Case Report

ANNALS OF MEDICINE & SURGERY

OPEN

Spontaneous widespread muscle hematoma complicated by pyomyositis in a case of dengue hemorrhagic fever: a case report from Nepal

Binita Timilsina, MBBS[a,*], Anil Suryabanshi, MBBS[a], Aashna Bhandari, MBBS[a], Saroj Pokhrel, MD[b], Chandra P. Chataut, MD[c]

Introduction and importance: Most dengue infections are asymptomatic, and some of them develop haemorrhagic manifestations with or without shock. However, dengue can sometimes present with very rare complications like pyomyositis.
Case presentation: A healthy 27-year-old male, presented with a 2-day fever, confirmed to be dengue through a positive non-structural protein 1 test. Despite initial symptomatic management, his condition worsened and he was hospitalized. Leucocyte and platelet counts dropped to the lowest value on the seventh day of illness, followed by the gradual development of chest pain, persistent fever, and severe limb pain. Radiographic evaluation revealed pleural effusion, and multiple intramuscular haematomas complicated by pyomyositis. Pleural effusion resolved on its own. Pyomyositis resolved with 6 weeks of appropriate antibiotics and aspiration of pus.
Clinical discussion: Dengue infection, caused by a dengue virus transmitted through Aedes mosquitoes, is a significant public health concern in many parts of the world. Dengue haemorrhagic fever is a severe form of dengue infection characterized by vascular leakage, thrombocytopenia, and bleeding manifestations. Although musculoskeletal manifestations are common in dengue fever, the occurrence of multiple muscle haematomas and pyomyositis as complications of Dengue haemorrhagic fever is rare. Drainage or aspiration of pus combined with the antibiotics according to the pus culture and sensitivity report is the management strategy.
Conclusion: Prolonged fever with severe musculoskeletal pain and focal tenderness on examination in a dengue patient, warrant radiographic testing (ultrasonography or MRI) considering the differentials of haematoma, myositis, or pyomyositis.

Keywords: case report, dengue haemorrhagic fever, dengue, primary pyomyositis, spontaneous muscle haematoma

Introduction

Dengue is a vector-borne tropical illness caused by one of the four serotypes of Dengue virus (DENV 1, 2, 3, and 4) of the genus Flavivirus, which is transmitted by the bite of female Aedes mosquitoes. Aedes aegypti and Aedes albopictus, both are prevalent in Nepal. All four serotypes exist in Nepal, with DENV 1 and 2 contributing the highest burden of cases[1,2]. Since the first case in 2004, dengue cases have been identified every year and outbreaks occur every 2–3 years, the latest being in the year 2022[3]. Dengue has varied presentations- asymptomatic, undifferentiated fever, dengue fever to severe dengue infection. Additional manifestations include neurological involvement, myocardial dysfunction, liver failure, and renal failure, however, primary pyomyositis is rare and to our knowledge, this is the second case report[4,5]. Written informed consent has been taken from the patient for publication of this case report. This case report has been reported in line with the SCARE guideline[6].

HIGHLIGHTS

- Dengue haemorrhagic fever can develop even in a healthy individual without any predisposing risk factors.
- Primary pyomyositis is one of the most unusual complications of Dengue infection.
- High degree of suspicion is necessary to diagnose pyomyositis in a Dengue patient due to the overlapping clinical features.
- Aspiration in combination with adequate antibiotic treatment can result in successful resolution of pyomyositis.

Case presentation

A 27-year-old male, residing in Kathmandu, presented to the clinic with a fever for 2 days. His axillary temperature was 101.8°F, blood pressure was 124/80 mmHg, and pulse was 86 beats per min

[a]Tribhuvan University Teaching Hospital, Institute of Medicine, [b]Nepalese Army Institute of Health Sciences, Kathmandu, Nepal and [c]Cook County Health, Chicago, IL

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

*Corresponding author. Address: Tribhuvan University Teaching Hospital, Institute of Medicine, 44600, Kathmandu, Nepal, Kawasoti- 01, Nawalparasi Susta East, 45306, Gandaki Province, Nepal. Tel.: +977 986 013 6493. E-mail: 2015binitatimilsina@gmail.com (B. Timilsina).

