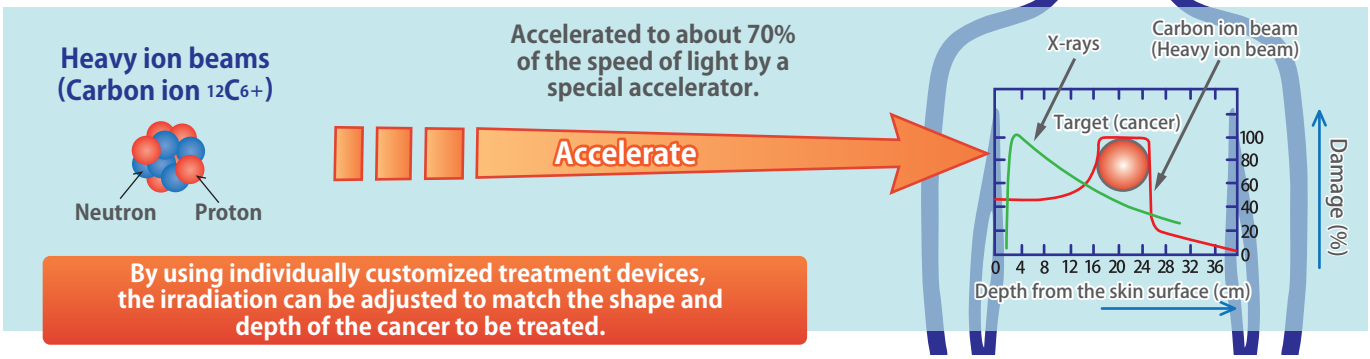
Heavy Ion Cancer Therapy

Gunma University, Gunma Prefecture

(Information provided by Gunma University)

Heavy Ion Radiotherapy

Heavy ions are accelerated to approximately 70% of the speed of light and directed to patients in order to treat deep-seated cancers within the body. Heavy ion cancer therapy allows tumors to be treated with non-invasive procedures, in contrast to surgery.



By using individually customized treatment devices, the irradiation can be adjusted to match the shape and depth of the cancer to be treated.

Advantages of Heavy Ion Radioterapy

1 Superior Dose Localization

Heavy ion radiotherapy can severely damage the tumor while minimizing damage to surrounding tissues. It has fewer adverse effect (toxicity) than conventional radiotherapy.

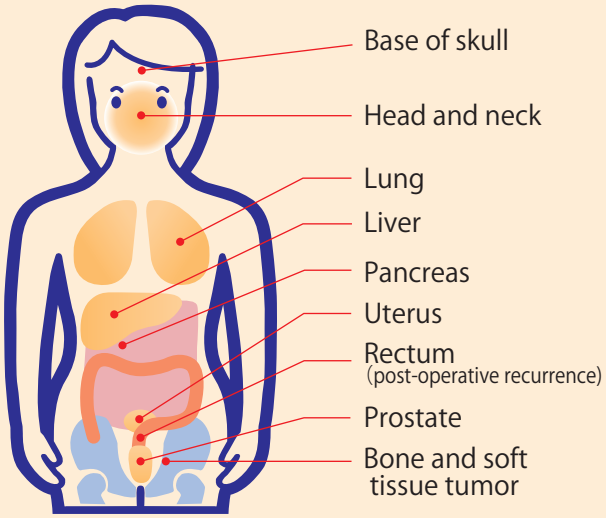
2 Effective Against Cancers Which are Resistant to Conventional Radotherapy

Heavy ion beams have stronger biological effects than X-rays. For example, heavy ion radiotherapy is more effective against tumors such as osteosarcomas osteosarcoma, which are difficult to cure with conventional X-ray radiotherapy.

3 Short Treatment Period

The treatment period for heavy ion radiotherapy is relatively short (3 weeks on average). Compared to conventional X-ray radiotherapy, which typically requires 6-7 weeks, the treatment time can be reduced dramatically.

Common types of cancer treated with heavy ion radiotherapy



The Cost of Heavy Ion Radiotherapy (for Overseas Patients)

Gunma University Heavy Ion Medical Center has set the following medical costs for overseas patients who are not enrolled in Japan's public health insurance.
※However, additional medical costs besides those for heavy ion radiotherapy may also be required.

●Cost of heavy ion radiotherapy → Private patient payment: Approximately 5 million yen.

Notes:

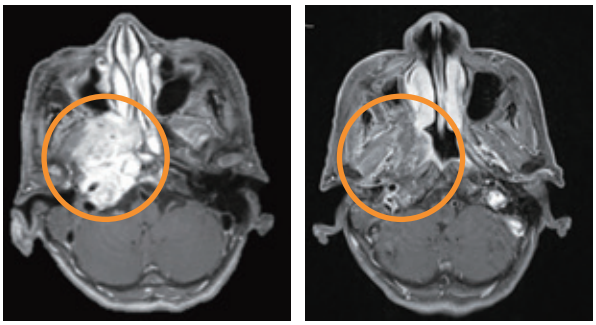
1, The cost of Heavy ion radiotherapy is fixed, regardless of the number of sessions.
2, Costs for medical services other than heavy ion radiotherapy (e.g., consultations, examinations, hospitalization, other related services) are not included.
3, Additional expenses, including travel, accommodation,and Medical Coordinators services are not included.

