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MULTIMODAL INTEGRATIVE APPROACH IN THE MANAGEMENT OF FOURNIER'S GANGRENE: A CASE STUDY ON EFFECTIVE RECOVERY

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Abstract

Introduction: Fournier's gangrene (FG) is a rapidly progressive and life-threatening form of necrotizing fasciitis affecting the perineal, genital, and perianal regions. It is characterized by extensive soft tissue necrosis, systemic toxicity, and a high mortality risk. Standard management involves prompt surgical debridement, broad-spectrum antimicrobial therapy, and intensive supportive care. However, despite advancements in medical and surgical interventions, FG remains associated with significant morbidity and mortality. Contributing factors include rising antimicrobial resistance and disruption of the host microbiome. A major determinant of prolonged morbidity is delayed wound healing, which often persists even after effective infection control.

Case presentation: This case report describes the clinical course of a 49-year-old male diagnosed with Fournier's gangrene, presenting with a Fournier's Gangrene Severity Index (FGSI) score of 7.

Discussion: The patient was managed through an integrative, multi-stage treatment approach. Initial intervention included *Chhedana Karma* (surgical debridement), systemic antibiotic therapy, and adjunctive local wound care using *Panchavalkala Kashaya* and *Jatyadi Taila*. In addition, oral administration of Ayurvedic formulations including *Punarnava Mandura*, *Shigru Guggulu*, *Amalaki Rasayana*, *Ashwagandha Churna*, and *Giloya Ghana Vati* was employed to promote systemic detoxification, immune modulation, and tissue regeneration. Upon development of healthy granulation tissue and favourable wound conditions, *Seevana Karma* (surgical wound closure via suturing) was performed.

Conclusion: This integrative treatment strategy resulted in progressive wound healing and complete recovery within six weeks.

Keywords: Fournier's Gangrene, Integrative Wound Management, Ayurveda

Introduction

Fournier's gangrene (FG) is a rare, potentially fatal necrotizing fasciitis that spreads quickly and affects the scrotum, external genitalia, and perineal area characterized by obliterative endarteritis leading to extensive tissue necrosis.[1] This polymicrobial infection primarily affects people around the age of 50.9 and has a male-to-female ratio of roughly 10:1 and affects approximately 1.6 per 100,000 men annually.[2] Risk factors include advanced age > 50 years, diabetes, obesity, chronic alcoholism, and debilitated and immunosuppressed individuals.[3] It has also been found that delayed diagnosis that is pretreatment days more than five days and high FGSI > 9 values also contribute to poor prognosis and higher mortality.[4] Prompt surgical debridement to remove necrotic tissue, broad-spectrum antibiotics to control sepsis, and reconstructive treatments when needed are essential component of conventional treatment plan.[5] Recent studies have shown that fatality rates vary from 3 to 67 percent, and morbidity is still substantial despite extensive surgical and medicinal care.[6]

In the Ayurvedic system of traditional Indian medicine, an exact description corresponding to Fournier's gangrene is not explicitly documented. However, several conditions described in classical Ayurvedic texts- such as *Visarpa*, particularly the *Pitta-Kaphaja Visarpa*[7], *Kotha*[8] , and certain features of *Dushta Vrana* (chronic non-healing wounds)[9] - exhibit clinical similarities with this condition and for the management of these conditions, various therapeutic modalities have been traditionally employed, including surgical debridement, the use of immunomodulatory and anti-inflammatory agents, and stage-specific wound management protocols involving a range of Ayurvedic formulations. In this case report, an integrative therapeutic approach was adopted, combining conventional management including systemic antibiotics and surgical debridement with local and systemic Ayurvedic interventions. Local wound care involved cleansing with *Panchavalkala Kashaya* and dressing with *Jatyadi Taila*, tailored according to the wound condition. Systemic Ayurvedic therapy included the administration of *Shigru Guggulu*, *Punarnava Mandura*, and Rasayana formulations to support detoxification, enhance tissue regeneration, and strengthen systemic immunity.[10] Wound closure by secondary intention further facilitated optimal recovery.

The outcome of this case managed under academic institution indicates that the integration of Ayurvedic therapies with standard medical care may enhance the rate of wound healing, reduce the risk of secondary infections, and potentially lower morbidity and mortality associated with Fournier's gangrene. These findings support the potential role of integrative treatment protocols in the management of complex, non-healing infections.