Annals of Medicine & Surgery (2023) 85:5223–5227

Received 19 July 2023; Accepted 13 August 2023

Published online 1 September 2023

http://dx.doi.org/10.1097/MS9.0000000000001222

(bpm). He denied prior comorbidities like thyroid illness, diabetes mellitus, and immunocompromised state. Review of systems was normal. Due to the ongoing dengue outbreak, a dengue non-structural protein 1 (NS1) test was sent which came positive with negative IgG/IgM. His haemoglobin was 16.7 gm/dl, white blood cell (WBC) was 6×10^3/mm^3 and platelet was 131×10^3/mm^3 (Table 1). The rest of his blood and urine investigations were unremarkable. Then, he was sent home with antipyretics.

The following day, he went to the emergency room after experiencing two episodes of vomiting, severe headache, myalgia, and rash. On examination, he appeared unwell and had an axillary temperature of 100.5°F, blood pressure was 130/84 mmHg, and pulse was 92 bpm. Petechiae was present over the extremities, torso, abdomen, and face. Investigations including complete blood count, renal function test, and liver function were repeated. Platelet and WBC counts were trending down from the previous day (Table 1). Mild hyponatremia (Sodium 130 mEq/l) and mild transaminitis were also present.

He was hospitalized and treated per guidelines with analgesics, antipyretics, bed rest, fluids, and nutritional support. On the 7th day of the illness, the WBC and platelets dropped to 1900/mm^3 and 48000/mm^3, respectively. Thereafter, he developed gradually worsening sharp chest pain, aggravated during inspiration. Electrocardiogram and Troponin-I were normal. Ultrasonography (USG), done on the 11th day of illness, revealed borderline splenomegaly and minimal left-sided pleural effusion. Simultaneously, the patient developed severe pain in his lower limbs and his fever once again peaked at 100.4°F. The recorded blood pressure was 100/80 mmHg, and the heart rate was 97 bpm. Despite supportive management, the fever persisted, and the pain became increasingly severe, confining him to bed. Examination findings showed focal tenderness in the left buttock, left lumbosacral region, and bilateral medial thigh without skin changes.

Diagnostic investigations were performed to identify the cause of the relentless fever. Routine examination of urine and stool was normal. Cultures of urine, stool, and blood showed no growth. Human Immunodeficiency virus, Brucella, Scrub Typhus, Typhoid, Malaria, and Leptospirosis were also negative. However, the NS1 test for dengue was still positive with a positive IgG/IgM antibody. Inflammatory markers were raised: erythrocytic sedimentation rate was 60 mm/h (normal 0–10 mm/h), C-reactive protein was 90 mg/l (normal: <10.0 mg/l), and procalcitonin was 0.29 ng/ml (< 0.5: Local bacterial infection possible, systemic infection not likely). Creatinine kinase, troponin level, and echocardiography were normal. The cannula site looked normal. There was no history of recent trauma or intramuscular injections or recreational drug usage.

Table 1

Table showing the trend of Complete Blood Count (CBC).

Date/day of illness	Haemoglobin (gm/dl) / haematocrit (%)	White blood cell count ($\times10^3$/mm^3) (neutrophil % /lymphocyte %)	Platelet ($\times10^3$/mm^3)
Sept 1/2nd	16.7/48	6 (81.1/12.9)	131
Sept 2/3rd	16.6/48	3.1 (70/16)	76
Sept 3/4th	15.4/44.6	2.4 (56.9//36.9)	75
Sept 4/5th	16.6/42.4	2.3 (65.7/31.1)	80
Sept 6/7th	16.6/43.5	1.9 (53/42)	48
Sept 7/8th	15.7/46.8	3.0	116
Sept 10/11th	13.8/39.9	9.1 (76.3/14.4)	159
Sept 11/12th	14.7/41.3	10.03 (82.5/10.4)	233
Sept 13/14th	14.7/42.8	6.86	425
Sept 16/17th	14.9/43.4	7.38	528
Sept 20/21st	15.1/41.4	7.2 (61.7/32.4)	325

Sept, September.

