SGO ANNUAL MEETING ON WOMEN'S CANCER TAMPA, FL • 2023

PATIENTS • PURPOSE • PROGRESS

GD2 and GD3 tumor gangliosides as diagnostic markers for all subtypes and stages of ovarian cancer (OC) in liquid biopsies

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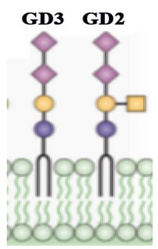
Funding Sources and Conflict of Interest Disclosures: Canadian Institutes of Health Research , Reseau Quebecois pour le Medicines (RQRM). HUS is a consultant for AOA Dx. and has patents licensed to the company. AMJ and PG are employees of AOA Dx.

INTRODUCTION

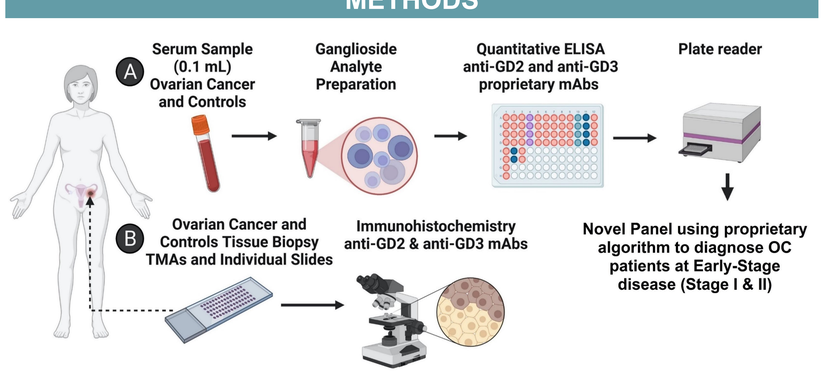
Ovarian Cancer (OC) - the deadliest gynecological cancer:

- Up to 95% of women with OC have symptoms for many months even in early stages
- 84% of women consult a provider due to their symptoms, but the average diagnosis takes 9 months
- Lack of early diagnostic tools result in true disease identification at late cancer stages
- Seeking to alleviate this unmet diagnostic need, we evaluated two cancer biomarkers: gangliosides GD2 and GD3 glycolipids, which have not been previously investigated for diagnostic purposes in OC



GD2 and GD3 are on the outer leaflet of the plasma membrane and are shed by tumor cells

METHODS



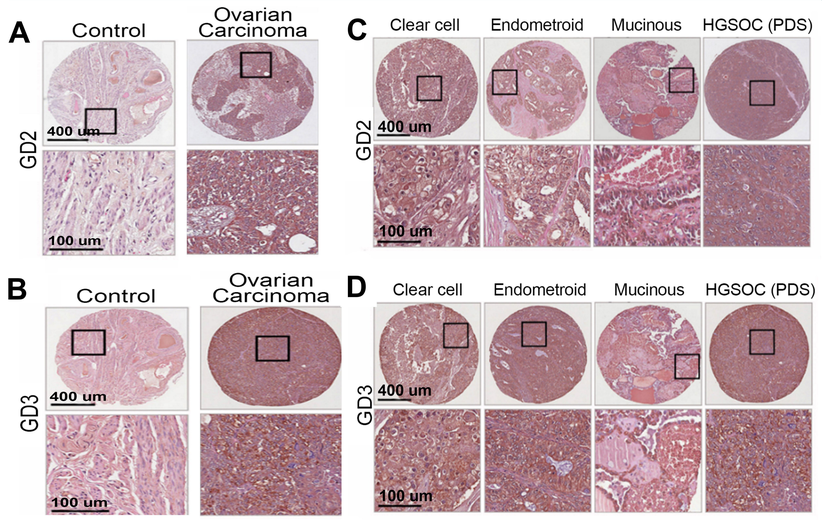
A. Quantitative ELISA method:

- GD2 and GD3 are shed by tumor cells
- Quantitative ELISA method was developed to measure GD2 and GD3 in serum
- Discovery study (n=379 serum samples), n=214 OC patients versus controls n=165 healthy donors, other gynecological conditions, or other cancers
- Powered Model study (n=200 serum samples), n=41 OC patients versus controls n=159 healthy donors, other gynecological conditions, or other cancers, for building a diagnostic model. Cross validation was used to protect against over-fitting.

