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Post-Dengue Swelling: An Atypical Presentation and Diagnostic Dilemma Resolved with Herbal Decoction

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ABSTRACT

Dengue fever is an important arboviral disease, transmitted by mosquitoes especially those of the *Aedes* genus, primarily by *Aedes* (Stegomyia) aegypti (Linnaeus, 1762) and in some rare cases by *Aedes* (Stegomyia) *albopictus* (Skuse) with a wide clinical spectrum, ranging from self-limiting mild sickness to life threatening conditions like dengue hemorrhagic fever (DHF) and eventually dengue shock syndrome (DSS). In the past decade, the emergence of dengue has been linked to unusual coinfections.The transitory reduction of host innate immunity could be the most likely cause of dengue-associated co-infections and/or super-infections. Furthermore, the dual infection can aggravate the clinical course of dengue fever. We are reporting an unusual case of intramuscular calf swelling in a 27-year-old male patient following dengue.The swelling yielded conflicting radiological interpretations, including intramuscular cysticercosis, cellulitis, abscess and hematoma. This diagnostic ambiguity posed significant challenges in managing the swelling. Despite these diagnostic challenges, the swelling was effectively managed with a herbal decoction made from three Unani herbs: *Artemisia absinthium, Swertia chirata,* and *Tinospora cortifolia.*

Keywords: *Dengue fever, DHF, DHS, Cellulitis, Intramuscular cysticercosis, Artemisia absinthium, Swertia chirata and Tinospora cortifolia.*

1. INTRODUCTION

Dengue, often called "breakbone fever," [1] is an arboviral disease primarily spread to humans through mosquito bites, especially from the Aedes genus, particularly Aedes (Stegomyia) aegypti and, in rare instances, Aedes (Stegomyia) albopictus.[2] There are four serotypes of the dengue virus: DENV-1, DENV-2, DENV-3, and DENV-4, all capable of causing infections in humans.[3] This disease has become a significant public health concern in many tropical regions, contributing to high rates of illness and death. Over the last 50 years, dengue incidence has surged 30-fold, with an estimated 390 million infections occurring annually, of which around 96 million present with symptoms.[4,5] Multiple factors, such as global trade, urbanization, climate change, vector suitability, and vulnerability of populations created favorable conditions for dengue transmission.[6] Primary dengue virus infections can present with symptoms ranging from mild flu-like illness to severe complications such as coagulopathy, increased vascular fragility, and heightened permeability. This severe condition is known as dengue hemorrhagic fever (DHF), which can further progress to hypovolemic shock, referred to as dengue shock

syndrome (DSS). Both DHF and DSS are life-threatening and can be fatal.[7] Most dengue fever cases are self-limiting and have a low mortality rate of less than 1% when identified early and treated appropriately. However, dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS) carry a mortality rate of 2% to 5% even with treatment; if left untreated, this rate can rise to 20%.[8,9] Additionally, dengue patients are often at greater risk for bacterial infections[10,11] due to immunosuppression caused by the dengue virus, as well as antibiotic resistance in strains of Staphylococcus aureus.[12] In the past decade, the emergence of dengue has been linked to unusual coinfections. Cases of concurrent bacteremia or Staphylococcus aureus co-infection have been observed in adults with dengue.[12,13] Diagnosis typically involves clinical evaluation and diagnostic tests such as RT-PCR, NS1 ELISA for early detection, and later IgM/IgG antibody tests.[14] There are no specific curative treatments for dengue; care is primarily supportive. Effective management focuses on careful fluid resuscitation during the critical phase, with crystalloids being the preferred initial fluid. Prophylactic platelet transfusions are not recommended, underscoring the importance of prevention in controlling dengue.[15] We present a rare case of intramuscular calf swelling following dengue, accompanied by conflicting radiological interpretations. The condition was effectively managed using a herbal decoction composed of three Unani herbs: *Artemisia absinthium*, *Swertia chirata*, and *Tinospora cortifolia.*

Case Report

A 27-year-old male patient, with no past medical history presented to the National Institute of Unani Medicine, Bengaluru, with high grade fever, chills, nausea, retro-orbital pain, arthralgia and myalgia for two days. On admission, the patient was well conscious and oriented with a GCS of 15/15. His temperature was 102°F, his pulse rate was 95 beats per minute, and his respiratory rate was 19 breaths per minute, with an oxygen saturation of 98%.The patient's blood pressure was 110/80 mmHg. All other aspects of the physical examination were within optimal limits. Initial blood investigations showed Ns1Ag positive, platelet count of 70000/µL, hematocrit of 45%, hemoglobin level of 13.9 g/dL, and leukocyte count of 2100/Cmm. His liver enzymes were mildly elevated, AST =123 U/L, ALT= 135 U/L. Serum HbsAg and HCV antibody were negative while as serum C-reactive protein (CRP) was positive. The investigation summary is given in Table 1.