With focal tenderness and no alternative explanation, intramuscular haematoma with/without secondary infection was suspected and plain MRI of the Lumbosacral Spine with the pelvis and bilateral thigh was ordered on day 13 of illness. MRI showed a relatively well-defined collection with associated muscle oedema in the left psoas muscle measuring $8.1\times1.3\times0.9$ cm (volume 9.4 ml) extending from L2 to L4 vertebral level and in the left gluteal medius muscle measuring $5.4\times3.5\times1.5$ cm (volume 14.1 ml) (Fig. 1). The collection displayed a hypointense signal in T1 weighted images and a hyperintense signal in T2 weighted and Short Tau Inversion Recovery (STIR) images.

Additional collections were seen in the left adductor longus muscle measuring $8.0\times2.5\times2.5$ cm (volume 25 ml) (Fig. 2) and in the right pectineus muscles measuring $2.1\times2.6\times0.6$ cm (volume 1.6 ml). These collections showed diffusion restriction within. Perilesional oedema was seen in the respective muscles. With these internal characteristics of collections, pyomyositis was diagnosed.

Clindamycin and Tazobactam-piperacillin were started empirically, and the patient was upgraded to the intensive care unit. Under aseptic conditions, ~6 ml of purulent fluid with a reddish coloration was aspirated from the left adductor muscle with USG guidance. Gram staining of aspirated fluid yielded no organisms; however, the culture grew Methicillin Sensitive Staphylococcus aureus, sensitive to Cloxacillin, and Tazobactam-Piperacillin, but resistant to Clindamycin. This confirmed the diagnosis of pyomyositis. Acid Fast Bacilli stain and Polymerase chain reaction test for mycobacteria were also done from the aspirated fluid, which yielded negative results. Based on the culture and antibiotic susceptibility report, antibiotics were switched to Cloxacillin (1 gm, intravenous injection, four times a day) and Tazobactam-piperacillin (4.5 gm, intravenous injection, three times a day). The patient received dual intravenous antibiotics for 2 weeks, followed by 4 weeks of oral Cloxacillin (500 mg four times a day). Throughout the treatment period, continuous clinical and USG monitoring was done.

On day 18 of illness, repeat USG of the left thigh revealed a collection measuring $7.6\times3.5\times2.1$ cm (volume 30 ml) within the left adductor muscle and a small collection measuring $4.0\times2.8\times1.1$ cm (volume 6.5 ml) within left gluteus medius muscle (Fig. 3). We aspirated ~30 ml of pus-like fluid from the left adductor muscle.

Subsequent USG examinations demonstrated decreasing amount of fluid collection indicating a good response to antibiotics. Thus, the patient was discharged on oral antibiotics after 25 days of hospital stay. USG performed at the end of the 6 weeks of antibiotic treatment revealed the absence of any intramuscular collection.

DISCUSSION

Dengue is a rapidly emerging disease in Nepal and has already become endemic across most provinces. This is largely due to the expansion of vectors from the Terai region to the Hilly region due

