

Teaser Memorandum

Catholic University Industry Academic Cooperation
Foundation

**Intra-Cavitary Radiotherapy Apparatus and System
Having Respectively Expanding Balloons**

Executive Summary

M.S., R.T.T. Chang-Uk Kim, Radiation Oncology Assistant Manager has developed a novel Intra-Cavitary Radiotherapy apparatus and system having a respectively expanding balloon.

The Catholic University Industry-Academic Cooperation Foundation, a Technology Licensing Organization at Catholic University, intends to enter into a technology transfer or licensing transaction with regards to the agents. Terms of the transaction are not set, and interested parties may further discuss the details if they wish to enter into an agreement.

Industry Sector: Medical Devices/ Diagnostics/ Biomaterials

Therapeutic Target: Patients for all kind of Gynecological cancers

State of Development: Between early stage and over IIb stage

Key Technology Highlights

□ Accurate treatment of ICR at every moment

According to the Intra-Cavitary Radiotherapy apparatus and system having respectively expanding balloons, the air volume required for balloon expansion is checked such that the repetitive treatment or simulation is possible. That is, geometric errors can be reduced by using the novel Intra-Cavitary Radiotherapy apparatus.

□ Patients will feel more comfortable

Since the gauze is packed around the applicator, the insertion quantity or angle can remain constant for following treatments. The gauze packing can be skipped when applicable. Therefore, patients can feel more comfortable and the time to prepare the treatment is reduced.

□ Expansion of balloons to a desired location

The front balloon can be expanded to the width of the cylinder or the insertion location of it or both. Also, the middle balloon is expanded at the entrance of vagina such that the Intra-Cavitary Radiotherapy Apparatus is supported.

□ Measurement of the real delivered radiation dose

The balloons or the cylinder hold TLD (Thermo Luminescence Dosimeter). TLD is material which stores radiational energy by changing its structure. When the material is heated at some later time, it releases the energy as ultraviolet or visible light. Accordingly, the doctor can measure the real delivered radiation dose.

Proposal Abstract

The present technology relates to the applicators (tandem, ovoid) for applying the expansion of balloons, such that the simulation and treatment can be reproduced and the patients feel comfortable.

■ IP Owner Summary

The Catholic University of Korea
Industry-Academic Cooperation
Foundation

■ Personal Description of Researcher

- **Name:** Chang-Uk Kim
- **Present Position:** M.S.,
Senior Radiation
Therapist of Oncology
- **Major:** Medical Science
- **Research interest:**
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■ Market Feasibility

- **Korean and Global market size:**
 - Korean market size related to uterine cervical cancer is 80 billion won, and Global market size is estimated to more than 1 trillion won.
- **Korean and Global market opportunity (competitors and competing product):**
 - Goodgene has developed a DNA chip for diagnosing uterine cervical cancer.
 - Digene dominates fifty percent of HPV diagnosis market.

■ Trend & Partnership

- **Future outlook and trends related to technology:**
Medical treatment for all kinds of Gynecological cancers
- **Technology Transfer and Commercialization conditions:**
Need to test performance
- **Type of business relationship sought (including licensing availability):**
Development collaboration, or non-exclusive or exclusive licensing agreement

Technology Overview

■ Technology Platform

The core technology provides promising Intra-Cavitary Radiotherapy apparatus and system having respectively expanding balloons in which the balloons can be expanded to the desired degree during the treatment for uterine cervical cancer. The apparatus for Intra-Cavitary Radiotherapy makes it possible to reduce geometric error, and can be managed independently so that other organs do not receive unnecessary radiation. Also, the balloons are billowed independently and packed in the vagina so that every treatment is an accurate and reproducible therapy.

■ Background and un-met needs

The principle of Intra-Cavitary Radiotherapy is that the sources are located proximal to the treatment target and deliver their entire dose within the tumor. It is different with external radiation therapy in that the distance between the source and the target is kept minimal. This could be an advantage in treatment, but also a liability in terms of accurately planning the dose as the applicator, target and critical structures change making the treated dose different from the planned dose. For over 2b stage cervix cancer, it is reported that the case of External Radiation Therapy keeps pace with Intra-Cavitary Radiotherapy can get better treatment effect than one thing. There are factors that restrict the placement of applicators and dose distribution within this process. For example, the position or thickness of the applicator can be changed by gauze packing. Also, it is difficult to obtain better, various and alternative dose distributions, since only three applicators are used in treatment. Also, the factor that only one tandem and two ovoids are used in ICR causes limited dose distribution and irregular dose distribution.