Table1: Showing investigation summary of the patient

Complete blood count	Day 1	Day 6
White blood cell count (× /Cmm)	2100	3800
Red blood cell count (× 10^9 /µL)	5.10	5.00
Hemoglobin level (g/dL)	13.9	14.2
Haematocrit (%)	45	40
Platelet count /µL	700000	133000
Liver enzymes		
AST (U/L)	123	134
ALT (U/L)	135	146
Renal functions		
Serum creatinine	0.7	0.6
Infammatory markers		
C-reactive protein (mg/L)	Positive	
Urinalysis		
Pus cells, RBCs, Proteins	Nil	

After the initial assessment, the patient was diagnosed with dengue fever during the febrile phase, and appropriate monitoring was initiated. He received oral paracetamol 650 mg as needed to manage his fever. The patient was admitted for six days and managed conservatively. His clinical condition improved, and subsequent blood tests showed an increase in both platelet and leukocyte counts, which rose to 1.33 × 10^3/µL and 3,800/Cmm respectively, as detailed above in Table 1. The following day, the patient was discharged. However, two days post-discharge, he returned to the hospital complaining of difficulty walking due to pain in his left calf. The pain progressively worsened, further restricting his mobility, leading to a referral to the surgery department. Upon examination of the left leg, a firm, tender swelling was noted on the lateral aspect of the

gastrocnemius muscle. The skin over the swelling remained intact but was slightly warm to the touch. Palpation revealed a consistent, non-fluctuant mass with poorly defined edges. The swelling was particularly tender upon dorsiflexion of the foot, with no crepitus or bruising observed. Flexion of knee joint was limited due to pain, however there were no signs of distal neurovascular deficits.To further evaluate the swelling, an ultrasound (USG) of the left calf was ordered, and the patient went to a private diagnostic center. The USG revealed an irregular, thick-walled, anechoic cystic lesion with internal echoes measuring 1.4 x 1.4 x 0.9 cm (CC x TR x AP), located in the intramuscular plane of the fibularis longus muscle. Radiologists primarily diagnosed it as intramuscular cysticercosis, as shown in Figure A.

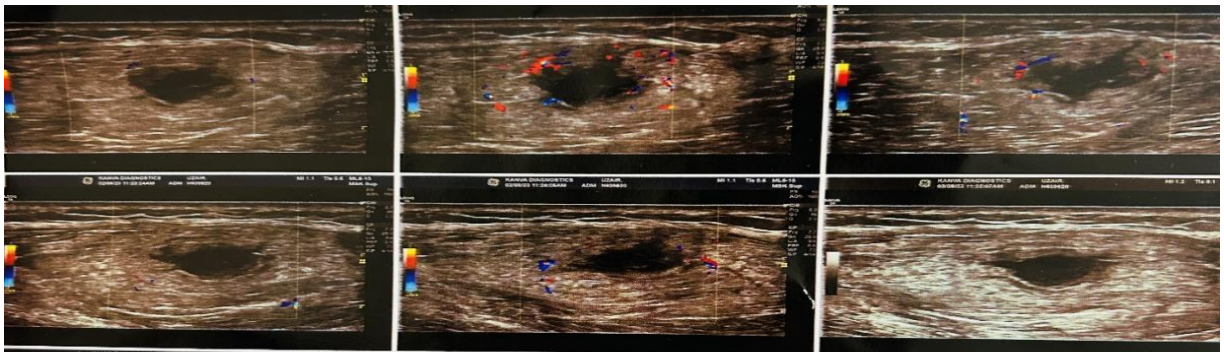

Figure A: USG left calf showing an irregular thick walled anechoic cystic lesion with internal echoes measuring 1.4 x 1.4 x 0.9cm (CC x TR x AP) noted in intramuscular plane involving fibularis longus.

The patient sought consultation at a private hospital and was prescribed Albendazole tablets 400 mg to be taken twice daily for 14 days. Throughout the treatment, the pain consistently worsened, causing increasing discomfort for the patient. On the fourth day of treatment, he was advised to undergo a repeat scan and consult another radiologist. The second ultrasound revealed a relatively well-defined complex cystic lesion measuring 12.7 x 5.5 mm in the lateral head of the gastrocnemius muscle in the left calf region, with no associated vascularity as shown in Figure B below.

