

Infection Risk in an Urban Watershed by the Compound Disaster of Flood and Earthquake

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The Great East Japan Earthquake occurred on March, 11, 2011, and one consequence was severe damage to the sewage systems. As a result, there was a severe deterioration in hygienic conditions, and the risk of exposure to pathogens increased in the disaster area. In addition to torrential rainfall and typhoon damage which occur frequently in Tokyo, there is the possibility of the occurrence of a massive metropolitan direct-hit earthquake. In other words, the risk of a compound disaster generated by heavy rain and flooding after a big earthquake is high in the Tokyo metropolitan area. In this case, the situation that raw sewage flows due to the destruction of the sewer pipe network is expected to combine with floodwater and it is considered that the infection risk will increase remarkably.

Therefore, in this study, the risk assessment technique of pathogens was applied to a compound disaster of a large earthquake with a flood and an evaluation method of the infection risk was proposed. The infection risks of the norovirus and cholera vibrio were calculated quantitatively using the Kanda River basin as the study area. The spatial distribution of the infection risk was created and the visualization of the infection risk was investigated. The results for the metropolitan area, where functionality is normally high, for a single disaster, it is shown when it suffers a compound disaster, such as being hit by a great earthquake and a flood, it was found that the infection risk changes in a range of 1.2 to 10 times higher than usual in the case of a large earthquake with a flood and subsequent inland inundation. Thus, not only care of physical externally caused injuries, but also that of infectious diseases is vital in such compound disasters.