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Research article

A RETROSPECTIVE STUDY ON COMPLICATIONS AND CLINICAL MANAGEMENT OF NECROTIZING FASCIITIS AT TERITIARY CARE HOSPITAL IN DHARMAPURI

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ABSTRACT

Necrotizing fasciitis (NF) is a term used to describe a collection of relatively infrequent but life-threatening infections of the skin, soft tissues, and muscles that tend to spread quickly across the fascia planes, causing progressive fascia destruction at a pace of 2–3 cm/h. Its rapid clinical progress is linked to polymicrobial infection and synergy, which generally co-exists in the lower or higher limbs, the perineum and genital area (Fournier's gangrene), and the abdominal wall. The major goal of this study is to evaluate risk factors, clinical symptoms, and categorise patients with necrotizing fasciitis using the LRINEC score in a tertiary care hospital. Study design: Retrospective Observational study. Study site: Department of general surgery at tertiary care hospital, Dharmapuri Study Duration: Six months. Sample Size: 200 patients. Study criteria: - Inclusion criteria: All patients who were diagnosed (confirmed either clinically or radiologically) with Necrotising fasciitis of either sex. A retrospective analysis of data obtained from case sheets, who were admitted to the surgical department with a provisional diagnosis of NF from the year Jan 2021 to Dec 2021 at a tertiary care hospital after obtaining the permission of institutional review board and ethical committee, Padmavathi College of Pharmacy, Dharmapuri, India. The overall dynamics of NF are quick, and severe illness development will become apparent within a few hours. In the present study we intended to stratify risk factors that allow for a better and initial presentation to allow for quick recognition of NF. After examining the one-year medical outcomes in 200 patients, our statistical analysis concluded that LRINEC score can be utilized for risk stratification and prognosis in addition to its diagnostic function. We finally concluded that patients in group 2 with a score of >6 are more likely to spend longer time in the hospital and are more likely to have surgery.

Key Words:- Retrospective Study Complications And Clinical Management Fasciitis At Teritiary Care

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INTRODUCTION

Necrotizing fasciitis (NF) is a term used to describe a collection of relatively infrequent but life-threatening infections of the skin, soft tissues, and muscles that tend to spread quickly across the fascia planes, causing progressive fascia destruction at a pace of 2–3 cm/h. Its rapid clinical progress is linked to polymicrobial infection and synergy, which generally co-exists in the lower or higher limbs, the perineum and genital area (Fournier's gangrene), and the abdominal wall [Vishnoi V, *et al* 2018, 2. Shaikh N, *et al* 2015]. Group A streptococcal infection, widely known as flesh-eating bacteria, is the most rapidly growing kind of necrotizing fasciitis. Microbial infections with a single bacterium (monomicrobial) or a mix of bacteria can also cause necrotizing fasciitis (polymicrobial). Necrotizing fasciitis can develop for a variety of reasons (both traumatic and non-traumatic) in a wide range of patients. Some medical problems have been discovered to increase the risk of infection in patients. Diabetes, cancer, drug addiction, and chronic renal illness are among the most common causes of immunosuppression. [3. Demirag B, *et al* 2004] Necrotizing fasciitis was initially recognised in

500 BC, when Hippocrates described a complication of erysipelas sickness in a clinical description that resembled the present diagnosis of NF [4. Cheng NC, *et al.*2011]. In 1783, the chief surgeon of the Hotel Dieu in Lyon, Claude Colles, described a condition that was strikingly similar to modern diagnoses of NF [5. Mundigler G, *et al.* 1998]. Joseph Jones, a military surgeon in the Confederate States of America's army, was the first to describe "modern" NF. During the American Civil War, he documented 2,642 instances of gas gangrene treated in hospitals, with a fatality rate of about 46%. [Hakkarainen TW*et al.* 2014]. In 1883, Jean Alfred Fournier described a syndrome in which five men developed necrosis of the perineum; this type of NF was later named after him and is known as Fournier's gangrene [7. Wong CH, *et al. 2004]*]. Meleney found a link between beta-haemolytic streptococcus A and a series of hospitalised cases in Beijing in 1924. Meleney's gangrene was the name given to these patients for several decades after that [Holland MJ, 2009]. Wilson proposed the term "necrotizing fasciitis" as a more precise description of this condition in 1952. [Bozkurt O, *et al.* 2015]. The late 1980s saw a resurgence of interest in this disease. According to Stevens, 11 of the 20 patients who presented with streptococcal shock were identified with NF. The condition was dubbed "flesh-eating bacterium syndrome" by the media [Lille ST, *et al* 1996]**.**

Aim and Objectives Of The Study

The major goal of this study is to evaluate risk factors, clinical symptoms, and categorise patients with necrotizing fasciitis using the LRINEC score in a tertiary care hospital.

