Primary cutaneous cryptococcosis caused by Cryptococcus gattii VGII in a tsunami survivor from Thailand

Manoon Leechawengwongs a,*, Samaniya Milindankura a, Kriengkrai Sathirapongsasutia, Teerawit Tangkoskul b, Sompone Punyagupta a

a Vichaiyut Hospital, 71/3 Setsiri Road, Phyaithai, Bangkok 10400, Thailand
b Department of Medicine, Faculty of Medicine Siriraj Hospital, Bangkok 10700, Thailand

A R T I C L E   I N F O
Article history:
Received 13 July 2014
Received in revised form
10 August 2014
Accepted 25 August 2014

Keywords:
Cryptococcus gattii
Primary cutaneous cryptococcosis
Tsunami survivor

A B S T R A C T
Skin and soft tissue fungal infections with Apophysomyces elegans, Fusarium solani, Cladophialophora bantiana have been reported in survivors from 2004 Indian ocean Tsunami. We report the first case of primary cutaneous cryptococcosis caused by Cryptococcus gattii VGII in a Tsunami survivor from Thailand.

© 2014 International Society for Human and Animal Mycology. International Society for Human and Animal Mycology Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/3.0/).

1. Introduction

Skin and soft tissue fungal infections were rare in survivors from 2004 Indian ocean Tsunami. Only Apophysomyces elegans [1], [2], Fusarium solani [3] and Cladophialophora bantiana [4] associated wound infections have been reported in Tsunami survivors. Cryptococcus gattii may be found worldwide, not only restricted to tropical and subtropical regions. C. gattii has been isolated from the environment e.g. decayed wood, soil around the trees. C. gattii can be divided into four molecular types VGI, VGII, VGIII and VGIIV [5],[6]. C. gattii associated infections usually manifest as pneumonia and meningitis [7]. Primary skin and soft tissue cryptococcosis is rare. We report the first case of primary cutaneous cryptococcosis caused by Cryptococcus gattii VGII in a Tsunami survivor from Thailand.

2. Case

A previously healthy 48-year-old Thai woman was admitted to Vichaiyut hospital in Bangkok on December 27, 2004 (day 0 being the day of hospital admission) for treatment of sustained injuries in the Tsunami. One day earlier while walking on the beach in front of the hotel in Lanta island, Krabi province, Thailand, she was hit and carried by the Tsunami wave towards the hotel. Fortunately she was able to grab the wooden fence of the veranda. Although she was submerged under the sea water for some time, she did not pass out or aspirate the sea water. Despite sustaining injury to her chin, right chest, back, right elbow, right index finger, left wrist and both lower legs, she was able to stand and walk to the high ground and later returned to her hotel. She flew to Bangkok on the next day.

On examination her vital signs were normal. She was afebrile and not in respiratory distress. Her ear canals were packed with sand. Sand was also found in the conjunctiva of both eyes. Heart and lungs were normal. Abdomen was soft and not tender. Her mandible, right index finger and left wrist were swollen. There were multiple skin abrasions of her back and anterior surface of both lower legs. A very small puncture wound was found over the left shin. Rib cage x-ray revealed fracture of right 7th, 8th, 9th and 10th ribs. Chest x-ray showed no pulmonary infiltration. No other fracture was found on the x-ray of the affected parts. Blood test was normal. Cryptococcal antigen was not sent.

Initially she was treated with broad spectrum antibiotics ciprofloxacin and clindamycin for 2 weeks. However, the wound of both lower legs gradually got worse. The skin of anterior surface of both lower legs appeared in flammed, red and tender. Culture of pus from the left lower leg was sent on day 18 and on day 21 Cryptococcus spp. grew.

Ultrasound of the wound of left shin revealed thickening of skin and subcutaneous layer with irregular hypoechoic area about 0.9 × 3 cm². Debridement of wounds of both lower legs was done...
under general anaesthesia on day 23. Foreign bodies including sand and small pieces of woods were found and removed. Wounds were irrigated and removal of dead tissue was done. Moderate encapsulated yeast cells were found on the India ink stain of discharge of the left leg but not of the right leg. Bacterial cultures of discharge from both legs were negative. Culture of pus from the left leg grew *Cryptococcus* spp. which was identified as *C. gattii* serotypes B and C by using the canavanine-glycine-bromothymol blue agar and later it was determined to be *C. gattii* molecular type VGII by the *URA5* RFLP typing method (Fig. 1).

