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Successful Management of Pyogenic Liver Abscess in a 39-Year-Old Male through Ayurveda: Case Study

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ABSTRACT

Liver abscesses are a significant clinical condition characterized by localized pus collection within the liver parenchyma. This condition is correlated with a disorder described in Ayurveda texts; known as *Yakrut vidradhi* (liver abscess). A liver abscess is a type of *Abhyantar Vidradhi;* that refers to an internal abscess. In India, studies have estimated the prevalence of pyogenic liver abscess (PLA) to be approximately 0.022-0.031% (22-31 cases per 100,000 individuals). The condition is significantly associated with risk factors such as alcohol consumption and diabetes. In South Asia, the incidence has been increasing, with Taiwan reporting a prevalence of 0.012% to 0.018% (12 to 18 cases per 100,000 people). *Klebsiella Pneumoniae* is the most common pathogen, particularly in patients with comorbidities like diabetes. This case study discusses a 39-year-old male admitted with complaints of nausea, abdominal pain primarily in the right hypochondriac region, general weakness, and intermittent fever. Laboratory tests, including hematological investigations and liver function tests, along with imaging studies, confirmed the presence of a pyogenic liver abscess. The patient was successfully managed through Ayurveda treatment using multiple polyherbal formulations. This case emphasizes the importance of early detection and intervention to prevent complications.

INTRODUCTION

Liver abscesses, particularly pyogenic liver abscesses (PLA), are serious intra-abdominal infections characterized by the accumulation of pus within the liver parenchyma. These abscesses primarily result from bacterial infections that enter the liver through the biliary tract, portal vein, or from adjacent structures[1]. In India, studies have estimated the prevalence of pyogenic liver abscess (PLA) to be approximately 0.022-0.031% (22-31 cases per 100,000 individuals). The condition is significantly associated with risk factors such as alcohol consumption and diabetes. In South Asia, the incidence has been increasing, with Taiwan reporting a prevalence of 0.012% to 0.018% (12 to 18 cases per 100,000 people)[2]. Pyogenic liver abscesses often arise secondary to biliary tract diseases like cholangitis or cholecystitis, or from hematogenous spread of infection. 50% of solitary liver abscesses occur in the right lobe of the liver (a more significant part with more blood supply), less commonly in the left liver lobe or caudate lobe[3].Without early intervention, liver abscesses can lead to serious complications, including rupture, peritonitis, or sepsis. Modern medicine offers clear explanations for the routes of bacterial entry, the body's immune response, and the resulting necrosis that forms the abscess. Ayurveda offers a complementary perspective by focusing on restoring balance within the body and preventing disease recurrence. Ayurveda treatments are designed to remove toxins and clear blockages in channels to enhance the body's natural healing processes. Ayurveda remedies typically involve herbal formulations, dietary modifications, and lifestyle adjustments that work to rebalance the metabolic and inflammatory systems and structural and fluid balance systems while strengthening digestive function[4]. For example, herbs like *Tinospora cordifolia*, *Picrorhiza kurroa,* and *Boerhavia diffusa* are commonly used in Ayurveda to cleanse the liver, reduce inflammation, and restore its function[5]. What sets Ayurveda apart is its individualized treatment approach. Every patient's constitution is unique, and treatment is tailored to their specific biological system imbalance. This allows Ayurveda to address the root cause of the condition; rather than simply managing the symptoms. For an individual with a predominant imbalance in metabolic and inflammatory systems, cooling herbs that reduce inflammation would be used, while in a predominant structural and fluid balance system case, drying herbs would be applied to reduce the formation of mucus and pus. This personalized approach ensures that not only is the abscess treated, but the body's natural equilibrium is restored, preventing further complications. Ayurveda also emphasized preventive care as a core part of supporting health. By teaching individuals how to maintain balance in metabolic and structural systems, a strong digestive system, and proper elimination of toxins, Ayurveda provides a blueprint for preventing diseases such as liver abscesses from developing in the first place. This holistic; preventive philosophy reflects the deep wisdom of Ayurveda, as it teaches individuals to live in harmony with their internal systems and the environment around them. While modern medicine excels at managing acute infections and complications, Ayurveda offers a long-term, sustainable approach to health that complements and enhances modern treatments. By addressing the root causes of disease, system imbalances, poor digestion, and accumulation of toxic substances, Ayurveda not only treats the immediate condition but also promotes lasting wellness[6].

