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RESEARCH ARTICLE

“INTEGRATIVE NATUROPATHY AND YOGA MODULE AS ADJUNCTIVE CARE IN THE MANAGEMENT OF CELLULITIS: A 21-DAY SINGLE CASE REPORT”

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Abstract

Cellulitis is an acute bacterial infection of the deep dermis and subcutaneous tissues commonly treated with conventional antibiotics, yet persistent local inflammation, edema, and obesity-related metabolic burdens frequently prolong recovery. This case report documents a 68-year-old male with Grade 2 obesity (BMI 39 kg/m²) presenting with a two-year history of bilateral lower-limb swelling, localized erythema, warmth, and marked left-leg pain, complicated by hypertension and bilateral varicose veins. Alongside a 5-day course of oral antibiotics and antihypertensive therapy, the patient underwent a 21-day inpatient multimodal naturopathic and yogic intervention. The integrative regimen included tailored hydrotherapy, mud therapy, heliotherapy, an eliminative and anti-inflammatory diet, and daily structured yoga asanas, pranayama, and meditation. Following the 21-day intervention, bilateral pedal edema significantly diminished, with circumferential foot girth decreasing from 29 cm to 22 cm on the right and 32 cm to 24 cm on the left. Systemic inflammation markedly improved, evidenced by a drop in C-reactive protein (CRP) from 11.2 mg/L to 6.6 mg/L, alongside a reduction in the Cellulitis Severity Scale score from 15 to 4. The patient reported complete pain resolution (VAS 0/10), reduced insomnia (Insomnia Severity Index dropped from 17 to 6), and a weight reduction of 11 kg (BMI decreased to 34.7 kg/m²). Improvements were sustained through a 2-month post-discharge follow-up without adverse events. These findings suggest that structured naturopathy and yoga therapies may serve as effective adjunctive care to standard medical therapy in accelerating symptom resolution, resolving chronic edema, and improving quality of life in cellulitis.

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Introduction:-

Cellulitis is a common acute bacterial infection involving the deeper dermis and subcutaneous tissues that is clinically characterized by localized erythema, warmth, swelling, and tenderness or pain. It's primarily a clinical diagnosis and it may be difficult to distinguish from non-infectious conditions such as venous stasis dermatitis, eczema, lymphedema, contact dermatitis, and deep-vein thrombosis(1). It is relatively common and most often occurs in middle-aged and older adults. When comparing men and women, there is no statistically significant difference in the incidence of cellulitis(2). Although a population-based analysis found that the prevalence was 24.6 cases per 1,000 person-years, with lower-extremity involvement predominating and the highest frequency seen in people aged 45 to 64. The epidemiological data from India remain limited (3). Cellulitis usually develops following disruption of the skin barrier by trauma, insect bites, ulcers, surgical wounds, fissures, or other breaks in skin integrity, allowing microorganisms to invade the underlying tissues. The β -haemolytic streptococci, particularly *Streptococcus pyogenes*, are important causative organisms, while *Staphylococcus aureus* also frequently implicated. Other conditions may be involved in patients with specific risk factors such as immunosuppression, edema, lymphedema, venous insufficiency, diabetes, obesity, eczema, and fungal infections. This invasion subsequently activates the local inflammatory response, involving cytokine release and neutrophil recruitment, produces vasodilation, increased vascular permeability, and the characteristic erythema, warmth, edema, and tenderness(2).

The UK Clinical Resource Efficiency Support Team (CREST) guidelines recommend use of the Eron classification (the Dundee classification) of cellulitis in order to grade severity that contains of class 1-4 that distinguish based on the presence or absence of defined systemic features of sepsis and co-morbidities(1). Management of cellulitis is primarily directed toward controlling the bacterial infection and preventing progression or complications. Current clinical guidelines recommend antibiotic treatments directed primarily against streptococci for typical non-purulent cellulitis with specific risk factors like local inflammation, pain, edema, and functional limitations beyond the initial control of infection(4). This has a scope of interest in adjunctive approaches that may support symptom management and recovery while conventional treatment is continued.

Due to its prevalence, recurrence, need for medical attention, and potential for consequences, cellulitis poses a significant strain on healthcare systems. From a naturopathic and yoga therapy focuses on measures intended to promote comfort, circulation, relaxation, and recovery while addressing modifiable lifestyle and constitutional factors. It may provide an additional supportive mind-body component and healing design in an integrative care programme. Current evidence suggests yoga may positively impact various immune-mediated and inflammatory diseases by downregulating pro-inflammatory markers and increasing anti-inflammatory markers(5). There remains limited clinical literature describing the use of an integrative naturopathy and yoga programme as adjunctive care during recovery from cellulitis despite of using conventional treatments. Hence, this case report describes the management of cellulitis using a naturopathy and yoga-based approach as supportive care alongside conventional medical treatment. It aims to enhance understanding of holistic healthcare strategies for managing cellulitis-related symptoms and improving quality of life. A 21-day naturopathy and yoga-based supportive programme was implemented, with clinical outcomes monitored throughout the treatment period to assess changes in symptoms and overall well-being.

