STEREOLOGICAL ESTIMATION OF MEAN NUCLEAR VOLUME AS A PROGNOSTIC FACTOR IN CANINE MAST CELL TUMOURS

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Introduction: Cutaneous Mast Cell Tumour (MCT)'s Patnaik and Kiupel grading schemes rely on qualitative and semi-quantitative features susceptible to inter-observer variability. Stereological estimation of volume-weighted mean nuclear volume (MNV) provides information about both size and variability of nuclear size, which has been proven to have a prognostic value in other solid tumours. The objective was to compare MNV with MCT grade and biological behaviour.

Materials and Methods: 56 MCTs were graded according to Patnaik and Kiupel by consensus of three experienced pathologists. Clinical history of dogs treated with surgical excision alone was collected with a minimum follow-up period of one year (n=31). MNV was estimated using the point-intercept method on vertical sections in 10 microscopic fields, with an approximately constant distance proportional to overall sectional area. Animals were divided according to outcome: (group 1) no recurrence; (group 2) local recurrence, lymph node or distant metastasis. Statistical analyses of results were performed by the Mann-Whitney U Test and Receiver Operating Characteristics (ROC) curve.

Results: MNV of low-grade (n=35) and high-grade (n=20) was 139.6 (±35.2) µm³ and 222.9 (±80.4) µm³, respectively. MNV of grade II (n=39) and grade III (n=16) was 145.6 (±38.6) µm³ and 229.0 (±88.6) µm³, respectively ($P<.0001$, Mann-Whitney U test). An optimal cut-off value of MNV>169 µm³ (81% sensibility and 78% specificity) was shown to differentiate MTCs with a more aggressive behaviour (group 2).

Conclusions: The present study suggests that estimation of MNV on routine histological sections may objectively improve the detection of more aggressive MCTs.