OBJECTIVES:

1. Determine the risk factors for NF in patients.
2. To determine the severity of NF symptoms and clinical parameters in patients.
3. To classify the infection site in patients.
4. Using the LRINEC (Laboratory Risk Indicator for Necrotising Fasciitis) scale, divide the patients into two groups.
5. Evaluate the treatment of necrotizing fasciitis

MATERIALS AND METHODS:

Study design: Retrospective Observational study.
Study site: Department of general surgery at tertiary care hospital, Dharmapuri
Study Duration: Six months
Sample Size: 200 patients.
Study criteria: -

Inclusion criteria:

All patients who were diagnosed (confirmed either clinically or radiologically) with Necrotising fasciitis of either sex.

Exclusion criteria:

1. Below age of 20 years,
2. Pregnant women,
3. lactating women.

METHOD OF DATA COLLECTION:

A retrospective analysis of data obtained from case sheets, who were admitted to the surgical department with a provisional diagnosis of NF from the year Jan 2021 to Dec 2021 at a tertiary care hospital after obtaining the permission of institutional review board and ethical committee, Padmavathi College of Pharmacy, Dharmapuri, India.
The data to be collected from the patient's case records i.e.

Patient's demographics:

1. Age
2. Gender,
3. Risk factors (such as life style, diet, family history, comorbidities),
4. Chief complaints,
5. History of present illness,
6. Past medical history,
7. General examination,
8. Signs and symptoms,
9. Final diagnosis,
10. Drug therapy,
11. Statistical Analysis: A suitable statistic will be applied to project the results.

Results:

Out of 200 patients, a higher rate of NF was observed in age group of 51 to 60 yrs. 30.5% (61) followed by age group of 61 to 70 yrs. 29% (58) followed by age group of 41-50 yrs. 16% (32), followed by age group 71-80 yrs. 13.5% (27), followed by age group of 31-40 yrs. 9% (18), followed by age group 21-30 yrs. 2% (4) respectively.

Out of 200 patients' highest members affected with necrotizing fasciitis were males 136 (68%) and lowest were females 74(32%) respectively

Out of 200 patients, 31% (62) of NF, most infected site left lower limb, followed by 29% (58) right lower limb followed by 13.5% (27) right upper limb followed by 8% (16) left upper limb followed by 8% (16) right foot followed by6.5% (13) left foot followed by 2% (4) both left and right knee respectively.

- LTF- Left foot
- LTLL- left lower limb
- LTUL-left upper limb

- RTLL- right lower limb
- RTUL- right upper limb
- RTF- right foot

Among 200 patients, based on risk factors NF were observed in trauma 37.88% (118) followed by DM 32.42 % (95) followed by HTN 18.08% (53) followed by ALC 7.76% (21) followed by past surgeries 4.43% (13) respectively

Out of 200 patients, 136 (68%) suffered with pain, 135(67.5%) suffered with ulcer, 131(65%) suffered with edema,126(63%) were suffered with fever, 105(52.5%) were suffered with necrosis, 100(50%) were suffered with discoloration, 75(37.5%) were suffered with pus discharge, 73(36.5%) were suffered with blebs, 66(33%) were suffered with breathlessness, 65(32.5%) were suffered with foul smell discharge.

A total of 200 NF cases divided into two groups based on LRINEC score. Score of 0-6 were indicated in group 1 (37.5%) and greater than 6 were indicated in group 2 (62.5%). Compare to group 1, patients in group 2 have more score, length of the stay and surgery significantly higher in group 2 patients.

Out of 200 patient's surgery was performed in 56.5% (119) and 40.5 % (81) were treated with medications

out of 200 patients 38(19%) were undergone Fasciotomy and debridement removal, 30(15%) were undergone amputation, 26(13%) were undergone debridement removal, 24 (12%) was undergone Fasciotomy and 1(0.5%) were undergone Fasciotomy followed by amputation.

Out of 200 patient's antibiotics were given to everyone and anti-pyretic for 78.6%9 (156) patients, anti-inflammatory drugs for 65 % (133) patients, analgesics for 56.0% (112) patients, vitamins for 55.5% (111) patients

Out of 200 patients, the most commonly prescribed drug Ceftriaxone and Metronidazole (52) least prescribed drug is amoxicillin (1).