Case Presentation:-

A 68-year-old married male presented with a 2 years history of bilateral lower limb swelling especially in dorsum of foot and ankle with pitting pedal edema, more pronounced on the left side, associated with left leg pain and redness with slightly localised warmth. He additionally reported disturbed sleep and reduced appetite from one year. Also with C/O increased body weight since 7 years. He had come to our IPD of Alva's Anandamaya Arogyadhama. The pain and swelling over limbs will aggravate over long standing and climbing. It relieves on rest. No H/O surgeries. Laboratory investigations revealed fasting plasma glucose of 94 mg/dL, HbA1c of 6.3%, total cholesterol of 205 mg/dL, with serum creatinine of 1.0 mg/dL. Bilateral lower-limb venous Doppler was performed as part of baseline assessment. The final recorded diagnoses were bilateral cellulitis, bilateral varicose veins and hypertension. No H/O DM-2, fever, trauma, DVT, CVD so on. The patient was under anti-hypertensive drugs [Tab telma 40mg] daily and antibiotics [Tab Reticef CV 200 mg BD A/F] for 5 days alongside the naturopathic treatments. IPD NO : 2026IP2654.

Clinical Findings:-

On examination, he was conscious and oriented, afebrile, with a pulse rate of 78 beats/min, respiratory rate of 18 breaths/min, blood pressure of 140/90 mmHg and SpO₂ of 98%. His height was 161 cm and weight was 101 kg, with a BMI of approximately 39 kg/m² [obese grade 2]. Bilateral pitting lower-limb edema was present, with greater severity on the left. Cardiovascular, respiratory, abdominal and neurological examinations were otherwise unremarkable except for weak peripheral pulses and an antalgic gait. Pain intensity was 8/10 on the Visual Analogue Scale (VAS).

Therapeutic Focus:-

The line of treatment was focused on reducing body weight, swelling, pain and redness over lower limbs, to achieve homeostasis and to reduce inflammation . According to Naturopathy principles, an eliminative and anti-inflammatory diet therapy is personalised .Further more Naturopathy treatments like massage , hydrotherapy , mud therapy, reflexology and Yoga therapy was given for 21 days (Table 1 and Table 2).

Diagnosis Criteria:-

- The diagnosis is clinically based on classic clinical findings as Rubor (redness), dolor (pain), tumor (swelling), and calor (heat) and by diagnostic tool venous doppler ultrasound of both the legs(1).
- Cellulitis is diagnosed under ICD-10-CM within category L03 (Cellulitis and acute lymphangitis), with specific codes assigned based on the precise anatomical site and laterality of the infection(6) .

Systemic examination according to naturopathy:-

1. Facial Diagnosis : Mild puffy , with periorbital puffiness
2. Encumbrance: Mixed encumbrance
3. Tongue Diagnosis:
 - Thin- moderate whitish coating
 - Tongue colour- pink , surface is moist with visible fissuring and no ulcerations .
4. Iris Diagnosis :

Right iris	Left iris
2 Closed lacunae in 6' O'clock position in of 3 rd major zone. Arcus senilis/sodium ring is seen.	Closed lacunae in 5'O'clock position 3 rd major zone. Scurf rim seen in 6 th zone and sodium ring is seen .

Methods:-

Following a detailed case history, initial counselling, and obtaining written informed consent, an individualized intervention plan was developed by a team comprising of Naturopathy physician and a Yoga expert. The patient's vital parameters were monitored daily, and medications were continued as the same dosage as prescribed by the treating physician for 5 days alongside naturopathy and yoga interventions are prescribed. The patient remained as an inpatient for a period of 21 days.

Assessments:-

Height, weight and BMI were calculated. A comprehensive assessment was performed using standardized scales, along with laboratory investigations.

- Primary outcomes – Circumferential girth measurement [edema] , C-Reactive protein [CRP].
- Secondary outcomes : Cellulitis severity scale [CSS], Body mass index [BMI], visual analogue scale [VAS], Insomnia severity index [ISI].

Relevant laboratory parameters were also assessed, all these outcomes were assessed before and after the 21 days of intervention.

Intervention:-

This case study was conducted at the Alva's AnandamayaArogyadhama Nature Cure and Yoga Centre, located in Mijar, Shobhavana, Moodabidri, Dakshina Karnataka.

