

The use of advanced imaging techniques, such as PET-CT and MRI, has significantly improved the accuracy of tumor detection and staging. These techniques allow for the visualization of metabolic activity and soft tissue contrast, respectively, providing a more comprehensive view of the tumor's extent and characteristics. This information is crucial for determining the most appropriate treatment strategy for each patient.

Recent advancements in radiation therapy, including intensity-modulated radiation therapy (IMRT) and stereotactic body radiotherapy (SBRT), have enabled more precise targeting of tumors while minimizing damage to surrounding healthy tissue. These techniques involve the use of sophisticated planning systems and delivery methods to optimize the dose distribution, leading to improved treatment outcomes and reduced side effects.

Imaging techniques

The integration of imaging and treatment planning is essential for the successful delivery of radiation therapy. Advanced imaging techniques, such as PET-CT and MRI, provide detailed information about the tumor's location, size, and metabolic activity. This information is used to create a personalized treatment plan that targets the tumor while sparing healthy tissue.

Clinical Applications

Cancer treatment

Radiation therapy is a cornerstone of cancer treatment, used to kill cancer cells and shrink tumors. It can be used as a primary treatment, in combination with surgery or chemotherapy, or as a palliative treatment to relieve symptoms. The use of advanced imaging techniques and radiation therapy techniques, such as IMRT and SBRT, has improved the effectiveness of radiation therapy and reduced side effects.

Non-cancer applications

Radiation therapy is also used to treat various non-cancerous conditions, such as pain relief, control of bleeding, and treatment of benign tumors. The use of radiation therapy in these applications is often palliative, aimed at improving the patient's quality of life. The use of advanced imaging techniques and radiation therapy techniques, such as IMRT and SBRT, has improved the effectiveness of radiation therapy and reduced side effects.

1. Radiotherapy
2. Chemotherapy