SHIELDING DEVICE FOR LOCAL RADIATION THERAPY

Providing a way to shield the radiation irradiated

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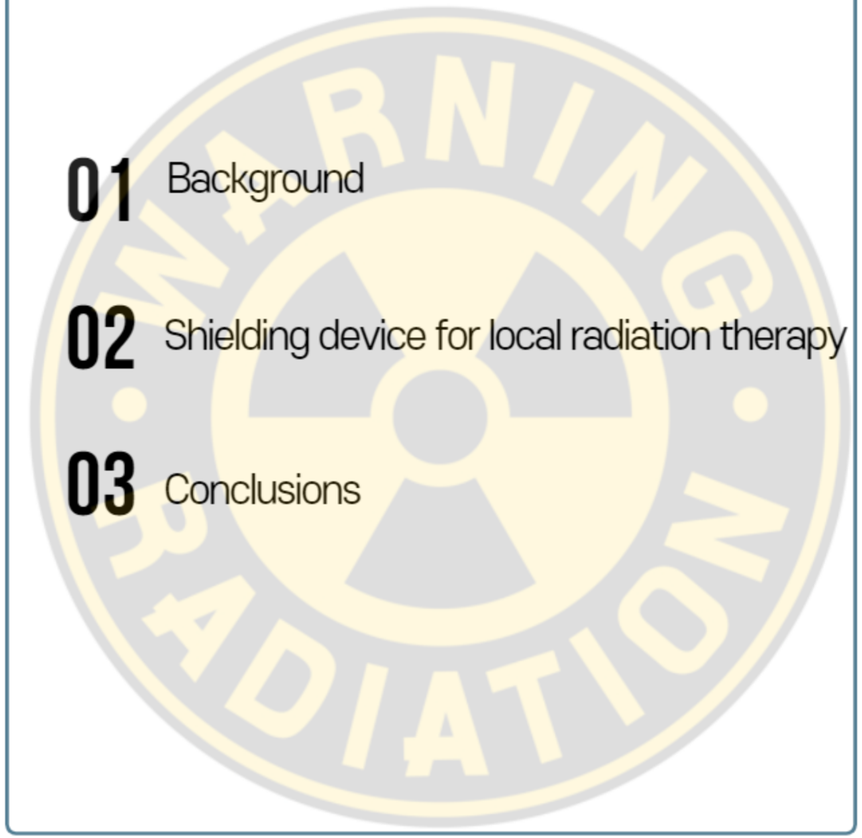


EDGEX CO., Ltd COMPANY PROFILE

EdgeX was established at the heart of Seoul, South Korea with an aim to design and build advanced, sophisticated, outstanding products, technology, and medical solutions. Our innovations advance the existing array of technologies and services towards a new future and seek to improve the quality of life across many landscapes.

4 patents for
medical innovations

HEAD COMPANY

Korea Nuclear Engineering Management Corporation (KONEC) focuses on the management of nuclear and radioactive waste, and provides engineering services.

01

Background

01 Background

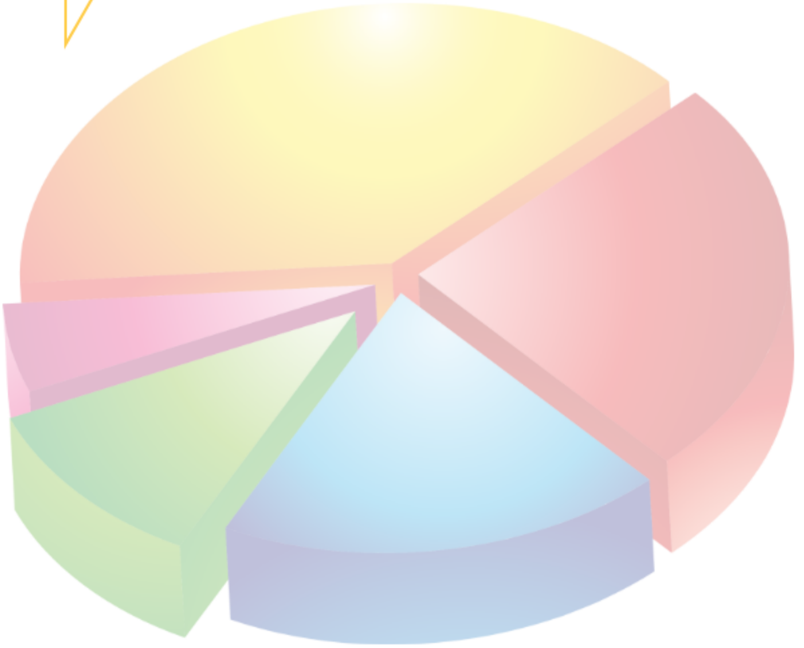
Radiation toxicity

Most cancer patients undergoing radiation therapy will develop injury to normal tissue as a result of treatment.