Case report

A 49-year-old male with a longstanding history of daily tobacco use and chronic alcohol consumption over the past 25 years presented to the outpatient department (OPD) with complaints of scrotal and perianal swelling, severe pain, and purulent discharge persisting for 10 days. The symptoms initially began as localized swelling in the perianal region, accompanied by throbbing pain that progressively intensified. Despite the increasing severity, the patient delayed seeking medical attention. Approximately five days after symptom onset, the swelling spontaneously ruptured, leading to the discharge of purulent, foul-smelling material. Upon presentation to the OPD, the patient was febrile with a temperature of 102°F, tachycardic with a heart rate of 130 beats per minute, normotensive with a blood pressure of 130/70 mmHg, and had a respiratory rate of 18 breaths per minute.

Clinical findings

On inspection, there is prominent erythema, oedema, and induration were observed in the scrotal, genital, and perianal regions. The skin over the scrotum appeared tense, with discoloration ranging from pale to cyanotic or blackened areas, accompanied by a shiny appearance (Figure 1). A purulent, foul-smelling discharge is noted, emanating from an open wound located in the perianal region, specifically at the base of the scrotum (Figure 2). The wound edges are ragged and undermined. Palpation reveals significant tenderness, with the area of discomfort extending beyond the borders of erythema and oedema. The affected tissue is typically soft, boggy and fluctuant, with areas of induration. The local temperature over the affected region is markedly elevated, and the patient is febrile. No palpable crepitus is detected on initial examination. Additionally, a urinary catheter is found to be in situ. The patient presents with tachycardia (heart rate: 130 beats per minute).

Fig. 1. Preoperative image showing oedematous swelling of the scrotum and penis (Day 1).

Fig. 2. Preoperative image showing a peri-anal wound with profuse pus discharge (Day 1).

Timeline

The clinical timeline of the patient is described in Table 1.

Diagnostic Assessment

The final diagnosis of Fournier's gangrene was established based on a combination of classical clinical features, risk factor history and laboratory findings. On physical examination, the presence of ragged wound edges, undermined tissues, boggy induration, and areas of cyanosis and blackened skin were highly suggestive of tissue necrosis. The overall clinical picture pointed toward polymicrobial necrotizing fasciitis of the perineum the defining pathology of Fournier's gangrene.

Laboratory investigations further supported this diagnosis. A markedly elevated total leukocyte count (19,600 cells/mm^3) indicated systemic inflammatory response, while electrolyte disturbances such as hyponatremia (Na^+: 129 mmol/L) and hyperkalaemia (serum potassium: 5.6 mmol/L). And these resulted Fournier's Gangrene Severity Index (FGSI) score of 7 indicating a moderate to high risk of mortality and confirming the severity of systemic involvement.

Table 1: Patient course

DATE	PROCEDURE	OBSERVATION
Day 1	Surgical debridement	Profuse pus discharge from perianal region associated with scrotal swelling (Fig.1,2).
Week 1	C&D with *Panchavalkala Kashaya*	Pus discharge reduced considerably, no healthy granulation tissue present (Fig.3).
Week 2-3	Jatyadi Taila packing	Healthy granulation tissue observed (Fig.4).
Week 4	Suturing for secondary intention	Suture line healthy, no seroma formation (Fig.5).
Week 5	Sutures removal	Suture line remains healthy, no seroma (Fig.6).
Week 6	Follow up	Wound completely healed (Fig.7).

Therapeutic Intervention

The treatment protocol is detailed in Table 1. Due to the rapid progression of the disease, the initial management focused on controlling infection and sepsis through both surgical and medical interventions. Surgical debridement was performed, followed by cleaning (*Vrana Shodhana*) and the application of dressings using *Panchavalkala Kashaya Kshalana* until the formation of healthy granulation tissue. Upon resolution of sepsis and normalization of haematological parameters, the focus shifted to wound management. Local application of *Jatyadi Taila* was utilized for wound healing (*Vrana Ropana*). Subsequently, the wound closed by secondary intention. Oral Ayurvedic medications were prescribed as follows: *Ashwagandha Churna* (1 TSF BD), *Amalaki Rasayana* (1 TSF BD), and *Giloy Ghana Vati* (500 mg BD) as immunomodulators; *Punarnava Mandura* (500 mg BD) as a hematinic and anti-inflammatory agent; and *Shigru Guggulu* (500 mg BD) for inflammation reduction, throughout the treatment course. The patient was discharged following suture removal on the 10th day post-suturing, with oral Ayurvedic medications and instructions to maintain proper local hygiene. On follow-up at 15 days, the wound had healed without any further signs of infection.

