Preventing Accidents and Incidents in Radiotherapy in the Czech Republic

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General information

Radiotherapy machines in CZ

<table>
<thead>
<tr>
<th>Number</th>
<th>Machine Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>Linear Accelerators</td>
</tr>
<tr>
<td>1</td>
<td>CyberKnife</td>
</tr>
<tr>
<td>12</td>
<td>Cobalt Irradiators</td>
</tr>
<tr>
<td>1</td>
<td>GammaKnife</td>
</tr>
<tr>
<td>7</td>
<td>Cesium Irradiators</td>
</tr>
<tr>
<td>25</td>
<td>X Ray Radiotherapy</td>
</tr>
<tr>
<td>17</td>
<td>Brachytherapy</td>
</tr>
</tbody>
</table>

Radiotherapy departments in CZ

<table>
<thead>
<tr>
<th>Number</th>
<th>Department Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Complex Oncology centre</td>
</tr>
<tr>
<td>21</td>
<td>Radiotherapy</td>
</tr>
</tbody>
</table>

Documentation required by the Atomic Act:

- Quality Assurance Program
- In site Emergency Plan
- Monitoring Program
- Controlled Area delineation
- Optimalization
Accidents in the Radiotherapy

Accidents are described in the Quality Assurance Program (in clinical part is specified accidents according patient's pathway during treatment in particular, in quality assurance and control part is specified accidents according equipments failure).

**Classification of Accidents:**

- **A „Radiation serious event“** – exp: Dose > 30% than planning dose
  
  Reaction: notification to organization and SÚJB, immediate remedy, investigate, system measure, protocol to SÚJB.

- **B “Radiation event with major sequel”** – exp: Dose > 15% than planning dose
  
  Reaction: notification to organization, immediate remedy, investigate, system measure, protocol.

- **C “Radiation event with limited sequel”** – exp: Patient was irradiated by bad wedge for the one time.
  
  Reaction: notification to organization, immediate remedy, investigate, system measure, protocol

- **D „Potential radiation event – Near miss”**
  
  Reaction: investigation system measure, register
Prevent Accidents in the Radiotherapy

Clear and instructive Quality Assurance Program including:

- Definition of responsibility for each member of the staff
- Cooperation between staff in the whole treatment process
- Methods of patient's identification in the whole treatment process
- Methods of marking irradiation field
- Using individual tools which are clearly identifiable
- Definition and controlling important points
- Double checking of every procedure during treatment process
- Definition of every possibility of dissonances
- Quality assurance and quality control and double checking of results
- Definition of instruction in case of Accidents
- Reparations and Services
Responds in case of Accident

Clear and instructive Quality Assurance Program including:

- Identification of root causes
- Ingestion of corrective actions
- Write down the protocol about Accident
Feedback in case of Accidents

Clear and instructive Quality Assurance Program including:

- Inform staff about identification of root causes and Ingestion of corrective Actions
- Controlling process where been the failures
- Incorporate finding into relevant documentation and plan of drills and training

23 Radiotherapy departments – 162 Accidents
Accidents „A“ – 7 events
Accidents „B“ – 6 events
Accidents „C“ – 144 events
Accidents „D“ – 6 events

Root causes of Accidents – types of failures:

Human factor – 141 cases
(5%diagnostic, treatment prescription and acceptance, 20%simulation, treatment planning and patient set-up, 75% treatment)
Failures of equipments – 21 cases
Incidents in the Radiotherapy

Clear and instructive **In-site Emergency Plan:**

- Definition of responsibility for each member of the staff in case of Incident
- Cooperation between staff in the Incident
- Definition and controlling important points
- Definition every possibility of potential event
- Quality assurance and quality control and double checking of results
- Definition of instruction in case of Incident
- Identification reasons of Incident
- Ingestion of corrective Actions
- Write down the protocol about Incidents
- Incorporate finding into relevant documentation and plan of drills and training
Inspections

- Special Inspection Team for Radiotherapy
- Inspection directing clinical part (controlling preparedness to radiological accident and incident – documentations, instructions and analyses of accidents and incidents)
- Inspection directing quality assurance and control (on-side visit during calibration, dosimetry, acceptance tests and commissioning measurements and independent audits)
- We control documentation about Reparations and Services in both type of inspection
Important points

- Definition of all predicted possibilities for accident and incidents in radiotherapy department
- Rules for examination of events
- Proposed the remedial action
- Definition of responsibilities within the workplace
- Feedback from solving of accident and incidents elsewhere
- Regular practicing e and drills of potential possibilities of accident and incidents
- Regular update of Quality assurance program
- Training of “In-site emergency plan”
- Reciprocal exchange of information between license holders and regulatory body
- Regular Inspections