Figure B:USG left calf showing a relatively well-defined complex cystic lesion measuring 12.7 x 5.5 mm in the lateral head of the gastrocnemius muscle.

The possible diagnosis included a resolving intramuscular hematoma or intramuscular cysticercosis. To further evaluate the swelling, a magnetic resonance imaging (MRI) scan of the left calf muscle was subsequently ordered. The MRI showed diffuse subcutaneous swelling with edematous changes and pockets of free fluid in the lateral and proximal aspects of the proximal and mid-leg, consistent with cellulitis. Additionally, inter and intramuscular STIR hyperintense signal changes in the posterolateral compartment of the proximal and mid-leg suggested edema and myositis, predominantly affecting the tibialis posterior, soleus muscle, and lateral head of the gastrocnemius muscle. A small pocket of fluid collection was noted in the lateral aspect of the soleus muscle in the proximal leg, suggestive of an abscess, as shown in Figure C.

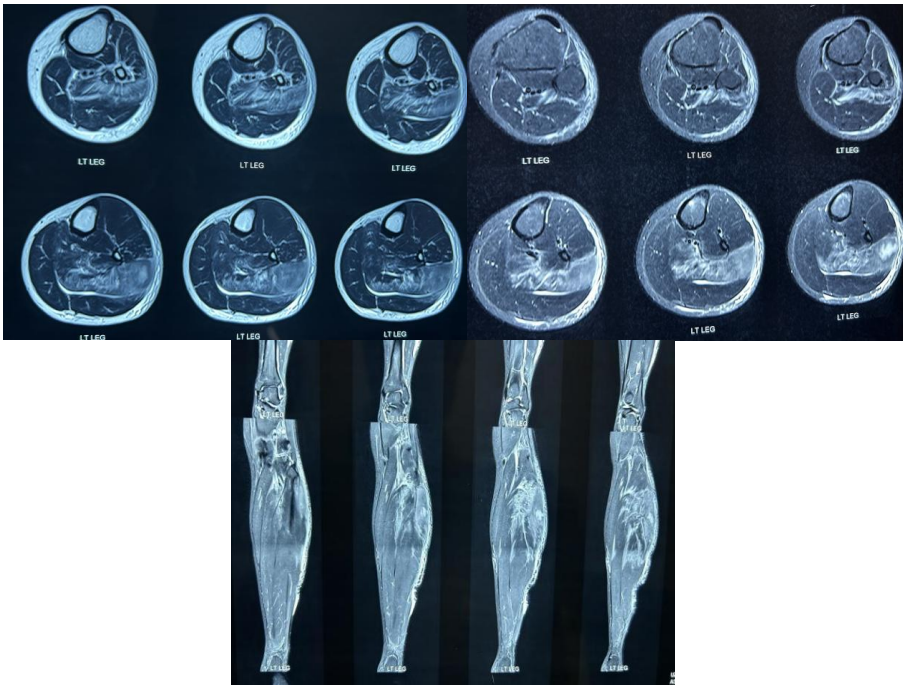

Figure C: MRI left calf showing edematous changes, myositis and pockets of free fluid involving the tibialis posterior, soleus muscle and lateral head of gastrocnemius muscle suggestive of cellulitis or abscess.

Fine-Needle Aspiration Cytology(FNAC) was avoided for the risk of cyst rupture leading to dissemination of parasitic material, inflammatory response and potential for anaphylaxis.The patient was advised for regular follow-ups to track the swelling and monitor it meticulously.The conflicting diagnoses for the swelling with varying interpretations from radiologists, like intramuscular cysticercosis, cellulitis, haematoma and abscess made patient anxious and worried about his condition. Following a frustating odyssey of multiple hospital visits and inconclusive diagnoses, the patient with a glimer of hope, attended the OPD of Regimenal therapies, National Institute of Unani Medicine, Bengaluru for the same. The patient was examined clinically and the MRI findings were correlated with the patient's clinical presentation and the overall features were concerning for an infective or inflammatory etiology.The patient was prescribed a herbal decoction consisting of *Artemisia absinthium*, *Swertia chirata,* and *Tinospora cortifolia,* 200 ml to be administered twice daily on an empty stomach for 7 days. The decoction was prepared by steeping 5g of each herbal ingredient in 400ml of water for 6 hours, followed by boiling until the volume of water reduces to half, and then straining the mixture to obtain the filtrate. These drugs have been used by eminent greek physicians to treat various inflammations and infectious diseases owing to their wide spectrum of pharmacological effects like anti-inflammatory, antipyretic, antihelmenthic and analgesic effect .[16]

Within just three days of treatment, the patient experienced significant improvement and was able to walk with greater ease. His clinical condition continued to improve, and the pain subsided. He was subsequently discharged after seven days and instructed to follow up after one week. At the follow-up, there was no swelling, and the patient was walking comfortably. A review ultrasound of the calf demonstrated a substantial reduction in the size of the lesion, as illustrated in the Figure D below.