Over 50% of all cancer patients receive radiation therapy in some form, but although the treatment effectively da mages tumor cells, it also harms the surrounding tissu e, causing toxicity to otherwise healthy tissues also, the radiation irradiated can be harmful to the health of other cells and organs.

The toxicities resulting from radiation-induced normal tissue injury is dependent upon the location of treatment, with the most common toxicities involving the oral cavity and gastrointestinal (GI) tract in the forms of oral mucositis, esophagitis, and proctitis.

According to statistics, over 200,000 patients yearly suffer from radiation-induced oral mucositis, esophagitis, and proctitis in the U.S., which may lead to severe morbidity and, ultimately, treatment breaks or discontinuation that adversely impact tumor cure rates.



01 Radiation therapy shielding

01. Background

02. Shielding device for local radiation therapy

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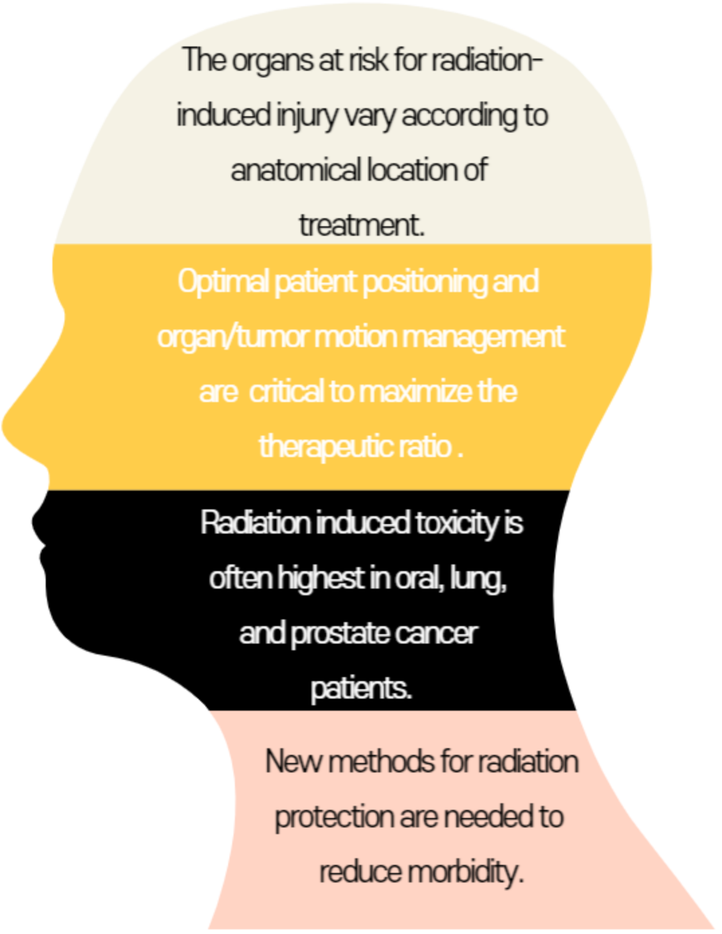
Radiation therapy shielding

Modern advances in high-precision RT delivery, such as intensity-modulated RT (IMRT), stereotactic radiosurgery, and internal radiation therapy such as brachytherapy and intraoperative radiation, allow clinicians to spare organs better while targeting tumors with a higher accuracy.

Radiation exposure, and the impossibility of focusing and pinpointing the exact location of tradition during cancer treatment, can damage organs and other parts of the body as well.

Attempts to reduce radiation-induced side effects such as physical spacers, shielding, and treatments for radiation-induced mucositis have many limitations in protecting normal tissue, including concerns regarding diminishing intended tumor treatment, dependency on user experience, and additional side effects.



