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Original Research Article

A clinical study of Fournier's gangrene and use of honey dressing in treatment

Subodh P. Ugane, Shrikant K. Kalbagwar*, Sanjot B. Kurane

Department of General Surgery, Govt. Medical College Miraj, Miraj, Maharashtra, India

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***Correspondence:**
Dr. Shrikant K. Kalbagwar,
E-mail: shrikantkalbagwar@gmail.com

ABSTRACT

Background: Fournier's gangrene is necrotizing fasciitis involving genitals and perineal regions. Fournier's gangrene is a surgical emergency. If not treated immediately it spreads rapidly causing septicemia leading to death. Mainstay of treatment is surgical and regular dressing. Various dressing materials are available like eusol, in our study we use Honey as dressing material. This is a small work to attempt to study incidence, etiology and pathogenesis and use of dressing for the treatment of Fournier's Gangrene.
Methods: in our study we study 40 male patients of Fournier's gangrene. We studied clinico- pathology of disease and use of honey dressing for the management of Fournier's gangrene. Out of 40 patients 18 were treated with honey as dressing material and remaining 22 with eusol.
Results: 40 patients were admitted, and majority of patients were in age group > 60 years mean age was 54.08_15.47 years. Majority of patients belonged to lower socioeconomic class 82.5%. Most of patients presented in hospital within 7 days of initial symptoms. In this study etiological causes found in 85% of patients and among which most common were urogenital causes 32.5%. Majority of patients had chronic alcoholism and bad hygiene as predisposing factors. 25% were associated with diabetes mellitus. In this study 12% of patients were HIV positive. Most common organism found in pus culture was *E. coli* (42.5%) followed by Coagulase Negative Staphylococci in 32.5%, Klebsiella in 12.5%, Pseudomonas in 7.5% and no organism were isolated in 5%. Mean days required for healthy granulation by honey dressing was 9.62+- 4.5 days and for eusol was 10.5 +- 3.79 days. In our study mortality was 22.5%.
Conclusions: Diabetes and alcoholism are predisposing factors associated with this disease. HIV is emerging predisposing factor for Fournier's gangrene. Honey is very useful for treatment of Fournier's gangrene it reduces days for clearance of slough and hospital stay.

Keywords: Fournier's gangrene, Honey dressing

INTRODUCTION

Fournier's gangrene is an infective fasciitis of perineal genital and perianal region. Fournier's Gangrene is a surgical emergency involving mainly genitals, perianal and perineal areas.[1] It is a rapidly spreading inflammatory process involving these regions. Fournier's Gangrene is an end arteritis caused by multi organisms.[2] It causes thrombosis of subcutaneous vessels leading to subcutaneous edema. Infection causes release of various inflammatory mediators causing septicemia and also leads to necrosis of scrotal wall, sloughing and exposure of testicles. Specific locations, rapid spread and early death due to septicemia if not treated are reasons for surgical emergency.

Genitals and perineal regions are more prone for infection as their tendency to responds to inflammation by causing

subcutaneous edema which leads to hypoxia of skin and release of inflammatory mediators. Immediate surgical intervention needed to remove all necrotic tissue. Initial treatment is fluids and higher antibiotics, but mainstay of treatment is surgical. It involves removing of all dead, necrotic tissue.

After surgical debridement main role is of intravenous fluids, higher antibiotics and dressing. There are various types of dressing and dressing materials are available. Most conventional dressing involves use of Eusol which is a granulating agent.

Honey is also being used for wound dressings.[3] It is used topically over the wound. Honey has low pH about 3.5 also has hygroscopic action which causes removal of slough and leading to granulation. E. Efem used honey first in treatment of Fournier's Gangrene. Enzymatic actions of honey cause granulation and also stimulates epithelialization biologically.[4]

METHODS

This study included all adult patients with Fournier's gangrene admitted and managed in our Tertiary care hospital for the period of three years. All the patients were thoroughly evaluated by detailed history, clinical examination and necessary investigation. Patients were managed by early surgical and medical management, guided by standard protocol of treatment.

All patients underwent surgical debridement after admission and after stabilization of vitals by intravenous fluids and higher antibiotics. After debridement all patients treated by regular dressings on daily basis. Out of 40 patients 18 patients randomly selected and treated by honey as dressing material and remaining 22 by routine Eusol dressing. Patients died within one week are excluded in study. Pus culture and sensitivity done in all patients. All patients healed by secondary intension. No patient requires secondary surgical procedure or hyperbaric oxygen therapy.

