

CASE STUDY

Integrative Approach to manage post-debridement wound of Fournier's Gangrene: Successful Wound Healing with Herbal wound fumigation and Ayurveda Therapy

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ABSTRACT

Fournier's gangrene is a severe necrotizing fasciitis of the perineal and scrotal region that requires immediate surgical intervention and postoperative wound care. This case study presents the successful management of a post-debridement wound in a 36-year-old male patient, which was not responding to conventional modern treatment. Significant wound healing and recovery were achieved by integrating Ayurveda wound management, including Vranadhoopan Karma and supportive Ayurveda medications. Vranadhoopan Karma, a traditional fumigation therapy, was performed using anti-inflammatory, antimicrobial, and antioxidant herbs to promote wound healing, reduce infection and enhance tissue regeneration. The treatment resulted in healthy granulation tissue formation and wound contraction, eventually facilitating surgical suturing. The patient exhibited significant improvement with reduction in infection and accelerated wound healing. After a follow-up of 2 months patient is doing well with no signs of recurrence. This case highlights the effectiveness of Ayurveda interventions, particularly Vranadhoopan Karma, as a complementary therapy in post-debridement wound care for Fournier's gangrene. The combination of surgical and Ayurveda management provided a successful clinical outcome, demonstrating the potential of integrative medicine in treating complex wounds.

Keywords: Perineal Necrotizing Fasciitis, Scrotal Gangrene, Ayurvedic Fumigation Therapy, Granulation Tissue Formation, Post-Debridement Wound Care.

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INTRODUCTION

Fournier's gangrene is a rare condition, accounting for less than 0.02% of hospital admissions, with an overall incidence of approximately 1.6 cases per 100,000 males per year. Fournier's gangrene is a rare but life-threatening necrotizing fasciitis of the perineal and scrotal region, necessitating prompt surgical debridement and aggressive postoperative wound management [1]. While conventional medical approaches focus on surgical intervention and broad-spectrum antibiotics, complementary therapies, including Ayurveda wound management, may enhance healing outcomes [2].

This case study is unique as it presents the successful integration of Vranadhoopan Karma, a traditional Ayurveda fumigation therapy, in post-debridement wound care. The use of herbal fumigation in conjunction with Ayurveda medications contributed to improved wound healing, reduced infection, and favourable patient recovery [3]. Existing literature supports the antimicrobial, anti-inflammatory, antioxidant, and wound-healing properties of Ayurveda interventions, yet their application in Fournier's gangrene remains underexplored. This case contributes valuable insights into the role of integrative medicine in managing severe necrotizing infections.

PATIENT INFORMATION

A 36-year-old male with no known history of immunosuppression presented with severe pain, swelling, and a foul-smelling purulent discharge from the scrotal region. He exhibited systemic signs of infection, including fever, tachycardia, and leukocytosis. Following postoperative debridement, both testicles were visibly exposed due to extensive tissue loss. His medical history was unremarkable, with no known

diabetes, hypertension, or prior necrotizing infections. There was no family history of severe infections or immunosuppressive conditions. Psychosocially, the patient had no history of smoking, alcohol, or substance abuse and had a supportive family and social structure.

Upon admission, the patient underwent emergency hospitalization and was immediately started on intravenous broad-spectrum antibiotics. To enhance recovery, Ayurvedic intervention was introduced alongside conventional treatment. This included Vranadhoopan Karma, a traditional herbal fumigation therapy, along with supportive Ayurveda medications. This integrative approach promoted granulation tissue formation, reduced infection, and accelerated wound healing. Following successful surgical suturing, the patient showed no signs of recurrence or complications, highlighting the potential role of integrative medicine in managing severe necrotizing infections.

Clinical Findings

On physical examination, both testicles were visibly exposed due to extensive tissue loss, with surrounding edema and erythema extending to the perineal region. Significant tenderness was noted on palpation, and a foul-smelling purulent discharge was present, suggesting an ongoing infection. Systemic signs included fever (38.5°C), tachycardia (heart rate: 110 bpm), and an elevated respiratory rate (22 breaths per minute), consistent with sepsis. The patient was normotensive, with a blood pressure of 110/68 mmHg. Laboratory investigations revealed anaemia (Hb: 8.2 g/dL), leukocytosis (WBC: 19,800/mm³), and elevated inflammatory markers, including Interleukin-6 (IL-6: 53.2 pg/mL), indicating a severe inflammatory response. The platelet count was 337,000/mm³, within the normal range.

