Independent validation study of a CP-GEP model (*Merlin Assay*) to identify patients with melanoma who can safely forgo sentinel lymph node biopsy

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Background

For patients with primary cutaneous melanoma, sentinel lymph node biopsy (SLNB) is an important technique to assess disease stage and to guide adjuvant systemic therapy[1]. Around 80-85% of all SLNB procedures do not detect nodal metastasis.

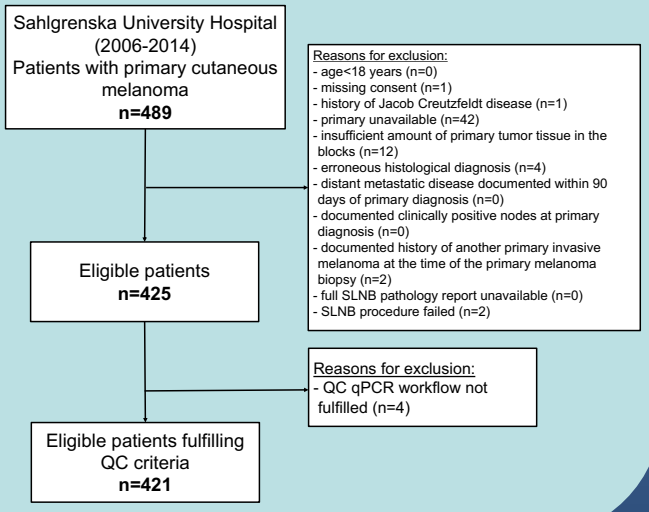
A model using clinicopathologic and gene expression variables (CP-GEP; Merlin Assay) has been introduced to identify patients that may safely forgo SLNB[2] due to their low risk for nodal metastasis. CP-GEP combines Breslow thickness and patient age with the expression of eight genes to classify patients as High Risk or Low Risk for nodal metastasis.

Purpose

The aim was to independently validate the Merlin Assay in a population-based retrospective cohort.

Method

421 FFPE primary melanomas were analyzed for CP-GEP which classified patients into Low risk and High risk for nodal metastasis. CP-GEP risk labels were compared to the known SLNB status.



Results

The median age was 60 years and 49% of the patients were females. Of the 421 patients, 335 patients (80%) were classified as CP-GEP High Risk and 86 (20%) as CP-GEP Low Risk for nodal metastasis. The overall SLNB positivity was 13%. Of the 86 CP-GEP Low Risk patients, CP-GEP could correctly identify 83 (96.5%) patients who were SLNB negative. For patients with T1-T2 tumors, the negative predictive value (NPV) was 96.5% and the SLNB reduction rate was 35.4%. For patients with T1-T3 tumors, the NPV was 96.5% and the SLNB reduction rate was 24.0%. All T4 tumors were classified as CP-GEP High Risk for nodal metastasis.

	pT1 n=30	pT2 n=210	pT3 n=118	pT4 n=63	pT1-T2 n=240	pT1-T3 n=358
CP-GEP high risk						
True positive	0	17	18	16	17	35
False positive	14	124	99	47	138	237
CP-GEP low risk						
True negative	15	67	1	0	82	83
False negative	1	2	0	0	3	3
PPV %	0	12.1	15.4	25.4	11.0	12.9
(95% CI)	(0-23.2)	(7.2-18.6)	(9.4-23.2)	(15.3-37.9)	(6.5-17.0)	(9.1-17.4)
NPV %	93.8	97.1	100	-	96.5	96.5
(95% CI)	(69.8-99.8)	(89.9-99.6)	(2.5-100)		(90.0-99.3)	(90.1-99.3)
SLNB-RR %	53.3	32.9	0.8	0	35.4	24
(95% CI)	(34.3-71.7)	(26.5-39.7)	(0-4.6)	(0-5.7)	(29.4-41.8)	(19.7-28.8)
Sensitivity %	0	89.5	100	100	85.0	92.1
(95% CI)	(0-97.5)	(66.9-98.7)	(81.5-100)	(79.4-100)	(62.1-96.8)	(78.6-98.3)
Specificity %	51.7	35.1	1	0	37.3	25.9
(95% CI)	(32.5-70.6)	(28.3-42.3)	(0-5.4)	(0-7.5)	(30.9-44.0)	(21.2-31.1)

Conclusion

The CP-GEP model has been independently validated in a European retrospective patient cohort, and can be used to identify patients who may safely forgo SLNB procedure due to their low risk for nodal metastasis.

Take home message

CP-GEP (Merlin Assay) is a non-invasive method to identify patients with a low risk nodal metastasis, and may be used to deselect patients from sentinel lymph node biopsy.

References

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2. Bellomo D, Arias-Mejias SM, Ramana C, Heim JB, Quattrocchi E, Sominidi-Damodaran S, et al. Model Combining Tumor Molecular and Clinicopathologic Risk Factors Predicts Sentinel Lymph Node Metastasis in Primary Cutaneous Melanoma. JCO Precis Oncol. 2020;4:319-34.

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