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions.

Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation. Independent t test or Mann Whitney U test was used as test of significance to identify the mean difference between two quantitative variables and qualitative variables respectively.

Graphical representation of data: MS Excel and MS word was used to obtain various types of graphs such as bar diagram and Pie diagram. p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

RESULTS

Majority of patients were in the age group >60 years (45%), 32.5% were in age group of 41 to 60 and 22.5% were in age group <40 years. Mean age was 54.08 ± 15.47 years, minimum age was 24 years and maximum age was 80 years, range was 56 years. Majority of patients belonged to Lower SES (82.5%) and 17.5% belonged to Middle class. Most patients presented in hospital within 7 days of initial of symptoms. Most common day of presentation in hospital was 5th day (Figure 1).

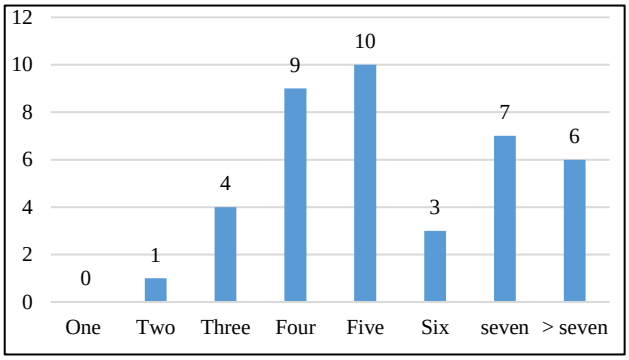

Figure 1: Duration of symptoms.

In this study etiological causes found in 85% of patients. 30% patients had anorectal cause, 32.5% patients had urogenital causes and 22.5% patients had dermatological causes. 15% of patients had unknown etiology (idiopathic) (Figure 2).

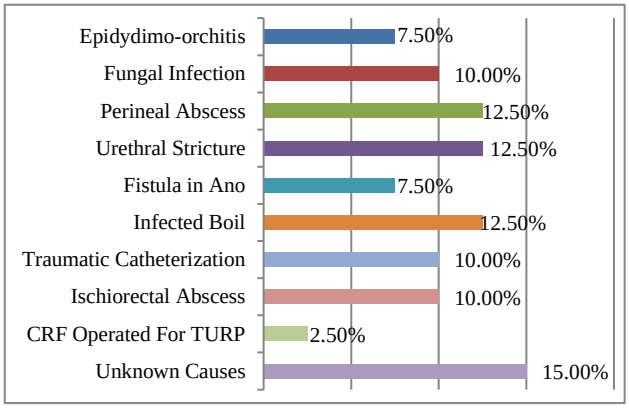

Figure 2: Probable etiology of fournier's gangrene.

Majority of the subjects had chronic alcoholism as predisposing factors, followed by chronic alcoholism and Bad hygiene together and others as shown in above Table. 25% had associated Diabetes Mellitus. Most common site of gangrene was scrotum. Scrotum was involved in all the subjects (100%). Were as Scrotum and Penis was involved in 25%, Scrotum and Medial thigh in 12.5% and Scrotum and Abdomen, Scrotum, abdomen and penis, Scrotum, Perineal area and Medial thigh and Scrotum, penis, perineal area, Medial thigh and Anterior

abdomen wall extension was seen in 2.5% respectively. Anemia was seen in 92.5% of subjects. Severe anemia was seen among 25% of subjects. TLC was 10,000 and more in 60% of subjects. Out of which 11 patients 27.5% had count more than 13000 and had poor outcome. In this study out of 40 patients 5 patients were HIV positive and 35 were HIV negative (Figure 3).

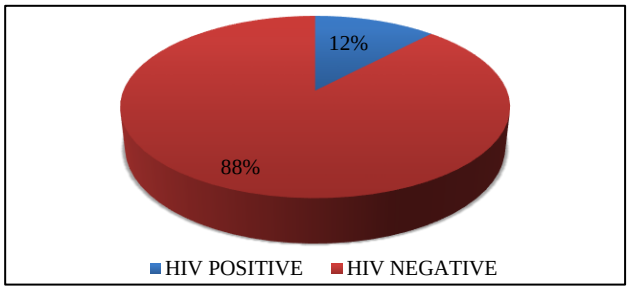

Figure 3: Pie diagram showing HIV status among subjects.