2. Materials & Methods

2.1. Patient Information

A 39-year-old male presented with complaints of nausea, abdominal pain localized to the right hypochondria, and generalized weakness. The patient denied any history of diabetes, hypertension, or other major illnesses. His family medical history was also unremarkable. The symptoms persisted for 3–5 days before presentation, accompanied by intermittent fever with a maximum recorded temperature of 102°F.

2.2. Clinical Findings

On physical examination, the patient was conscious, alert, and had stable vital signs, including a pulse rate of 74 beats per minute and blood pressure of 130/90 mmHg. Intermittent fever was noted, while systemic examination findings were unremarkable. The abdominal examination revealed tenderness in the right hypochondriac region.

2.3. Diagnosis Assessment

Table 1 Blood investigation reports.

Parameter	Result
Hematological Tests	
Hemoglobin	14.4 g/dl
Total WBC Count	13,600 cells/mm^3
Liver Enzymes	
SGOT	19.45 U/L
SGPT	28.29 U/L
Total Bilirubin	0.61 mg/dl
Direct Bilirubin	0.32 mg/dl
Indirect Bilirubin	0.29 mg/dl
Urine Examination	
Color	Dark yellow
Appearance	Turbid
Albumin	(+)
Bilirubin	(++)

2.4. Imaging

Ultrasound (USG): The liver measured 153 mm, with a borderline enlargement. The hepatic parenchymal echo texture indicated a fatty liver. A 6.3 cm x 4.2 cm x 5.2 cm (volume: 75 cc) abscess was noted in the right lobe of the liver, partially liquefied and non-aspirable. The findings were consistent with borderline hepatomegaly and Grade 1 fatty liver.

The clinical presentation led to a provisional diagnosis of a liver abscess. The presence of nausea, right hypochondrial pain, leukocytosis, elevated liver enzymes, and bilirubin in the urine, along with USG findings, confirmed the diagnosis of a pyogenic liver abscess. The abscess, located in the right lobe of the liver, was large and partially liquefied but non-aspirable.

2.5. Timeline

The patient underwent admitted male surgical ward management with Ayurveda therapeutic modalities for 23 Days. This was followed by dietary and lifestyle modifications for three months under regular supervision.

Table 2 Timeline

Date	Event/Observation
24/04/2024	The patient reported to the Shalyatantra outdoor patient department. Based on clinical history, physical examination, laboratory and sonographic findings, a final diagnosis of pyogenic liver abscess was made. The patient was admitted to Shalyatantra ward.
24/04/2024 to 03/05/2024	Treatment Given
	1. Crataeva religiosa bark decoction (20ml, twice daily, before food)
	2. Mahasudarshan tablet (2 tablets, twice daily, after food)
	3. Arogyavardhini tablet (2 tablets, twice daily, after food)
	4. Phaltrikadi herbal decoction (30 ml, twice daily, before food)
	5. Moringa soup with black pepper (1 glass, twice daily)
04/05/2024 to 16/05/2024	Medications Updated:
	1. Crataeva religiosa bark decoction (20ml, twice daily, before food)
	2. Arogyavardhini tablet (2 tablets, twice daily, after food)
	3. Phaltrikadi herbal decoction (30 ml, twice daily, before food)
	4. Moringa soup with black pepper (1 glass, twice daily)
	5. Cyperus rotundus decoction for the entire day (Consume in small sips)
Post-Treatment	Outcome
16/05/2024	Patient: Symptomatic relief, improved well-being, and liver abscess size reduction.

