Histologic Grading of Canine Cutaneous Mast Cell Tumors: Is There a Good System?

Adam W. Stern*  
*Corresponding author: Adam W. Stern, DVM, CMI-IV, CFC, DACVP, Department of Pathobiology and Veterinary Diagnostic Laboratory, University of Illinois at Urbana-Champaign, Urbana Illinois, USA

Canine cutaneous mast cell tumors are one of the most commonly diagnosed neoplasms of the skin. Veterinary pathologists commonly grade these neoplasms utilizing the Patnaik grading system. Recently, a 2-tier grading system has been proposed. Comparisons between these two systems need to be performed to determine which grading system will most accurately identify aggressive mast cell tumors and allow for the selection of the most appropriate therapy.

Canine cutaneous mast cell tumors in the dog are reported to account for 7% to 21% of skin tumors in the dog [1-4]. Mast cell tumors can arise from any skin site on the dog [2]. Histologic grading of cutaneous mast cell tumors has been the main tool for veterinary pathologists to assess the potential biologic behavior of cutaneous mast cell tumors in dogs and is the gold standard for mast cell tumor prognostication [1-5]. The most commonly utilized grading system is the Patnaik grading system [3]. Recently, a 2-tier histologic grading system has been introduced for cutaneous mast cell tumors [3]. These two grading systems look at different morphologic criteria. Veterinary clinicians and veterinary pathologists as with any neoplasm are looking for the most accurate and reliable grading system.

With regards to the Patnaik grading system, histologic grading is based upon multiple cellular morphologic criteria including degree of cellularity, cellular pleomorphism, presence/absence of cytoplasmic granules, shape and size of nuclei, and mitotic index [3,6]. This grading scheme has been commonly used for prognostication and therapeutic determination. The Patnaik grading system has been cited for weaknesses including predominance of grade II neoplasms, interobserver variation, and potential to exclude some aggressive cutaneous mast cell tumors that have a low mitotic index [3-5,7,8]. According to one study, the percentage of recurrence of incomplete excision cases was 50% [5]. The 50% recurrence rate would suggest that veterinarians need a more accurate grading system to identify these neoplasms.

Recently, a 2-tier histologic grading system (low and high grade) for cutaneous mast cell tumors was proposed [3]. The criteria for grading is different from that of the Patnaik grading system and a high grade diagnosis is given to a neoplasm with at least 1 of the following features: at least 7 mitotic figures in 10 high power fields (hpf), karyomegaly with the highest diameter of at least 10% of the neoplastic cells varying by at least two-fold, at least 3 multinucleated giant cells with 3 or more nuclei in 10 hpf, or at least 3 bizarre nuclei in 10 hpf [3]. According to the 2-tier grading system, high grade mast cell tumors were significantly associated with shorter time to metastasis or new tumor development, and had a shorter survival time.

It is clear that development of another histologic grading scheme for cutaneous mast cell tumors was warranted to decrease the interobserver variation, inability to accurately determine if an incompletely excised grade II cutaneous mast cell tumor would recur, and decrease the inability to detect the group of aggressive mast cell tumors with a low mitotic index. The introduction of the 2-tier grading system is a potential solution to make up for the shortcomings of the Patnaik grading system; however, a number of questions remain including:

1. Does the 2-tier system accurately identify aggressive mast cell tumors with a low mitotic index?
2. From the clinical prospective, which grading system in conjunction with supplemental testing such as expression of KIT most accurately allows for the selection of the most appropriate therapy?
3. Is there interobserver variation for some of the criteria utilized in the 2-tier grading system such as karyomegaly or presence of bizarre nuclei?

With the development of the 2-tier grading system further studies must be performed on this system to prove or disprove its accuracy in identifying aggressive cutaneous mast cell tumors and ability to help determine the most appropriate therapy for cutaneous mast cell tumors with comparison to the Patnaik grading system. Until further studies are performed comparing these two systems, it is most appropriate to utilize both grading systems which would subsequently allow for both respective and prospective comparisons between the Patnaik and the 2-tier systems.

References

*Corresponding author: Adam W. Stern, DVM, CMI-IV, CFC, DACVP, Department of Pathobiology and Veterinary Diagnostic Laboratory, University of Illinois at Urbana-Champaign, Urbana Illinois, USA, 61802, E-mail: awstern@illinois.edu

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