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Fournier's Gangrene- A Clinical Observational Study Of Management Practices And Outcomes At A Tertiary Care Center

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Abstract

Background: Fournier's gangrene is an acute, rapidly progressive, and fulminant necrotizing infection affecting the external genitalia, perineal and perianal regions. FOURNIER'S gangrene is a life-threatening, fulminant form of necrotizing infection of the genital, perineal, and perianal regions, which usually affects men. It leads to thrombotic occlusion of small blood vessels within the skin and subcutaneous tissues, leading to gangrene of the overlying skin. It can extend onto the anterior abdominal wall, chest wall, and even the medial aspects of the thigh

Aim & Objective: To study the presentation, management practices, and outcomes of Fournier's gangrene at a tertiary care center.

Methods: this Prospective observational study was done with 40 Fournier's gangrene patients in the Surgical wards of Rajiv Gandhi Government General Hospital from 1.10.2020 to 30.09.2020 (12 months) APACHE II (Acute Physiology and Chronic Health Evaluation) was initially being used to stratify patients based on their clinical parameters. Labor and his colleagues 1995 developed the so-called Fournier Gangrene Severity Index (FGSI) based on the following physiological and clinical parameters. Each of them is scored from 0 to 4. A higher score indicates a greater deviation from the normal range. FGI represents the sum of the values assigned to all parameters.

Results : Age distribution were 7.5% is Up to 40 years, 35.0% is 41-50 years, 30.0% is 51-60 years, 17.5% is 61-70 years, 10.0% is Above 70 years. Etiology distribution were 2.5% is Dermatological, 57.5% is Idiopathic, 27.5% is Perianal, 12.5% is Urogenital. 52.5% of the patients were diabetic and 47.5% were nondiabetics. 20.0% of the patients were hypertensive and, 80.0% were non-hypertensives. 20.0% of the patients had a previous history of Coronary Artery Disease and 80.0% were found be nil history. distribution of other medical comorbidities ,of which 2.5% is AML, 10.0% is CLD, 2.5% is NHL, 5.0% is PAD, 2.5% is RHD. The extent of involvement was confined to genitalia in 67.5%, involving the genitalia and perineum in 15.0%, involving the genitalia, perineum, and thigh in 7.5%, and 10.0% involving the Genitalia, perineum, infra umbilical region. several debridements in which 1 is present at 82.5% which is maximum and followed by 2 is 10% and 3 is 5.0% and 4 is least with 2.5 % and the overall average is 1.28 with S.D 0.67. complication AKI-45% , DKA-17.5%, Septic shock- 17.5% , Encephalopathy- 5.0% ,ARDS- 7.5%, DCLD- 2.5% . Polymicrobial involvement was observed in 60% of patients with an average of 2 microbes in the isolate. No growth was observed in 2.5 % of the patients. Reconstruction distribution shows that 25.0% needed Flap cover, 7.5% needed Flap cover with Skin grafting, 17.5% needed Primary closure, 2.5% needed Skin graft with primary closure, and 47.5% did not

undergo any reconstruction. The last group included those wounds healed by secondary intention, those who were lost in follow-up, and those who expired. The comparison between FGSI with Mortality by Pearson's chi-squared test was χ^2=40.000, p=0.000<0.01 which shows a highly statistically significant association between FGSI and Mortality.

Conclusion: Fournier's gangrene is a surgical emergency that requires early diagnosis and prompt treatment. Resuscitation, surgical debridement, and treatment of the comorbid conditions should be done simultaneously to achieve better outcomes. A low threshold for diagnosis should be maintained when people with predisposing factors. The source of infection is identifiable in many cases and they should be diligently searched. Since the mortality associated with this disease is high, prompt referral by primary care physicians to higher centers must be emphasized.

