DOSE VERIFICATION OF BNCT HEAD AND NECK PATIENTS WITH TLD

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The clinical boron neutron capture therapy (BNCT) protocol HN-BPA-01-2003, opened in December 2003, is focused on locally recurred and inoperable irradiated head and neck tumours. In this region, radiosensitive tissues have already received irradiation dose due to their location close to the tumour. Therefore, special caution has to be paid when giving the additional BNCT dose. The calculated doses have to be verified with in vivo measurements until full reliability of the computations is achieved.

The geometric model of a head and neck patient in the treatment planning is based on images obtained with computer tomography the model therefore being more accurate than the former model based on magnetic resonance imaging used for brain tumour patients. The absorbed gamma doses calculated with the treatment planning software SERA (INEEL/MSU, USA) were verified with measurements performed using thermoluminescent (TL) dosimeters. The TL analysis methods used to determine absorbed gamma doses in BNCT beams have been published in detail elsewhere [1]. The verification of calculated doses of twelve head and neck patients treated at FiR 1 was made.

For the gamma dose determination TL detectors 7LiF:Mg,Cu,P of the type MCP-7s (TLD Niewiadomski & Co., Krakow, Poland) were used. To correct the thermal neutron sensitivity of the TLDs activation measurements were also performed. 55Mn(n,γ) activation reaction rates were determined with diluted Mn-Al activation foils (1%, ∅ 12 mm × 0.2 mm, ECN Petten) and wires (2.7 %, Reactor Experiments Inc.). The measurements were carried out at several points on the skin of patients' head and neck region. Calculated 55Mn(n,γ) activation reaction rates and 6Li kerma dose rates also needed in the thermal neutron correction of the TLDs were computed with SERA. Further, gamma dose rates were calculated to be compared with those measured in vivo.

The results of the dose verification will be reported.