

BOGGIO-1: In vivo dosimetry for BNCT treatments in Argentine trials

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In BNCT as in every radiation treatment, doses to Organs at Risk have to be maintained as low as possible in order to avoid undesirable complications. In Argentina patients with cutaneous skin melanomas in extremities have been treated since 2003. The prescribed dose was delivered in one fraction, so the knowledge of the dose received by normal tissue and organs at risk is crucial. Since the first treatments carried out with an hyperthermal neutron beam in Argentina at the RA 6 reactor, and after 2015 with an optimized beam especially tuned for treating shallow tumors, measurements have been done in order to evaluate dose contributions from the main radiation components to different organs outside the target volume. In this type of treatment, patient might be exposed not only to primary beam but to secondary photons as well, in different body organs.

TLD 700 have been used as detectors for in vivo dosimetry. These detectors tally neutrons in the overall reading when irradiating in mixed beams as they have traces of ^6Li which incurs with high probability in the reaction $^6\text{Li}(n,\alpha)^3\text{H}$. Gamma dose values in health tissues have been always very far from tolerance values for each one of the measured organs. Radiochromic films have been analyzed as another method for in vivo dosimetry. Measurements with radiochromic films EBT2 and TLD 700 yielded good results taking into account the tolerances used in radiation protection. The use of the Glow Curve analysis method has been used by E. Boggio et al [1] to estimate both photon and slow neutron dose with TLD 700, proved to be a useful dosimetric tool. Authors have carried out measurements in a whole body phantom (BOMAb) undergoing a BNCT treatment for extremities, using 2 TLD and 1 activation detector for comparing neutron dose with both methods, getting good results. TLD 700 till now, looks as an appropriate method for in vivo dosimetry, without ruling out the use of radiochromic films as alternative detectors

[1] E. Boggio, P. Andrés, J. Longhino "Neutron-Photon mixed dosimetry by TLD 700 glow curve analysis and its implementation in dose monitoring for BNCT treatments", World Congress on MP&BME, Toronto, 2015