ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 01 | January - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

"A PROSPECTIVE STUDY COMPARING THE EFFICIENCY OF RAW PAPAYA WITH POVIDONE IODINE VERSUS CONVENTIONAL CHEMICAL DEBRIDEMENT AGENT APPLICATION ON WOUND BED IN PATIENT WITH FOURNIER'S GANGRENE."

Surgery

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ABSTRACT

Aim: To compare the efficacy of Raw papaya with commercially available chemical debridement agent on wound bed in patient with Fournier's gangrene and to study the durations of healing in both groups. **Objectives** : To evaluate the safety and efficacy of Raw Papaya for wound dressing compared to conventional chemical debridement agents. To determine the advantages and disadvantages of each method for better wound healing and formation of granulation tissue. **Materials And Methods** : Sample Size: 50. Duration of study: 24 months Type of study: Prospective study. Inclusion criteria: All male patient suffering from Fournier's gangrene disease who presented at General Surgery department of Osmania General Hospital were included in the study within age group 20 years to 60 years of age and who are willing to give consent for the study. Exclusion criteria: Female gender, those with known history of malignancy, connective tissues disorders, on steroids, immunosuppressive drugs, radiation & chemotherapy, Any known allergy to any of the dressing material, those with known liver disease and Nonconsenting patients are excluded. **Conclusion:** Raw papaya along with iodine are effective in hastening the healing process by formation of early granulation tissue and wound contraction, compared to conventional chemical debridement agent dressings. The following conclusions were derived. 1. Raw papaya showed faster and better granulation formation rates when compared to chemical debridement group. 2. Patients in the Raw Papaya group were ambulant early. 4. Incidence of wound infection was less in the Raw Papaya group owing to its bacteriostatic nature. 5. Cost effective and easy to use.

KEYWORDS

Fourniers gangrene, Raw Papaya dressing.

INTRODUCTION:

Fournier's gangrene is a rare but severe bacterial infection that affects the soft tissue of the external genitalia and perineum, It is a form of necrotizing fasciitis, commonly known as a flesh-eating disease. It was first described in 1764 and later named after Jean Alfred Fournier, a French venereologist who presented clinical cases in 1883. While it can affect individuals of any age, it is more prevalent in older men with diabetes, alcoholism, or immunocompromised states. The initial symptoms may include sudden pain, swelling, or redness in the genital area, accompanied by fever and a generalised illness. Urinary tract infections and perianal abscesses may provide a starting point for the infection[1]. Treatment of FG requires an aggressive multimodal approach, including hemodynamic stabilization and broad-spectrum antibiotics and early aggressive surgical debridement. In some cases, hyperbaric oxygen therapy may be used to inhibit the growth of anaerobic bacteria. The prognosis of Fournier's gangrene varies, with mortality rates reported between 3% and 50%. Indian Carica papaya, commonly known as papaya, has been studied for its potential use in wound debridement due to the presence of proteolytic enzymes like papain and chymopapain. Which are believed to aid in the removal of necrotic tissue and promote healing. Papaya extract has antimicrobial properties that may help prevent infection. Studies have indicated that papaya pulp can contribute to the clearance of deep dermal wounds within a span of 5 to 6 days, and the loosening of eschar in full-thickness burns. However, there are disadvantages like allergic reactions, anaphylaxis, particularly in individuals with latex allergies. This has resulted in the withdrawal of commercial papain products from the market in some countries.