Table 1: Time line

Day	Events and Interventions
Day 1	Both testicles were exposed due to tissue loss, with surrounding edema, erythema, tenderness, and foul-smelling purulent discharge. Fever (38.5°C), tachycardia (110 bpm), and increased respiratory rate (22 bpm) indicated sepsis, though BP remained stable at 110/68 mmHg.
Day 2	Laboratory tests revealed anemia (Hb: 8.2 g/dL), leukocytosis (WBC: 19,800/mm ³), and elevated inflammatory markers, including IL-6 (53.2 pg/mL).
Day 3-5	Post-debridement wound care continued, with concerns of delayed healing. Continued IV antibiotics, pain management, and supportive care.
Day 6	Initiation of Vranadhoopan Karma (Ayurveda fumigation therapy), along with Ayurvedic wound care and medications to promote healing through controlling the infection.
Day 7-15	Daily Vranadhoopan Karma performed. Notable reduction in infection and improvement in granulation tissue formation. The patient remained stable with no signs of systemic deterioration.
Day 16	Significant wound healing was observed. Decision made for surgical suturing of the wound.
Day 17-20	Post-suturing care is provided. No recurrence of infection. The patient continued Ayurvedic medications to support wound healing and recovery.
Day 21	The patient was discharged with instructions for continued wound care and follow-up. Complete recovery expected with no complications.

Diagnostic Assessment

The patient's presentation of extensive tissue loss exposing both testicles, perineal edema, erythema, tenderness, and foul-smelling purulent discharge strongly suggests a severe soft tissue infection. Systemic signs, including fever (38.5°C), tachycardia (110 bpm), and increased respiratory rate (22 bpm), indicate sepsis. Laboratory findings of anemia (Hb: 8.2 g/dL), leukocytosis (WBC: 19,800/mm³), and elevated IL-6 (53.2 pg/mL) further supported an ongoing infectious and inflammatory process.

Morden Intervention

The patient was started on broad-spectrum intravenous antibiotics, including Piperacillin-Tazobactam (4.5g IV every 6 hours) for gram-positive, gram-negative, and anaerobic coverage, along with Metronidazole (500mg IV every 8 hours) to specifically target anaerobes. Pain management was provided with Paracetamol (1g IV every 8 hours). Additionally, IV fluids and supportive therapy were administered to maintain hemodynamic stability. This regimen was continued for the initial five days.

Ayurvedic Intervention

As the infection remained uncontrolled post-debridement despite conventional modern treatment, Vranadhoopan Karma, a traditional Ayurveda fumigation therapy, was initiated to promote wound healing. This therapy utilized medicinal herbs with antimicrobial, antioxidant, and wound-healing properties, including *Gour sarshap*, *Neem leaves powder*, *Guggulu (Commiphora mukul)*, and *Vacha*. The fumigation, performed twice daily for 10 days, resulted in improved granulation tissue formation.

Additionally, Ayurvedic oral medications were administered to support systemic healing and immunity, including Tab. *Gandhak Rasayana* (2 BD), *Arogyavardhani Vati* (2 BD), and *Trivang Bhasma* (125 mg BD).

Changes in Therapeutic Interventions

Initially, the patient was managed with IV antibiotics and surgical debridement to control the infection. However, as there was no significant improvement with modern treatment alone, Ayurvedic therapy was introduced, including Vranadhoopan Karma (fumigation therapy) and oral herbal medications, to promote wound healing and tissue regeneration. As the wound showed significant granulation tissue formation, the patient underwent surgical suturing for closure. Post-suturing, oral antibiotics and Ayurveda medications were continued to prevent reinfection and promote complete recovery. The integration of conventional and Ayurveda therapies resulted in accelerated wound healing, reduced infection, and no recurrence, demonstrating the effectiveness of an integrative treatment approach.

Follow-up and Outcomes

Clinician- and Patient-Assessed Outcomes

The patient showed significant improvement in wound healing, infection control, and overall recovery. Clinician-assessed outcomes included the formation of healthy granulation tissue, absence of necrosis, and no signs of recurrent infection at the surgical site. The patient-reported outcomes included reduced pain, improved mobility, and overall satisfaction with the treatment process. By the end of treatment, the patient experienced complete wound healing without functional impairments.

Table 2: Before and After Haematological changes

Test	Initial Value	Follow-up Value	Interpretation
WBC (mm ³)	19,800	7,000	Reduced to normal levels
Hemoglobin (g/dL)	8.2	9.2	Improved with nutritional support
Platelets (mm ³)	337000	311,000	Maintained within normal range
IL-6 (pg/mL)	53.2	3.780	Reduced to normal values indicating remarkable reduction in systemic inflammation

Intervention Adherence and Tolerability

Adherence to the post-discharge regimen, including oral antibiotics, Ayurvedic medications, and wound care, was monitored through patient-reported compliance and clinical assessment. The patient and caregivers were educated on proper wound care and medication schedules, ensuring high adherence. Regular follow-ups confirmed good tolerability, with no reported gastrointestinal issues or medication intolerance from either the conventional or Ayurveda treatments.

Adverse and Unanticipated Events

No adverse events or treatment-related complications were observed. No discomfort was reported during Vranadhoopan Karma (Ayurveda fumigation therapy), but this was transient and managed by adjusting the intensity of the fumigation. No allergic reactions, wound dehiscence, or reinfection occurred, confirming the safety and efficacy of the integrative therapeutic approach.

