

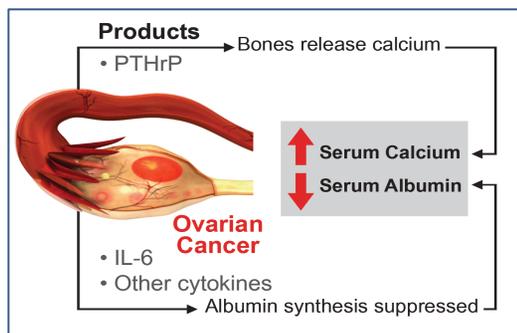
Longitudinal Increases in Albumin-Adjusted Serum Calcium Predict Ovarian Cancer

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Background

- No screening method for ovarian cancer (OC)
- Women who develop OC show increased serum calcium and decreased albumin [1,2]
- Mechanisms are known (shown below)
- These facts could be used in OC screening



Hypothesis: Prior to dx, women with OC will show a positive slope in albumin-adjusted serum calcium (a-asc) over time

Methods

- Population-based case-control study based in Sioux Falls, SD
- Cases: Women with epithelial OC
- Controls: Women without OC
- Exclusions: History of cancer or parathyroid disease
- Data from electronic Comprehensive Metabolic Panels (CMP)
- We calculated albumin-adjusted serum calcium (a-asc) from pre-diagnosis to diagnosis

Results

124 Cases and 98 controls. Cases significantly older (64.7 ± 12.9 vs 41.0 ± 6.8)

Controls: First and last a-asc = 9.23 mg/d; Slope = 0.

Cases: First and last a-asc = $9.29 (\pm 0.44)$ & $9.37 \text{ mg/dL} (\pm 0.32)$; Slope= $0.04/\text{mg/dl}/\text{year}$ ($p < 0.001$)

Finding: Albumin adjusted calcium (a-ac) is virtually unchanged among controls but sharply rises prior to diagnosis among cases

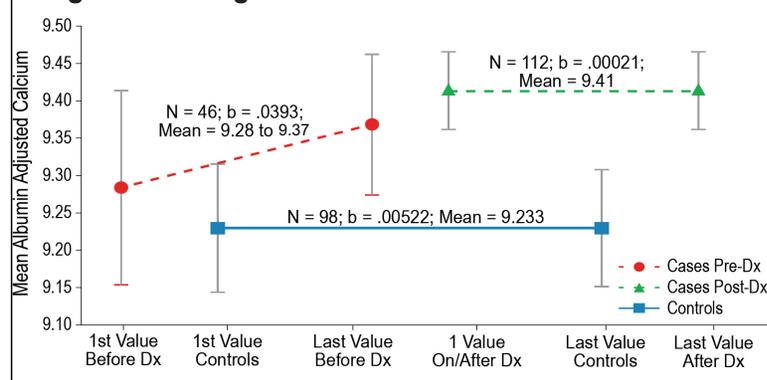


Table 1. Odds Ratio of Ovarian Cancer by Age and Annual Change in a-ac

Change in Aa-C	Age (years)				
	45	50	55	60	65
0.10	0.595	0.878	1.297	1.914	2.825
0.15	0.614	0.906	1.337	1.974	2.914
0.20	0.633	0.934	1.379	2.035	3.005
0.25	0.652	0.963	1.422	2.099	3.099
0.30	0.673	0.993	1.466	2.165	3.195
0.35	0.694	1.024	1.512	2.232	3.295
0.40	0.715	1.056	1.559	2.302	3.398

- Women who developed OC showed a positive slope in a-asc.
- The probability of OC for 0.04 mg/dL/year increase in a-asc increases with age until 70 and shows a dose-response.
- The Odds Ratio for OC for a 65 yr old woman with a 0.10/mg/dL increase/yr was 2.8.
- This effect was seen for early stage tumors and persisted after age- adjustment.
- Future studies should age-match controls.

Conclusions

A positive slope in a-asc should increase suspicion for an occult OC. These women could be referred for transvaginal sonography.

Acknowledgements

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References

- [1] Kelly MG, et al. Serum calcium and serum albumin are biomarkers that can discriminate malignant from benign pelvic masses. *Cancer Epidemiol Biomark Prev* 2015; 24:1593-1598.
- [2] Schwartz GG, et al. Women who develop ovarian cancer show an increase in serum calcium and a decrease in serum albumin: A longitudinal study in the Janus Serum Bank Cohort. *Gynecol Oncol* 2020;159:264-269.

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