Antimicrobial Therapy for Water-Associated Wound Infections in a Disaster Setting: Gram-Negative Bacilli in an Aquatic Environment and Lessons from Banda Aceh

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Abbreviations:
ARI = acute respiratory tract infection
DPC = delayed primary closure
JDR = Japan Disaster Relief
JSD = Japan Self-Defense
NCCLS = National Committee for Clinical Laboratory Standards
TCBS = thiosulfate-citrate-bile salts-sucrose

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Abstract

Introduction: As members of the Japan Disaster Relief (JDR) team in Banda Aceh, three of the authors treated 1,891 patients following the tsunami of 2004. Of the 367 cases with traumatic injuries, 216 cases required antimicrobial therapy. The medical services were continued by the Japan Self-Defense (JSD) Medical Team until mid-March 2005. Of the 216 cases initially treated by JDR, 54 required prolonged antimicrobial therapy for persistent symptoms despite repeated debridement. The aim of this study is to recommend an appropriate antimicrobial therapy for water-associated wound infections in the absence of laboratory services in disaster settings following tsunami.

Methods: The JDR and JSD treatment records were analyzed retrospectively. In August 2006, 19 months after the tsunami, the authors investigated pathogens in natural aquatic habitats in the affected area in Banda Aceh. At the same time, interviews with tsunami survivors were performed to determine the influential factors that facilitated wound infections after the tsunami.

Results: From the 49 water samples tested, *Aeromonas sp.*, *Vibrio sp.*, *Klebsiella sp.*, and *Proteus sp.* were isolated from 24, 16, 15, and six samples, respectively. Regardless of the genus, almost all of the isolated gram-negative bacilli were sensitive to ciprofloxacin and gentamicin.

Conclusions: From the microbiological test results and analyses of the medical records and interviews, the researchers recommend the following regimen when clinical microbiological tests are not available: initial treatment with beta-lactam penicillins for three days, followed, if the first antimicrobial is not effective, by ciprofloxacin or any other relevant new quinolones, with the addition of gentamicin if necessary.

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Introduction

The tsunami that occurred in the Indian Ocean on 26 December 2004 killed >275,000 people.[1] Indonesia's Aceh Province sustained the greatest damage; according to the Indonesian government's estimates, 129,775 individuals perished, 38,786 people were lost, and 504,518 others were displaced following the earthquake and tsunami.[2] Many survivors were injured by the debris caused by the tsunami. Since the traumatic wounds were exposed to and submerged in water, the wounds were contaminated. Therefore, even in minor wounds, the risk for the development of infection was considerably high.[3–7]

From 02 January to 19 January 2005, the Japan Disaster Relief (JDR) medical team provided medical care services in Banda Aceh. During this period, this team, which included three of the authors, treated 1,891 patients during that period. Among these, there were 367 cases with traumatic injuries. Of these, 216 (59%) received antimicrobial therapy. Debridement was performed for 45 cases, and the delayed primary closure (DPC) principles were followed. During this period, as many as 10 cases demonstrated no improvement with-