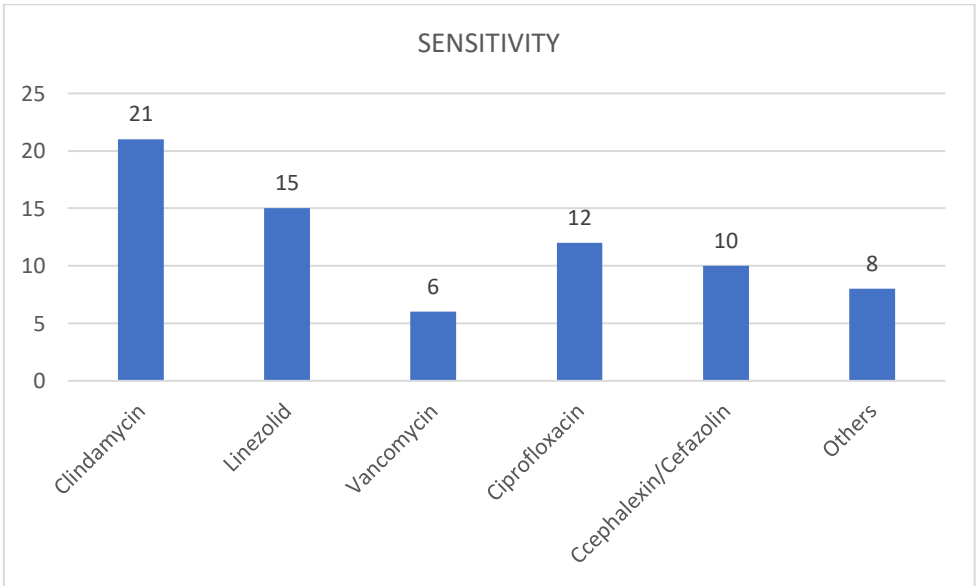

Figure 1: Bar diagram showing sensitivity pattern of organisms isolated.

Discussion

Necrotizing fasciitis is a common infection encountered in our clinical set up. This study was designed only for type II diabetes mellitus patients with lower limb necrotizing fasciitis hence makes it unique done so far. Our primary intention was to early diagnosis based on the natural history of the condition so that prompt and effective management of necrotizing fasciitis in type II diabetes mellitus in an urban tertiary care hospital. In our experience most common mode of onset of symptoms is spontaneous (65%) in nature. but clinical presentation is variable and hence mode of onset has no much value in predicting the course of the disease.

Our study also made a note on the common organisms possible with necrotizing fasciitis in our setup which will give a guide on the most empirical treatment early in the course of the hospital stay rather than wait for the culture sensitivity reports. The similar goal of being proactive and taking swift action to lower the overall mortality rate was also achieved by sensitive patterns [10]. This improved the outcomes of our surgical care. As a result, this study helps our diabetic patients with NF recover considerably more quickly and experience lower rates of morbidity and death. and lower fatality rates in contrast to other research.

The mean average age was 56.6±10.22 years. The study group consists of 61 type II diabetic patients out of whom 48(78.7) % were male patients and 13(21.3%) female's patients. These results of age distribution and gender distribution obtained in the present study were similar to results obtained in a systemic review [6] and another retrospective study [7].

The present study was conducted in a tertiary care teaching hospital. The hospital-based study may be influenced by the referral bias. The study sample may not represent the general population. Hence, the results may not be applicable to the general population.

In conclusion necrotizing fasciitis is a common condition encountered in our setup and high degree of suspicion is required acutely swollen limb in a diabetic patient. A detailed foot care is essential in these patients as they are prone for more severe infection than those followed foot care. An early extensive debridement is mandatory and key for a favourable outcome. And to start on broad spectrum antibiotics as soon as suspected necrotizing fasciitis is advisable. And to sum up in a diabetic patient with lower limb swelling, no foot care, hemodynamic instability and spreading lesion, start on 3rd generation cephalosporins and an extensive debridement. Reassess after 72 hours and plan for a second surgery if wound not clean. Clean wounds continue dressing and discharge and follow up for dressing on OPD basis. Admit the patient if wound has satisfactory granulation tissue and repeat culture and plan for skin graft or secondary suturing

Declarations

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Conflict of interest declaration

Nil

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Contributors

Zaara Ahmed, Assistant Professor, Mahanth H M, Assistant Professor, Sachin Subbaraya, Associate Professor, Vidya K R, Assistant Professor.

Ethical Clearance

Obtained from institutional ethical committee

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