ปาฐกถาพิเศษ

"การรักษาด้วยรังสียุคใหม่"

"The Modern Radiation Therapy"

โดย

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Ion Beam Applications

BELGIUM

THE MODERN RADIATION THERAPY

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➢ **New tools for Brachytherapy**
➢ **IBA Proton Therapy System**
➢ **FDG Distribution Concept**

New tools for Brachytherapy

Mission

- To offer innovative brachytherapy products (sources, delivery systems, and services) to improve the safety and effectiveness of the existing procedures
- To expand the indications for brachytherapy beyond the current applications

RadioMed/IBA "Claim"

What do we do?

We have an innovative design and manufacturing technology for radioactive sources used in brachytherapy.

The sources has received FDA approval.

Source Design Concept

- Based on Pd-103 radioisotopes.
- Naturally sealed in a fine, coiled wire design.
- Linear source so length can be adjusted in-situ without violating its "sealed" nature.
- Flexible, axially elastic so it can expand and shrink with the tissue.
- Delivers homogeneous dose to tissue.

Innovation and Expertise

The combination of RadioMed's innovative source design/manufacturing concept and IBA's unique accelerator technology, for the first time allows the introduction of a truly next-generation product for brachytherapy markets.

A Proton Therapy System for In-Hospital Operation

Ion Beam Applications, Louvain-la-Neuve, Belgium

Goal of Proton Therapy

To deposit the radiation dose more precisely in the target volume, with less dose in the surrounding healthy tissues.

Main Specifications of a "Proton Therapy System"

- Ability to reach the tumor
- Ability to reach the tumor in a supine pateint from any selected direction
- Ability to reach the tumor accurately
- Ability to verify and control the dose deposition

Accelerators parameters driving the technology choice

- Energy : defines the range in the patient (230 MeV enough)
- Energy definition : defines the range accuracy and the distal falloff
- Beam current : defines the dose rate (10^{11} p/sec enough)
- Beam current stability and noise : defines ability to use wobbling and scanning
- Accurate and fast beam current control : needed for conformal therapy

Consequences of clinical considerations on facility design

- The most important elements defining the system performance are the Nozzle and the Pateint Positioner
- The Accelerator and the Beam Transport System have much less impact on the system performance
- The Accelerator should be transparent (ignored) at treatment level
- The simplest accelerator meeting the clinical specifications in a cost-effective way should be selected

Equipment proposed by IBA to meet the clinical specification

- 230 MeV Proton Accelerator (isochronous cyclotron + energy selection system)
- Beam Transport and Switching System
- Isocentric Gantries (typically 3) and on Fixed Beam Line
- Nozzles for scattering and wobbling (scanning compatibles)
- Robotic Patient Positioners
- Control System and Safety System

Three Methods of Beam Spreading

- Double scattering for small to moderate fields
- Wobbling for the largest and deepest fields
- Pencil Beam Scanning

Conclusion : Advantages of the IBA Proton Therapy System

- Meets state-of-the-art clinical specifications
- Specifically designed as an in-hospital system
- Fully automated system
- Intrinsic simplicity and reliability
- Fast access to internal parts
- Reduced costs :
  - lower building space requirements
  - fewer personnel
  - less operation and maintenance costs