Abstract **4526**: CA-62: A New Biomarker for the Detection of Early-Stage Renal Cell Carcinoma.

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Background:

- The American Cancer Society classifies Renal Cell Carcinoma (RCC) to be among the ten most common cancers. However, despite this need, effective biomarkers for early-stage detection of RCC are not yet available.
- The purpose of this study was to assess the diagnostic characteristics of a carcinoma-specific transmembrane N-glycoprotein biomarker, CA-62, for the detection of early-stage kidney cancer. Blinded serum samples from 204 patients were included in the clinical study, of which 68 had TNM-classified stages IA, IB, IIA, or IIB renal cell carcinomas, while 136 were drawn from healthy volunteers.

Methods:

- Quantitative measurement of serum CA-62 levels was performed using a chemiluminescent CLIA-CA-62 immunoassay ("JVS Diagnostics" LLC).
- Statistical analysis (MedCalc; version 19.7.4, MedCalc Software Ltd, Belgium, EU) was used to assess the diagnostic characteristics of the CA-62 biomarker for the detection of RCC, including sensitivity, specificity, and test accuracy.

CA-62 N-glycoprotein biomarker has demonstrated a 94.3% sensitivity for RCC at 96% specificity for early stages of kidney cancer detection.

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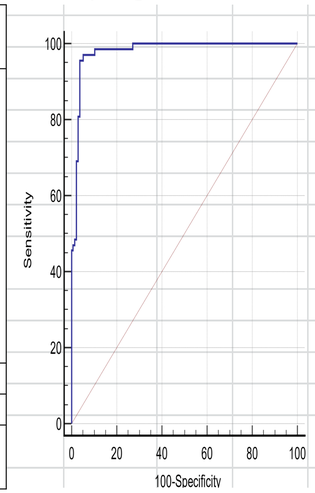
Results:

Results: Significantly higher median concentrations of CA-62 were found in sera of RCC patients compared to those found in healthy controls as follows; stage I A, B (8,935 U/mL), stage II A (6,291 U/mL), stage II B (8,808 U/mL), and healthy controls (2,815 U/mL). It was expected that serum CA-62 levels would be elevated at these early stages of RCC (Stages I-IIB), demonstrating significant overexpression of this epithelial carcinoma marker during the initial stages of cancerogenesis. The results of the study are presented in Table 1. The area under the ROC curve (AUC) for RCC patients vs. healthy controls was 0.98 with a 95% CI (0.950-0.994), z-statistics (67.3), and a significance of p<0.0001.

Table 1: Diagnostic characteristics of CA-62 for patients with early stages of RCC.

Parameter	Number of patients with CA-62 > 5000 U/mL, %
Stage I A, B	48/51 (94%)
Stage I A	28/31 (90%)
Stage I B	20/20 (100%)
Stage II A, B	16/17 (92%)
Stage II A	12/13 (92%)
Stage II B	4/4 (100%)
Total	64/68 (94.3%)
Healthy volunteers	5/136 (4%)
Sensitivity %	94.3%
Specificity %	96%
AUC	0.98
Test Accuracy %	95.5%

Picture 1. ROC- curves of CA-62 marker in a cohort of patients with early stages of RCC and healthy volunteers.



Variable	CA_62_kU/ml
Classification variable	histology
Sample size	204
Positive group [a]	68 (33,33%)
Negative group [b]	136 (66,67%)
Area under the ROC curve (AUC)	0.98
Standard Error [a]	0.00837
95% Confidence interval [b]	0.950 to 0.994
95% Bootstrap CI [c]	0.957 to 0.992
z statistic	57.34
Significance level P (Area =0.5)	<0.0001

Future Directions for Research: Given that CA-62 is not specific for kidney cancer, it is reasonable to suggest the use of CA-62 combination with some other biomarkers that may lack the sensitivity of CA-62 but are often elevated in RCC patients, such as tumor-infiltrating lymphocytes and/or possibly some inflammation biomarkers. In particular, the combination of transmembrane glycoproteins CA-62 and CD105, combined with biomarkers, such as Endothelial Vascular Growth Factor (EVGF) and/or a growth factor derived from platelets (PDGF) could be successfully used for kidney cancer screening to achieve both high sensitivity and specificity for RCC detection.