Role of basic knowledge of radiation and its effects in radiation emergency

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8:10 a.m., March 12 2011
(17 hr after the earthquake)
REMAT was sent from NIRS to Fukushima by a helicopter of JSDF*

*Japan Self-Defense Forces (JSDF)
At offsite command center in Okuma-machi (from 12 to 15 March)

- No electricity
- No water supply
- Combined Disaster

Damage to lifelines

- Internet ×
- Mobile phone ×
- Facsimile ×
- Telephone ×
- Satellite phone ☑ (2 lines)
Dysfunction of hospitals for radiation emergency medicine in Fukushima

Present OFCC*

Secondary level
Fukushima Medical University (FMU)

Former OFCC

Primary level
Minamisouma City General Hosp
Futaba Kousei Hosp
Oono Prefectural Hosp
Imamura Hosp
Fukushima Labor Accident Hosp
Iwaki City Kyoritu General Hosp

*OFCC: Offsite command center
What is difference between radiation accident and other disasters?

- Earthquake
- Tsunami
- Volcano eruption
- Other natural phenomenon
- Fire or wildfire
- Explosion
- Others (train, plane)
- Release of Radiation
- Ship accident
- Storm
- Heavy rain
- Heavy snowfall
- Flood
- High tide
Radiation

- Cannot be detected by human senses

- Does not induce immediate death or symptoms (burns, wounds) (Except prodromal symptoms of ARS*)

- Contaminations alone:
  Not immediate threat to patient
  Not threat to responders

Concepts, terms, and risks are poorly understood

*ARS: acute radiation syndrome
At 11:01 March 14, 2011
At No. 3 reactor building
7 workers and 4 JSDF personnel were injured (pieces of concrete hit the JSDF personnel)
The 7 workers were transported to a clinic at the Fukushima Daini NPP (2F)
The 4 injured JSDF personnel were brought to the offsite command center (OFCC) by a track
Hydrogen explosion (2)

March 14, 11:01  Hydrogen explosion
11 workers : injured & contaminated

March 14, Midnight
Refused to accept

March 15, Morning
Admission to

Fukushima medical university hospital

Doctor (TEPCO)
Nurse (NIRS)
Expert of radiation protection (NIRS)
Ambulances (2)

TEPCO : Tokyo Electric Power Company
NIRS : National Institute of Radiological Sciences
OFCC : Offsite command center

On March 24 at the Unit 3 of NPP

- Three workers accidentally stepped in the water containing high concentrations of radioactive materials
- Two of them were contaminated on the feet since the water came into their boots
- They worked for 30 min soaking their feet in contaminated water, ignoring the alarm of personal dosimeters
Heavy contaminations (2)

- Brought to Fukushima Medical University (FMU) and then to NIRS
- Levels of contamination on the skin were over than 100, 000 cpm
- No symptoms or signs were observed due to contamination
- Skin equivalent dose: < 500 mSv
Lack of knowledge (1)

- Certification showing “No contamination” is required for seeing a doctor at a hospital

- A child of 8 y.o. who had evacuated from Minami-Souma city in Fukushima prefecture could not see a doctor since she had no certification in Fukushima.
Refusal to transfer patients by rescue teams in areas where residents were asked to evacuate into shelters

- The emergency fire response teams that had been sent to Fukushima prefecture were asked to transfer patients from a hospital located 20-30 km from NPP on March 16, 2011.
- They decided to refuse this request, as their own safety was not secured.
- These teams were from local governments without nuclear facilities.

[Kyodo News, March 23, 2011]

http://www.47news.jp/CN/201103/CN2011032301000358.html
Lack of knowledge (3)

Discrimination/sluts in workers at the Fukusuima NPP

Workers involved in recovery task at the NPP received discrimination/sluts associated with high psychological distress:

✓ Declined contract for apartment rental
✓ Refusal to see a doctor

Before the Fukushima accident, the education system for radiation emergency was established in local governments with nuclear facilities.

Hospitals not designated as radiation emergency facilities would not receive patients from the NPPs because of concerns about the health effects of radiation.
Summary (2)

- Radiation is widely used in society
- **Basic knowledge of radiation** and its effects is extremely important for all health care providers
- Effective education system is required