Diagnostic discordance among histopathological reviewers for difficult-to-diagnose melanocytic lesions

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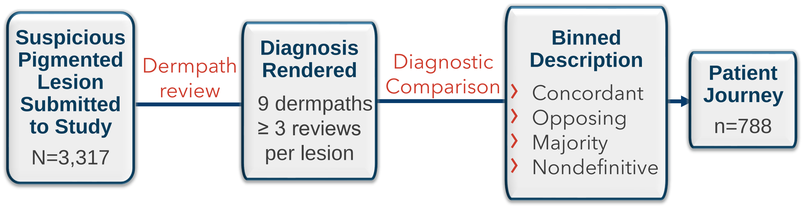
Background

- Diagnostic discordance in cutaneous melanocytic lesions is well documented, and it is particularly prevalent among difficult-to-diagnose cases, for which histopathology may be insufficient for a definitive diagnosis.[1-4]

Methods

- Melanocytic lesions and associated de-identified clinical data from patients ≥ 18 years of age were included in this IRB-approved study. All melanocytic lesions underwent independent diagnosis review by up to nine unique board-certified dermatopathologists. Each lesion received ≥ 3 diagnoses via electronic, whole-slide images with zoom-in capability as **benign**, **malignant**, or **unknown malignant potential** (**UMP**).
- Samples were binned according to the following: *concordant* (all diagnoses of the same designation); *opposing* (both benign and malignant designations); *majority* (a single designation with the highest number of diagnoses but without opposing designations); and *nondefinitive* (equal number of designations but without opposing designations).
- Patient journey simulation was performed on lesions suitable for ancillary testing (i.e., majority, opposing, and nondefinitive) by assigning each diagnosis to a standard treatment parameter related to lesion excision: Benign = No excision; Malignant = **wide-local excision** (**WLE**); UMP = equal chance of No Excision, Narrow & Complete, or WLE.

Figure 1. Study Schematic



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References

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Results

Table 1. Binned Descriptions* *Benign / UMP / Malignant*

Description	Benign	Malignant	UMP	Unknown
Concordant	3/0/0 4/0/0	0/0/3 0/0/4	0/3/0	-
Opposing	-	-	-	1/0/2, 1/0/3, 1/1/1, 1/1/2, 1/1/3, 1/2/1, 1/2/2, 1/3/1, 1/3/2, 2/0/1, 2/0/2, 2/1/1, 2/1/2, 2/2/1, 2/2/2, 2/3/1, 3/0/1, 3/0/2, 3/1/1, 3/2/1
Majority	2/1/0 3/1/0 3/2/0 4/1/0	0/1/2 0/1/3 0/2/3	0/2/1 0/3/1 0/3/2 0/4/1 1/2/0 1/3/0 1/4/0 2/3/0	-
Nondefinitive	-	-	-	0/2/2 2/2/0

*Each diagnosis is represented numerically, and diagnosis results are displayed as number of benign/UMP/malignant dermatopathologist H&E reviews. UMP, unknown malignant potential

Table 2. Diagnoses Comparison and Binning Results

Lesion subsets suitable for ancillary testing* (N=3,317)				
Description	Benign, n (%)	Malignant, n (%)	UMP, n (%)	Unknown, n (%)
Concordant	995 (30.0%)	1534 (46.3%)	15 (0.5%)	-
Opposing	-	-	-	230 (6.9%)
Majority	242 (7.3%)	160 (4.8%)	88 (2.7%)	-
Nondefinitive	-	-	-	53 (1.6%)

*Lesions suitable for ancillary testing are shaded. benign, blue; malignant, red; uncertain malignant potential (UMP) or unknown, grey.

Table 3. Cohort Summary

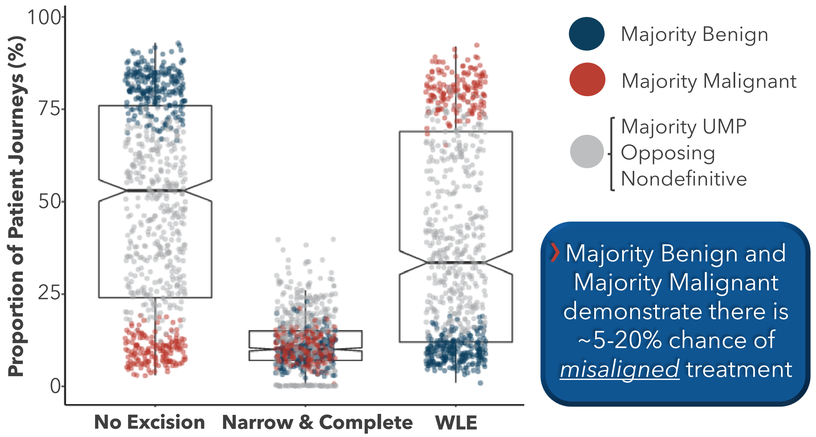
Lesion subsets suitable for ancillary testing* n, (%)	
Unequivocal#	2,529 (76.3%)
Equivocal	788 (23.7%)

*Lesions suitable for ancillary testing are shaded. # Unequivocal includes fully concordant benign or malignant cases only.

- Equivocal lesions (23.7%) are suitable for ancillary testing[5]

Results

Figure 2. Patient Journey Simulation: Surgical Treatment (n=788)



- Majority Benign and Majority Malignant demonstrate there is ~5-20% chance of *misaligned* treatment

- Each patient was run through 100 simulated patient journeys and for each iterative journey each patient was randomly assigned to a diagnosis provided by one of the dermatopathology reviews. Patient treatment distribution (n=788) is shown with each dot representing a single patient. Median with upper/lower quartiles are outlined. WLE, wide-local excision.

Conclusions

- Histopathologic review in this large cohort demonstrated substantial diagnostic variation, with 23.7% of cases receiving equivocal or discordant diagnoses
- The clinical impact of diagnostic discordance is highlighted in the patient journey simulation and demonstrates high treatment variation

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