01 Internal shielding for radiation therapy

Internal shielding for radiation therapy

PROBLEM

Due to the nature of the radiation from the irradiator, conventional radiation therapy has the drawback that it is challenging to locally irradiate cancer tissue and healthy cell tissues nearby the cancer site are also exposed to radiation. Tissue damage, hair loss, reduced immunity, and other problems experienced by radiation therapy patients.

SOLUTION

Given the aforementioned facts, current technology enables local radiation therapy for cancer tissue in the body to expose organs or tissues other than the cancer tissue while shielding radiation irradiated through the rod-shaped collimator of the radiation irradiator from the rear of the cancer tissue.

OPPORTUNITY

Our company has already presented another model called "internal shielding for radiation therapy", that you can find more details by visiting our website. However, because the X-ray needle module only localizes and irradiates diseased tissue, the prior technology has the benefit of reducing harm to healthy human tissue surrounding cancerous tissue. However, a configuration for radiation shielding inside the body is not provided. It is also considered that organs or tissues other than cancer tissues may also be exposed to radiation, and there is a strong need for improvement.

GOAL

The goal of the current invention is to

1. shield radiation is used to treat localized cancer tissue in the body through the rod-shaped collimator of the irradiator at the backside of the cancer tissue.
2. Another goal of the invention is to create a shielding device for local radiation therapy that, by shielding organs and tissues other than cancerous tissue, can lessen the damage radiation therapy causes and, in particular, can maximize the shielding efficacy of the shielding device.

02

02. Shielding device for local radiation therapy

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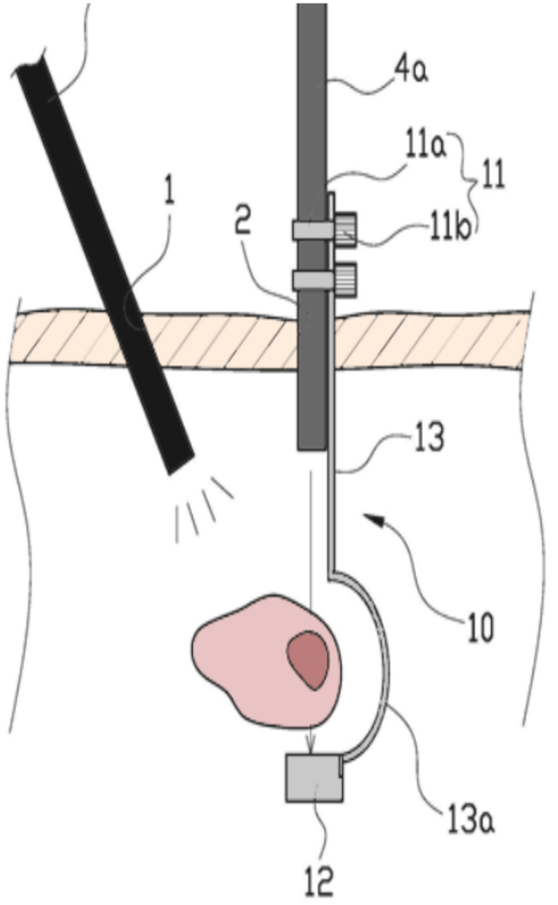
02 소제목을 입력

Shielding device for local radiation therapy

Technology overview

Our technology refers to a shielding device for localized radiation treatment, more specifically to a cancer tissue close to an organ or skin in the body that is to be irradiated locally with radiation (X-ray) to protect the healthy tissue around the cancer tissue. It's a term that refers to a shielding device for localized radiation therapy that can efficiently screen other organs or tissues from radiation exposure in order to reduce radiation damage to cancer tissue.



02 소제목을 입력

Shielding device for local radiation therapy

Technology overview

1 In order to protect the rear of cancer tissue from radiation treatment, our technology provides a shielding device for localized radiation therapy that includes a shielding unit positioned in the radiation's irradiation direction and a rod-shaped collimator. The radiation-reflecting surface of the shielding unit is designed as a concave surface with a radius of curvature that is configured to guide the reflected radiation toward the cancer tissue in front of the radiation-reflecting shielding mechanism.