Keywords: Fournier's Gangrene, Polymicrobial Involvement, Chronic Kidney Disease, FGSI Score

Introduction

FOURNIER'S gangrene is a life-threatening, fulminant form of necrotizing infection of the genital, perineal, and perianal regions, which usually affects men. It leads to thrombotic occlusion of small blood vessels within the skin and subcutaneous tissues, leading to gangrene of the overlying skin that can extend onto the anterior abdominal wall, chest wall, and even the medial aspects of the thigh. It can affect almost all age groups.[1] It is more commonly seen among people with immunosuppression like chronic kidney disease, diabetes mellitus, etc. Bauriene first reported this form of the disease. He described it as rapidly progressive necrosis of the male external genitalia of idiopathic origin. A more detailed account of this condition was given by a French dermatologist named Dr. Jean.A.Fournier in 1883. [2]The basic management practice includes prompt resuscitation and early debridement of all gangrenous and necrotic tissues with the administration of antibiotics.[3] Reconstruction can be done by primary closure or with a flap cover or skin grafting at a later date when the condition of the wound improves. Mortality associated with this condition may be attributed to late presentation to the surgeon due to poor patient knowledge, rapidity of disease progression, and underlying comorbidities. Fournier's gangrene severity index is a useful tool that helps in risk stratification and prediction of mortality in patients based on their physiological and laboratory parameters.[4,5]

Methods

This Prospective observational study was done with 40 Fournier's gangrene patients in the Surgical wards of Rajiv Gandhi Government General Hospital from 1.10.2020 to 30.09.2020 (12 months) APACHE II (Acute Physiology and Chronic Health Evaluation) was initially being used to stratify patients based on their clinical parameters. Labor and his colleagues 1995 developed the so-called Fournier Gangrene Severity Index (FGSI) based on the following physiological and clinical parameters. Each of them is scored from 0 to 4. A higher score indicates a greater deviation from the normal range. FGI represents the sum of the values assigned to all parameters. inclusion criteria: All patients above the age of 18 who were admitted and diagnosed clinically to have Fournier's gangrene. exclusion criteria**:** Patients with scrotal wall abscess

Stastical analysis: The collected data were analyzed with IBM.SPSS statistics software 23.0 Version. To describe the data descriptive statistics frequency analysis, and percentage analysis was used for categorical variables, and the mean & S.D were used for continuous variables. To find the significant difference between the bivariate samples in Independent groups the Unpaired sample t-test was used. To find the significance in categorical data Chi-Square test was used similarly if the expected cell frequency is less than 5 in 2×2 tables then the Fisher's Exact was used. In all the above statistical tools the probability value of .05 is considered a significant level.

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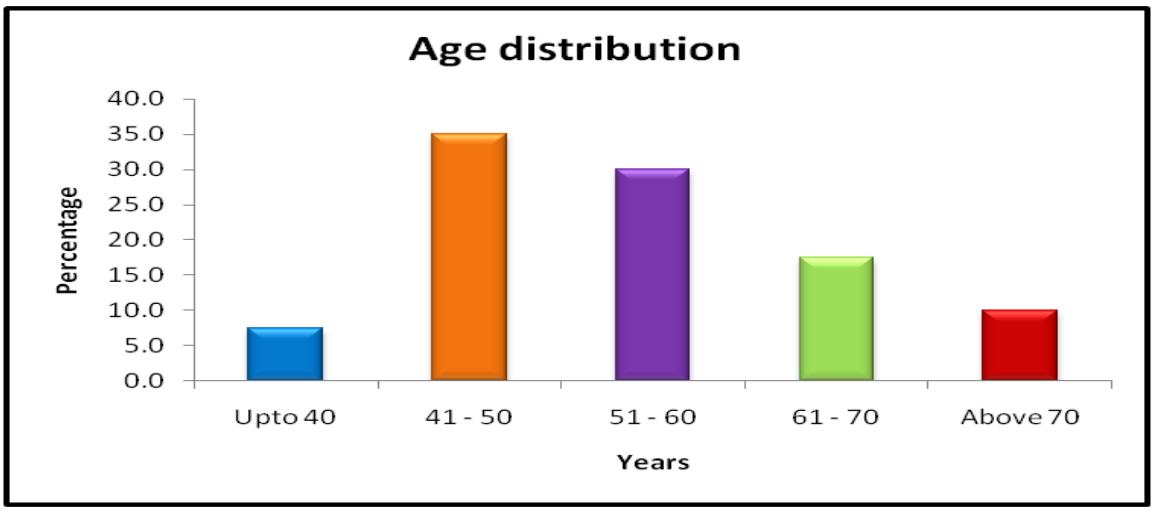
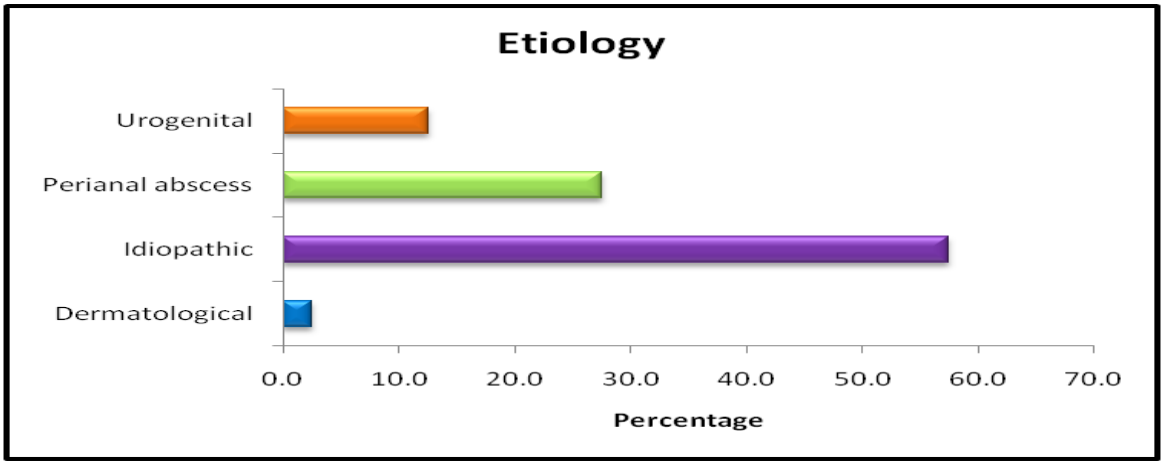
Results