Follow-up and Outcomes

The patient responded well to integrative management combining surgical and Ayurvedic care. During the first week, surgical debridement effectively controlled the spread of infection and wound care with *Panchavalkala Kashaya* significantly decreased discharge and necrotic tissue (Figure 3), and the patient showed progressive clinical improvement. During Weeks 2 and 3, *Jatyadi Taila* packing promoted the appearance of healthy granulation tissue (Figure 4). Ayurvedic support and wound hygiene were continued throughout this period. In Week 4, following complete granulation and reduction in wound size, the patient underwent scrotoplasty (Figure 5). Suture line evaluations were conducted on the 3rd and 7th days, and sutures were removed by the end of the week, revealing a well-approximated, infection-free wound (Figure 6). By Week 6, complete wound healing was achieved, with no residual discharge, necrosis, or dehiscence (Figure 7). At the 6-month follow-up, the patient maintained full recovery. The surgical site remained healthy, with no recurrence of infection or abscess formation.

Fig. 3. Post-surgical debridement (Week 1).

Fig. 4. Wound after Jatyadi Taila packing (Weeks 2–3).

Fig. 5. Wound healing by secondary intention (Week 4).

Fig. 6. Wound appearance after suture removal (Week 5).

Fig. 7. Complete wound healing (Week 6).

Discussion

Fournier's gangrene (FG) is a rapidly progressing, life-threatening form of polymicrobial necrotizing fasciitis that affects the perineum, perianal region, and external genitalia. It is characterized by tissue destruction, systemic inflammatory response, and high mortality rates, despite timely surgical intervention and broad-spectrum antimicrobial therapy.[11] Although conventional management comprising urgent surgical debridement, empirical antibiotic regimens, and intensive supportive care remains the cornerstone of treatment, clinical outcomes are often suboptimal.[12] From the Ayurvedic standpoint, the clinical picture of FG resembles with conditions such as, *Kotha*-gangrene[13], *Visarpa* - cellulitis[14] and *Dushta Vrana* - chronic infected wound with systemic manifestations.[15] Ayurvedic management of such complex pathologies follows a multi-dimensional strategy involving *Chhedana* (surgical debridement)[16], Vrana Shodhana and Vrana Ropana (local wound management)[17], and systemic rejuvenation via *Rasayana* therapy. But the application of Ayurvedic interventions must be judicious and appropriately timed within the clinical trajectory of the disease. Initially in addition to standard surgical excision of necrotic tissue (*chhedana*), wound cleansing was enhanced through the use of *Panchavalkala kashaya* for irrigation. Concurrently, a 7-day course of broad-spectrum antibiotics was administered in accordance with standard clinical protocols. To counteract the risk of antibiotic resistance and support host immunity, Ayurvedic immunomodulatory agents such as *Ashwagandha churna* and *Amalaki rasayana* were introduced. During the acute phase of Fournier's gangrene, aggressive surgical and antimicrobial therapy is paramount but add on Ayurvedic therapies not only help during the stabilization and recovery phases but also enhance systemic and local recovery without interfering with life-saving interventions.[18] In this stage Ayurveda,

particularly useful in modulating systemic inflammation, and strengthening host immune responses. Internally administered herbal and herbo-mineral formulations play a critical role in the systemic management of infection and inflammation. Preparations such as *Shigru Guggulu* and known for their anti-inflammatory, antimicrobial, and detoxifying actions, may assist in modulating the host response to infection. Immunomodulatory agents like *Punarnava Mandura*, and *Giloy Ghana Vati*, *Ashwagandha churna Amalaki rasayana*, are widely documented in Ayurvedic literature and supported by emerging pharmacological studies for their adaptogenic, antioxidant, and immunopotentiating properties. [19,20,21] These proves to support systemic resilience and prevent progression to multi-organ dysfunction.[22]