■ Discovery and Achievements

The Intra-Cavitary Radiotherapy Apparatus and System have expanding balloons which push organs such as the rectum and bladder in order to expand the internal vagina.

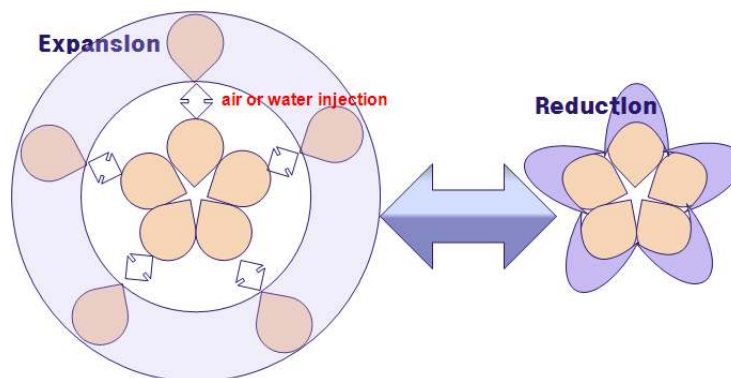


Fig. 1. a cross-section of Intra-Cavitary Radiotherapy apparatus

Fig 1 shows the expansion and reduction of balloons when viewed from the front. Each balloon is covered with a poly-vinyl and expansion of the internal vagina is obtained by filling with water or air. According to this structure of Intra-Cavitary Radiotherapy apparatus, the position of the applicators and the expansion of applicator are able to be reproduced for subsequent simulations or treatments. Also, the Intra-Cavitary Radiotherapy apparatus can reproduce the expansion degree of balloons by measuring the previous degree.

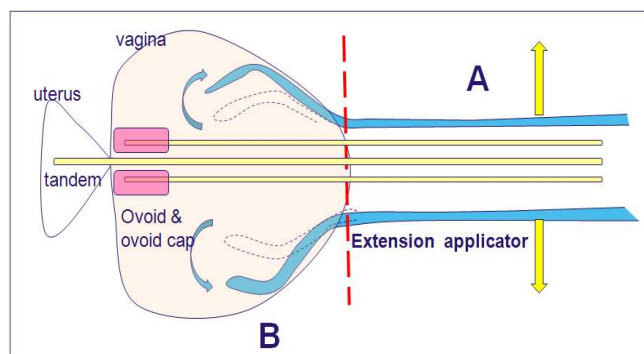


Fig. 2. a cross-section of Intra-Cavitary Radiotherapy apparatus

A surgeon is able to measure how much the vagina volume has expanded from a scale mark. Therefore, whenever he treats the patient again, he will know exactly how the apparatus should be set-up. Also, the Intra-Cavitary Radiotherapy Apparatus will reduce geometric applicator error from gauze packing or use without gauze packing. This helps to reduce the patient's inconvenience. Besides, inserting extension balloons into the vagina without gauze packing, reduces distance from the radiation source. Accordingly, It doesn't give pretty pain for a patient to get an expanded vagina, so we are able to expect to give them comfortable treatment.

Further, the holder can be formed in the inner surface of the cylinder. Additionally, the tandem and ovoid are installed in the holder, so that it can obtain better, more diverse and alternative dose distributions.

Since Thermo Luminescence Dosimeter (TLD) can be placed in the extension balloons, it allows one to get the value of the real given dose. Consequently, one can expect to obtain a variety type dose distribution and a plenty type dose distribution inside the vagina.

Patents and Publications

Table 1. List of Patents for Intra-Cavitary Radiotherapy apparatus and system

Country	Patent, Publication or Appln. No.	Status	Description
PCT	PCT/KR2010/006490	application	Intra-Cavitary Radiotherapy apparatus and system having respectively expanding balloon
Korea	10-2009-0089277	withdrawn	Intra-Cavitary Radiotherapy apparatus and system having respectively expanding balloon
Korea	10-2010-0092496	application	Intra-Cavitary Radiotherapy apparatus and system having respectively expanding balloon