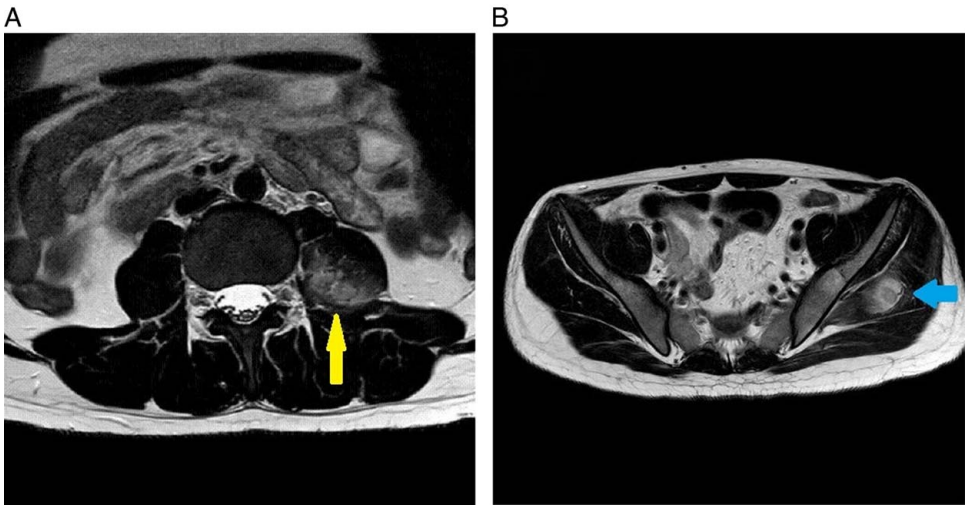

Figure 1. MRI showing hyper and hypointense signal indicating inflammation and abscess formation in left psoas (A) and left gluteal medius muscle (B).

to climate change as well as the movement of people between India and Nepal. Because both countries share an open border and the first reported case of dengue was imported from India as well[2]. The recent outbreak was in the year 2022 and the largest cases were reported from Kathmandu and Lalitpur, both located in the Hilly region[3].

About 20% of dengue infections are symptomatic which follow a natural progression compromising of three phases: febrile phase, critical phase, and recovery phase. The critical phase imposes a significant threat and is characterized by systemic vascular leak, third space fluid loss (pleural effusion and ascites), bleeding, shock, and organ impairment[7]. Only Dengue haemorrhagic fever (DHF) and Dengue shock syndrome have all three phases, and interestingly, most symptomatic dengue infections are self-limiting without progressing to the critical phase[8]. However, the presence of comorbid conditions, second dengue infection, and children have a higher tendency to develop DHF and Dengue shock syndrome[9]. Our patient had a typical presentation of Dengue fever with fever, headache, myalgia, petechia, and gastrointestinal involvement at the beginning, later complicated by pleural effusion and muscle haematoma secondary to bleeding on around day 7 to day 11 of illness denoting the critical phase. What makes this case unusual is, despite the absence of risk factors for severe dengue, the patient eventually progressed to develop DHF.

Among warning signs of the critical phase, spontaneous bleeding from mucosa and skin is frequently encountered. However, spontaneous muscle haematoma is a rare presentation. Few case reports have described spontaneous haematoma formation but our case is distinct as it involved the simultaneous presence of haematomas in multiple muscles[10,11]. There are various mechanisms by which the bleeding and haematoma develop: platelet destruction, endothelial injury and activation of coagulation and Disseminated Intravascular Coagulation, mac_aq RID="AQ4">, and molecular mimicry between dengue viral protein and coagulation protein[12]. In our case, there was a significant drop in platelet count to 48 000/mm^3 on the 7^{th} day of illness and prothrombin time/International Normalized Ratio