Figure NO. 1: Age Wise Distribution among Study Population

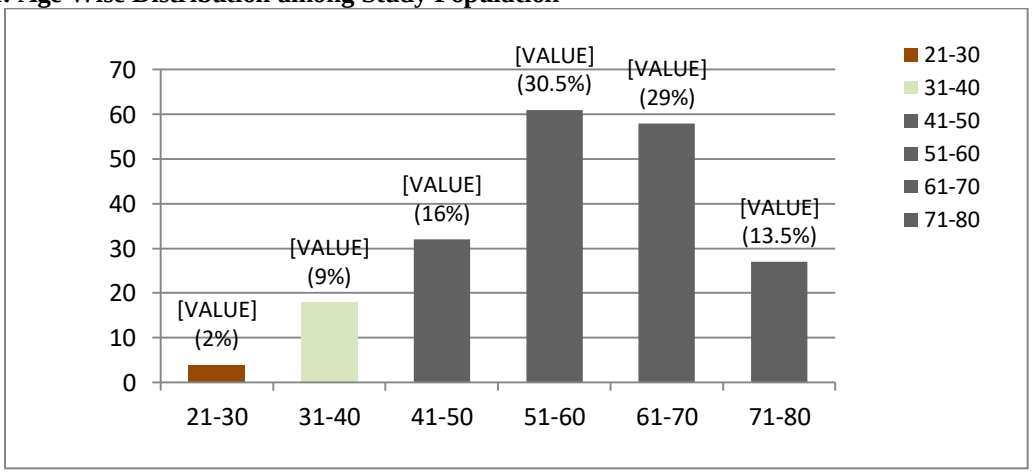


Figure 2: Gender Wise Distribution among Study Population

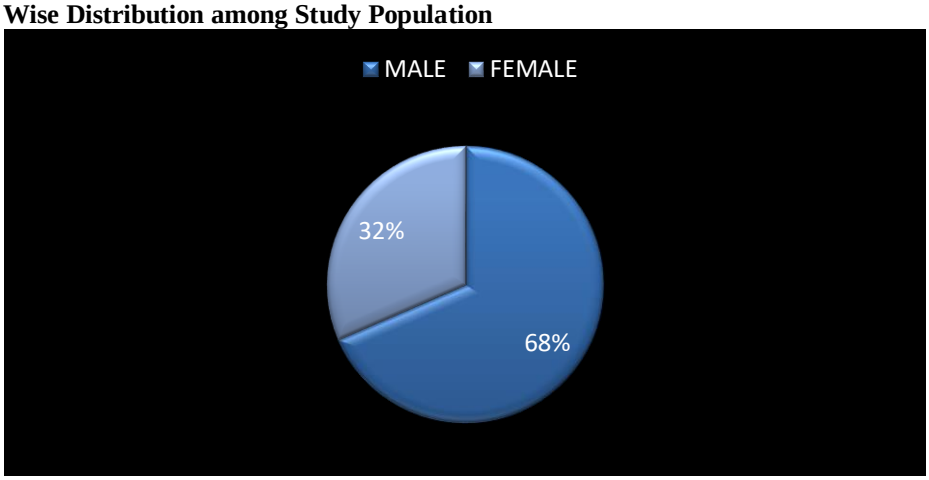


Figure 3: Categorize the Patients Based On Site Of Infection