MATERIALS AND METHODS :

Sample Size: 50. Duration of study: 24 months Type of study: Prospective study. Inclusion criteria: All male patient suffering from Fournier's gangrene disease who presented at General Surgery department of Osmania General Hospital were included in the study within age group 20 years to 60 years of age and who are willing to give consent for the study. Exclusion criteria: Female gender, those with known history of malignancy, connective tissues disorders, on steroids, immunosuppressive drugs, radiation & chemotherapy, Any known allergy to any of the dressing material, those with known liver disease and Nonconsenting patients are excluded. A group of 50 patients were randomly allotted into two groups of 25 each. Surgical debridement of necrotic tissue was done and based on the culture and sensitivity report antibiotics were started accordingly. A strict diabetic control was achieved in both the groups. **Control group**: Regular debridement with conventionally used chemical debridement agent. **Study group**: After initial stabilization of the patient and surgical debridement of the Fournier's gangrene wound, dressing is done with raw papaya. Regular dressing was done twice daily with watchful for soakage. In either group after a healthy granulating tissue was achieved, the wound was assessed**.**

RESULTS

The data was analyzed using SPSS (Statistical Package for Social Science) software. The data collected were scored and analyzed, Continuous variables were presented as means with Standard Deviation (SD) and categorical variables were presented as frequency and percentages. Student unpaired T test was used for testing the significance of all the mean and standard deviation in groups. Chi-square test was used to compare proportions. P value <= 0.05 was considered as statistically Significant in all statistical results

A total of 50 cases were analysed across different age groups, with the majority falling within the 41-50 years age bracket (56%) with the frequency distribution of 13 (52%) patients in group A (CCDA) and 15 (60%) were in group B (Raw Papaya).

Fournier's gangrene is a type of necrotizing fasciitis with polymicrobial culture picture. In this study multiple organism were isolated from the wound bed of Fournier's gangrene of which 22(70%) were culture positive in group A(CCDA) and 20 (62.5%) were culture positive in group B (raw papaya).

In this study Escherichia coli was the most isolated organism in both the Groups with 10(23.8%) cases in Group A and 8(19.04%) in Group B. whereas second common organism was Pseudomonas with 12(28.5%) culture positive in both the groups.

In this study the mean duration of appearance of healthy granulation tissue were 14.36 days in group A (CCDA) When compared to 12.56 in group B (RP). demonstrated significantly lower duration for granulation formation, t (3.6753), P=0.006. The result is significant at p<0.05.

25 patients who were treated with Raw Papaya (mean=26) compared

to the 25 patients in the conventional chemical debridement dressing group (mean=29.24) demonstrated significantly lower duration for hospital stay, t (5.3929), p=0.001. The result is significant at p<0.05.

In this study the total cost of dressing for 25 patients in group A was one lakh twenty thousand, mean cost was four thousand eight hundred, whereas total cost for group B was eighty-five thousand, mean cost was three thousand and four hundred.

DISCUSSION

Fournier's gangrene is the result of a highly lethal and rapidly progressive necrotizing infection of the perineal and genital fascia, with gangrene of the overlying skin. Anorectal, genitourinary, and traumatic infections are the most common causes of Fournier's gangrene.

Perioperative fluid resuscitation, cardiopulmonary support, antibiotic therapy, and nutritional support are of major importance in management of the disease; however, examination under anaesthesia with aggressive surgical debridement remains the most important aspect of treatment. Diversion of the faecal and urinary streams may not always be necessary but should always be considered on a case-by-case basis. Despite optimal medical and surgical management, the mortality rate in Fournier's gangrene still exceeds 40% in many series.

Many clinicians will select enzymes when CSWD is not an option. Clinical experience strongly suggests that combined therapy.

Advantages are, this is a cost-effective treatment when used for bigger wounds, can be applied over infective wounds where debridement are needed. After formation of healthy granulation tissue patients can be taken up for spilt skin grafting or SSG. Present study is a prospective study regarding Raw Papaya debridement (enzymatic) dressing versus conventional chemical debridement dressing.

Age Distribution: In most studies the ratio between males and female is 10:1 (Eke, 2000) [6] The usual form of presentation is men between 50 and 70 years, with one or more predisposing factors. At present as opposed to what was believed at the time of Fournier, it is accepted that children may be affected by the disease. (Montoya et al., 2009). Due to the usual absence of predisposing factors in children some reports have indicated a better prognosis in them. In the pediatric literature there is description of healing with limited excision of scrotal affection. (Ameh et al., 2004) [8]. 28 out of 50 that is 56% of the patients in the study populations were in the age group of 40-50 years. 12% that is 06 patients were in the age group of 20-30 and other 12% were in the age group of >60 and 10% that were in the age group of 30-40.