Overall, the combination of surgical, pharmacologic, and Ayurveda interventions resulted in successful recovery, no recurrence of Fournier's gangrene, and full restoration of function. The patient continued with long-term lifestyle modifications and herbal support to maintain overall health and prevent future infections.

DISCUSSION

The strengths of this case management included early surgical intervention, aggressive infection control with broad-spectrum antibiotics, and the integration of Ayurveda wound care (Vranadhoopan Karma) to enhance healing. The combination of conventional and Ayurveda medicine provided a holistic approach, addressing both infection control and tissue regeneration. The patient showed faster wound healing, reduced inflammation, and no recurrence, demonstrating the potential benefits of integrative medicine in managing complex wounds. Another strength was strong patient adherence, achieved through continuous monitoring, education, and a well-structured follow-up plan.

Nimba (*Azadirachta indica*) is well known for its antimicrobial, anti-inflammatory, antibacterial, and antioxidant properties, making it highly effective in wound healing and infection control. Studies have demonstrated its strong antibacterial activity against *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae*, common pathogens in wound infections. Neem extracts work by disrupting bacterial membranes, inhibiting biofilm formation, and reducing microbial load, thereby preventing infections and promoting faster healing.

In wound healing studies using excision and incision models in Sprague Dawley rats, Neem significantly enhanced wound contraction, tensile strength, and collagen synthesis [4]. Its ability to reduce inflammation, stimulate fibroblast activity, and promote neovascularization accelerates tissue regeneration. Additionally, its antioxidant properties protect against oxidative stress, further aiding the healing process. Given its broad-spectrum antimicrobial effects, Nimba is a promising natural adjunct in managing infected wounds, post-surgical healing, and chronic ulcers, supporting its use in Ayurvedic wound care practices like Vranadhoopan Karma [5]. The hexane extract of *Acorus calamus* rhizome (AC-R-H) exhibits broad-spectrum antibacterial activity, enhancing ampicillin efficacy against *Escherichia coli*, *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, and *Bacillus cereus*. Its bioactive fraction (S-III-BAF), rich in Asarone, disrupts membrane integrity, increases permeability, and inhibits biofilm formation, aiding in infection control and wound healing. In Ayurveda, *Acorus calamus* is used in Vranadhoopan Karma, a fumigation therapy that eliminates pathogens, reduces inflammation, and promotes tissue regeneration, making it a valuable complementary treatment in post-debridement wound care [6].

Mustard seeds (*Gour Sarshap*) exhibit strong antimicrobial properties, effectively inhibiting pathogens like *Staphylococcus aureus*, *Streptococcus mutans*, *Enterococcus faecalis*, and *Candida albicans* [7]. Their anti-inflammatory and disinfecting effects support their use in Vranadhoopan Karma, an Ayurvedic fumigation therapy that sterilizes wounds, prevents infections, and promotes faster healing. This justifies their role as a natural adjunct in post-debridement wound care. Guggulu, the oleo-gum resin from *Commiphora wightii*, has demonstrated significant antimicrobial properties. Studies indicate that its ethanol extracts exhibit antibacterial activity against both Gram-positive and Gram-negative bacteria, including *Staphylococcus aureus*, *Escherichia coli*, *Salmonella typhi*, and *Bacillus subtilis*. The bioactive compounds, Guggulsterones E and Z, are believed to contribute significantly to this antimicrobial effect [8,9].

However, there were limitations to this approach. The lack of extensive clinical trials on Ayurvedic interventions such as Vranadhoopan Karma in Fournier's gangrene makes it challenging to generalize these findings. Additionally, objective comparisons between conventional and Ayurvedic treatments in wound healing were not available, as this case followed an integrated approach rather than a controlled study. Further research and randomized trials are needed to validate the efficacy of Ayurvedic therapies in similar cases.

CONCLUSION

This case highlights the importance of early surgical intervention in Fournier's gangrene and explores the potential benefits of Ayurvedic wound management as a complementary therapy. The successful integration of Vranadhoopan Karma along with standard medical treatment facilitated faster wound healing, reduced infection, and a favorable clinical outcome. While this case supports the role of Ayurveda in complex wound care, further clinical studies are needed to establish its efficacy on a broader scale. The primary takeaway is that integrative medicine may enhance recovery in severe infections when combined with conventional surgical and pharmacologic approaches, offering a holistic, patient-centered approach to healing.

Patient Perspective

The patient expressed gratitude for comprehensive care. Initially anxious about the life-threatening diagnosis of Fournier's gangrene, he felt reassured after emergency debridement and clear communication. Postoperatively, pain and swelling reduced, though wound healing seemed slow. Skepticism toward *Ayurvedic Vranadhoopan Karma* shifted after visible improvement, reduced odor, and healthy granulation. He reported no side effects, valued integrative care, recovered fully, and consented to publication with confidentiality.

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