On Pus culture and sensitivity, it was observed that most common organism isolated was E coli (42.5%), Coagulase Negative *Staphylococci* in 32.5%, *Klebsiella Pneumoniae* in 12.5%, *Pseudomonas* in 7.5% and no organism were isolated in 5% of subjects.

Mean days required of clearance of slough among subjects was 6.31 ± 2.14 days, mean days required for Healthy Granulation was 10.1 ± 4.1 days and mean duration of stay in hospital was 15.43 ± 7.69 days.

Mean days required for clearance of slough by honey dressing was 5.92 ± 1.84 days and in conventional dressing was 6.63 ± 2.36 days.

There was no statistical significance with respect to two groups in days required for clearance of slough (Table 1).

Table 1: Days required for clearance of slough comparison between two types of dressing done.

	Dressing Type	N	Mean	SD	P value
Days Required for clearance of slough (Days)	Honey Dressing	13	5.92	1.847	0.389
	Conventional Dressing	16	6.63	2.363	

Mean days required for healthy granulation by honey dressing was 9.62 ± 4.5 days and in conventional dressing was 10.5 ± 3.79 days. There was no statistical significance with respect to two groups in days required for health granulation (Table 2).

Table 2: Days required for healthy granulation comparison between two types of dressing done.

	Dressing Type	N	Mean	SD	P value
Days Required for Healthy Granulation	Honey Dressing	13	9.62	4.556	0.573
	Conventional Dressing	16	10.50	3.795	

Mean duration of stay in hospital in Honey dressing group was 15.44 ± 6.9 days and in conventional group was 15.41 ± 8.41 days. There was no statistical significance with respect to duration of hospital stay between two types of dressing (Table 3).

Table 3: Duration of stay in hospital comparison between two types of dressing done.

	Dressing Type	N	Mean	SD	P value
Duration of stay in Hospital (days)	Honey Dressing	18	15.44	6.956	0.989
	Conventional Dressing	22	15.41	8.416	

4 subjects (22.22%) in Honey dressing and 5 subjects (22.72%) in conventional group died during the course of treatment. There was no significant difference in outcome between two types of dressing (Figure 4).

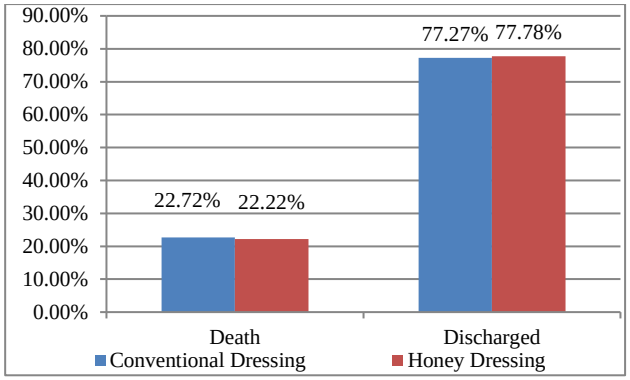

Figure 4: Comparison of outcome between two types of dressing.

DISCUSSION

Most commonly Fournier's gangrene occurs in third and sixth decade of life.[5] In our study majority of patients were in the age group of > 60 years (45%). Most common age group found to be 65 years. Fournier's gangrene occurs commonly in lower socioeconomic class.[6] In our study majority of patients were from lower socioeconomic class 82.5%. D.M. (Non-insulin dependent), bed ridden condition due to chronic illness, urinary problem is more in this age group, which acts as predisposing factor for the development of Fournier Gangrene. Initially it was thought that Fournier's Gangrene is idiopathic.[7] In our study there were 34 patients (85%) have etiological causes and 6 patients (15%) etiological cause in unidentified i.e. idiopathic. In our study most common etiology was urogenital 32.2%. 30% patients had anorectal causes and 22.5% patients had dermatological causes.

They included Perineal abscess, ischiorectal abscess, fistula in Ano, urethral strictures, traumatic catheterization, infected boil and fungal infection.

