A clinical impact study of dermatologists' use of the 23- or 35-gene expression profile tests to guide surgical excision and enhance management plan confidence

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Background

- The 23-gene expression profile (GEP) and 35-GEP tests are clinically available, objective ancillary diagnostic tools that facilitate diagnosis of melanocytic lesions with ambiguous histopathology. The tests use proprietary algorithms to produce results of: suggestive of benign neoplasm; intermediate (cannot rule out malignancy); or suggestive of malignant neoplasm with high accuracy.[1-6]
- Communication between the diagnosing dermatopathologist/pathologist and the treating clinician is key to establishing appropriate patient management.[7,8] There are circumstances when a dermatologist may find additional diagnostic information helpful in determining excision and follow-up actions.[9,10]

Here we present dermatologist management plans and confidence utilizing diagnostic GEP results in uncertain clinical and diagnostic scenarios.

Methods

- Clinicians were invited for study participation based on prior use of diagnostic GEP testing (minimum 3 encounters with GEP results). 32 board certified dermatologists participated in this Institutional Review Board (IRB)-approved study. Clinicians were asked 4 questions per scenario: **1) How would you treat the patient?** (No further treatment necessary, No further treatment necessary if lesion appears completely excised, Excise <5 mm margins (narrow but complete), Excise ≥5 mm margins (but <1 cm), Wide local excision (Excise ≥1 cm); **2) Which follow-up schedule would you recommend?** (Every 12, 6, 3 or every month); **3) How confident are you in this management plan?** (1 (not confident), 2 (slightly confident), 3 (somewhat confident), 4 (fairly confident), 5 (completely confident).
- Clinical and diagnostic information for 6 uncertain patient scenarios was provided to the clinicians (**Table 1**). Diagnostic information was taken from real-world pathology reports of melanocytic lesions and displayed in mock form including the diagnosis and microscopic description. Clinical information was based on common clinical situations that may alter patient treatment. GEP test results were either not provided (baseline), benign, or malignant for each patient scenario.

Table 1. Ambiguous lesion scenarios from real-world pathology reports

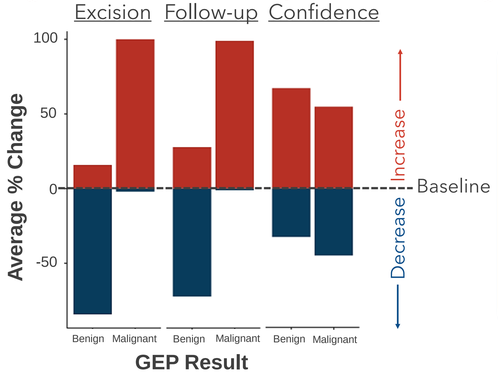
Clinical Impression	Diagnosis	Included excision recommendation
Cosmetic site	Melanocytic neoplasm, atypical melanocytic proliferation	**No**
Cosmetic site	Dysplastic nevus with features of regression	Yes
Personal history of melanoma	Melanocytic neoplasm, atypical melanocytic proliferation	**No**
Personal history of melanoma	Melanocytic neoplasm, deep penetrating	Yes
Comorbidities	Atypical intraepidermal melanocytic proliferation (AIMP)	Yes
High clinical suspicion	Atypical intraepidermal melanocytic proliferation (AIMP)	Yes

References

1. Clarke, L. E. *et al. J Cutan Pathol* 2015. 42 (4) 244–252. **2.** Clarke, L. E. *et al. Cancer* 2017. 123 (4) 617–628. **3.** Clarke, L. E. *et al. Personalized Medicine* 2020. 17 (5) 361–371. **4.** Estrada, S. *et al. SKIN* 2020. 4 (6) 506–522. **5.** Ko, J. S. *et al. Cancer Epidem Biomar Prev* 2017. 26 (7) 1107–1113. **6.** Ko, J. S. *et al. Human Pathology* 2019. 86 213–221. **7.** Smith, Shane D. B., et. al. *JAMA Dermatol*. 2021. 157(9):1033-1034. **8.** Cockerell, C. *Dermatol Surg*. 2018. 44(2):175-176. **9.** Cockerell C, et al. *Personalized Medicine*. 2017. 14(2):123-130. **10.** Farberg, A. *et al. SKIN* 2020. 4 (6) 523–533.

Results

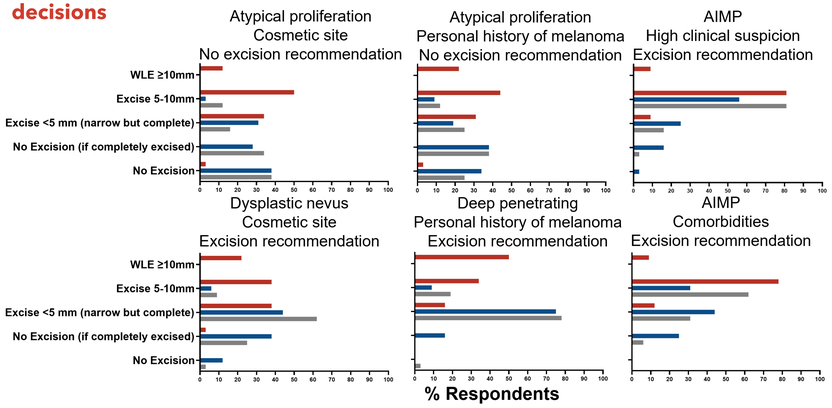
Figure 1. Overall clinical impact across all ambiguous scenarios



Clinical impact: The vast majority of excision decisions and follow-up changes were aligned with GEP results across the uncertain scenarios. In addition, there was an increase in overall management plan confidence with a GEP result.

- Clinical impact was assessed by calculating the mean percent of no change, increase in change, or decrease in change relative to no GEP results for each scenario and normalized to 100%.

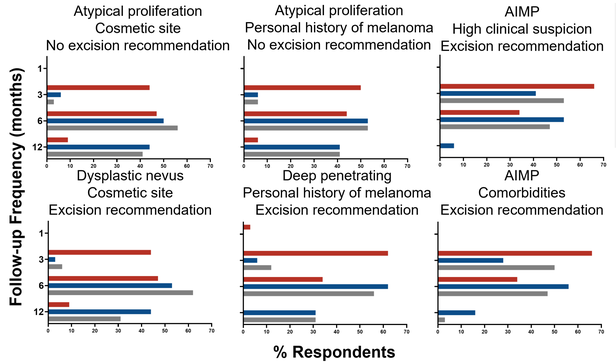
Figure 2. GEP results impact surgical excision planning, including margin decisions



- Surgical margins: When a malignant GEP result is provided, there was an increase in surgical treatment for most scenarios. When a benign GEP result was received, there was a decreased in surgical management in most scenarios.

Results

Figure 3. GEP results alter follow-up frequency



- Follow-up frequency: Shown here is a representation of how GEP results can alter that cadence resulting in a tailored strategy.

Malignant GEP
Benign GEP
Baseline (no GEP)

Conclusions

- GEP results can aid dermatologists in decision making to achieve appropriate management plans.
- Management changes, including surgical excisions and follow-up frequency, were aligned with GEP results for these uncertain clinical scenarios.
- Scenario-specific details demonstrate that a personalized approach can be achieved with GEP.

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