Case Reports of Heavy Ion Radiotherapy

Head and Neck Cancer (Adenoid cystic carcinoma)

Radiation dose: 64.0Gy (RBE)
Number of fractions: 16
Total treatment duration: 4weeks

photograph; contrast-enhanced MRI

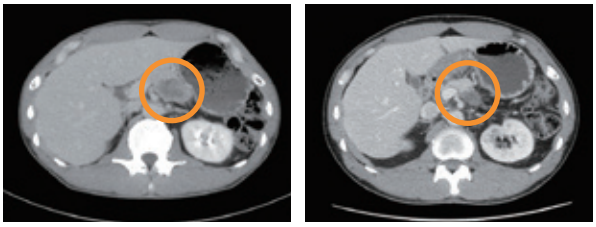


Before treatment　6 months after treatment

Pancreatic cancer (inoperable)

Radiation dose: 52.8Gy (RBE)　※chemotherapy combination
Number of fractions: 12
Total treatment duration: 3weeks

photograph; contrast-enhanced MRI

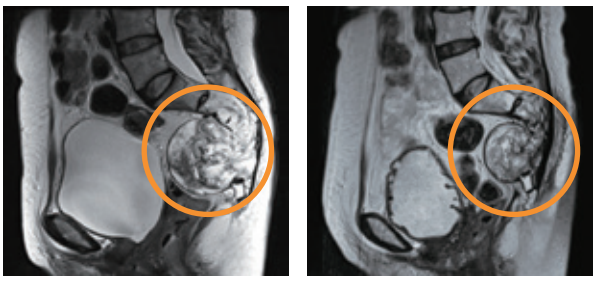


Before treatment　8 months after treatment

Sacral chordoma (bone tumor)

Radiation dose: 67.2Gy (RBE)
Number of fractions: 16
Total treatment duration: 4weeks

photograph; contrast-enhanced MRI



Before treatment　3 years after treatment

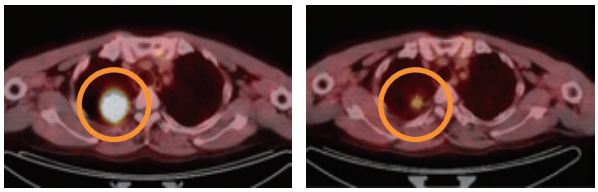
The tumor gradually decreases in size

Gy (RBE):
Unit of radiation dose for heavy ion radiotherapy

Lung cancer

Radiation dose: 60.0Gy (RBE)
Number of fractions: 4
Total treatment duration: 1weeks

photograph; FDG/PET-CT

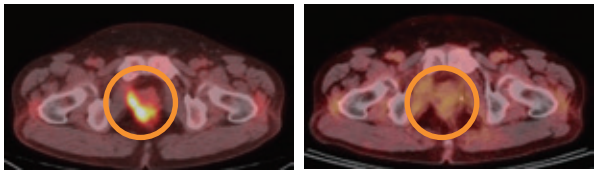


Before treatment　2 months after treatment

Rectal cancer (Postoperative local recurrence)

Radiation dose: 73.6Gy (RBE)
Number of fractions: 16
Total treatment duration: 4weeks

photograph; FDG/PET-CT



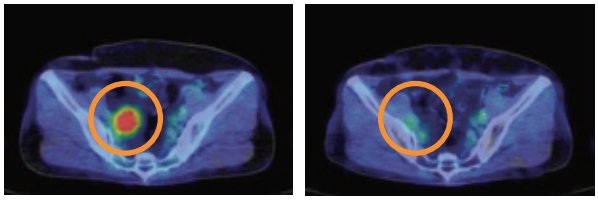
Before treatment　6 months after treatment

The drug accumulates in the tumor　No drug accumulation observed

Lymph node recurrence of endometrial cancer

Radiation dose: 52.80Gy (RBE)
Number of ractions: 12
Total treatment duration: 3weeks

photograph; FDG/PET-CT

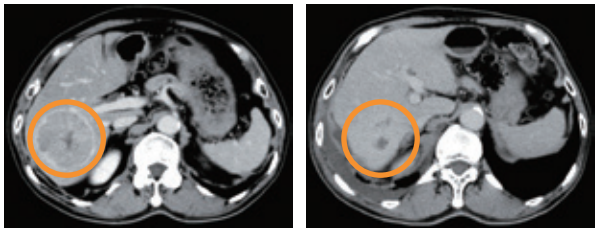


Before treatment　3 months after treatment

Hepatocellular carcinoma

Radiation dose: 52.8Gy (RBE)
Number of fractions: 4
Total treatment duration: 1week

