

Personal View

The Potential Clinical Advantages of Charged Particle Radiotherapy using Protons or Light Ions

B. Jones

Birmingham Cancer Centre, University Hospital Birmingham NHS Trust, Birmingham B15 2TH, UK

ABSTRACT:

The increasing use of charged particle radiotherapy (CPT) in many countries will require British oncologists to establish their personal viewpoints on this subject in order to advise their patients regarding the merits or otherwise of obtaining such treatment abroad. This paper covers the advantages and some disadvantages of CPT in many anatomical locations on the basis of the achievable dose distributions as a consequence of the Bragg peak effect. The advantages in terms of normal tissue effects should follow the reduction of tissue volumes exposed to low/moderate dose: significant reductions in acute tissue effects are expected and experienced. For late reacting tissues, the predicted benefits are in the reduction of chronic low-grade symptoms and so improving the quality of life. For tumour control, dose escalation beyond what is achievable with X-ray therapy is possible only for some tumour types. Also, some tumours not presently treated by X-rays can be treated by CPT instead of radical surgery. Many of the available publications about CPT are at 'proof of principle' stage, as the treatment technique continues to be optimised: this is a similar situation to megavoltage radiotherapy around 50 years ago. Oncologists in the UK need to familiarise themselves with CPT dose distributions, continually educate themselves by following the results of clinical studies as these emerge with time and hopefully visit CPT centres for direct experience. Jones, B. (2008). *Clinical Oncology* 20, 555—563

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Special points to note from the body of the article are:

The present author is increasingly concerned with requests from patients or from their oncologists regarding this dilemma. Even our younger, recently trained clinical oncologists have little or no knowledge or experience of CPT and cannot easily relate to what may be achievable, as CPT is not routinely included in training courses/examinations and few obtain the privilege of visiting CPT centres...

...In the meantime, radiation oncologists need to take a greater interest in what can and cannot be achieved using CPT, so that they can advise their patients and their medical colleagues in other specialities. Some oncologists continue to stress that there is no extant evidence base to recommend this form of treatment; although such

an attitude is respected in modern medicine, it might deny the considerable advantages, based on axiomatic physical principles, to patients.

Such evidence-based approaches have been applied, rather unfairly and rather predictably, to this area of interest. By contrast, various authorities have expressed views in support of particle therapy, even to the extent that it is unethical to conduct comparative randomised control trials against X-ray therapy because of the impressive reduction in total energy deposition within the body obtained by CPT [9,10]. However, because the capacity to treat will remain limited for many years, randomised control trials might be feasible in some situations where the indications are perhaps less certain.