Table 3 Dietary Regimen for Liver Abscesses

Category	Recommended Foods	Avoid
Hydration	Water (8-10 glasses/day)	Sugary drinks
	Herbal teas (e.g., ginger, mint) Medicated Buttermilk with Black Pepper and Dry Ginger	Caffeinated beverages
	Turmeric (curcumin)	Fried and processed foods

Anti-inflammatory Foods	Garlic (fresh or in food)	High-fat foods
	Ginger (fresh or as tea)	Excessive salt
Liver-Supporting Foods	Leafy greens (spinach, kale)	Alcohol
	Beets (raw or cooked)	Red meat or fatty cuts of meat
	Cruciferous vegetables (broccoli, cabbage, cauliflower)	Processed foods (chips, snacks, fast food)
	Citrus fruits (oranges, lemons, grapefruit)	Artificial sweeteners
Protein	Plant-based proteins (lentils, tofu, green gram)	Fatty cuts of meat (pork, lamb), Fried protein (e.g., fried fish or chicken)
Meal Frequency	Small, frequent meals (3-5 times a day)	Large, heavy meals
Digestive Enhancers	Warm, light meals	Cold foods (can slow digestion)
	Spices like cumin, fennel, and coriander to aid digestion	Processed dairy (e.g., cheese, ice cream)

2.6. PROBABLE MODE OF ACTION OF PRESCRIBED MEDICINES

2.6.1. Crataeva religiosa bark decoction

Mechanism of Action: *Crataeva religiosa* bark decoction has strong anti-inflammatory and detoxifying properties[7]. It's traditionally used in Ayurveda for liver and kidney disorders. In the case of a liver abscess, it helps reduce inflammation, promotes detoxification, and balances disturbed metabolic and inflammatory processes and fluid retention and structural balance, which are often responsible for liver-related issues.

Scientific Basis**:** The main active compound, lupeol, has been shown in studies to reduce inflammation, protect the liver, and aid in the drainage of pus from abscesses. It also supports bile secretion, which is essential for liver detoxification[8]. *Crateva religiosa* bark has shown significant antimicrobial activity against Staphylococcus aureus and Escherichia coli, with moderate effects on Bacillus subtilis and Pseudomonas aeruginosa. Methanolic and ethanolic extracts were found to be the most effective in inhibiting these bacterial strains[9].

2.6.2. Mahasudarshan Tablet

Mechanism of Action: This polyherbal formulation is used in Ayurveda medicine to treat fever, infections, and liver disorders. It works by purifying the blood, reducing toxins, and supporting the immune system to fight infections. In the context of liver abscess, it helps manage the fever and reduce the inflammation[10].

Scientific Basis**:** It contains Tinospora cordifolia, a potent immunomodulator and anti-inflammatory herb. It has been studied for its ability to enhance immune function, lower fever, and protect liver cells from infection and toxin-induced damage. The polyphenols and flavonoids in this herb have strong antioxidant effects, which help reduce oxidative stress on the liver. Mahasudarshan tablet, a traditional Ayurvedic polyherbal formulation, has been studied for its antimicrobial properties. Research indicates that it has a similar formulation, exhibits antibacterial activity against pathogens such as *Salmonella typhi*, *Staphylococcus epidermidis*, *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*[11].

2.6.3. Arogyavardhini Tablet

Mechanism of Action: Arogyavardhini Tablet is well-known polyherbo-mineral formulation in Ayurveda for its liver detoxifying properties[12]. It addresses liver abscesses by reducing inflammation and promoting the regeneration of liver tissue. It also corrects digestive function and balances metabolic and inflammatory processes, which are often aggravated in liver conditions[13].

Scientific Basis**:** This formula includes *Picrorhiza kurroa*, a widely researched herb for liver protection. Studies show that it has hepatoprotective effects by lowering elevated liver enzymes (like ALT and AST), reducing liver inflammation, and accelerating liver tissue repair[14]. It also helps in bile secretion, fat digestion and further facilitates the removal of toxins[15]. Arogyavardhani tablet has antibacterial activity against several bacterial species, including *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Escherichia coli*[16].

2.6.4. Phaltrikadi polyherbal decoction

Mechanism of Action: This decoction helps pacify metabolic and inflammatory processes and clears out excess toxins from the liver. It promotes bile flow and improves digestion, which is crucial when the liver is under stress from an abscess. It also has anti-inflammatory properties that help reduce liver swelling[17].