Graph :1 Age Distribution



GRAPH :1 The above table shows Age distribution were 7.5% is Upto 40 years, 35.0% is 41-50 years, 30.0% is 51-60 years, 17.5% is 61-70 years, 10.0% is Above 70 years.

Graph:2 Etiology



Graph :2 The above table shows Etiology distribution were 2.5% is Dermatological, 57.5% is Idiopathic, 27.5% is Perianal, 12.5% is Urogenital.52.5% of the patients were diabetic and 47.5% were non diabetics.20.0% among the patients were hypertensive and, 80.0% were non-hypertensives.20.0% of the patients had previous history of Coronary Artery Disease is and 80.0% didn't.7.5% were already diagnosed with Chronic Kidney disease, 92.5% were not.distribution of other medical comorbidies ,of which 2.5% is AML, 10.0% is CLD, 2.5% is NHL, 5.0% is PAD, 2.5% is RHD.

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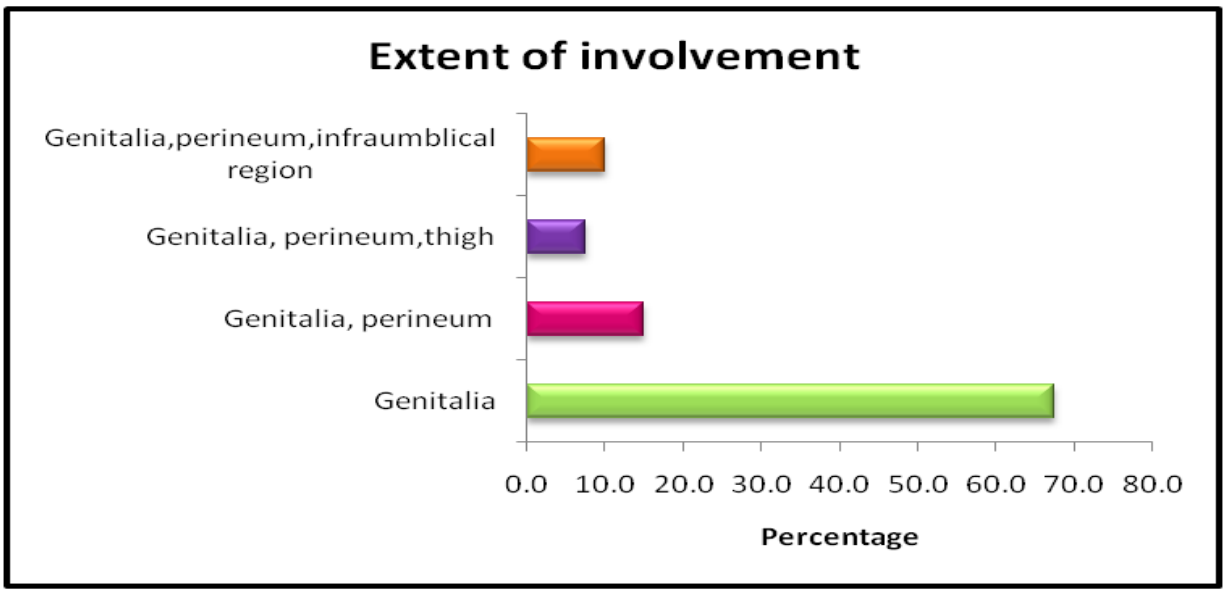
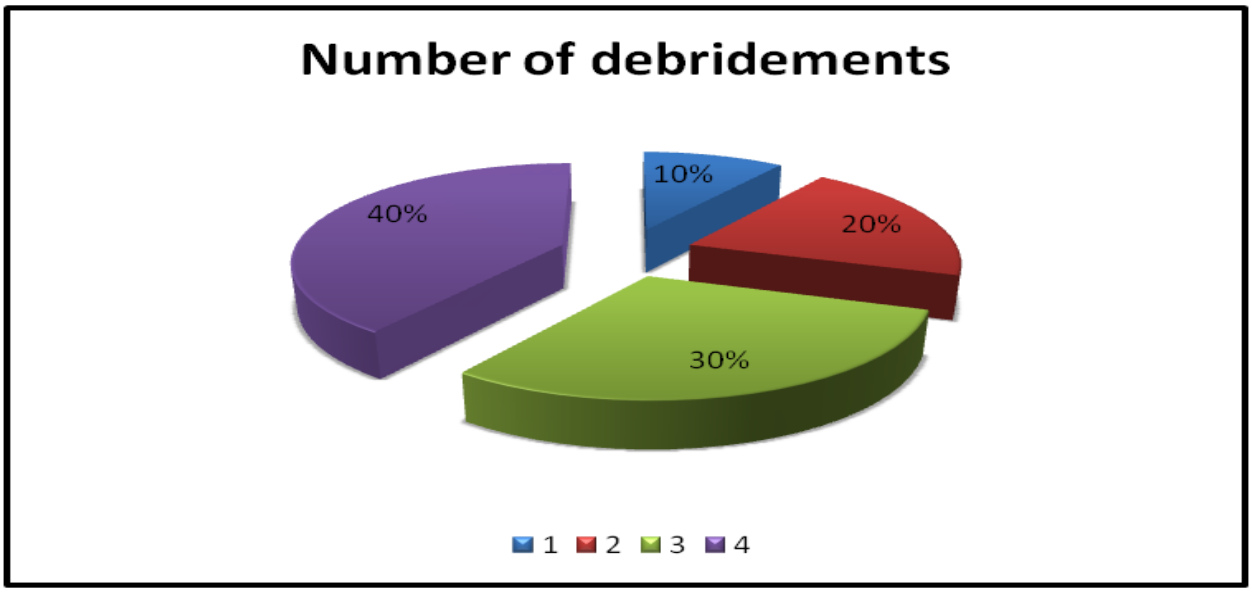
Graph : 3 Extent Of Involvement- Distribution



Graph :3 Extent of involvement was confined to genitalia in 67.5%, involving the genitalia and perineum in 15.0%, involving the genitalia, perineum, and thigh in 7.5%, and 10.0% involving the Genitalia, perineum, infra umbilical region.

Graph: 4 Number of debridements distribution



Graph:4 distribution of several debridements in which 1 is present in 82.5% which maximum and followed by 2 is 10% and 3 is 5.0% and 4 is least with 2.5 % and overall average is 1.28 with S.D 0.67. In our series, the diagnosis was entirely based on clinical findings. Imaging studies were not possible as most of them presented with advanced stages of the disease and systemic toxicity. Basic laboratory workup done for all the patients included- a complete hemogram, blood sugars, renal function test, serum electrolytes, liver function tests, arterial blood gas analysis, coagulation profile, blood culture, urine culture, and culture from tissue isolates. Empirical broad-spectrum antibiotics were administered to all patients with coverage of gram-positive, gram-negative, and anaerobic organisms. Serial change of the antibiotic was done based on a culture sensitivity

