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Forum

Radiotherapy – maintaining focus throughout the cancer journey

Gerard Adams(1) and Sandro V Porceddu(1,2)

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The development of advanced radiotherapy treatment techniques

Matthew Foote

Abstract

Radiation therapy has come a long way in the last few decades from treatment planning based on orthogonal radiographs with large margins around tumours. Developments in imaging and radiation planning software have led to improved radiotherapy treatment techniques such as intensity modulated radiotherapy, rotational intensity modulated radiotherapy and stereotactic body radiotherapy. These radiotherapy treatment advances enable sculpted dose distributions, with the ability to monitor and adapt to changes in patient and tumour position during radiotherapy. The purpose of this paper is to review the recent advances in radiotherapy treatment delivery with reference to how this may improve outcomes for cancer patients treated with radiotherapy.

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Functional imaging using PET and radiotherapy planning

Michael Fay(1) and Paul Thomas(2)

Abstract

Functional imaging with PET allows new insights into the extent of a tumour. This information has been rapidly included into treatment protocols. There are some complications in the process, not least of which is how to define the edge of the tumour. This review outlines current uses of PET in radiotherapy treatment planning. Concepts of radiotherapy volumes are outlined and common applications explored. PET now has an established role in radiotherapy planning. It is hoped that in those areas where it has not shown benefit, the development of new PET tracers will allow further improvement. There is still much work to be done, especially in the area of standardisation of techniques.

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New developments in image guidance for radiotherapy

Tomas Kron

Abstract

Image Guided Radiation Therapy refers to the concept of visualising the target or an important critical structure during radiotherapy to ensure accurate and reproducible radiation delivery throughout the course of treatment. There are many different methods for Image Guided Radiation Therapy, ranging from ultrasound to electronic portal imaging and volumetric CT scanning. In many circumstances, Image Guided Radiation Therapy can be enhanced by the use of implanted fiducial markers that are clearly visible and can make decision-making quicker and more robust. The most common application for image guidance at present is the accurate positioning of the target prior to treatment delivery. However, the availability of high quality imaging at the time of treatment delivery also facilitates management of intrafraction motion and adaptive radiotherapy. The latter encompasses a variety of methods to modify the treatment plan for individual patients in response to the images acquired during treatment. While there is still discussion as to what imaging approach is best for which purpose, there is no doubt that modern highly conformal or intensity modulated radiotherapy would not be feasible without some form of image guidance. The present article provides an overview of available techniques with the aim of illustrating their use in relevant clinical scenarios.

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Quality assurance in radiation oncology

Bryan Burmeister

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Abstract

Quality assurance is important for any medical procedure or intervention to ensure that patients receive management that is suited to their medical condition and that which has been described in textbooks, literature or by expert opinion. Currently many procedures are complex and require a multi-step process, each stage of which may be prone to mistakes, deviations or variation in interpretation. Radiation oncology involves a very complex process of consultation, preparation or planning and execution or treatment. Each of these processes requires stringent adherence to accepted standards both within a particular radiation oncology department or within a national health system. This is particularly important with rarer conditions, or where there is some debate regarding appropriate management. When conducting research it is vital that conformity across all researchers exists. While protocols go some way to ensure this, there have to be quality assurance mechanisms to ensure uniformity and compliance to the protocol. Some deviations may have minimal effects on outcome, while others may have a profound effect and compromise patient outcomes and results of clinical trials.

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Novel radiation techniques – a personalised approach for patients with rectal cancer

Arthur Sun Myint,(1) Vidhya Sagar Ramani,(2) Amir Montazeri,(1) Kate Perkins,(1) Robert Myerson,(3) and Jean Pierre Gerard.(4) On behalf of the ICON Group (International Contact Radiotherapy Society).

Abstract

Surgery remains the standard of care for most rectal cancer as it offers the best chance of cure. However, for patients with early stage low rectal cancers there are several treatment options available using novel radiotherapy techniques. Good responders to novel radiotherapy can avoid surgery. Poor responders need salvage surgery. Patient selection is important and careful assessment after preoperative chemoradiotherapy can identify good responders, even with advanced rectal cancers. Restaging magnetic resonance imaging scans can identify good radiological responses, which need to be confirmed by clinical examination and endoscopy. A watch and wait policy can be adopted for good responders, with surgery avoided or deferred. A boost with contact radiotherapy or brachytherapy can be offered to elderly patients to improve local control. This treatment strategy needs to be evaluated via clinical trials, for which the contact x-ray and transanal endoscopic microsurgery trials have been set up. In this way a personalised approach can be offered for patients with rectal cancer using novel radiotherapy techniques.

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Palliative radiotherapy in modern practice

Susan Wiltshire and Andrew Potter

Abstract

Radiotherapy provides effective symptom relief for patients with metastatic disease. The type and duration of radiotherapy depends on various factors including the patient's performance status and the symptom being palliated. Hypofractionated (shorter courses with larger doses per treatment) regimens are effective in relieving pain from metastatic bone disease and epidural spinal cord compression. Whole brain radiotherapy plays an important role in the management of brain metastases. More aggressive treatment with surgery, stereotactic radiosurgery, or high dose conventional radiotherapy may be appropriate for selected patients with a favourable prognosis.

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Functional outcomes after radiotherapy for early glottic cancer

Ellen Mills and Robyn Burnett

Abstract

This paper discusses the current evidence for functional outcomes following radiotherapy treatment for early glottic cancer and the role of speech pathology intervention. Limited data exists for either voice or swallowing outcomes for these patients and even less evidence was found detailing speech therapy treatment outcomes after radiotherapy. The limited research reports improvement in voice quality over time to at least two years. It has been shown that it is possible to collect both subjective and objective voice quality data along with quality of life information, and this can be applied pre treatment and at post treatment intervals. We also report on our local clinical experience with this patient group, including unpublished swallowing outcome data. Ongoing standardised collection of voice and swallowing data will continue to add to the body of knowledge in this area and may define the role, if any, of active voice therapy for this population.

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Surviving radiotherapy - what the future holds

Greg Wheeler

Abstract

The dramatic increase in the cure rates of malignancies over the last generation, especially in the paediatric population, has led to an increasing number of survivors. There is an increasing recognition of the late effects of the tumour, and its treatment whether it is surgery, radiotherapy or chemotherapy. Radiotherapy, being the oldest conventional cancer treatment, is the most studied and many long-term effects are known. There are significant impacts on patients' lives after treatment, including academic performance, ability to hold a job and even to obtain insurance. As the professions responsible for the cure of both children and adults, there is a medico legal and moral obligation to screen for, prevent and treat or mitigate the consequences of our treatment.

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