Weighted Gleason Grade Group: A New Prostate Cancer Biopsy Reporting System with Prognostic Potential

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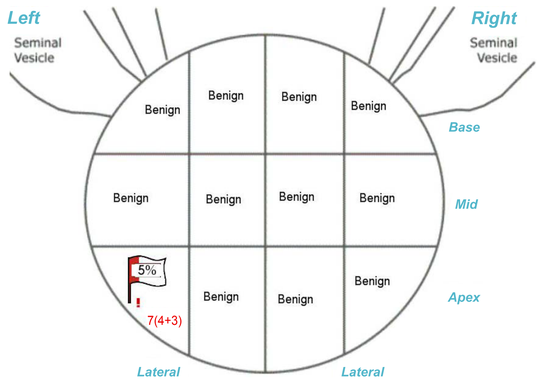
BACKGROUND

- Present prostate biopsy (PBx) reports typically report the highest Gleason Grade Group (GGG) as the single defining metric used by the urologist to gauge tumor aggressiveness and select treatment options. This does not consider the entirety of information contained in the PBx.
- Intuitively we presumed that a PBx showing multiple cancer cores would indicate a more aggressive malignancy; that information could be simply captured by summing the product of the number of cores positive with their respective GGG.
- We propose the Weighted Gleason Grade Group (WGGG) as a novel scoring system synthesizing histology and cancer volume into a single numerical score.

METHODS

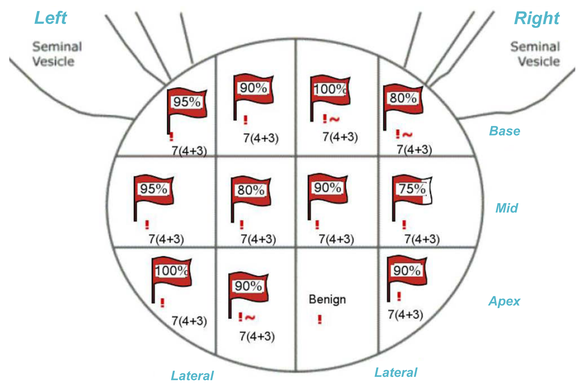
- We studied 246 men who underwent radical prostatectomy (RP) after standard multi-core PBx.
- The highest Gleason score in each PBx was converted to its assigned GGG. The WGGG was calculated by summing the product of the number of cancer cores with their respective GGGs, normalized for a 12-core PBx.
- The RP pathology of each man was studied for adverse features, including extraprostatic extension (EPE), positive surgical margins (PSM), seminal vesicle involvement (SVI), pathological up-grading and <u>any</u> adverse feature.
- We then studied the ability of conventional GGG vs. WGGG in each PBx to have 'predicted' each adverse feature found on RP pathology by creating receiver operating characteristic (ROC) curves for each metric against each and <u>any</u> adverse feature and then compared the areas under the curve (AUC) achieved by conventional single GGG vs. WGGG by means of DeLong testing.

Standard Biopsy Report: GGG 3

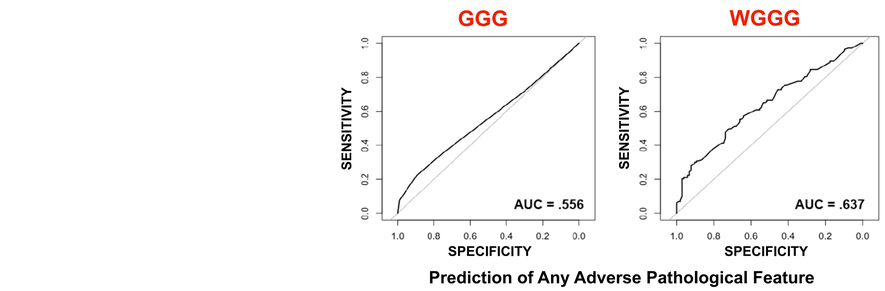


New Biopsy Report: WGGG 3

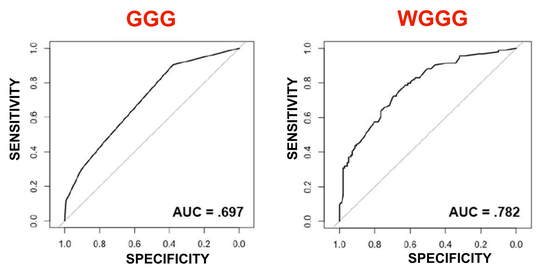
Standard Biopsy Report: GGG 3



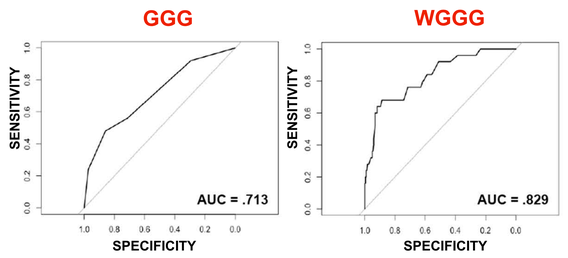
New Biopsy Report: WGGG 33



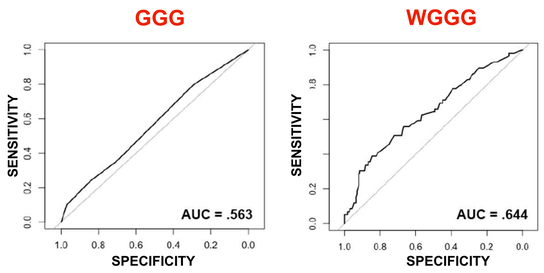
Prediction of Any Adverse Pathological Feature



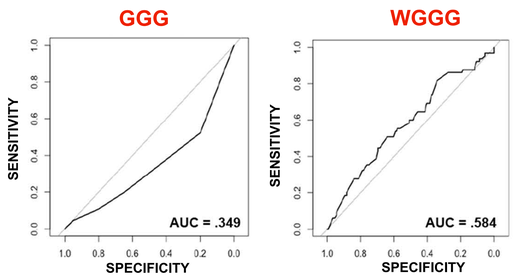
Prediction of Extra Prostatic Extension (EPE)



Prediction of Seminal Vesicle Invasion (SVI)



Prediction of Positive Surgical Margins (PSM)



Prediction of Pathologic Up-Grading

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RESULTS

- The AUC for WGGG vs. GGG was significantly higher for 'predicting':
  - EPE (0.782 vs. 0.697, respectively; z= -3.29; p= .0009).
  - PSM (AUC 0.644 vs. 0.563, respectively; z= -3.00; p= .0027).
  - SVI (AUC 0.829 vs. 0.713, respectively; z= -3.05; p= .0023).
  - Pathological upgrading (AUC 0.584 vs. 0.349, respectively; z= -3.13; p= .002).
  - <u>Any</u> adverse pathological feature (AUC 0.637 vs. 0.556, respectively; z= -3.29; p= .001)

CONCLUSIONS

- Every PBx provides 3 forms of data: 1) Gleason score, 2) number of cancer cores and 3) tumor volume per positive core. The present WGGG synthesizes the first 2 data points.
- The WGGG, by providing a metric reflecting the entirety of the PBx, offers the urologist added prognostic value compared with using the single metric GGG typically reported.
- The WGGG is easy to calculate and seems to be significantly better when preparing a patient for RP.
- The use of WGGG to predict biochemical recurrence (BCR), development of metastases and prostate cancer specific mortality (PCSM) utilizing data provided is being studied.
- Our present investigations are directed to incorporating tumor volume into the WGGG calculation which may improve the utility of WGGG in predicting adverse pathological features at RP, as well provide further prognostic information for newly diagnosed patients with prostate cancer.