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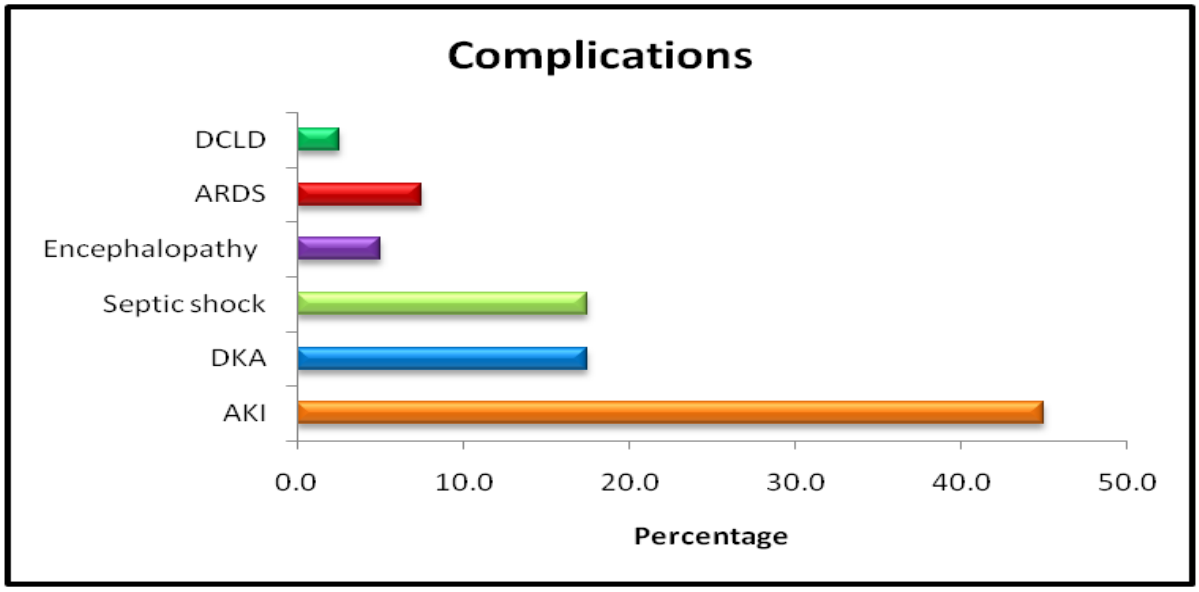
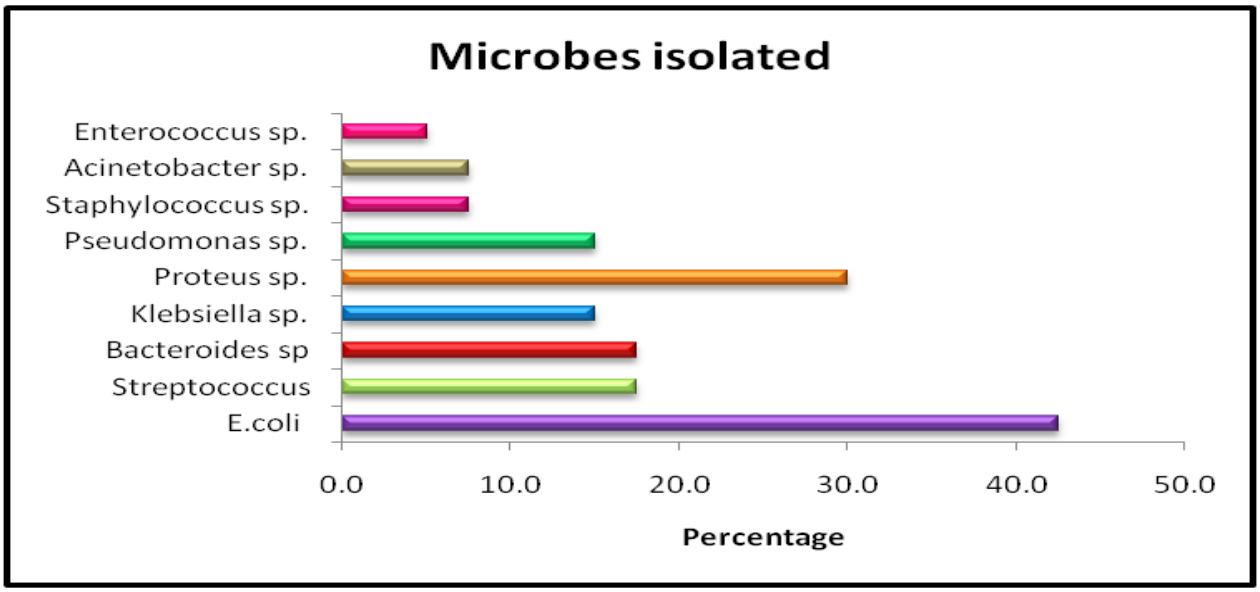
report. Patients were taken up for surgical debridement as early as possible after stabilization. Other comorbid and complications were managed in parallel. In our series, most of the wounds improved with single debridement. The maximum number of debridements done on a patient was 4 and the average number of debridements was 1.8Post debridement, wound care was given with daily wash and dressings with hydrogen peroxide, and saline. Negative pressure dressings and hyperbaric oxygen therapy were not done. All patients underwent urethral catheterization. Suprapubic cystostomy was needed in 2 patients due to the presence of urethral stricture. Extensive perianal disease warranted diversion of sigmoid colostomy in one patient. Other fecal diversion devices were not used. Orchidectomy was not required in any of the patients. Reconstruction procedures done in our series of patients included a combination of primary closure, medial thigh flap, and split-thickness skin grafting based on the defect. Those who didn't undergo any reconstruction include small defects that healed by secondary intention, some lost in follow-up, and the patients who expired.