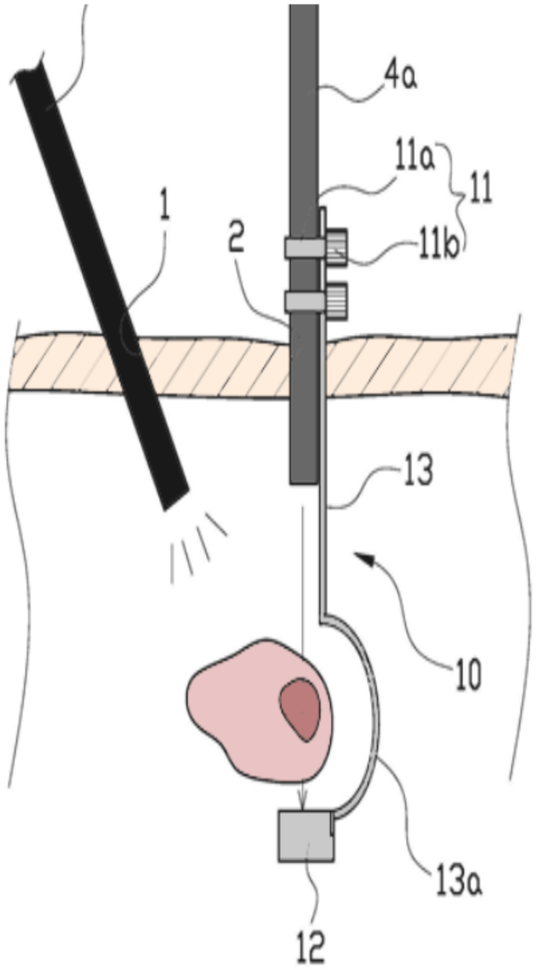
2 Our cutting-edge technology, the shielding unit comprises:

+ A shielding member having a concave surface to block radiation,
+ A granular diffusion member arranged in a plurality of the shielding member's concave surfaces,
+ And a plurality of the shielding member's diffusion members.

It is distinguished by a localized radiation therapy shielding mechanism that comprises a cover part for keeping within the concave surface.

3 In our technology, the shielding mechanism for localized radiation treatment is provided with the same radius of curvature as the shielding member's concave surface, which distinguishes the outer arrangement of the diffusion member.

4 The shielding member for local radiation treatment according to our cutting-edge technology comprises a shielding member, a diffusion member in the form of granules disposed on a surface, and a shield for shielding the rear of the cancerous tissue. The shielding member is disposed of in the irradiation the direction of the radiation irradiated through the rod-shaped collimator of the radiation irradiator.



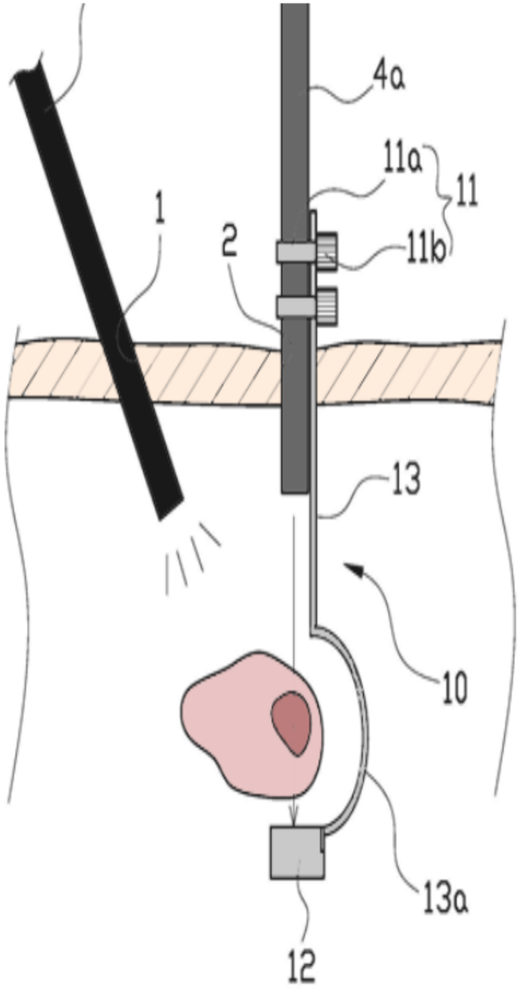
02 소제목을 입력

Shielding device for local radiation therapy

Technology effects

The radiation exposure to the cancer tissue by the shielding part located at the rear of the cancer tissue is blocked from exposing the surrounding organs or body tissues according to the shielding device for local radiation treatment according to our technology having the aforementioned characteristic configuration. At the same time, since the concave surface of the shield, reflects the radiation toward the cancer tissue, there is an effect of further concentrating the radiation.

