Abstract No. 0029

CURRENT STATUS ON CHILDHOOD THYROID CANCER AFTER FUKUSHIMA NPP DISASTER

- REPORT FROM ONE CLINICIAN’S POINT OF VIEW

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On March 11, 2011, TEPCO (Tokyo Electric Power Company) Fukushima Daiichi Nuclear Power Plant (NPP) shut down due to East Japan Earthquake & subsequent Tsunami; causing nuclear core meltdown, explosion, and enormous amount of radioactive substance proliferation.
Although it was different in size from the Chernobyl accident, the degree of the pollution was almost the same as that of Chernobyl.
Damage from Fukushima Daiichi NPP Accident

### UNSCEAR 2008 REPORT: VOLUME II

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Recovery operation</td>
<td>40k</td>
<td>530k</td>
</tr>
<tr>
<td>Average effective dose (mSv)</td>
<td>13 Max 679</td>
<td>117 Max over1000</td>
</tr>
<tr>
<td>Deaths from Acute Radiation Syndrome</td>
<td>0</td>
<td>28</td>
</tr>
</tbody>
</table>

#### A. Workers at NPP
At TEPCO Fukushima Daiichi NPP, 2 workers were killed by Tsunami on the day of the quake. Thereafter, 4 workers were reported to die by duty, **but NO outbreak or deaths after office hours or resignation have been recorded.**

#### B. US Soldiers
Former crew members of USS Ronald Reagan sailed off Fukushima immediately after the accident for Operation Tomodachi sued the US District Court stating **“they were exposed as TEPCO did not disclose the correct information”**.

#### USS Ronald Reagan Crew

<table>
<thead>
<tr>
<th></th>
<th>4,843</th>
</tr>
</thead>
<tbody>
<tr>
<td>Died of cancer or leukemia</td>
<td>6</td>
</tr>
<tr>
<td>MalignantNeoplasms(cancer)</td>
<td>46</td>
</tr>
<tr>
<td>Thyroid Disease</td>
<td>35</td>
</tr>
<tr>
<td>Respiratory System Disease</td>
<td>931</td>
</tr>
</tbody>
</table>

#### C. Birds and Insects

- The biological impacts of ingested radioactive materials on **the pale grass blue butterfly** Chiyo Nohara, et al., *Scientific Reports* 4, 4946 (2014)
- Abundance and genetic damage of **barn swallows** from Fukushima A.Bonisoli, T.A.Mousseau et al., *Scientific Reports* 5, 9432 (2015)
“Re-estimation of atmospheric release of radioactive material per SPEEDI-World Version” - as of April 1, 2011

G. Katata et al. (Japan Atomic Energy Agency)

18th Joint Conference on the Applications of Air Pollution Meteorology with the A&WMA 94th AMS Annual Meeting, 3 Feb. 2014. Atlanta, USA

(* SPEEDI: System for Prediction of Environmental Emergency Dose Information)

★ SPEEDI’s estimation tells us the similar outcome outside the prefecture. Investigation outside the prefecture is essential!
Increased thyroid cancer rates are suspected to be caused by exposure through the respiratory system and food ingestion. = Internal Exposure

Chernobyl is a region of shortage of iodine, Japan is not short of iodine. However, if seaweed is not ingested for a week or two, it may cause iodine level decline.

★ No accurate measurement could be done for initial exposure.
Fukushima Health Management Survey

Childhood thyroid cancer due to internal exposure of radioactive iodine is the health hazard being revealed after Chernobyl NPP accident. Based on TEPCO Fukushima Daiichi NPP accident, Fukushima Prefecture is conducting thyroid examination for people aged 18 years or younger at the time of the disaster.

Thyroid Ultrasound Examination
Definition of Diagnostic Criteria

<table>
<thead>
<tr>
<th></th>
<th>A1</th>
<th>No cysts/nodules</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A2</td>
<td>Nodules $\leq 5.0$mm or cysts $\leq 20.0$mm</td>
</tr>
</tbody>
</table>

Those with A1 and A2 test results are recommended to undergo their next regular screening.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Nodules $\geq 5.1$mm or cysts $\geq 20.1$mm</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>immediate need for confirmatory examination</th>
</tr>
</thead>
</table>

Participants with B and C test results are advised to take the confirmatory examination.

★ Why is the survey only limited to Fukushima?
Flow of Thyroid Ultrasound Examination

Primary Examination

Thyroid Ultrasound Check in 2-5 years later

Secondary Examination (Ultrasound/Blood test)

Aspiration Biopsy Cytology (FNAC)

Suspicious or Malignant

Follow Up

Operation

Waiting for Operation

No Medical Consultation

Even if it is diagnosed as cancer by individual (independent) examination, such case is not entirely recorded

Patients being on follow-up then missing; approx. 2,500 people

Suspicious in malignancy

Operation

Even when the diagnosis following surgery is of thyroid cancer, they are not measured officially.