Table 1: IPD treatment Protocol for 21 days

Therapy	Treatments	Duration /session (min)	Frequency [days]
Hydrotherapy	Enema	20 [twice/week]	6
	Revulsive compress to B/L legs	20	8
	Cold pack/compress to both legs	20(twice /day)	21
	Gastro hepatic pack	20	20
	Ganji turmeric bath	40	3
	Neutral spinal spray	12	6
	Cold foot bath with Epsom salt	20	21
	Ice massage to spine	10	20
	Ganji turmeric application to B/L lower limbs .	20	8
	Cold arm and foot bath	20	10
	Coconut oil application to both legs	40	21
Mud therapy	Abdomen and Eye pack	20	21
	Mud pack to both legs	20	12
	Full body mud bath	40	2
Heliotherapy	Sun exposure in the morning and early evening	20	21
Yoga therapy [everyday for 1 hr] And meditation [everyday for 40 min]	Suryanamaskara [6 rounds], suksmavyayama [isometric exercises] ,Tadasana, ardhachakrasana, utitapadasana, viparitakarani, setubandasana, savasana.	1 hr [yoga]	21
	Sheetalipranayam, anulom-vilom, nadishodana. SMET, OM meditation	15 + 40 min[meditation]	21
Massage therapy	Powder massage [except legs]	40	6
	Hot stone massage except legs	40	2
	Partial massage to abdomen and back	30	3
	Dry brush massage	30	2
Reflexology	Foot reflexology	30	10

Table 2: Naturopathic Diet protocol

Days	Diet- content	Times/day
Day 1-3	Naturopathic boiled diet+soup Juices [Ash guard, boiled apple]	3 times
Day 4-15	Raw diet [sprouts salad, vegetable sticks, fruit bowl] + Buttermilk with methi powder + Juices [Ash	3 times and juices [morning]

	guard, boiled apple,]+herbal tea [ginger, jeera, cinnamon]	
Day 16-19	1 time Raw diet [sprouts salad, vegetable sticks, fruit bowl] + Juice fasting [Ash guard, lemon honey ,tender coconut , watermelon, amla]	1 time – Raw diet 3 times- juices [250 ml]
Day 20-21	Naturopathic boiled diet + soup Juices [Ash guard, boiled apple]	3 times

Note : Drink water – 3 to 4L of water/day

Results:-

Table 3: Pre and Post Assessment table

Assessments	Pre- Treatment	Post-Treatment	Interpretation
1. Circumferential foot girth[edema]	Right – 29 cm	Right- 22 cm	Significant Bilateral reduction in edema
	Left – 32 cm	Left- 24 cm	
2. C-Reactive protein [CRP]	11.2 mg/L	6.6 mg/L	Reflects marked reduction in inflammation and infection
3. Cellulitis severity scale [CSS],	15	4	Improved localized cellulitis
4. Body mass index [BMI]	39 kg/m ²	34.7 Kg/m ²	Substantial weight loss and improved BMI .
	Height-161 cm Weight- 101 kg	Height- 161cm Weight- 90 kg	
5. Insomnia severity index[ISI]	17	6	Improved sleep
6. Visual analogue scale[VAS]	8	0	Reduced pain severity

Following Clinical photographs of the affected legs were obtained at baseline (Day 0) and following completion of the 21-day intervention (Day 21) to document visible changes during the treatment period. At baseline, the affected area showed prominent erythema, Edema, and local inflammatory changes. Following 21 days of treatment, the photographs demonstrated a visible reduction in edema and slight changes in erythema, with improvement in the overall appearance of the affected area. [Figure-1]



Figure – A

Figure – B

Figure 1: Clinical appearance of affected area [legs] before and after the 21-day intervention. (A) Baseline photograph showing erythema and edema of the affected area on Day 0. (B) Post-treatment photograph demonstrating reduction in erythema and edema on Day 21.

Follow up and outcomes:-

At discharge, the patient was advised to continue the prescribed naturopathic interventions and follow the recommended dietary regimen. She was also encouraged to practice yoga and pranayama. Regularly, obtain adequate sun exposure, and maintain a consistent pattern of sufficient and restorative sleep. These measures were recommended to help sustain the improvements achieved during the treatment period and support overall health and well-being. During the subsequent 2-month follow-up period, the patient remained clinically stable and reported no adverse events.

