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Inter-observer and Intra-observer Reproducibility in histologic evaluation of necrosis rate induced by neo-adjuvant chemotherapy for osteosarcomas

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Background
Tumor necrosis rate following neo-adjuvant chemotherapy is one of the most important prognostic factors for patients with osteosarcoma. The method of evaluating tumor necrosis rate is crude and subjective.

Purpose
The study aimed to evaluate the inter-observer and intra-observer reliability in histologic evaluation of necrosis rate after neo-adjuvant chemotherapy for osteosarcomas.

Materials and Methods
Ten H&E stained pathology slides from 10 osteosarcoma patients treated with preoperative chemotherapy were randomly selected. Six musculoskeletal pathologists with expert level were assigned to analyze the slides for tumor necrosis rate at 2 time points with a delay of 3 weeks. SPSS 18.0 software was used for statistical analyses. The means, standard deviations, intraclass and interclass correlation coefficient (ICC), and 95% confidence intervals (CI) were calculated. ICC values were interpreted as follows: >0.75 was excellent, 0.40–0.75 was fair to good and <0.40 was poor.

Results
The ICC among the 6 observers was 0.547 (95% CI 0.294-0.820) for tumor necrosis rate (range: 0-100%), suggesting fair reliability. Intra-observer data were 0.595, 0.867, 0.842, 0.952, 0.969, 0.984 respectively.

Conclusions
We observed a low inter-observer but relatively high intra-observer reliability regarding histologic evaluation of necrosis rate after neo-adjuvant chemotherapy in osteosarcoma patients. These findings suggest that a better validated measurement protocol and consensus for evaluating tumor necrosis rate after chemotherapy are needed.