CHANGE IN TUMOUR VOLUME AS A MEASURE OF CHEMOTHERAPY-INDUCED NECROSIS IN EWING'S SARCOMA OF THE BONE

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Reduction in tumour volume following chemotherapy may in part be due to necrosis of neoplastic cells, reduction of the supporting stroma or resolution of tumour-induced inflammation. We analyzed the CT/MRI scans and histology of 50 patients with Ewing's sarcoma of the bone treated between 1983 and 1993 to determine the correlation between change in tumour volume and tumour necrosis following chemotherapy; and determine the influence of tumour necrosis and change in tumour volume on prognosis. The mean age was 18 years (range 5 to 40 years), and 40 of the tumours were located in the extremities, and ten centrally. The volume at diagnosis varied from 31 ml to 1790 ml.

There was a negative correlation between observed change in volume and necrosis ($r = 0.73$, $p = 0.0001$). Tumour progression, despite chemotherapy, was only seen in those with less than 60% necrosis. The relapse-free survival and overall survival were 71% and 78%, respectively, for those with more than 90% necrosis, and 37% and 59%, respectively, for those with less than 90% necrosis ($p = < 0.05$). Though the outcome in patients with more than 40% tumour volume reduction was better than those with less than 40% reduction, this did not reach statistical significance. We found no relationship between tumour volume and serum lactate dehydrogenase levels at diagnosis. Patient's weight, sex, body mass index and tumour site did not affect change in tumour volume following chemotherapy or the observed tumour necrosis.

We conclude that change in tumour volume is a good predictor of chemotherapy-induced necrosis and that necrosis is a strong prognostic factor in Ewing's sarcoma of the bone.