Mini Review

Radiology and radiation therapy

Abstract

A closed-loop radiation therapy process is adaptive radiation treatment where the treatment process can be modified using a systematic feedback of measurements. Adaptive radiation therapy has the intention to improve radiation treatment by systematically monitoring treatment variations and incorporating them to re-optimize the treatment plan early on during the course of treatment. By this process, field margin and treatment dose can be consistently customized to each respective patient to achieve a safe dose escalation.

Keywords: radiography, radiotherapy, computer tomography

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Introduction

Imaging systems in medical are extensively used in radiological diagnosis. Their main benefits are more authentic and faster exams, elimination of exploratory surgery, availability of post processing and computed aided detection, immediate images availability, and ability to store and/or transmit the images electronically.[1,2] Opposite, the probable risk of correlated ionization radiation hazard from medical imaging, such as Computed Tomography and digital radiography[3,4] must be considered in risk to benefit ratio assessment. As we know that the treatment of cancer is make a challenge. Till today treatment of cancer is very expensive and impossible. Doctors and researcher are trying to develop a new advanced technology due to which cancer treatment may be possible. To improve it, radiography have main role in cancer treatment by which X-ray dose reduction using additional copper filters (Cu-filters) for abdominal general radiography was indicated in a report using a simulation study. We legalized the dose reduction effects using a clinical digital radiography system equipped with an indirect-type CsI detector and an automatic Cu-filter insertion function. An essential component of any intensity modulated radiation therapy ~IMRT! Program is film-based quality assurance ~QA! XV2 film is often used for IMRT QA, yet, it has imbibitions and energy response limitations which hinder accurate film dosimetry. A new commercially released ready-pack film has been introduced that has an enlarged dose range ~EDR2!, reportedly allowing measured doses above 600 cGy without saturation. Also, this film may have less energy dependence due to its composition.[5]

Technical view to improve the radiation therapy

Cancer is the remarkably common cause of cancer death in the developed world and the incidence is rising steeply in the developing world. Surgery is the utmost successful treatment but is only beneficial in the minority of patients with early disease. Radiotherapy can benefit the patient with early disease. Radiation therapy for cancer of the cervix usually involves a combination of external beam radiotherapy (EBRT) and intracavitary brachytherapy (ICBT), two distinctive modalities with different advantages. Intracavitary brachytherapy evolved from three European techniques (Stockholm, Paris, and Manchester) and still remains the cornerstone of treatment for cervical cancer. Although dose prescription at Point A of the Manchester system has been widely used since 1938, the validity of this specification for cancer of the cervix has been questioned over the years.[6] The 60 Gy reference volume specified by the International Commission of Radiation Units and Measures (ICRU) Report 38[7] represents the first attempt to improve uniform dose reporting with emphasis on the pear-shaped isodose volume, but similar to Point A dose and milligrams-hours it has no relationship to tumor volume.[8–9] With rapidly developing technology, conventional dental radiography is being overtaken by a revolution in digital radiography. In contemporary years the emphasis has been on indirect digital radiography involving the conversion of conventional film radiographs into digital images. This stage has been useful in helping the research and development of direct digital radiography which is now coming to the fore.[10] Using this technique, direct images are acquired in the dental practice. These images can be manipulated, enhanced, stored and exchanged for referral and other purposes, making them of great potential use. Additionally, the direct clinical and diagnostic benefits, the techniques also have distinct environmental advantages including less use of resources and reduced radiation dosages.[11] A basic block diagram of new computed radiography is given in Figure 1.[12]

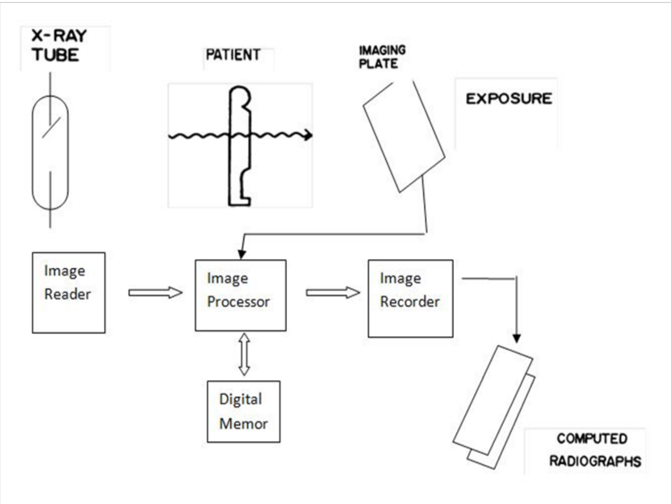

Figure 1 Basic block diagram of new computed radiography.

Conclusion

Advanced system of computed radiography that is based on new concepts and the latest computer technologies has been developed. This system eliminates the drawbacks of conventional screen-film radiography. The basic principle of the system is the conversion of the x-ray energy pattern into digital signals utilizing scanning laser stimulated luminescence (SLSL).

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Conflicts of interest

Authors declare there is no conflicts of interest.

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