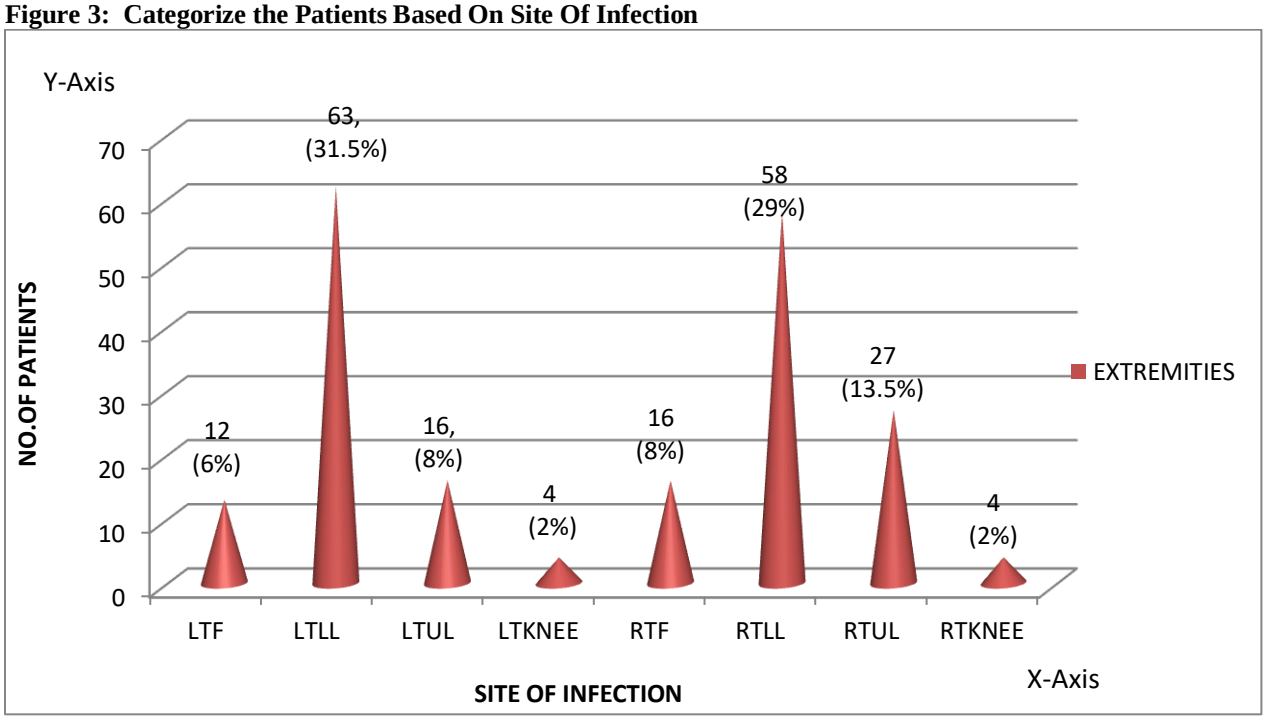


Figure 4: Classification of Patients Based On Risk Factors

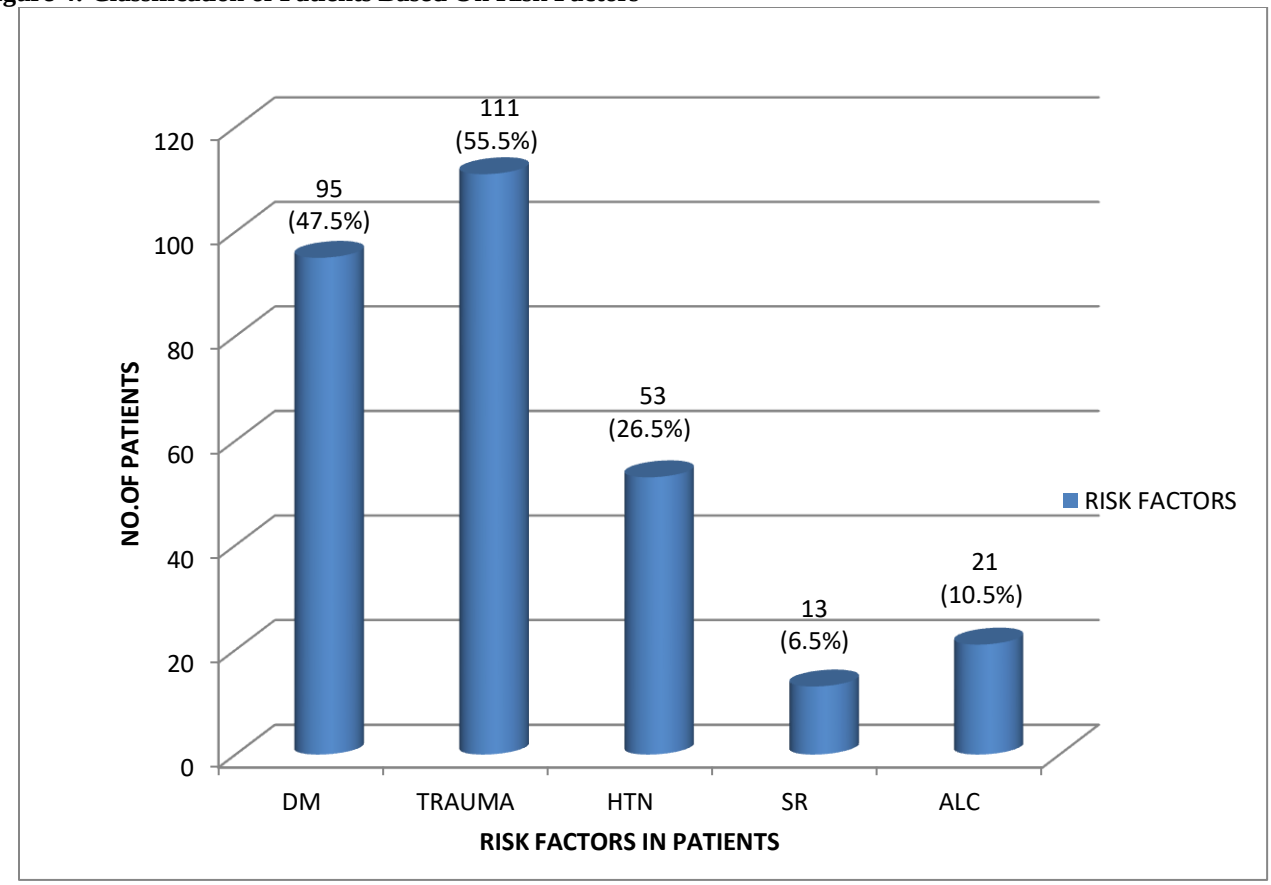


Figure 5: Classification of Patients Based on Manifestation:

