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CHANIDA PHAETTUT: COMPARISON OF THE DOSE DISTRIBUTION  
FROM COBALT-60 IN SPINAL CORD FROM DIFFERENT BLOCK  
TECHNIQUES USED FOR THE TREATMENT OF NASOPHARYNGEAL  
CARCINOMA. THESIS ADVISORS : RATANA PIRABUL M.Sc., PUANGTONG  
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Nasopharyngeal carcinoma is among the top 11 of carcinomas found in the Thai male population. The cure rate is high if treatment is given in the early stage and long survival is possible if the carcinoma is treated in the locally advanced stages. Effective radiotherapy requires high doses of radiation at the primary tumor and regional lymph nodes and lower doses at the spinal cord, which is a critical organ adjacent to the nodal areas. One of the frequently used irradiation techniques is two lateral opposed fields. This study intends to investigate the dose distribution from Cobalt-60 teletherapy unit along the central axis of the treatment field and at the spinal cord which is located at the lateral edge of the treatment field. Two lateral opposed fields with blocked penumbra technique and unblocked penumbra technique were the techniques used in this study. The measurements were performed in an average head paraffin phantom. Thermoluminescent dosimeters (TLD-100 rods) were embedded in the head phantom at all interesting points. A superflab was added on the surface of the phantom to vary the depth of the midline to be 6.5 cm, 7.0 cm and 7.5 cm.

The results showed higher doses along the central axis at all interesting points and at all depths of midline in the blocked penumbra technique. The maximum difference of the absorbed dose was 19.01% at depth 6.5 cm of midline. The higher doses are due to the scattered radiation from the shielding block penumbra. The absorbed doses at the spinal cord in the blocked penumbra technique at all interesting points and all depths of midline were significantly lower than in the unblocked penumbra technique (t-test  $p$ -value  $< 0.05$ ). The maximum difference of the absorbed dose in the blocked penumbra technique was 57.63% (t-test  $p$ -value  $< 0.0001$ ) in the slab located at the center of the treatment field at depth 7.5 cm of midline. The lower doses are due to the positioning of the shielding block at the edge of the treatment field, sharpening the geometric penumbra. The percentage differences of the absorbed doses in both techniques at the slab located at the middle of the field and the slab further from the field at all depths were found to be decreased due to the intensity transmitted.

This study showed that the blocked penumbra technique for two lateral opposed fields is the technique of choice in the treatment of nasopharyngeal carcinoma.