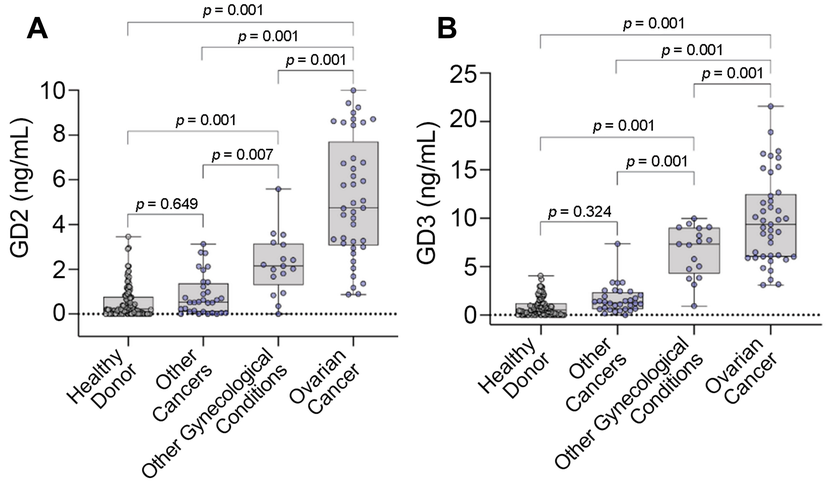
B. Immunohistochemistry (IHC) on ovarian tumor microarrays:

- GD2 and GD3 levels were evaluated in tissue samples by immunohistochemistry (n=299 tissue samples)
- Tissues included OC tumors (n=214), controls such as healthy fallopian tubes, healthy ovaries, benign adnexal masses, healthy surrounding tissue (n=66), and internal controls, healthy tissue surrounding OC tumors (n=31)

RESULTS



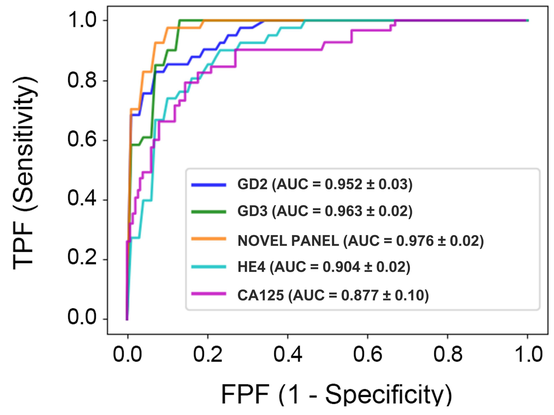
- GD2 and GD3 are detected uniformly in 78% of all OC subtypes and at all stages of the disease by immunohistochemistry
- GD2 and GD3 were not present in controls



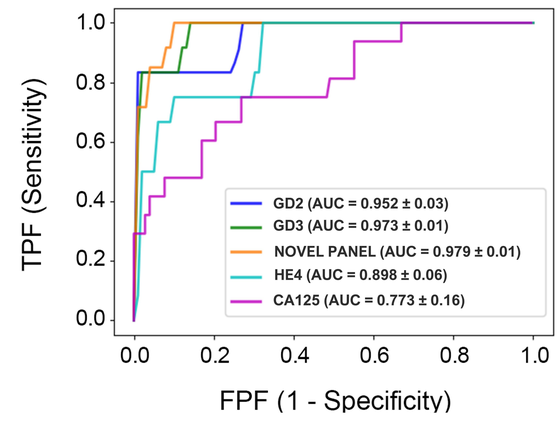
- Concentrations (ng/mL) of GD2 (A) and GD3 (B) in healthy donors (n=110), patients with OC (n=41) and patients with other conditions (Other cancers n=32; Other gynecological conditions n=17)
- GD2 and GD3 are significantly elevated in OC and can distinguish between normal controls, other cancers and other gynecological conditions

RESULTS

A. ROC curve all samples FIGO I-IV (n=41) and controls (n=159)



B. ROC curve early-stage samples FIGO I-II (n=14) and controls (n=159)



CONCLUSION

- GD2 and GD3 are diagnostic biomarkers in OC
- A Liquid Biopsy ELISA test using serum is a reliable diagnostic tool for all subtypes of epithelial OC, including early-stage and low CA-125 patients
- The Novel Panel was statistically superior to CA125 (p=0.002) in the overall population which included late and early stage OC and statistically superior to CA125 (p=0.006) in the early stage OC population
- The Novel Panel generated using proprietary algorithm affords more effective diagnostic tool than current standard of care with excellent sensitivity and specificity, especially for early-stage OC patients