In Ayurveda Local wound management is an essential component of Ayurvedic care and complements surgical debridement. In cases where slough and necrotic tissue persist post-debridement, herbal preparations such as *Panchavalkala decoction* for wound lavage may offer additional debridement and antiseptic benefits.[23] The elements in *Panchavalkala kashaya*, which have the qualities of cleansing (*shodhana*) and healing (*ropaṇa*) of wounds, are *Vaṭa* (*Ficus bengalensis* Linn), *Udumbara* (*Ficus glomerata* Roxb.), *Ashvattha* (*Ficus religiosa* Linn.), *Parisha* (*Thespesia populenoides* L.), and *Plakṣa* (*Ficus lacor* Buch-Ham.) (Shastri 819). Because of its high tannin content, it has an astringent effect that helps to shrink tissues, lessen inflammation, and cover wounds with a barrier.[24] Its antibacterial qualities guard against infection, and its anti-inflammatory qualities reduce swelling and redness to encourage quicker wound healing and improved tissue regeneration.[25] Oral medicines *Amalaki rasayana*, *Ashwagandha Churna*, *Shigru Guggulu*, *Giloy Ghana Vati* and *Punarnava Mandura*, as described in classical Ayurvedic texts, were also utilized to facilitate wound healing.[26,27] Due to the presence of vitamin C, bioflavonoids, flavones, polyphenols, and carotenoids, *Amalaki* is known for its antioxidant qualities.[28,29] It also has anti-inflammatory, immunomodulatory, and antibacterial characteristics, which may have aided in the healing process. *Amalaki rasayana's* immune suppressive properties greatly accelerate the body's innate healing mechanisms, resulting in quicker and more efficient wound healing.[30] In addition, *Ashwagandha* is well-known for its ability to promote collagen formation, reduce inflammation, and resist bacteria.[31] All these characteristics could have aided in improving the process of healing wounds. Similarly, *Shigru Guggulu*, composed of *Shigru* (*Moringa oleifera*) and *Guggulu* (*Commiphora mukul*), has antioxidant, anti-

inflammatory, and antimicrobial properties.[32] Together, they reduce inflammation, prevent infections, and promote wound healing. [33,34] Furthermore, *Giloy* contains chemical constituents such as tinosporine and tinosporic acid.[35] The aqueous crude extract of Tinospora cordifolia stems has demonstrated antioxidant properties.[36] Additionally, it is used as a *rasayan*a dravya in traditional medicine, known for its role in enhancing immunity.[37] Punarnava, which has antioxidant activity[38], *Mandura bhasma*, which has significant hematinic activity[39], *Triphala*, which has antioxidant and anti anemic properties, *Trikatu*, which is known to increase bioavailability[40], and *Gomutra*, which has antioxidant and antimicrobial properties, were among the ingredients of *Punarnava Mandura.*[41] Once the acute phase settled down, our focus shifted to healing the wound. *Jatyadi Taila*, prepared with herbs possessing antimicrobial, anti-inflammatory, and tissue-regenerative properties, may be applied topically to accelerate granulation and epithelialization.[42] Empirical evidence and traditional practice support their efficacy in chronic and infected wound beds.[43] *Jatyadi Taila*, a polyherbal oil that is mostly made of *Kashaya rasa* and *Tikta rasa*, is well-known for its ability to relieve pain (*Vedanasthapana*), cure wounds (*Ropana*), remove pus (*Pootihara*), and cleanse wounds (*Shodhana*). Important components with antibacterial, anti-inflammatory, and antifungal properties include salicylic acid from Jaati. Nimba's nimbine, combined with the active ingredients in turmeric and *yastimadhu*, contribute to its antibacterial, analgesic, and anti-inflammatory properties. In *Jatyadi Taila*, *tutha* (Copper sulphate) has cleansing qualities that help remove slough. All things considered, *Jatyadi Taila* has strong wound-healing properties.[44] These ingredients probably contributed to the healing process. When healthy granulation tissue formed, the wound was finally closed with secondary intention sutures. Our integrative treatment approach, combining conventional surgical and antibiotic, Ayurvedic interventions and suturing resulted in complete cure and healing of life threating FG. This is a single case report suggestive of excellent outcome but for generation of next level evidence well planned studies are required.

Conclusion

This case highlights the effectiveness of an integrative approach combining conventional and Ayurvedic treatments in managing Fournier's gangrene. Result of this single case study

suggest that incorporating Ayurvedic therapies alongside standard care may enhance recovery and improve overall patient outcomes in severe infections like Fournier's gangrene.

Patient perspective

I had pain and swelling near my private parts but didn't think it was serious at first. I ignored it for a few days, but then pus started coming out, and I got a high fever. Then I went to the hospital. I received both modern and Ayurvedic treatments over six weeks. I noticed considerable relief in the first week itself, and the wound kept improving. After suturing, it healed completely. At present, I don't have any complaints and feel completely fine.

Informed consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity.

Author Contributions

NH: Conducted the clinical assessment, documentation, and primary research for the case, involved in data collection, follow-up, and drafting of the case report.

RAB: Involved in data collection, follow-up, and drafting of the case report.

RS: Provided overall supervision, clinical guidance, and conceptual input throughout the case management. Reviewed and refined the manuscript critically for intellectual content and approved the final version for publication.

Ethical considerations

Not applicable. This case report is based on a clinical observation and did not require formal ethical approval. All procedures followed were in accordance with institutional and ethical guidelines.

Declaration of Conflicting Interests

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Data availability statement

All data generated or analysed during this study are included in this published article [and its supplementary information files.

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