Tsunami — An Indian Perspective - Tidal Wave Health Issues from India

SM Sapatnekar

Nemesis, the mythical goddess of retributive justice, seems to have assumed the form of Tsunami in Southeast Asia. As of 18 January 2005, the death is 157,558 and expected to continue to increase. Dr Lee Jong-Wook, Director-General of the World Health Organization estimates that between three to five million people are already affected. WHO warns up to five million people without access to basic services in Southeast Asia. Forty one districts along Coromandel coastline that borders eastern part of South India have experienced 10747 deaths with 5669 persons missing and 7081 injured. Add to that the 647,556 displaced persons to understand the picture of devastation. In some of the Andaman and Nicobar Group of islands, hardly anything is left in terms of population or sea shore after the lashes of Tsunami - a word unheard by most of Indians till now and too familiar today.

Tsunamis are giant sea waves that are produced by submarine earthquakes. That means there will be no warning or preparedness in the areas where there is no past experience of such disaster or where its frequency is low. Tsunamis travel thousands of miles at 300-600mph with very little loss of energy. Tsunamis not only propagate at high speeds, they can also travel transoceanic distances with little energy losses. Therefore even extremely remote geographical regions from the epicenter will be affected. As the tsunami’s speed diminishes its height grows. Onshore, Tsunamis may reach a maximum vertical height of even 30 meters. Thereby the barotrauma will be severe. They reach the coast with devastating impact on shoreline communities. Human life, livestock, properties, roads and landscapes are literally washed out. Successive crests can arrive at intervals of every 10 to 45 minutes and wreak destruction for several hours. Under such circumstances, it is difficult to organize first-aid and relief. Local geography may intensify the effect of a tsunami. Areas at greatest risk are less than 50 feet above sea level and within one mile of the shoreline. The potential outbreaks in tsunami affected areas will be predominantly due to faeco-orally transmitted infections, including cholera. Faecal contamination of drinking water, breeding of houseflies with accumulation of garbage and scant regard to personal hygiene all contribute to potential epidemics. Disease carried by water is a hauntingly efficient way to carry bacteria micro-organisms.

The picture for India is varied. Andaman and Nicobar group of islands have the worst figures of deaths, missing persons and washouts. The coastal districts are gradually recovering from the administrative paralysis. The nature and extent of damage has been fairly estimated. Initial steps in Disaster management exercise by the Government of India have been prompt and focused. By now, 595 relief camps have been established, sheltering 376,171 people. Another 646,256 people have been evacuated. The latent period between the ‘siren’ and action at field level is certain to vary according to communication infrastructure and maturity of local public health. Surprisingly, very few cases of ARDS due to near drowning have been reported. Within 3 weeks of the tsunami hit, a cumulative 174,567 overall morbidity is reported that consists mainly of acute respiratory infections(36701), skin conditions (8881) and febrile illness (9075). Acute diarrheal diseases constitute only 520 cases. Unless there is reporting bias, it reflects on appropriate measures of disease control.

Scenario for a practicing physician in such a disaster is peculiar. Situation appraisal is difficult. There is mob hysteria. Human behavior is irrational, akin to acute panic disorder. Herd instincts prevail. Public health infrastructure proves grossly inadequate. Popular expectations from medical practitioner are too high. He is expected to rise to the occasion for clinical tasks that are beyond hid competence. A pediatrician needs to act as a surgeon and an ophthalmologist may be required to double as an obstetrician! There is a trimodal distribution of traumatic injury deaths (Table 1).

The number and variety of clinical presentations is trying. The impact of Tsunami is like a “hit-and-run” accident. Various grades of trauma, dehydration, starvation and resultant fluid-electrolyte imbalance need to be anticipated in the rescued group. Patients report hours after injury. Anger, apprehension, anxiety state, insomnia followed by exhaustion prevails. Separation anxiety is marked especially for women and children. Perceived danger of death or anticipation of undesirable event is disproportionately more to reality. Bereaved families land in various grades of reactive depression.
There is the ubiquitous feeling of an aftershock. In due course, sizable population suffers post traumatic stress disorder (PTSD). With as many as 300000 people injured and many more in need of urgent medical or surgical treatment rescue agencies have a tall order in all tsunami affected countries.

Countless other survivors are at risk of infectious diseases or aggravating existing health conditions. Shortage of clean water is widespread and risk of diseases outbreaks increased throughout region. Invariably, it takes about two weeks for the public health to take over from disaster teams under such circumstances. Overcrowding in the rescue camps, unaccustomed physical environment, confusion, loss of initiative and poverty of environmental sanitation form ideal situation for causation and spread of communicable diseases. Faeco-orally transmitted infections and Vector borne diseases prevail. Cholera, typhoid, shigellosis, hepatitis A and E, dengue fever, malaria, scrub typhus, leptospirosis is the usual morbidity.

The proverbial ‘bolt from the blue’ of tsunami may dampen in foreseeable future. Tsunami Risk Evaluation through seismic Moment from a Real-time System (TREMORS) is based on a single 3-component broadband seismometer connected to a personal computer where special software is continuously running. It automatically detects the arrival of seismic waves from any large earthquake, locates the epicenter, and computes the seismic moment. Depending on the results, the system is capable of sending a short message, including all the results, through INMARSAT. It can also send a warning to a telephone and set off an alarm tone on the personal computer. As and when the TREMORS keeps vigil the world over, it will be possible to save lives and ameliorate the morbidity to a larger scale and with better results, when the Mother Nature is not happy.

**REFERENCES**

9. SEA Earthquake and Tsunami Situation Reports India 18 Jan 05 http://w3.whosea.org/en/Section23/Section1108/Section1835/Section1851/Section1866_8558.htm

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**Table 1 : Trimodial distribution of deaths from traumatic injury**

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<thead>
<tr>
<th>Peak</th>
<th>Duration</th>
<th>Description</th>
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<tbody>
<tr>
<td>First peak</td>
<td>Seconds to minutes</td>
<td>Injury incompatible with life (e.g., aortic dissection).</td>
</tr>
<tr>
<td>Second peak</td>
<td>Minutes to hours</td>
<td>Focus injuries of early management of severe trauma (e.g., haemorrhage, haemopneumothorax).</td>
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<tr>
<td>Third peak</td>
<td>Days to weeks</td>
<td>Complications, sepsis, multiorgan failure</td>
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(Adapted from Paul R P Taylor, David L Emonson and James E Schlimmer. Operation Shaddock — the Australian Defence Force response to the tsunami disaster in Papua New Guinea MJA 1998; 169: 602-606)