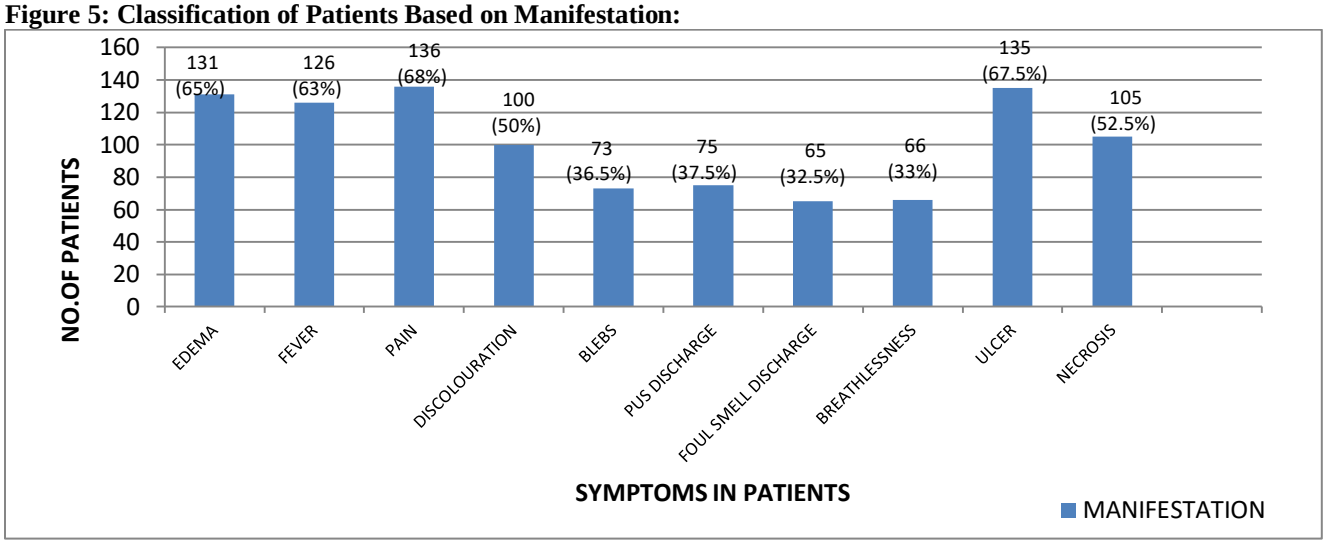


Figure 6: Classification Of Patients Based On Score

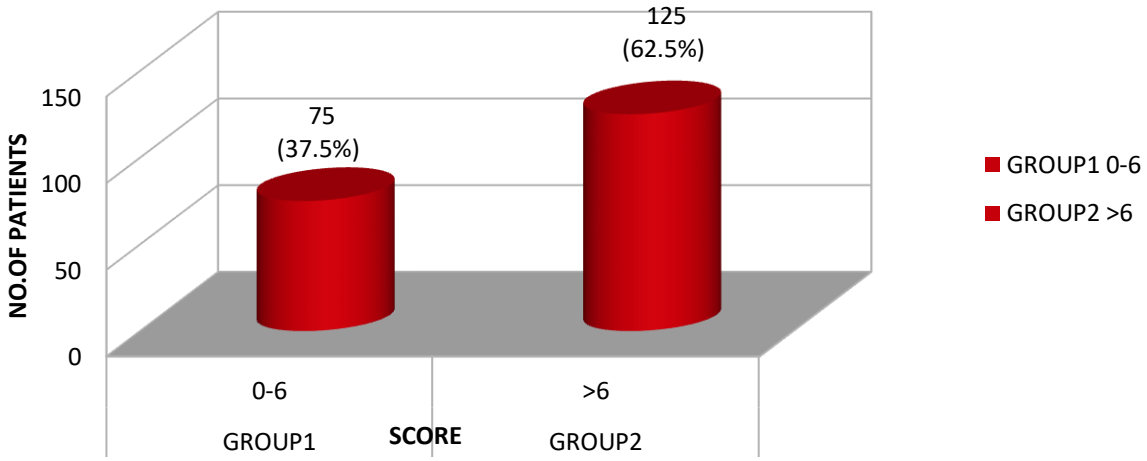


Figure 7: Classification of Patients Based on Surgery

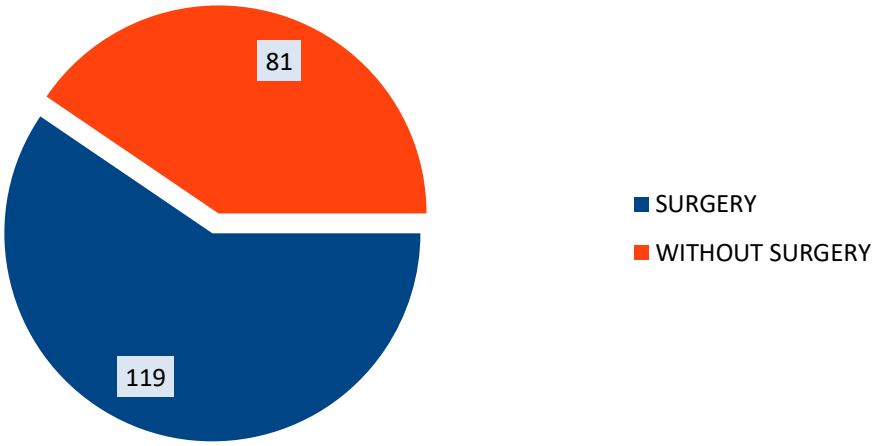


Figure 8: Type of surgery among study population

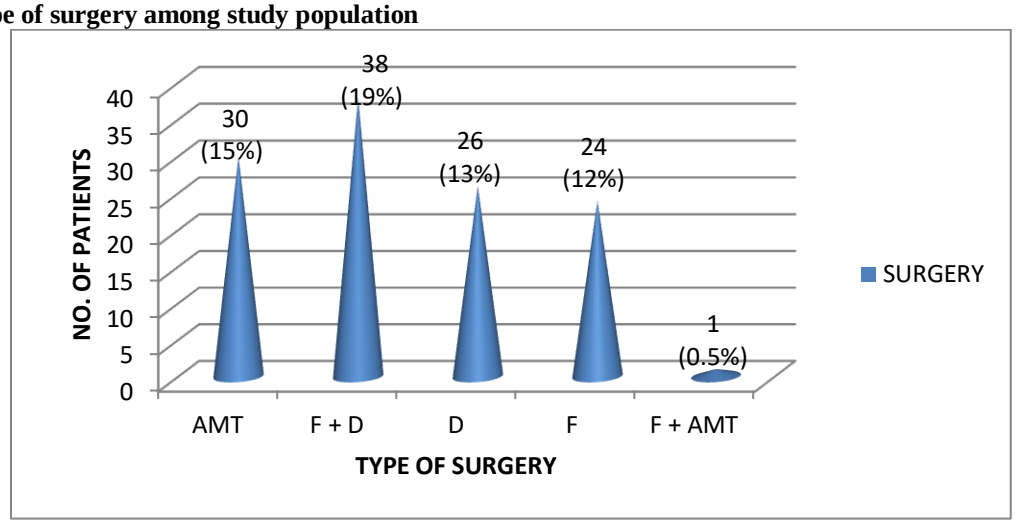


Figure 9: Categories of drugs based on prescribed therapy

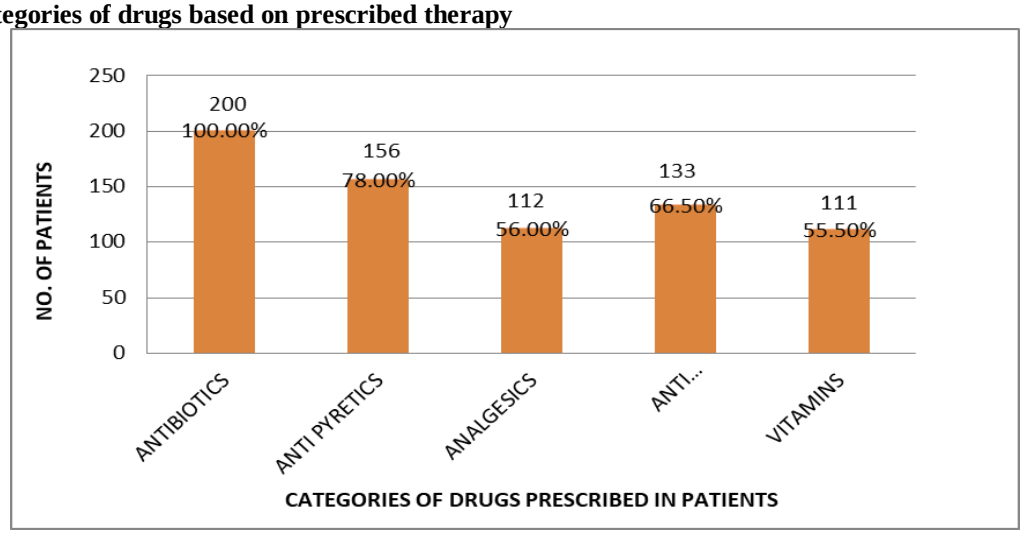
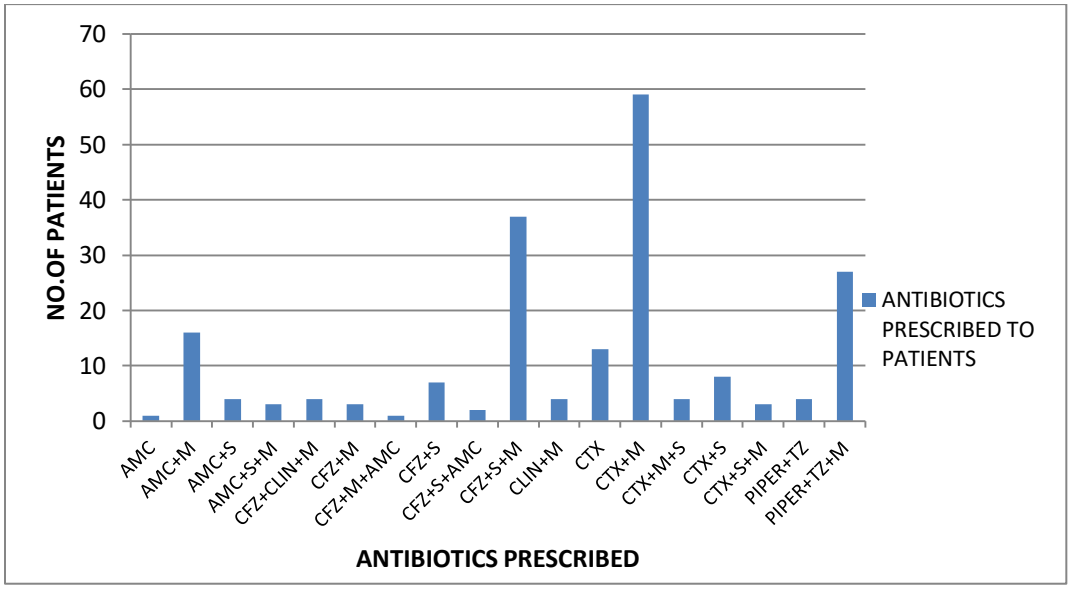


Figure 10: Classification Based on Prescribed Antibiotics



DISCUSSION

Necrotizing fasciitis is an important surgical acute infection of superficial fascia with rapid progression in around soft tissue. If not promptly recognized and aggressively treated, NF usually leads to sepsis and multiorgan failure with fatal outcome, thus early diagnosis and prompt surgical treatment are crucial for healing of these patients. The medical records of patients treated for acute NF localized on a different part of the body in a tertiary care teaching hospital during a 6 months period was retrospectively analysed.

