Neutron radiotherapy: Abratt reply

To the Editor: The clinical fast neutron therapy programme in South Africa (SA) should be discontinued because:

(i) Many experimental and clinical studies show an increase in serious late normal tissue complications with neutron therapy,[1,2] which can be reduced in part by using the technology described in the letters by Laramore[3] and Sauerwein *et al.*[4] Nevertheless, its ability to deliver irradiation to tumours and spare normal tissue is inferior to that of other contemporary radiation modalities. More importantly, these complications arise from the interaction of neutrons with normal tissue, and are progressive with time. A patient's perspective of the debilitating morbidity after modern neutron therapy for adenoid cystic carcinoma of the parotid has been described.[5]

(ii) Continuation of the neutron therapy programme cannot be supported based on the results of Phase III studies. The authors of the aforementioned letters refer repeatedly to the 1993 study of 32 patients with salivary gland tumours,[6] but its data do not support the use of neutron therapy. In the study, neutron therapy was administered to 13 patients, resulting in severe toxicity in 9 patients and life-threatening toxicity in 2 patients. This toxicity was much higher than in the photon therapy arm. The trial was discontinued due to decreased referrals.

(iii) Due to the disappointing outcome of patients treated with fast neutron therapy, all such facilities – except for 2 in the USA – have been discontinued in England, Europe, Canada and the USA.

(iv) There are few peer-reviewed publications in the PubMed database on clinical studies of fast neutron therapy over the last 10 years.

Although the subject is the neutron therapy programme in SA, none of the 13 co-authors of the letter by Sauerwein *et al.* practice as a radiation oncologist in SA. They present no additional data to justify the continuation of this clinical fast neutron therapy programme. The radiobiological research programme is a separate matter.

Prof Laramore argues for further patient recruitment, continued resource allocation and for the neutron therapy programme to serve as a resource for Africa. The call for increased recruitment is unrealistic as the strong trend is of decreasing referrals to the programme. The average radiation oncology department in SA sees 150 - 300 new patients per month, whereas patient accrual to the neutron therapy programme is reportedly 1 - 2 patients per month in the last year.

Advocating the maintenance of resources for the programme is counter to our need for fiscal responsibility within our resource-constrained environment. Moreover, the failure of neutron therapy to meet its goals is not due to a lack of resources, but rather the biological nature of the therapy.

The neutron therapy programme, as a resource for Africa, has no basis; its shortcomings are as relevant to patients from Africa as they are elsewhere and are compounded by the distance of the site for patients. African studies give no weight to neutron therapy in cancer control programmes, but rather value conventional cancer prevention strategies and therapies.[7]

There have been exciting new developments in the technologies of other radiation modalities including proton particle therapy, and in the concurrent use of radiation with biological therapy and chemotherapy. The latter requires high precision radiation administration by contemporary radiation techniques with other modalities. Phase III studies with large numbers of patients document the safety and efficacy of these approaches for most of the common solid tumours, e.g. cancer of the cervix, lung, rectum, oesophagus,

brain and oral cavity. This has led to their widespread use in evidence-based patient management. Radiation oncologists in SA, as elsewhere, will seek to participate in clinical research based on these and other novel approaches.

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