Scientific Basis: Phaltrikadi polyherbal decoction is rich in tannins and flavonoids, which act as antioxidants. These herbs protect liver cells from damage, reduce oxidative stress, and help regenerate damaged liver tissues. This makes Phaltrikadi herbal decoction an excellent liver tonic[18].

2.6.5. Moringa oleifera Soup with Black Pepper

Mechanism of Action: Moringa oleifera is a highly nutritious herb that supports liver detoxification and regeneration. Its anti-inflammatory properties help reduce swelling and aid in healing the liver tissue affected by abscesses[19]. The addition of *Piper nigrum* (Black Pepper) enhances digestion and improves the bioavailability of the active compounds in Moringa[20].

Scientific Basis: Moringa is rich in bioactive compounds like quercetin and chlorogenic acid, which have been shown to protect the liver from oxidative damage. These compounds reduce liver inflammation, support immune function, and promote liver healing[21]. Black Pepper contains piperine, which enhances the absorption of these nutrients, making the treatment more effective[22]. Moringa oleifera Leaf has antibacterial activity against several bacterial species, including Staphylococcus aureus and Escherichia coli[23]. black pepper has antimicrobial properties against various pathogens, including *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Salmonella spp.*, *Proteus mirabilis*, and *Candida albicans*[24].

2.6.6. Cyperus rotundus decoction

Mode of Action**:** *Cyperus rotundus* decoction is a classical Ayurveda preparation that focuses on strengthening digestion and metabolism. In liver abscesses, it helps correct the underlying digestive disturbances and supports liver function by balancing metabolic and inflammatory processes and fluid retention and structural balance. This remedy is taken throughout the day to maintain the body's digestive fire and detoxification process[25].

Scientific Perspective**:** *Cyperus rotundus* decoction is known for its anti-inflammatory, antimicrobial, and digestive stimulant properties. It helps reduce inflammation, prevent infections, and enhances digestive enzyme activity, all of which are crucial for managing liver abscesses and promoting liver regeneration. *Cyperus rotundus* decoction also supports detoxification, reduces the burden on the liver, and helps flush out toxins [26].

Table 3 Follow-up and Outcomes:

Parameter	Before Treatment (24/04/2024)	After Treatment (6/05/2024)
Hematological Tests		
Hemoglobin	14.4 g/dl	14.3 g/dl
Total WBC Count	13,600 cells/mm^3	7700 cells/mm^3

Liver Enzymes		
SGOT	19.45 U/L	15.91 U/L
SGPT	28.29 U/L	45.97 U/L
Total Bilirubin	0.61 mg/dl	0.53 mg/dl
Direct Bilirubin	0.32 mg/dl	0.29 mg/dl
Indirect Bilirubin	0.29 mg/dl	0.24 mg/dl
Urine Examination		
Colour	Dark yellow	Yellow
Appearance	Turbid	Turbid
Albumin	(+)	Trace
Bilirubin	(++)	Absent
Symptoms	Nausea, abdominalpain (right hypochondrium), generalized weakness, intermittent fever (max 102°F)	No nausea or abdominal pain, energetic, significant improvement in overall well-being
Ultrasound Report		
Liver Size	153 mm (borderline hepatomegaly)	149 mm (within normal limits)
Liver Pattern	Grade 1 fatty liver	Normal hepatic parenchymal echo texture
Abscess Size	6.3 cm × 4.2 cm × 5.2 cm (volume: 75 cc)	3 cm × 4.8 cm × 4.3 cm (volume: 25 cc)
Abscess State	Partially liquefied and non-aspirable	Partially liquefied and non-aspirable

