A Probable Case of Laboratory-Acquired Infection with \textit{Salmonella typhi}: Evidence from Phage Typing, Antibiograms, and Analysis by Pulsed-Field Gel Electrophoresis

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ABSTRACT

Objective: To report a probable case of laboratory-acquired typhoid fever involving a female laboratory technologist at a major diagnostic bacteriology laboratory in Kuala Lumpur, Malaysia.

Methods: The technologist presented with clinical symptoms of typhoid fever and was admitted to a major hospital in Kuala Lumpur. \textit{Salmonella typhi} isolated from her stools, as well as other \textit{S. typhi} isolates she had been working with, were analyzed by Vi phage typing, antibiogram studies, and pulsed-field gel electrophoresis. The phage type and antibiograms of the isolate were identical to those of one of the laboratory strains she had been working with during her routine duties.

Results: Pulsed-field gel electrophoresis analysis of restricted chromosomal DNA confirmed the identity of the isolate with that of the laboratory isolate. The isolate involved was phage type E1 and was resistant to multiple antibiotics.

Conclusion: The results strongly suggest that the laboratory technologist acquired the infection in the laboratory in the course of her work.

Key words: antibiogram, laboratory-acquired infection, pulsed-field gel electrophoresis, phage typing, \textit{Salmonella typhi}


Case Report

Typhoid fever remains an important public health problem in the developing world. In a rapidly developing country like Malaysia, increased urbanization has actually witnessed an increase in the incidence of cases. The causative agent of disease is \textit{Salmonella typhi}. It is spread through food, drinks, and sometimes directly through contaminated laboratory equipment and poor laboratory practices. Laboratory-acquired infections caused by bacterial, viral, fungal, rickettsial, and parasitic agents have been recognized since the beginning of this century. Laboratory workers have occasionally become infected by these microorganisms with which they are working, and some of these infections have resulted in death. For example, of the 20 typhoid deaths reported by Pike,¹ 15 occurred in Germany, 1 was reported in France, and 4 occurred in the United States. During a 33-month study in the United States by Blaser et al.,² 24 cases, or 2.4% of all typhoid cases reported, were laboratory-acquired typhoid fever. Laboratory-associated cases of salmonellosis are also well documented in a number of published reports and surveys. For example, in Great Britain, the overall incidence of \textit{Salmonella} infection is 0.137 infections per 1000 persons. Most of the workers affected have been microbiologists. However, in most countries endemic for \textit{Salmonella typhi} infection, like Malaysia, reports on laboratory-acquired infections are scarce, and there have been no published reports on this. The actual risk and incidence of laboratory-acquired infection is difficult to measure, but is bound to be significant as the laboratory workload increases as a result of increased disease activity. Also, surveillance data on laboratory-associated infections are difficult to obtain, because the infections are often subclinical and have an atypical incubation period and route of infection. Moreover, laboratory directors may not report any laboratory-related incidents for fear of reprisal or embarrassment. This report presents a probable case of laboratory-acquired typhoid fever involving a laboratory technologist in Kuala Lumpur, Malaysia.

The laboratory technologist involved (36-yr-old female) is employed at a major diagnostic bacteriology laboratory in Kuala Lumpur, Malaysia. She showed clinical symptoms of typhoid fever and was admitted to the