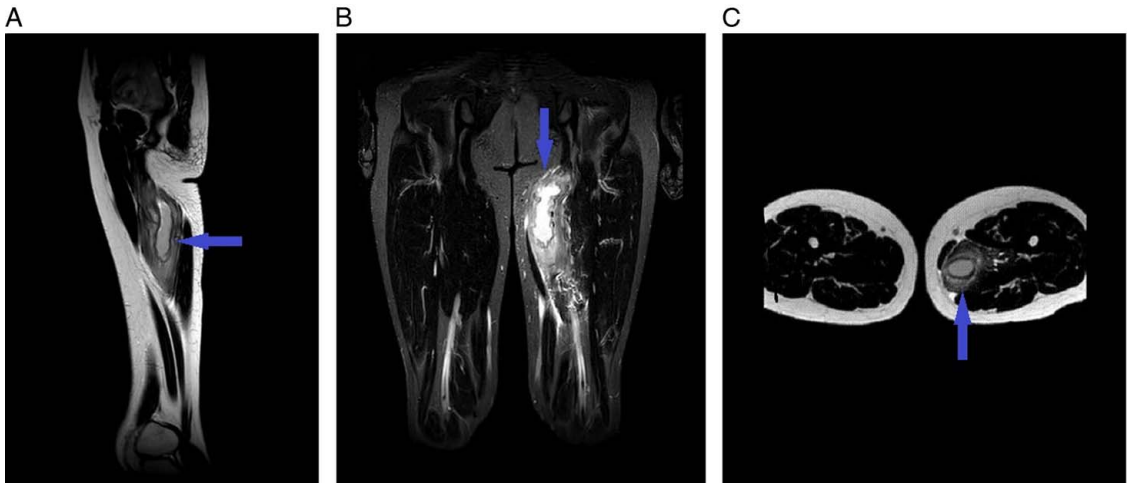

Figure 2. MRI showing left adductor pyomyositis in T1 (A), Short Tau Inversion Recovery (STIR) (B), and T2 (C) sequences.

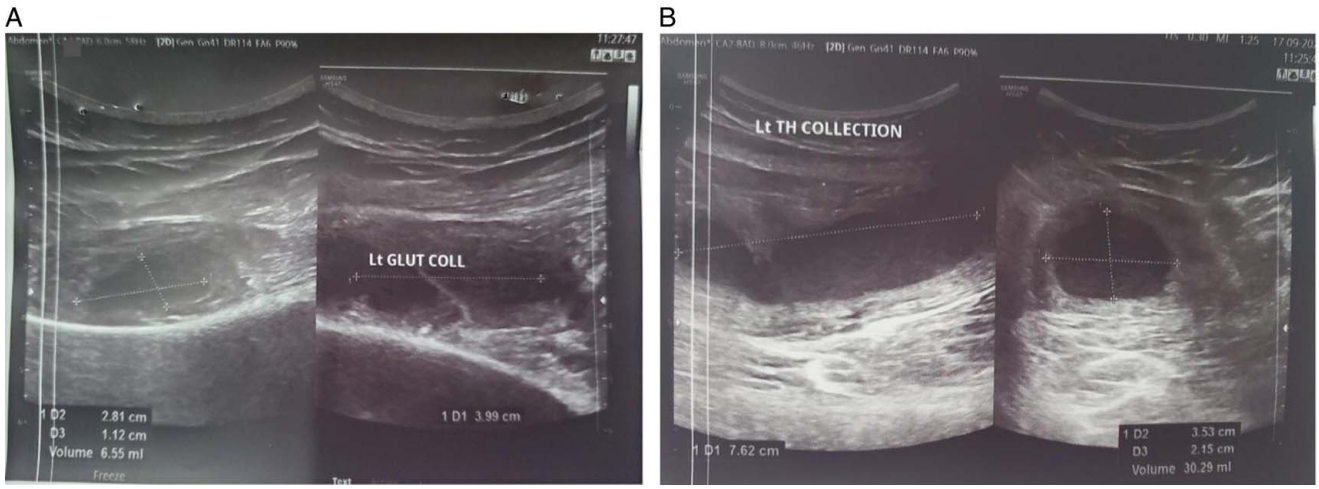

Figure 3. Ultrasonography showing collection on left gluteal medius (A) and left adductor muscle (B).

was normal. This dengue-induced thrombocytopenia, coupled with vascular leakage, contributed to the formation of multiple muscle haematomas. Thrombocytopenia with concurrent haematocrit rise also has prognostic value in determining severe dengue infection[9].