3. Result and Discussion

Modern treatment for liver abscesses typically involves a combination of intravenous antibiotics for 2-6 weeks, followed by oral antibiotics to complete the course. In Ayurveda, the timeline for managing liver abscesses can be comparable or sometimes shorter with appropriate therapies, depending on factors like the patient's individual constitution, biological makeup involvement, and the severity of the abscess. Ayurvedic interventions often focus on symptomatic relief and the root cause, which may accelerate healing in well-selected cases. Liver abscesses, particularly pyogenic ones, present a significant clinical challenge. In this case, the patient was diagnosed with a pyogenic liver abscess measuring 6.3 cm x 4.2 cm x 5.2 cm (volume: 75 cc) in the right lobe of the liver. The patient was presented with classic symptoms of nausea, right hypochondriac pain, and elevated liver enzymes. Empirical ayurveda therapy effectively reduced the abscess size and symptoms without the need for surgical drainage. Incorporating Ayurveda treatments such as Polyherbal formulations and dietary regimens supported the patient's liver function and aided in the detoxification process. The reduction in abscess size from 75 cc to 25 cc underscores the efficacy of Ayurveda treatments. The gradual improvement suggests that with continued therapy, complete resolution may be achieved without invasive procedures. The liver plays a vital role in detoxification, digestion, and overall metabolic health. Proper hydration is crucial for maintaining liver function, as water helps flush toxins and waste products through the bloodstream. Consuming 8-10 glasses of water daily supports enzymatic activities in the liver. Herbal teas like ginger and mint provide additional benefits by reducing inflammation and aiding in detoxification, while medicated buttermilk with black pepper and dry ginger enhances digestion, promotes bile flow, and protects against liver infections. Anti-inflammatory foods such as turmeric, garlic, and ginger are particularly beneficial for liver health. Turmeric, rich in curcumin, protects liver cells from damage, reduces oxidative stress, and supports regeneration. Garlic contains sulfur compounds that activate liver enzymes, aiding detoxification and reducing fat buildup [27]. Ginger improves liver enzyme activity, reduces inflammation, and protects against oxidative damage [28]. These foods not only lower inflammation but also strengthen the liver's ability to process and eliminate toxins.

Liver-supporting foods, including leafy greens, beets, cruciferous vegetables, and citrus fruits, provide essential nutrients that detoxify and protect the liver [29]. Leafy greens like spinach and kale bind to toxins and support natural detoxification pathways. Beets, rich in betaine, enhance bile flow and reduce inflammation. Cruciferous vegetables like broccoli and cabbage boost detox enzymes and help regenerate damaged liver cells. Citrus fruits, high in vitamin C, stimulate bile production and enhance toxin removal, improving overall liver health. Plant-based proteins, such as lentils, tofu, and green gram, are easier to metabolize than animal proteins and provide essential amino acids for repairing liver cells. Including these proteins ensures the liver has the building blocks needed for regeneration without being overburdened. Small, frequent meals throughout the day stabilize blood sugar levels, preventing excessive stress on the liver and improving glucose metabolism. Digestive enhancers like warm, light meals and spices such as cumin, fennel, and coriander also play a significant role in liver health. Warm meals are easy to digest, reducing the liver's workload. Cumin enhances bile flow for better fat digestion, fennel prevents bloating and promotes smooth digestion, and coriander supports detoxification and balances liver enzymes.

This comprehensive dietary approach supports liver detoxification, reduces inflammation, aids in tissue repair, and enhances overall liver function, ensuring optimal metabolic health and well-being.Avoiding certain foods is essential in liver abscess management to reduce liver strain, inflammation, and aid healing. Sugary drinks and artificial sweeteners worsen liver fat accumulation and disrupt gut health. Caffeinated beverages and alcohol strain the liver and impair recovery. Fried, processed, and high-fat foods, including red meat and fatty cuts, overload the liver with unhealthy fats and toxins, aggravating inflammation. Excessive salt leads to fluid retention, while processed dairy like cheese and ice cream adds to digestive strain. Cold foods and heavy meals slow digestion, further burdening the liver. These dietary restrictions help support liver function and promote faster recovery.

CONCLUSION

The case study highlights the importance of an Ayurveda approach to managing pyogenic liver abscesses. Ayurveda treatments helped a significant reduction in abscess size and prevented complications. This case underscores the potential of traditional Ayurvedic practices for effective patient management.

5. Ethical approval

As it is a Single case study no clearance from Institutional Ethical Committee was required. However, patients informed written consent was sought.

6. Declaration of generative AI

There is no help of generative AI and AI-assisted technologies in this writing process.

7. Conflict of interest

Both authors are aware of the publication and declare no conflict of interest.

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