photograph; contrast-enhanced CT



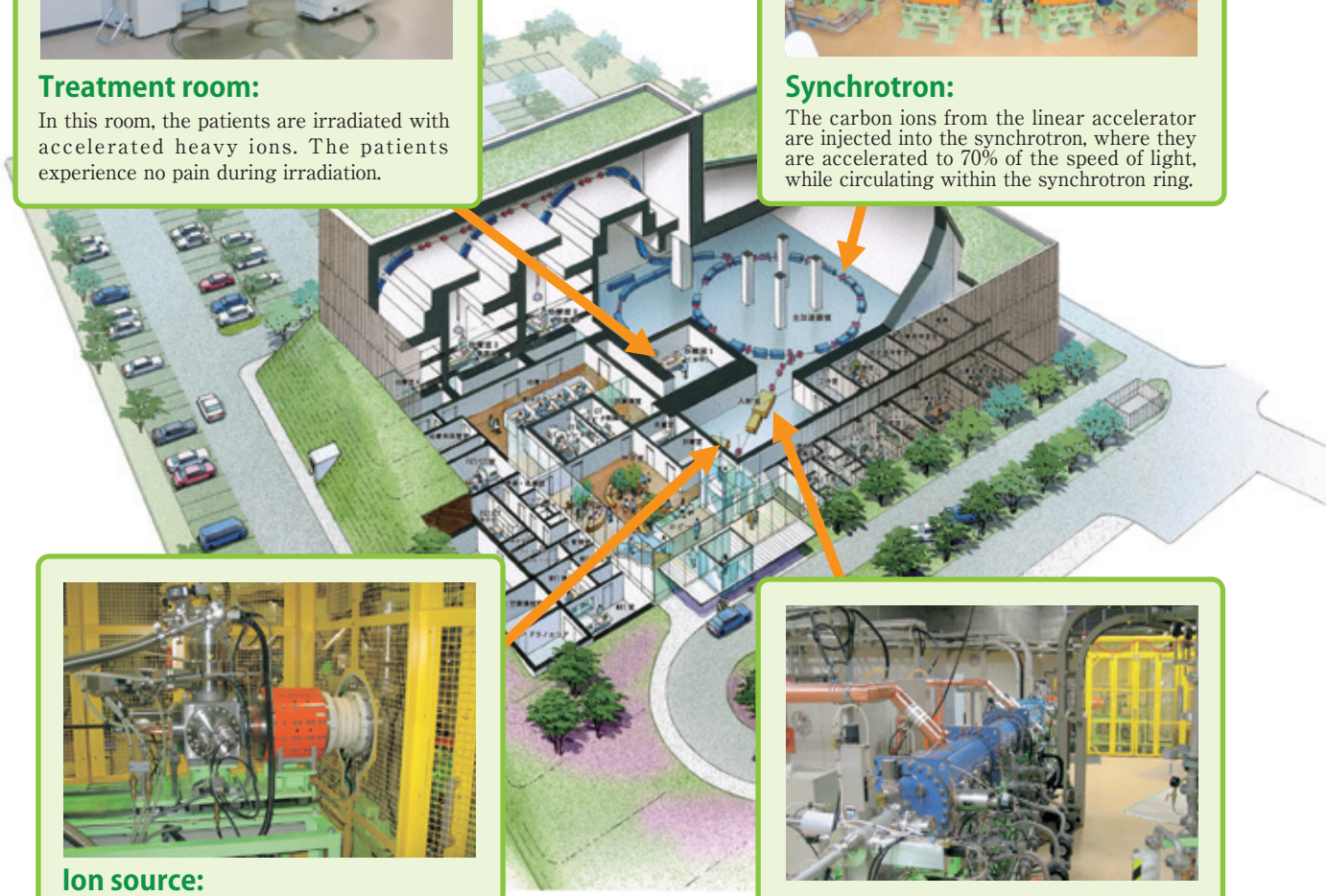
Before treatment　12 months after treatment

Heavy ion radiotherapy facility

To accelerate heavy ions (carbon ions) to about 70% of the speed of light and irradiate cancers located deep within the body, the facility is equipped with the following.

Treatment room:
In this room, the patients are irradiated with accelerated heavy ions. The patients experience no pain during irradiation.

Synchrotron:
The carbon ions from the linear accelerator are injected into the synchrotron, where they are accelerated to 70% of the speed of light, while circulating within the synchrotron ring.



Ion source:
Carbon ions are extracted from methane gas.

Linear Accelerator:
The linear accelerator provides initial acceleration to the carbon ions before they are injected into the synchrotron.

For information:

Gunma University Heavy Ion Medical Center

Address : 3-39-22, Showa-machi, Maebashi, Gunma, 371-8511 JAPAN

TEL +81 27-220-7891 (Japanese Language only)

Webpage https://heavy-ion.showa.gunma-u.ac.jp/en/

For overseas patients:

Please contact one of the companies of Medical Coordinators that cooperate with Gunma University Heavy Ion Medical Center. For more information, check the list on the website below.

Webpage https://heavy-ion.showa.gunma-u.ac.jp/en/page.php?id=31

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