Further, all the reported muscle haematomas resolved spontaneously; however, in our case, it was complicated by the formation of an abscess which is known as pyomyositis. Concurrent bacterial infection (pneumonia, bacteremia, or bacteriuria) is a common entity in dengue infection. The pathogenesis of concurrent bacterial infection in dengue is still not clear but many hypotheses have been formulated. Increased capillary leak resulting from endothelial injury due to cross-reactivity of NS1 antibody, leucopenia, and dysfunction of leucocytes due to direct viral infection could increase the susceptibility to concurrent bacterial infection[13,14]. Similarly, many parameters such as high C-reactive protein, high lactate, acute renal failure, prolonged fever, and prolonged activated partial prothrombin time can indicate a risk of bacterial infection[13,15,16]. But bacterial infection leading to pyomyositis is very rare in presentation as striated muscles are resistant to bacterial infection. It is usually present in a patient who is immunocompromised, diabetic, and some athletes who do vigorous exercise[17,18]. Primary pyomyositis is a bacterial infection of striated muscle that develops without contagious spread from the skin, bone, and soft tissue[18]. Staphylococcal aureus is the most frequent causative organism. In this case, the presence of muscle haematomas likely provided an ideal environment for bacterial growth and subsequent development of pyomyositis.

Pyomyositis presents initially with nonspecific symptoms, making early diagnosis challenging. As the condition progresses, fever and muscle pain become more apparent. Diagnosis of pyomyositis is even more difficult in DHF because dengue itself shares common symptoms such as fever, muscle pain, and arthralgia[14,17]. We also made the diagnosis late, only on the fifth day, following the onset of lower limb pain. A radiological investigation is essential to establish a definitive diagnosis. MRI is the gold standard imaging modality but USG is sufficient to make a diagnosis[19].

Treatment of dengue fever is mostly supportive since there is currently no specific antiviral medication to combat the virus. Once the patient progress to the critical phase, vigorous hydration is necessary as the patient can deteriorate rapidly if not acted on time[7,12]. Additionally, it is essential to adequately and appropriately manage any complications that may arise. In our case, pyomyositis of multiple muscles developed. The management of pyomyositis depends on the stage of the condition; antibiotics are used for the invasive stage, while antibiotics combined with incision and drainage are employed for the suppurative stage[17]. Given the presence of multiple and deep abscesses in our patient, aspiration was performed which improved his condition eliminating the need for incision and drainage. Antibiotics were continued for 6 weeks.

Conclusion

Dengue fever, without any apparent risk factors, can progress to DHF. Diagnosing pyomyositis in dengue cases is challenging as both conditions present with similar symptoms. Therefore, with a persistent fever, severe pain, and focal muscle tenderness, pyomyositis should be considered a differential and further investigations should be done. Aspiration along with adequate antibiotic treatment can result in the complete resolution of pyomyositis.

Ethical approval

Since this is a case report, our Institutional Review Board has waived the requirement for ethical approval.

Consent

Written informed consent was obtained from the patient for the publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Source of funding

None.

Author contribution

B.T. and A.S. collected data, reviewed literature, prepared the original manuscript, reviewed, and edited the manuscript. A.B., S.P., and C.P.C. reviewed and edited the manuscript. All the authors reviewed and approved the final version of the submission.

Conflicts of interest disclosure

The authors declare that they have no conflicts of interest.

Research registration unique identifying number (UIN)

Not applicable.

Guarantor

Dr. Chandra Prakash Chataut.

Data availability statement

All required data are present in the manuscript itself.

Provenance and peer review

Not commissioned, externally peer-reviewed.