Additionally, in the current technology, when a number of diffusion members are positioned on the shielding member's concave surface, when the radiation enters or reflects off the shielding member's reflecting surface, it is diffused and reflected by the diffusion members, weakening the radiation that the shielding member is reflecting. It has the effect of completely avoiding radiation exposure to surrounding organs or body tissues by further enhancing the shielding efficacy.



02 소제목을 입력

01. Background

02. Shielding device for local radiation therapy

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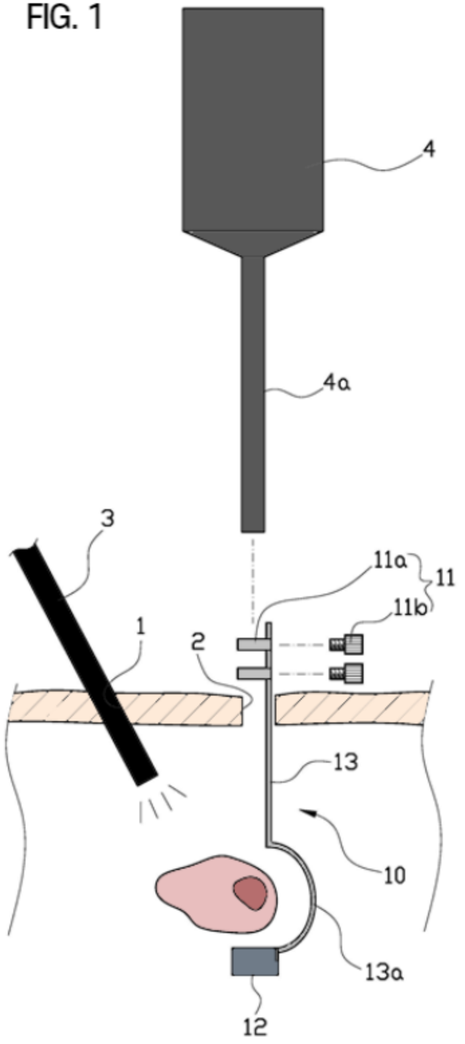
Detailed technology description

FIG. 1



FIGS. 1

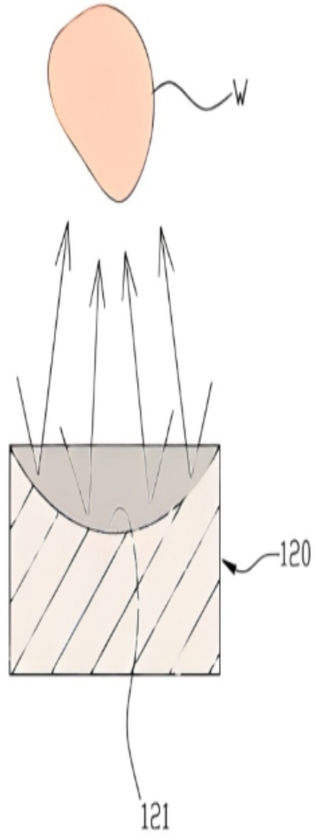
A cross-sectional view showing the us e of a shielding device for local radiation treatment according to the present invention.

FIGS. 2

A cross-sectional view showing a first the embodiment of the shielding unit in The shielding mechanism for localized radiation treatment accordin g to the present invention.

4:Fixing part
4a: Rod-shaped collimator
10: Shielding mechanism
11: Fixing part
11a: Circular rings
11b: Screw
12: Shielding part
13: Connection part
W: Cancer tissue
120: Shielding unit
121: Concave surface