Graph:5 Complications



Graph :5 shows distribution among the complication AKI-45% ,DKA-17.5%, Septic shock- 17.5% , Encephalopathy- 5.0% ,ARDS- 7.5%, DCLD- 2.5% .

Graph: 6 Distribution Of Microbes Isolated



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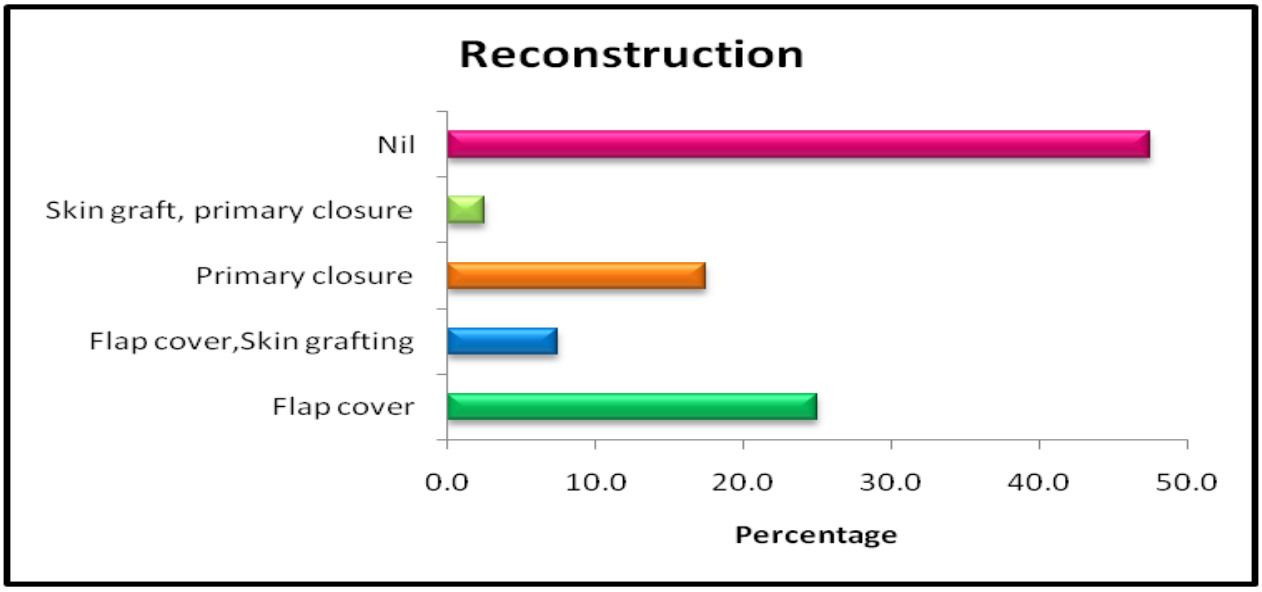
Graph:6 The above table shows the distribution of microbes isolated. 42.5% is E.coli, 17.5% is Streptococcus, 17.5% is Bacteroides sp, 15.0% is Klebsiella sp., 30.0% is Proteus sp., 15.0% is Pseudomonas sp., 7.5% is Staphylococcus sp., 7.5% is Acinetobacter sp., 5.0% is Enterococcus sp.In the series by Laor et al., the most commonly isolated aerobe was E.coli and anaerobe was Bacteroides. In our series, E.coli was isolated in 42.5% of cases and Bacteroides in 17.5% of cases. Polymicrobial involvement was observed in 60% of patients with an average of 2 microbes in the isolate. No growth was observed in 2.5 % of the patients.