References

[1] Gupta BP, Tuladhar R, Kurmi R, *et al*. Dengue periodic outbreaks and epidemiological trends in Nepal. Ann Clin Microbiol Antimicrob 2018;17:6.
[2] Malla S, Thakur GD, Shrestha SK, *et al*. Identification of all dengue serotypes in Nepal. Emerg Infect Dis 2008;14:1669–70.
[3] Epidemiology and Disease Control Division, Situational update of Dengue 2022, 31 December 2022. Accessed 1 July 2023. https://edcd.gov.np/news/situation-updates-of-dengue-as-of-30-nov-2022
[4] Li G-H, Ning Z-J, Liu Y-M, *et al*. Neurological manifestations of dengue infection. Front Cell Infect Microbiol 2017;7:449.
[5] Neeraja M, Lakshmi V, Teja V, *et al*. Unusual and rare manifestations of dengue during a dengue outbreak in a tertiary care hospital in South India. Arch Virol 2014;159:1567–73.
[6] Agha RA, Franchi T, Sohrabi C, *et al*. The SCARE 2020 guideline: updating consensus surgical CAse REport (SCARE) guidelines. Int J Surg 2020;84:226–30.
[7] W.H. Organization, Dengue haemorrhagic fever: diagnosis, treatment, prevention and control, World Health Organization. 1997. https://apps.who.int/iris/handle/10665/41988?search-result=true&query=dengue+haemorrhagic+fever%3A+diagnosis%2C+treatment%2C+prevention+and+control+1997&scope=&rpp=10&sort_by=score&order=desc
[8] W.H. Organization, S.P.f. Research, T.i.T. Diseases, W.H.O.D.o.C.o.N.T. Diseases, W.H.O. Epidemic, P. Alert, Dengue: guidelines for diagnosis, treatment, prevention and control, World Health Organization. 2009. https://apps.who.int/iris/bitstream/handle/10665/44188/9789241547871_eng.pdf?sequence=1&isAllowed=y
[9] Tsheten T, Clements ACA, Gray DJ, *et al*. Clinical predictors of severe dengue: a systematic review and meta-analysis. Infect Dis Poverty 2021;10:123.
[10] Ameer AM, Arachchi WK, Jayasingha PA. Psoas haematoma complicating dengue haemorrhagic fever: a case report. Galle Med J 2009;14:83–4.
[11] Kumar A, Mondal S, Sethi P, *et al*. Spontaneous iliopsoas haematoma in a patient with dengue haemorrhagic fever (DHF): a case report. J Vector Borne Dis 2017;54:103–5.
[12] Wang W-H, Urbina AN, Chang MR, *et al*. Dengue hemorrhagic fever—a systemic literature review of current perspectives on pathogenesis, prevention and control. J Microbiol Immunol Infect 2020;53:963–78.
[13] Thein T-L, Ng E-L, Yeang MS, *et al*. Risk factors for concurrent bacteremia in adult patients with dengue. J Microbiol Immunol Infect 2017;50:314–20.
[14] Ehelepola NDB, Rajapaksha R, Dhanapala D, *et al*. Concurrent methicillin-resistant Staphylococcus aureus septicemia and pyomyositis in a patient with dengue hemorrhagic fever: a case report. BMC Infect Dis 2018;18:99.
[15] Chen C-M, Chan K-S, Cheng K-C, *et al*. The exploration of risk factors of concurrent bacteraemia in patients critically ill with severe dengue. J Med Microbiol 2016;65:1505–11.
[16] See KC, Phua J, Yip HS, *et al*. Identification of concurrent bacterial infection in adult patients with dengue. Am J Trop Med Hyg 2013;89:804–10.
[17] Shittu A, Deinhardt-Emmer S, Vas Nunes J, *et al*. Tropical pyomyositis: an update. Trop Med Int Health 2020;25:660–5.
[18] Bickels J, Ben-Sira L, Kessler A, *et al*. Primary pyomyositis. JBJS 2002;84:2277–86.
[19] Yu JS, Habib P. MR imaging of urgent inflammatory and infectious conditions affecting the soft tissues of the musculoskeletal system. Emerg Radiol 2009;16:267–76.