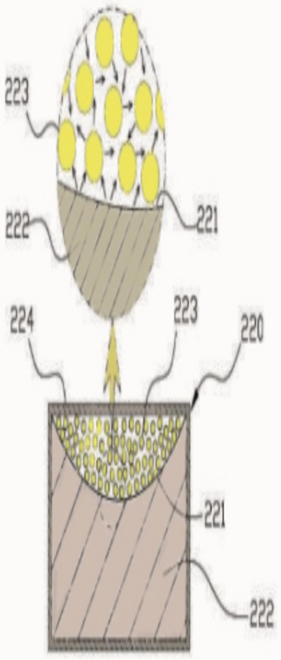
FIG. 2



02 소제목을 입력

Detailed technology description

FIG. 3



FIGS. 3

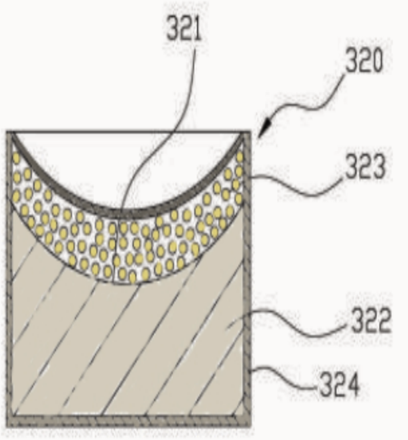
a cross-sectional view showing a second embodiment of the shielding unit in the shielding mechanism for localized radiation treatment according to the present invention.

FIGS. 4

A cross-sectional view showing a third embodiment of the shielding unit in the shielding mechanism for localized radiation treatment according to the present invention.

220: Shielding part
221: A reflective surface
222: Shielding member
223: Diffusion member
224: A cover member
320: Shielding part
321: A reflective surface
322: Shielding member
323: Diffusion member
324: A cover member

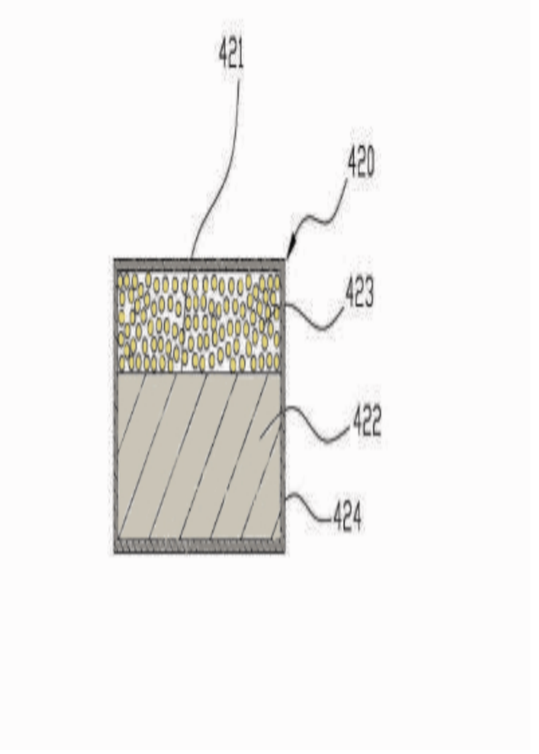
FIG. 4



02 소제목을 입력

Detailed technology description

FIG. 5



FIGS. 5

A cross-sectional view showing a fourth embodiment of the shielding unit in the shielding mechanism for localized radiation treatment according to the present invention.

420: Shielding part
421: A reflective surface
422: Shielding member
423: Diffusion member
424: A cover member

02 소제목을 입력

Clinical applications

During local radiation therapy for cancer tissue in the body, our technology offers a way to shield the radiation irradiated through the rod-shaped collimator of the radiation irradiator from the back of the cancer tissue. so that organs or tissues other than the cancer tissue are not exposed to radiation treatment.

In particular, a shielding device for local radiation treatment that can boost the shielding tool's effectivenes s is offered. Additionally, it stops further harm. The shielding part has a concave the surface on which the radi ation is reflected, and the radius of curvature of the concave surface is such that the reflected radiation is on the front side of the shielding part of the cancer tissue. This shielding part also has a shielding part for shielding th e rear of the cancerous tissue.

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Conclusion

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03 소제목을 입력

Conclusions

We offer the following distinctive advantages:

Our Shielding device for local radiation therapy technology have the potential to shift the paradigm of clinical management of patients receiving radiation therapy for cancer by reducing radiation-associated morbidity and therefore improving treatme nt adherence, having the potential to improve survival.

- Minimizes radiation-caused damage and prevents the spread of radiation to other organs or tissues other than cancer tissue to the radiation treatment.
- Increased protection, reduced severe morbidity, treatment breaks or discontinuation that adversely impacts tumor cure rates.
- Decreases the spread of radiation to other tissues or organs and the occurrence of related complications such as mucositis, esophagitis, and proctitis.
- Flexible and easy to apply around cancer tissue to effectively protect organs and healthy tissue.
- Dosimetric advantage and compliance compared to generic systems.

Thank you

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