Our study was conducted in a population of 200 at a tertiary care hospital, where it was observed that highest cases of NF was in the age group 51 to 60 yrs. 30.5% (61) followed by age group of 61 to 70 yrs. 29% (58) followed by age group of 41-50 yrs. 16% (32), followed by age group 71-80 yrs. 13.5% (27), followed by age group of 31-40 yrs. 9% (18), followed by age group 21-30 yrs. 2% (4) due to presence of comorbidities like DM, HTN in elderly people which was in line with the study of Vishnoi V, chiam HC *et al*. (1)

Whereas, the percentage of NF was higher in males compared to females due to presence of risk factors like smoking, alcohol intake. males (69%) and least were females (32%) which is in line with the study of Shaikh N *et al*. (2) Left lower limb was most affected extremities (31.5%) and least affected was left and right knee (2%), which is in line with previous study by Demirag B *et al*. (3)

In our survey, Diabetes was the most frequent comorbidity in NF patients. Previous studies reported that poorly controlled DM in NF patients can cause adverse outcomes which were similar to study of Vishnoi V, chiam HC *et al* (1), Cheng, NC., *et al* (4). Among 200 patients, based on risk factors NF were observed in trauma 37.88% (118) followed by DM 32.42 % (95) followed by HTN 18.08% (53) followed by ALC 7.76% (21) followed by past surgeries 4.43% (13) respectively which was in lined with the study conducted by Mundigler G *et al.* Geppert A *et.al* 1998.

In 2004, Wong et al. created a laboratory risk indicator for necrotizing fasciitis (LRINEC) score that can be utilized to risk stratify patients presenting with signs of cellulitis to determine the likelihood of NF being present. It uses six different serologic parameters: C-reactive protein (CRP, >150 mg/l – 4 points), total white cell count (<15 x106 /mm3 - 0 points, 15–25 - 1 point, >25 - 2 points), hemoglobin (>13.5 g/dl – 0 points, 11–13.5 - 1 point, <11 - 2 points), sodium (<135 mmol/L - 2 points), creatinine (>141 μmol/L – 2 points) and glucose (>10 mmol/L – 1 point). A score of 6 or higher indicates that NF should be seriously considered. The LRINEC score, developed based on data from 89 NF patients is widely used, but has never been validated and the authors themselves noted that many other conditions might cause similar laboratory derangements, a study by Hakkarainen TW *et al*. 2014, Wong CH *et al* 2004.