Graph 7: Reconstruction Distribution



Graph :7 Reconstruction distribution shows 25.0% needed Flap cover, 7.5% needed Flap cover with Skin grafting, 17.5% needed Primary closure, 2.5% needed Skin graft with primary closure, 47.5% did not undergo any reconstruction. The last group included those wounds healed by secondary intention, those who were lost in follow-up, and those who expired.

Discussion

Fournier's gangrene is a rare and often fulminant necrotizing fasciitis of the perineum and genital region frequently due to a synergistic polymicrobial infection. This truly emergent condition is typically seen in elderly, diabetic, or otherwise immune-compromised individuals. The nidus of infection is typically urogenital or anorectal, but cutaneous sources of infection have been reported, with poor personal hygiene acting as an apparent contributing element of infection occurrence.[6] Reported mortality rates range from 3% to 45%, affected by factors such as underlying comorbidities, the source of infection, and the presence of severe illness or sepsis upon initial evaluation and treatment. [7]Consultation for early surgical debridement and initiation of broad-spectrum IV antibiotics to cover Gram-positive, Gram-negative, and anaerobic bacteria is critical, and the addition of other adjunctive therapies such as IVIG and hyperbaric oxygen therapy may be considered.[8] While the occurrence of Fournier's gangrene in an otherwise healthy young adult is unanticipated in modern times, frequent masturbation as the underlying cause of this condition is even more unexpected. An extensive review of the current medical literature rarely reveals past reports of Fournier's gangrene or necrotizing fasciitis of the penis or scrotum directly resulting from masturbation.[9] More frequently, occasional reports exist of male patients with other medical and surgical genital complications due to masturbation, autoerotic, and other sexual activities. Past published complications include direct bacterial inoculation or fat embolism after penile injection, and urethral tears and lodged foreign bodies in the bladder after urethral self-instrumentation for erotic stimulation Reports of penile incarceration injury after placement of constricting rings and ring-like devices exist and

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can rarely lead to Fournier's gangrene or penile necrosis.[10]The most common age group of disease in our series was 41-50 years (35%), The most common etiology in our series was idiopathic(57.5%). The most common comorbidity was diabetes mellitus(52.5%). Other comorbid included 2.5% with acute myeloid leukemia,10.0% with chronic liver disease, 2.5% with non-Hodgkin's lymphoma, 5.0% with peripheral arterial disease, and 2.5% with rheumatic heart disease. The majority of the patients had disease confined to the genitalia(67.5%). Acute Kidney Injury was the most common complication faced by the patients (45%)[11]In our series 82.5% of patients required only a single debridement. The most common aerobe isolated in our series was Escherichia coli(42.5%). The most common anaerobe was Bacteroides(17.5%). Polymicrobial involvement was observed in 60% of patients with an average of 2 microbes in the isolate.[12] The most common reconstructive procedure done in our series was local musculocutaneous flap cover (25%) followed by primary closure (17.5%). Mortality in our series was 15.0%. Among the comorbidities, diabetes mellitus($p=0.011$) and coronary artery disease($p=0.002$) show a statistically significant relationship with mortality.[13]Increasing age also showed an increased risk of mortality ($p=0.0005$) Higher scores in FGSI showed an increased association with mortality($p<0.01$). Delayed presentation to health care providers also showed an increased risk of mortality ($p=0.0005$).[14,15]

Conclusion

Fournier's gangrene is a surgical emergency that requires early diagnosis and prompt treatment. Resuscitation, surgical debridement, and treatment of the comorbid conditions should be done simultaneously to achieve better outcomes. A low threshold for diagnosis should be maintained when people with predisposing factors. The source of infection is identifiable in many of the cases and they should be diligently searched for. Since the mortality associated with this disease is high, prompt referral by primary care physicians to higher centers must be emphasized. Thorough surgical debridement and appropriate antibiotic therapy play a vital role in reducing the risk of morbidity and mortality. Reconstruction procedures should be done once the wound status improves adequately. Fournier's Gangrene Severity Score is a useful tool for risk stratification of patients and prediction of prognosis.

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