Diabetes and alcoholism are predisposing factors most commonly found in various studies.[8.] In our study predisposing factors were chronic alcoholism with bad hygiene in 22.5%, bad hygiene in 15% and smoking in 5%. Poor personal Hygiene predisposes to itching and scratches. They act as portal of entry. In diabetes mellitus patients is predisposed for end arteritis due to decrease in local immune response there are more chances of infection in diabetic patient.

In our study out of 40 patients 5 patients 12% were HIV positive. In study of Peter Ngugi 2014, out of 146 patient, 24 patient (16.4%) were HIV positive. It showed HIV may be emerging as an important predisposing factor for Fournier's Gangrene.[9]

Fournier's gangrene mainly involves perineal region most commonly scrotum. Scrotal involvement along with medial thigh, anterior abdominal wall suggest severe disease.

In our study, pus culture and sensitivity most common organism isolated was *E. coli* in

17 patients i.e. 42.5% and then second most common was coagulate negative Staphylococci in 32.5%, Klebsiella pneumonia in 12.5%, pseudomonas 7.5% and No organism were isolated in 5% of subjects. Most common organism isolated in various studies were *E. coli* and *Klebsiella* similar to our study.[10]

Regular dressing after surgical debridement is must for treatment of Fournier's gangrene. We used honey as dressing material. The enzymes found in honey, play an important role in its antibiotic properties. Invertase produced by the bee converts sucrose to glucose and fructose, amylase breaks down starch, glucose oxidase converts glucose to gluconolactone which in turn yields gluconic acid and hydrogen peroxide.[11] Trace amounts of vitamin B, calcium, iron, zinc, potassium, phosphorus, magnesium, selenium, and chromium are also found in the composition of honey. The low pH of honey comes from the organic acids like acetic, butanoic, formic, citric, succinic, lactic malic, pyroglutamic, and gluconic acid. Although the exact composition of honey varies depending on the geographical source and the plants on which the bees have been feeding, this supersaturated mixture of sugars with small quantities of enzymes, amino acids, vitamins, minerals and organic acids holds many desired properties for an impressive antibacterial dressing for wounds.[11] Several studies have shown it to inhibit over 60 species of bacteria including, anaerobes, gram-positive and gram-negative bacteria and even some yeast species of Aspergillus, and Penicillium.[12,13]

Glucose oxidase secreted from the hypopharyngeal glands of the bee converts glucose to gluconic acid and hydrogen peroxide.[14,15] The bactericidal effect of hydrogen peroxide, further decreases the number of microorganisms available on the wound bed. The release of hydrogen peroxide is slow and continuous for a constant antibacterial effect successfully eliminates microorganisms but is not cytotoxic to the surrounding tissue.[14,15] The third antimicrobial property of honey is due to glucose oxidase converting glucose to gluconic acid which gives honey its low pH.[11,15] Honey has an acidic composition with a pH between 3.2-4.5, which is acidic enough to inhibit many pathogens.[12,15,16] The more acid the pH the more the pathogen growth is inhibited. In addition to decreasing the pathogens in the wound, the acidic environment is beneficial to epithelialization. The acid environment increases the amount of oxygen released from the hemoglobin in the wound bed, which, in turn, increase the rate of granulation.[15]

As a dressing on wounds, honey provides a moist healing environment, rapidly clears infection, deodorizes, and reduces inflammation, edema, and exudation. It increases the rate of healing by stimulation of angiogenesis, granulation, and epithelialization.

Mean days required for clearance of slough for honey dressing was 5.92 ± 1.84 days and in conventional dressing was 6.63 ± 2.36 days. This showed honey is useful for clearance of slough. Also mean days required for healthy granulation by honey dressing was 9.62 ± 4.5 days and in conventional dressing was 10.5 ± 3.79 days. This showed that honey is quite better for wound management in Fournier's gangrene as in study in 2004.[17]

Duration of hospital stay was reduced by use of honey as dressing material comparing to conventional dressing. Also, outcome of patients after treatment with honey dressing is much better than conventional dressing.

CONCLUSION

Fournier's gangrene occurs in older age groups. It occurs in lower socioeconomic class patients. Fournier's gangrene is not an idiopathic gangrene, most common etiology were urogenital causes. Diabetes and alcoholism are predisposing factors associated with this disease. HIV is emerging predisposing factor for Fournier's gangrene. Honey is very useful for treatment of Fournier's gangrene it reduces days for clearance of slough and hospital stay. It also promotes early healthy granulation.

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