Discussion:-

This case report presents an integrative approach in managing of Cellulitis through naturopathic interventions. The combination of dietary modifications, detoxification practices naturopathic and yoga remedies aimed at addressing the symptoms of cellulitis, poor sleep, weight management too. Following 21 days of naturopathic intervention, there was a significant reduction in CSS scores from 15 to 4 indicates improved clinical features such as erythema, warmth, tenderness, edema and ulceration symptoms has reduced. Significant reduction in bilateral edema from circumferential foot girth from Right-29 to 22 cm and left foot- 32 to 24cm, marked reduction in inflammation and infection by CRP – 11.2 mg/L to 6.6 mg/L, significant improved sleep and pain severity and body weight decreasing from 101 kg to 90 kg with BMI from 39 kg/m² to 34.7 kg/m².

Several studies have specifies that Obesity represents a recognized risk factor that may interact with local and systemic factors that can cause cellulitis. Excess adipose tissue is associated with chronic low-grade inflammation, with increased production of inflammatory mediators such as interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF- α). IL-6, impaired lymphatic flow, altered immune responses, increased skin-fold moisture and friction, and impaired local tissue conditions. It can stimulate hepatic production of C-reactive protein (CRP), thereby contributing to a persistent pro-inflammatory state(7). Similarly, a systematic review of risk factors for non-purulent leg cellulitis reported that a BMI >30 kg/m² was associated with increased odds of cellulitis, while chronic leg edema/lymphoedema showed an even stronger association(8). Therefore, the coexistence of obesity and cellulitis may provide a biological context for increased inflammatory burden and delayed resolution of local edema.

From an integrative perspective, naturopathic care may address modifiable factors associated with recovery, including physical activity, diet, sleep, stress management, hydration, and local supportive therapies where clinically appropriate. Although evidences, demonstrating that naturopathic interventions can eradicate the bacterial cause of cellulitis remains insufficient. Cellulitis produces local inflammation with vasodilation, increased vascular permeability, tissue edema and stimulation of nociceptors. Cooling /local cold packs/cold compresses [cryotherapy]effect to the affected area can produce local vasoconstriction and reduced tissue blood flow, which

may decrease fluid extravasation and swelling. Cooling also slows peripheral nerve conduction, which can contribute to an analgesic effect(9). Therapeutic mud has been investigated by recent systematic-review evidence as a non-pharmacological intervention for inflammatory and painful musculoskeletal conditions, with proposed effects involving local thermal exchange, modulation of inflammatory processes and reduction of pain and swelling(10). Therefore, in the present case, mud application may have provided supportive relief of local discomfort and inflammatory swelling rather than exerting a primary antimicrobial effect. Ganji turmeric bath used as intervention may have provided additional local soothing and anti-inflammatory support. Turmeric (*Curcuma longa*) contains curcuminoids, particularly curcumin, which have demonstrated anti-inflammatory, antioxidant and antimicrobial activities in experimental studies. It suggests potential benefits in wound healing through modulation of inflammation and tissue-repair processes(11). However, considerable heterogeneity in formulations and treatment protocols limits direct clinical recommendations. Dietary modification with nutrient-dense plant foods, eliminative and anti-inflammatory diet have supported metabolic, immune function and tissue repair, while sun exposure for 10-15 minutes on early morning and early evening rays, supported vitamin D signalling has roles in epidermal barrier function, innate immunity and wound repair(12,13).

Yoga includes Asana, pranayama and relaxation was incorporated as a mind-body component of the supportive module contributing to relaxation, physical activity, sleep, and general inflammatory regulation. A systematic review of 15 studies found that yoga was associated with favourable changes in inflammatory biomarkers, particularly IL-6, C-reactive protein (CRP) and tumor necrosis factor- α (TNF- α), although studies were heterogeneous and predominantly conducted in chronic inflammatory conditions rather than acute infections(14). Hence, the integrated use of hydrotherapy, mud therapy, massage, dietary modification, sun exposure and yoga alongside appropriate conventional management rather may have produced complementary effects on inflammation, circulation, metabolic regulation, symptoms of cellulitis, weight management and sleep quality, which contributes to the overall clinical improvement. However, Future controlled studies with larger samples should evaluate individual naturopathic modalities separately and use standardized outcomes with longer follow-up to determine whether improvements are sustained.

Patient perspective:-

The patient reported improvement in symptoms of cellulitis, sleep and weight after the intervention, along with better ability to perform daily activities. He found the multimodal naturopathy and yoga interventions acceptable and expressed willingness to continue the recommended dietary, lifestyle, and yoga practices.

Conclusion:-

This case study suggests that, 21-day naturopathy and yoga-based supportive programme, administered alongside conventional medical treatment, was associated with improvement in cellulitis-related symptoms, edema and overall well-being in this case. The findings suggest that an integrative approach may provide supportive benefits during recovery; however, controlled clinical studies are required to determine the specific contribution and efficacy of individual naturopathy and yoga interventions in cellulitis.

Informed Consent:-

The patient signed an informed consent to publish his de-identified information.

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