Int J Legal Med (2006) 120: 185–187
DOI 10.1007/s00414-005-0031-4

LETTER TO THE EDITOR

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Experiences in tsunami victim identification

Received: 6 May 2005 / Accepted: 11 July 2005 / Published online: 25 August 2005

Keywords Disaster victim identification · Tsunami · Mass disaster · Makeshift mortuary operations

Sir,

On 26 December 2004, giant tsunami waves devastated the coast lines of 12 south-east Asian countries, with the number of persons confirmed dead or still missing exceeding 300,000 as of 30 June 2005. Directly after the tsunami had struck Thailand's holiday resorts on the south-western coast, tens of thousands of locals and Western holidaymakers were missing, and hourly, more and more were confirmed dead by local authorities via the national and international media. As members of the German Federal Police's disaster victim identification (DVI), these authors arrived on the island of Phuket, Thailand, on 28 and 30 December 2004, and worked in the region of Phuket and Khao Lak until returning to Germany on 14 January 2005.

During the first 2 days after the tsunami had struck, hurried disposal of corpses by cremation or mass burials was performed in the region of Phuket and Khao Lak at some places under the surveillance of local authorities, resulting in bodies being either wrongly or not identified. Thai (local) tsunami victims had been visually "identified" by relatives and friends and were hastily cremated at Wat Yan Yao, at least until 29 December 2004; in addition, mass burials of corpses of believed Thai citizens (as determined by their black hair color, in contrast to those with blonde hair who were believed to be foreigners) were conducted during the first 2 weeks of January 2005 near the city of Phang Nga, not far from the region of Khao Lak (Fig. 1).

Under the leadership of the Thai police, the German DVI team worked at three different provisional mortuaries during the early phase of the tsunami operation, handling approximately 400 bodies during the first 3 weeks after the tsunami. Over the first days, identification procedures had to be performed in the open, at a site not far from Phuket airport, since no provisional mortuaries were installed in the region at that time. Most of the deceased that underwent identification procedures at this work site were tsunami victims who had died in Phuket hospital shortly after the disaster had occurred. Since the Thai medical system was not prepared to give those who survived the tsunami immediate and appropriate medical care directly after the disaster—as the medical supply system of any country confronted with a disaster of such vast dimensions would be overstretched—at least hundreds of tsunami victims who initially survived died during the first days after the disaster from respiratory tract infections as a sequel of near-drowning, blunt force trauma or sepsis originating from wound infections.

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Fig. 1 A mass grave near the city of Phang Nga, not far from the region of Khao Lak (photo taken 3 January 2005)

One week after the disaster, the German DVI team moved and started working at the Ban Muang temple in the region of Khao Lak (100 km north of Phuket Island). Approximately 2,000 bodies that had been transported here from beaches, hotel resorts and inland, where they had been recovered by Thai military and civil volunteers, were lying in rows on the ground in the open (Fig. 2). An immense problem was the lack of sufficient means of cooling the dead in order to slow down putrefaction; an ineffective attempt to slow down putrefaction and to preserve the bodies in their present state was made by the Thai military by cooling the corpses with dry ice (Fig. 3).

On 3 January 2005, the German DVI team moved to its third work site at the Yan Yao temple. Here, makeshift mortuaries in air-conditioned tents and temple buildings with water and electricity supply had been installed, allowing 24-h work for DVI teams from 12 different nations. At the Yan Yao temple, enough cooling containers for approximately 2,500 bodies were procured until 5 January (before, the corpses were lying unsurveillanced on the ground in the open here, too), and the collecting of odontological data was supplemented by the availability of dental radiography.

Since the identification protocols used and the manner and type of post-mortem data collection varied considerably between the different DVI teams in the very early phase of the tsunami operation, data collection and identification procedures were standardized on 12 January 2005, when the multinational Thailand Tsunami Victim Identification committee (TTVI) was formed. The TTVI defined standardized protocols and harmonization of identification procedures for DVI based on the Interpol disas-

Fig. 2 Bodies of tsunami victims lying in rows on the ground in the open at the Ban Muang temple (photo taken 2 January 2005)

Fig. 3 An ineffective attempt to slow down putrefaction of bodies was made with dry ice at the Ban Muang temple (photo taken 2 January 2005)

ter victim identification guide [2], with specification of procedures for pathology, odontology, photography, fingerprinting, re-examination, moving of bodies, chain of evidence and DNA testing of ante-mortem and post-mortem samples (targeting 16 gene loci). Post-mortem data were transferred to the Information Management Center (IMC) in Phuket town, where they were compared with ante-mortem data by using the Plass Data System (Plass Data Software, Holbaek, Denmark). Matches of post-mortem and ante-mortem data then had to be reviewed by a board of Thai medical and police authorities. When identification was confirmed, the death certificate was issued and the body could officially be released to the relatives (a procedure that was coordinated by the German embassy for the German citizens).

Sex determination was not a problem in any of the bodies examined due to the presence of the reproductive organs; body parts were not among the human remains examined by the German DVI team. Estimation of age was mainly based on odontological features, occasionally supported by anthropologic data such as skull suture fusion, epiphyseal union of distal radius and ulna, etc. The causes of death of those tsunami victims examined by the German DVI team were exclusively drowning and blunt trauma.

Between the foundation of the TTVI on 12 January until 31 March 2005, a total of 4,082 post-mortem data files has been created, with 1,112 victims of different nationalities being identified from these data files by matching them with the ante-mortem data, including 1,046 cases identified on the basis of one type of data (962 dental, 71 fingerprint, 10 physical and 3 DNA) and 66 others identified by combinations of data types [1].

The procedure of the deceased being buried or cremated without having been properly identified in the region of Phuket and Khao Lak over the first 2 weeks (a procedure that was obviously practiced in Indonesia and Sri Lanka on a much larger scale for months) was, in these authors' opinion, mainly an effect of the most common disaster myth, namely, that corpses represent an imminent risk of epidemics and must be disposed off immediately. This commonly held belief that dead bodies pose a public health threat obviously resulted in confusion among the authorities and the general public. However, the medical and epidemiologic profile of the tsunami disaster can be considered similar to that of a hurricane with resultant flooding. Experience indicates that epidemics of communicable diseases to the living do not always occur after large-scale floods, and moreover, there is no scientific evidence that dead bodies have ever spontaneously spread any epidemics [3]. In addition, the tsunami experience has shown, once more, that performing identification of mass disaster victims in an advanced state of putrefaction by visual means without any supportive evidence such as dental charts or fingerprints is highly erroneous. Presently, while this paper is being written, exhumation and re-examination of the bodies buried in the mass graves near Phang Nga are being undertaken by international DVI teams at the Yan Yao temple.

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