★ An accurate diagnosis for thyroid cancer, a number of treatment cannot be grasped with the current system. No one can tell the truth; is this right thing?
### The Results of Thyroid Ultrasound Examination

#### As of March 31, 2017

<table>
<thead>
<tr>
<th>Name of Exam</th>
<th>Preceding Exam</th>
<th>1st Round</th>
<th>2nd Round</th>
<th>3rd Round</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>367,672</td>
<td>381,282</td>
<td>336,616</td>
<td></td>
</tr>
<tr>
<td>Examinee</td>
<td>300,476</td>
<td>270,511</td>
<td>120,596</td>
<td></td>
</tr>
<tr>
<td>Exam Rate(%)</td>
<td>81.7</td>
<td>71.0</td>
<td>35.8</td>
<td></td>
</tr>
<tr>
<td>B,C Judgment</td>
<td>2,294</td>
<td>2,226</td>
<td>691</td>
<td></td>
</tr>
<tr>
<td>Suspicious or Malignant</td>
<td>116</td>
<td>71</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Tumor size (mm)</td>
<td>13.9±7.8</td>
<td>11.1±5.6</td>
<td>13.4±3.6</td>
<td></td>
</tr>
<tr>
<td>Operated</td>
<td>102</td>
<td>49</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Confirmed Thyroid Cancer</td>
<td>101</td>
<td>49</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Suspicious or Malignant</td>
<td>116</td>
<td>71</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Gender Ratio (M:F)</td>
<td>1:2</td>
<td>1:1.2</td>
<td>1:1</td>
<td></td>
</tr>
<tr>
<td>Age at diagnosis</td>
<td>17.3±2.7</td>
<td>16.9±3.2</td>
<td>15.5±2.1</td>
<td></td>
</tr>
<tr>
<td>Age at disaster</td>
<td>14.9±2.6</td>
<td>12.6±3.2</td>
<td>10.3±2.1</td>
<td></td>
</tr>
<tr>
<td>Operated</td>
<td>6~18</td>
<td>5~18</td>
<td>8~13</td>
<td></td>
</tr>
</tbody>
</table>

In Chernobyl case, those who were infant at the time of accident have higher rate for thyroid cancer in later years, while cancer was found with only those who were over 5 years old in Fukushima case (actually there was a case that 4 years old child had a cancer thus fact is yet unknown).

<table>
<thead>
<tr>
<th>Malignancy confirmed at 2nd round</th>
<th>71</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result in 1st Round of 71</td>
<td></td>
</tr>
<tr>
<td>A1: 33, A2: 32, B: 5, Not Examined: 1</td>
<td></td>
</tr>
</tbody>
</table>

65 people who were once judged as A (no abnormality) diagnosed as cancer at medical inspection held 2 years later.
125 cases of Thyroid Cancer
M 44 : F 81, Age at disaster 14.8 ± 2.7 (5-18)

114 cases of lobectomy resection (91.2%)
11 cases of total extirpation (8.8%)

Papillary thyroid carcinoma 121, Poorly differentiated thyroid carcinoma 3, Others 1

Tumor size

≥ 10mm
51 cases (40.8%)

< 10mm
74 cases (59.2%)

Lymph node metastasis
97 cases (77.6%)

Extrathyroidal invasion
49 cases (40%)

Distant (lung) metastasis
2 cases (3%)

No lymph node • extrathyroidal invasion • distant metastasis = 5 cases (4%)

Those 120 cases (96%) excluding the 5 cases are the cases to be operated now according to the guidelines.

"Thus it’s not over diagnosis or over treatment"

Number of recurrence, reoperation, RI-Tx is not made to public

★ Too many cases being judged as “surgery needed”
If you are exposed even only to a small amount of radiation, the risk of developing cancer increases. Absolute safety is ZERO dose, which is NOT TO BE EXPOSED!

This is the report released by Radiation Effects Research Institute in 2012, which is an organization closely tracking the atomic bomb survivors in Hiroshima and Nagasaki for over 60 years.

★ Fukushima health survey itself will most likely be shrunk. It’s not being reported, rather, it’s being forgotten. Investigation needs to carry on as clarification on radioactive exposure requires much time. We need to get more attention!
The 3・11 Fund for Children with Thyroid Cancer was established in July, 2016.

**Fund for Children with Thyroid Cancer**

Something we want you to know about children.

Children’s thyroid cancer is increasing around the Fukushima Prefecture. Parents and children are isolated from society and face serious struggles. Repeated medical exams and increased hospital expenses cause marital disharmony and interruptions to schooling.

Many have lobbied for financial support for medical expenses incurred. In April 2017, the Tokyo Branch of the Japan Medical Women’s Association made recommendations to include phone and face-to-face consultations.

We want all of you around the world pay an extra attention to Japan and Fukushima; we invite your comments and opinions!
Should you have any questions or need further information, please feel free to contact to:

Motomi Ushiyama  
email: moumou44@gmail.com  

Also, please feel free to share this information with whom you think of appropriate.  

Thank you!