Laboratory findings may indicate the extent of infection. In our study, a total of 200 cases in the study population was divided into two groups based on LRINEC Score, in line with prior findings, we confirmed that the LRINEC is helpful to identify patients' risk for NF when compared to cellulitis. A score of 0-6 were indicated as group 1 (37.5%) and a score greater than 6 were indicated as group 2 (62.5%). Compare to group 1, patients in group 2 have more score, length of the stay and surgery significantly higher in group 2 patients which is in line with study conducted by Wong CH *et al* 2004, Holland MJ *et al*. 2009, El-Menyar *et al.* 2017

Adding relevant clinical parameters to the score such as pain (severe– 2 points, intermediate -1 point, mild/none– 0 points), fever (38°C-2 points, 37.6 – 37.9°C– 1 point, 37.5°C- 0 points), tachycardia (>100 heart beats/minute-1 point), and signs of acute kidney injury - 1 point) further optimized the score (14). But in our study of 200 patients, 136 (68%) suffered with pain, 135(67.5%) suffered with ulcer, 131(65%) suffered with edema,126(63%) were suffered with fever, 105(52.5%) were suffered with necrosis, 100(50%) were suffered with discoloration, 75(37.5%) were suffered with pus discharge, 73(36.5%) were suffered with blebs, 66(33%) were suffered with breathlessness, 65(32.5%) were suffered with foul smell discharge, in line with the study of Cheng, NC., *et al* 2011.

Out of 200 patients 38(19%) were undergone Fasciotomy and debridement removal, 30(15%) were undergone amputation, 26(13%) were undergone debridement removal, 24 (12%) was undergone Fasciotomy and 1(0.5%) were undergone fasciotomy followed by amputation. In surgery was performed in 56.5% (119) and 40.5 % (81) were treated with medications was in line with the study of Bozkurt O *et al* 2015, Shaikh N et al 2015, Lille ST et al 1996.

Anaerobic coverage is quite important for type 1 infection; metronidazole, clindamycin, or carbapenems (imipenem) are effective antimicrobials. Type 2 disease is treated with antibiotics against S. pyogenes and S. aureus, first or second generation of cephalosporins are used for the coverage of methicillin-sensitive Staphylococcus aureus (MSSA). Some studies suggest that clindamycin is superior to penicillin in managing streptococcal infections, but this has yet to be satisfactorily proven. Another study has proposed that clinicians should consider adding clindamycin to the beta-lactam antibiotic regimen when NF or myositis is present. Type 3 NF should be managed with clindamycin and penicillin, which cover the Clostridium species. Finally, type 4 NF can be treated with amphotericin B or fluoroconazoles.

As of in our study of 200 patients', antibiotics were given to everyone and anti-pyretic for 78.6%,9

(156) patients, anti-inflammatory drugs for 65 % (133) patients, analgesics for 56.0% (112) patients, vitamins for 55.5% (111) patients. Out of 200 patients, the most commonly prescribed drug was Ceftriaxone and Metronidazole (52) least prescribed drug is amoxicillin which was in line with the study conducted by Lille ST *et al*. 1996, Hakkarainen TW et al (6), Misiakos EP *et al* 2014, Andreasen TJ *et al. 20*17.

Any delay in diagnosis and surgery is commonly recognised to be associated with a large increase in mortality. Today, NF remains a high-mortality disease, and the only option to improve prognosis is to treat it as soon as possible. These cases show how difficult it is to identify NF, and surgeons must be aware of the importance of early detection and treatment to avoid mortality. Surgery (mainly fasciotomy) is still the most effective treatment; LRINEC score can be utilized for risk stratification and prognosis in addition to its diagnostic function.

LIMITATIONS

A retrospective methodology, small sample size is where our study is limited. Apart from that, because the data was gathered retroactively, several data like social habits, surgical data went missing. In addition, the study time was shorter. Additionally, the study time was shorter. Our research would be enhanced if we had the opportunity to counsel the patients, as this would allow us to collect more data in addition to the case sheets.

CONCLUSION

The overall dynamics of NF are quick, and severe illness development will become apparent within a few hours. In the present study we intended to stratify risk factors that allow for a better and initial presentation to allow for quick recognition of NF. After examining the one-year medical outcomes in 200 patients, our statistical analysis concluded that LRINEC score can be utilized for risk stratification and prognosis in addition to its diagnostic function. We finally concluded that patients in group 2 with a score of >6 are more likely to spend longer time in the hospital and are more likely to have surgery.

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