She was started on anti-fungal treatment on day 21 with IV amphotericin B 0.5 mg/kg/day and oral itraconazole 100 mg twice a day. On day 42 IV amphotericin B was discontinued and itraconazole was switched to oral fluconazole 200 mg daily. Repeated India ink stain of pus on day 43 and day 56 still showed encapsulated yeast cells. On day 64 India ink smear was negative and fungal culture showed no growth. She was discharged from the hospital on day 65. Oral fluconazole was stopped on day 111. The wound finally closed and no relapse was seen during follow-up for the last nine years (Fig. 2).

3. Discussion

The lungs and central nervous system are the most common organs affected by *C. gattii* acquired through the inhalation. Primary skin and soft tissue cryptococcosis can occur after the traumatic inoculation. To our knowledge skin and soft tissue infection caused by *C. gattii* has not been reported in Indian ocean Tsunami survivors. Our previously healthy patient most likely acquired infection during the 2004 Tsunami as we found the small piece of woods inside her wound. Culture of pus from the left leg grew *C. gattii* which belonged to VGII molecular type. Molecular subtyping was not done. In Thailand cryptococcosis caused by *C. gattii* is uncommon and the most prevalent molecular type of *C. gattii* is VGII as in our case. VGIIb is found to be the most common molecular subtype of VGII in Thailand [8]. VGII can be found in Vancouver Island, Canada, northwestern United States, Brazil, Columbia and Puerto Rico [9]. Our patient was successfully treated by a combination of surgical drainage and antifungal treatment including three weeks of IV amphotericin B and three months of oral azoles. No relapse occurred on follow up for nine years.

In summary, clinicians should be aware of possibility of *C. gattii* skin and soft tissue infection in Tsunami survivors. Early diagnosis and early treatment of *C. gattii* can lead to complete wound healing.

**Funding source**

There are none.
Conflict of interest statement

There are none.

Consent

Written consent has been obtained from the patient.

References

[1] Andresen D, Donaldson A, Choo L, Knox A, Klaassen M, Ursic C, et al. Multifocal cutaneous mucormycosis complicating polymicrobial wound infections in a Tsunami survivor from Sri Lanka. Lancet 2005;365:876–8.
[2] Snell BJ, Tavakoli K. Necrotizing fasciitis caused by Apophysomyces elegans complicating soft tissue and pelvic injuries in a Tsunami survivor from Thailand. Plast Reconstr Surg 2007;119(1):448–9.
[3] Maegele M, Gregor S, Yuecel N, Simanski C, Paffrath T, Rixen D, et al. One year ago not business as usual: Wound management, infection and psychoemotional control during tertiary medical care following the 2004 Tsunami disaster in Southeast Asia. Critical care 2006;10(50). http://dx.doi.org/10:1186/cc4868.
[4] Petrini B, Farnebo F, Hedblad MA, Appelgren P. Concomitant late soft tissue infections by Cladophialophora bantiana and Mycobacterium abscessus following tsunami injuries. Med Mycol 2006;44(2):189–92.
[5] Springer DJ, Phadke S, Billmyre RB, Heitman J. Cryptococcus gattii, no longer an accidental pathogen? Curr Fungal Infect Rep 2012;6:245–56.
[6] Chaturvedi V, Chaturvedi S. Cryptococcus gattii: a resurgent fungal pathogen. Trends Microbiol 2011;19(1):564–71.
[7] Harris JR, Lockhart SR, Debes E, Marsden-Haug N, Goldoft M, Wohrle R, et al. Cryptococcus gattii in the United States: clinical aspects of infection with an emerging pathogen. Clin Infect Dis 2011;53:1188–95.
[8] Kaokharoen S, Ngamskulrungroj P, Fricative C, Trilles L, Piyabongkarn D, Banlunara W, et al. Molecular epidemiology reveals genetic diversity amongst isolates of the Cryptococcus neoformans/C. gattii species complex in Thailand. PLoS Negl Trop Dis 2013;7(7):e2297. http://dx.doi.org/10.1371/journal.pntd.0002297.
[9] Pasa CR, Chang MR, Hans-Filho G. Post trauma primary cutaneous cryptococcosis in an immunocompetent host by Cryptococcus gattii VGII. Mycoses 2011;55:e1–3.