Transfusion under Triple Threat: Japan’s Earthquake, Tsunami, and Nuclear Crisis

Kenneth E. Nollet, MD, PhD, FCAP
Director, Office of International Cooperation, Radiation Medical Science Center; Professor, Department of Blood Transfusion and Transplantation Immunology
Western Australia with size comparisons to Germany, Japan and the UK.

Who's here from WA?

NICE 2007
Tsunami of Genome Science

CALL FOR PAPERS

Early 2011 Conference Poster

National Center of Sciences
Tokyo, JAPAN
This map shows the March 11 earthquake and its associated aftershocks through March 14, 2011 at 11:20 PM JST. The size of the circles is a function of magnitude and the color indicates the date: March 11, light green; March 12, yellow; March 13, orange, and March 14, red.

Keen SK. QST* 95(6)77, 2011
*Journal of ARRL, national association for Amateur Radio in the United States
Serial radiation measurements before and after the magnitude 9.0 earthquake, tsunami, and subsequent nuclear power plant crisis. Radiation surveillance is a routine activity of this department.
≥118 medical facilities wrecked

11 MDs killed

16 in Iwate
77 in Miyagi
25 in Fukushima

PREFECTURES

Japan Times April 26, 2011
Miyagi Red Cross Blood Center

SERVING:
- Aomori
- Iwate
- Akita
- Miyagi
- Yamagata
- Fukushima

PREFECTURES

Collapsed platelet shaker

Broken water pipe

Office in chaos

Photos courtesy of T. Itoh, Miyagi Red Cross

Damaged CL4800 for HBV, HCV, and HIV screening
Red Cross blood stocks on the coast were removed.

map from www.cosmo-kaken.co.jp/en/special.html
8 major hospitals in disaster-response mode for 11-24 days

map from www.cosmo-kaken.co.jp/en/special.html
Critical patients in, chronic patients out
No municipal water, just reserves on campus

4-day reserve
今回、血液ドナー検査を行うにあたり、HIV抗体検査を実施する必要があることの説明を受け、その意義を理解いたしました。また、検査結果についても、プライバシーの保護が厳密に行われることを理解しました。

☑ 1. HIV抗体検査の必要性について
☑ 2. 検査同意の撤回について
☑ 3. 連絡先について

(説明)
説明年月日：平成23年3月14日
説明医：（自筆署名，もしくは記名押印）

（同意）
同意年月日：平成23年3月14日
同意者（本人）：（自筆署名，もしくは記名押印）

Emergency Donor Screening Consent

Physician: Takahiro KANNO

Donor: Kenneth NOLLET
Cutting Edge Transfusion Medicine

2 December 2007
Ken Nollet, MD, PhD

NICE 2007
Irradiation, FMU
<table>
<thead>
<tr>
<th>Area</th>
<th>Location</th>
<th>Hospital</th>
<th>Beds</th>
<th>A</th>
<th>O</th>
<th>B</th>
<th>AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamadori</td>
<td>11</td>
<td>Minami Soma</td>
<td>230</td>
<td>&gt;6</td>
<td>&gt;6</td>
<td>&gt;4</td>
<td>&gt;4</td>
</tr>
<tr>
<td>Coastal</td>
<td>4</td>
<td>Iwaki Kyoritsu</td>
<td>828</td>
<td>20</td>
<td>20</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Shirakawa Kosei</td>
<td>471</td>
<td>&gt;26</td>
<td>&gt;18</td>
<td>&gt;10</td>
<td>&gt;8</td>
</tr>
<tr>
<td>Nakadori</td>
<td>3</td>
<td>Ohta Nishinouchi</td>
<td>1029</td>
<td>30</td>
<td>30</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Central</td>
<td>1</td>
<td>FMU</td>
<td>778</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fukushima Red Cross</td>
<td>359</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aizu (Inland)</td>
<td>2</td>
<td>Aizu Central</td>
<td>898</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>South Aizu</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hospital red cell inventories

Patients and units transfused decreased after 3.11 in the 8 disaster response hospitals of Fukushima Prefecture. For patients, **Total** refers to those who received any kind of transfusion. Thus, one patient may be counted in two or more rows.

<table>
<thead>
<tr>
<th></th>
<th>Patients Transfused</th>
<th>Units Transfused</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
</tr>
<tr>
<td>Total</td>
<td>635</td>
<td>457</td>
</tr>
<tr>
<td>Red Cells</td>
<td>530</td>
<td>392</td>
</tr>
<tr>
<td>Plasma</td>
<td>96</td>
<td>37</td>
</tr>
<tr>
<td>Platelets</td>
<td>166</td>
<td>106</td>
</tr>
</tbody>
</table>

Remote supply for Tohoku

1,089 platelet units/day
March 20 – May 2

762 red cell units/day
April 7 – May 15
The Great East Japan Earthquake of March 11, 2011, From the Vantage Point of Blood Banking and Transfusion Medicine

Kenneth E. Nollet *, Hitoshi Ohto, Hiroyasu Yasuda, Arifumi Hasegawa

Department of Blood Transfusion and Transplantation Immunology, Fukushima Medical University, Fukushima, Japan
Department of Emergency and Critical Care Medicine, Fukushima Medical University, Fukushima, Japan

ARTICLE INFO

Article history:
Available online 16 August 2012

ABSTRACT

Background: The Great East Japan Earthquake of March 11, 2011, and subsequent tsunami took nearly 20 000 lives in Tohoku, the northeastern part of Japan's main island. Most victims were either carried away by the tsunami or drowned. The ability to collect blood was disrupted on the Pacific coast of Tohoku. Inland areas were less affected, but allogeneic blood collected in Tohoku is tested at the Miyagi Red Cross Blood Center (Miyagi Center) in the coastal city of Sendai. Miyagi Center was damaged and could not test for 2 months.

Objectives: The aims of this study are as follows: (1) to assess transfusion practice at 8 disaster response hospitals in Tohoku's Fukushima Prefecture, for equal intervals before and after March 11, 2011; (2) to report activities related to blood collection and distribution in response to the disaster; and (3) to describe the Great East Japan Earthquake in the context of other disasters.
Nollet KE: Blood banking and transfusion medicine in extreme or resource-limited conditions. 49, 378-379.

Hess JR, Lelkens CCM, Holcomb JB, Scalea TM: Advances in military, field, and austere transfusion medicine in the last decade. 49, 380-386.


Barrett CL, Louw VJ, Webb MJ: Exchange transfusion as a life-saving intervention in three patients with different haematological malignancies with severe hyperleukocytosis where leukapheresis was not available. 49, 397-402.


McCullough TK, McCullough J: Strengthening blood programs in developing countries. 49, 408-415.


Transfusion and Apheresis Science, 2013
“Extreme Theme” special section
Seeking new manuscripts from around the world, including Australia and New Zealand

Theme Editor: Hitoshi OHTO, hit-ohto@fmu.ac.jp
Deputy Editor: Ken NOLLET, nollet@fmu.ac.jp