Organisms involved: 42 Out of 50 patients were culture positive that is 84%. 16% that is 08 out of 50 patients were culture negative. Organism culture for exudates were: Escherichia coli- 18 (42.8%), Pseudomonas aeruginosa- 12 (28.5%), Staphylococcus aureus- 08 (19%), Klebsiella- 04 (9.5%)

The incidence of **wound infection** in the CCDA group was slightly higher than the Raw Papaya group (22 versus 20 patients). The difference in two groups however was statistically insignificant. Osato et al [10] in 1993 proved that Raw Papaya has bacteriostatic properties against several enteropathogens such as Bacillus subtilis, Enterobacter cloacae, Escherichia coli, Salmonella typhi, Staphylococcus aureus, Proteus vulgaris, Pseudomonas aeruginosa, and Klebsiella pneumoniae and decrease the rate of bacterial contamination. In the current study, the total number of infected cases were 42, and total culture negative cases were 08.

Fig 1 RP- dressing day1

The duration of appearance of **healthy granulation tissue** were observed of which the average days taken by group B of raw papaya dressing were 12.6 days when compared to 14.4days taken by group A patients treated with chemical debridement agent dressing. T test-3.6753, p-valve – 0.006 which is statistically significant. This signifies that raw papaya has more efficacy than chemical debridement agent.

Fig 2: CCDA- dressing day-1

Fig 3: RP- dressing day- 12

Fig 4: CCDA- dressing day-16

Starley et. al 1999 study[11] showed that Topical papaya, mashed and applied daily to pediatrics burns, effectively de-sloughs necrotic tissue, prevents burn wound infection, and promotes wound granulation suitable for skin graft application. But no study was conducted showing efficacy of Raw Papaya over Fournier's gangrene wound bed for the effective debridement.

Duration Of Hospital Stay: Fournier's gangrene is indeed a severe and potentially life-threatening condition with mortality rates ranges from 40% - 50%. Also with high morbidity rates, patient is hospitalized for several days and required several settings of surgical and non-surgical debridement. In this study the duration of hospitalization was observed and following information were concluded. The average days of hospitalization for the group A (CCDA) was 29.2 days when compared to average days of hospitalization for the group B (RP) were 26 days. T test: 5.3929, P-valve: 0.001 which is statistically significant.

In this study the total cost of dressing for 25 patients in group A was one lakh twenty thousand out of which direct medical cost for dressing materials was eighty thousand and cost of health care personal was forty thousand. mean was four thousand eight hundred, whereas total cost for group B was eighty-five thousand out of which direct cost for dressing material was sixty thousand costs for health care personal was twenty-five thousand mean cost was three thousand and four hundred proving them to be cost-effective in the management of the Fournier's gangrene.

The results showed significant differences in the direct medical costs and the average cost between chemical debridement agents and Raw Papaya wound dressings ($p<0.05$). All included raw papaya dressing proves to be a better alternative to the conventional chemical debridement agent dressings and has to be adopted by all the health care professionals.

CONCLUSION :

Raw papaya along with iodine are effective in hastening the healing process by formation of early granulation tissue and wound contraction. So that, the number of debridement and dressings required can be reduced as supported by the present study. Raw papaya wound dressing methods have significant role in increasing the rate of the wound healing process compared to conventional chemical debridement agent dressings. When we compare the use of Raw Papaya dressings with the NAOCL dressings group for the treatment of Fournier's gangrene, the following conclusions were derived.

1. Raw papaya showed faster and better granulation formation rates when compared to chemical debridement group.
2. Patients in the Raw Papaya group were ambulant early and hence reduced the burden of the attending staff and patient's relatives.
3. There was no adverse effects or reactions seen when Raw Papaya dressing was applied over the wound.
4. Incidence of wound infection was less in the Raw Papaya group owing to its bacteriostatic nature.

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