Figure D:USG left calf showing a relatively well-defined complex cystic lesion measuring 12.7 x 5.5 mm in the lateral head of the gastrocnemius muscle.

2. DISCUSSION

Dengue is a prevalent febrile illness caused by infection with one of the four dengue virus serotypes (DENV), transmitted by *Aedes aegypti* or *Aedes albopictus* mosquitoes. Increasing evidence suggests that defective innate and adaptive immunity contribute to the immunological pathogenesis of severe dengue infections, resulting in multisystemic and atypical clinical manifestation.[4,17] According to the WHO recommendations for dengue fever, unusual or atypical manifestations are also termed "expanded dengue syndrome".[4] These could be repercussions of severe shock, co-infections, or underlying host illnesses or disorders. Various atypical manifestations of dengue include hepatitis causing transaminitis, fulminant hepatic failure, acalculous cholecystitis, renal failure, febrile diarrhea, myocarditis, conduction abnormalities in heart, pericarditis, and ARDS. Our patient had developed an atypical post dengue swelling, involving lateral and proximal aspect of left calf muscle, associated with edema and myositis, predominantly involving the tibialis posterior, soleus and lateral head of gastrocnemius muscle. The swelling was associated with diagnostic uncertainty, resulting in conflicting diagnoses and subsequent management complexities. In Unani system of medicine, swelling is referred as "*Warm*". It encompasses various conditions characterized by localized accumulation of blood, pus, water, or gas. Such swellings can result from undesirable temperamental changes, which predispose individuals to opportunistic infections, leading to a wide range of clinical manifestations. In our patient, based on the nature of swelling on clinical examination, it was diagnosed to be from an altered temperament, owing to dominance of hot temperamental humors. The overall features were concerning for an infective or inflammatory etiology. Various mechanisms have been proposed to explain co-infections in dengue fever. The relative immunosuppression caused by the virus appears to be the most probable mechanism.[13] So treatment included drugs like *Artemisia absinthium*, *Swertia chirata*, and *Tinospora cortifolia* having *Muhallil* (anti-inflamatory), *Habis* (styptic), *Qabiz* (astringent), and *Dafe Taffun* (antiseptic), *Dafe Alam* (analgesic) properties.[16,18,19] Despite diagnostic challenges, the swelling was managed successfully with the decoction of *Artemisia absinthium*, *Swertia chirata*, and *Tinospora cortifolia*. Modern analytical and spectroscopic techniques have demonstrated the phytochemistry, pharmacology, toxicology, chemical profiling, and structural identification of the isolated compounds from *Artemisia absinthium*,[20-23] *Swertia chirata*,[24,25] and *Tinospora cortifolia*.[26,27,28] These drugs exhibited anti-inflammatory, antioxidant, immunomodulatory, antibacterial, antihelmenthic, antitumour, hepatoprotective and antiviral properties, offering scientific evidence for traditional claims of these drugs. Furthermore *Tinospora cortifolia* bioactives assist the immune system to resist infections and maintain leucocyte functioning. This case report highlights the potential of Unani medicine in resolving diagnostic dilemmas with holistic approach and improving patient outcomes. By embracing integrative approaches to healthcare,we can enhance our understanding of complex conditions and provide more effective, patient-centered care.

3. CONCLUSION

Infectious disease is still a mystery, with a wide range of agent-host responses. Dengue fever is an example of unusual manifestations. The dysregulated immune response triggered by DENV infection may culminate in severe disease and bacterial co-infection or super-infection, affecting the prognosis of dengue fever.This case report highlights the potential of Unani medicine in resolving diagnostic dilemmas with holistic approach and improving patient outcomes. By embracing integrative approaches to healthcare,we can enhance our understanding of complex conditions and provide more effective, patient-centered care. Case studies like this may contribute to increased awareness of the unusual manifestations and immune-pathogenesis of bacterial co-infections in dengue fever.It also highlights the potential of Unani medicine and its holistic approach in managing such rare complications

4. DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained the appropriate patient consent form. The patient had given his consent for his scan images and other clinical information to be reported in the journal.The patient have been informed about the purpose of reporting this case. The patient understands that name and initials will not be published and due efforts will be made to conceal his identity.

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Conflicts of interest:

There are no conflicts of interest.

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