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Predictive value of index lesion cross-sectional area in diffuse large B cell lymphoma patients treated with chimeric antigen receptor T-cells

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SI/CTR Abstract

Word count: 250 words

Predictive value of index lesion cross-sectional area in diffuse large B cell lymphoma patients treated with chimeric antigen receptor T-cells

Nicole Winchell, Drew Torigian, MD, Stephen Schuster, MD*

(*) indicates primary project advisor

(**) indicates another student who is declaring the same project as primary for SI

Introduction: Diffuse large B cell lymphoma (DLBCL), the most common subtype of lymphoma, has poor survival in relapsed, refractory (r/r) patients. Tisagenlecleucel, an anti-CD19 chimeric antigen receptor T cell product, has a 50% complete response rate in r/r DLBCL. This study aimed to determine if poor response to tisagenlecleucel correlated to increased bulk of tumor burden on baseline imaging based on average index lesion area.

Methods: A secondary data analysis was performed on 20 patients with DLBCL treated with tisagenlecleucel. An ROC curve was generated based on average area of index lesions from baseline CT scans that were measured by a third-party radiologist via Chesson criteria and response to treatment at 6 months. This was used to determine a cutoff value for high vs low tumor burden and then analyzed with a Chi square test using $\alpha=0.05$.

Results: The ROC AUC (an aggregate measure of metric performance) was 0.68. Sensitivity and false positive rate (Se, FPR) for a cutoff value of 7 cm² were 100% and 50%, respectively. The next lowest FPR was 33% with Se of 62.5% at a cutoff of 4 cm².

At a cutoff value of 7 cm² for average index lesion, low tumor bulk showed statistically significant correlation with higher response rate to tisagenlecleucel (p=0.017).

Discussion: The results show that baseline tumor bulk is correlated with response to treatment with tisagenlecleucel, but additional data would be necessary to increase confidence in this result. This correlation indicates tumor bulk would be useful in identifying if this high-cost treatment is warranted.

No citations, tables, figures or appendices allowed.



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Predictive value of index lesion cross-sectional area in diffuse large B cell lymphoma patients treated with chimeric antigen receptor T-cells

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- DLBCL has poor survival with current 1st and 2nd line therapies
- Anti-CD19 CAR T cells (tisagenlecleucel) have a ~50% complete response rate in r/r cases
 - BUT costs ~\$475,000
- **Objective:** correlate response to CAR T cell to the bulkiness of tumor burden



- Previous research showed increased risk of adverse effects (i.e. tumor lysis) with increased tumor burden
- Currently no data predicting response based on baseline imaging
- Could help determine best candidates to receive this high-cost therapy

Objectives & Hypothesis

- Research Question
 - Does average index lesion area correlate to response outcome in r/r DLBCL treated with CAR T cells?
- Hypothesis
 - Higher average index lesion area correlates to increased incidence of progressive disease following r/r DLBCL treated with CAR T cells.

Approach & Results

- Secondary data analysis
- Population: 20 r/r DLBCL pts treated with anti-CD19 chimeric antigen receptor T cells
- No intervention (data analysis)
- Comparison: low vs high tumor bulk
- Outcome: Response to tisagenlecleucel
- Data source and collection: index lesions on baseline CT scan per Chesson criteria, response outcomes

Approach & Results

- Analysis

- ROC AUC, Chi square ($\alpha=0.05$)

- Findings

- ROC AUC = 68%

- Aggregate measure of metric performance

- Cutoff value of 7 cm²

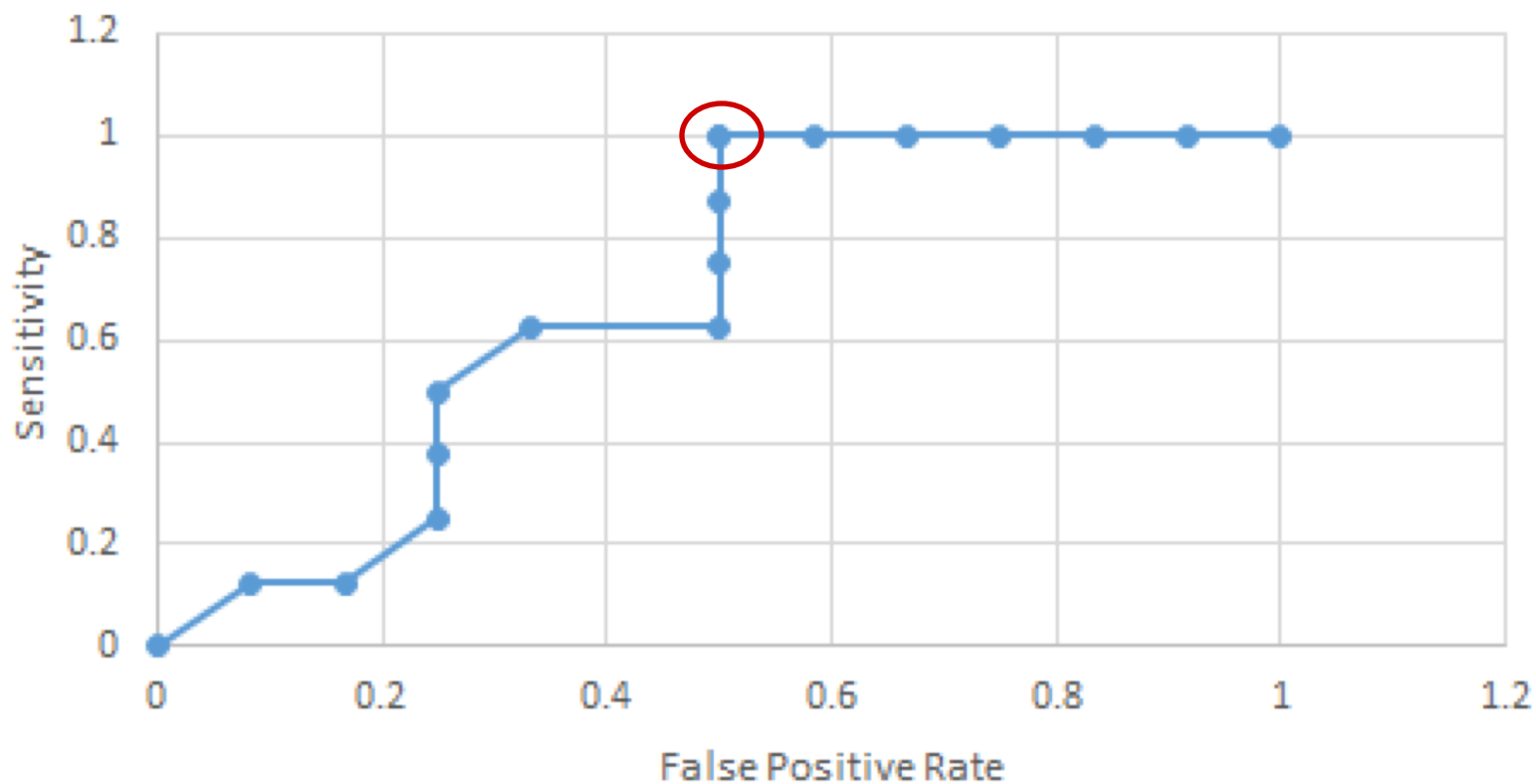
- Sensitivity = 100%, FPR = 50%

- Next lowest FPR was 33% with sensitivity of 62.5% at 4cm² cutoff.

- Chi square = 5.71 ($p=0.017$)



ROC





Conclusions

- Low tumor bulk ($<7\text{cm}^2$) showed statistically significant correlation with higher response rate to tisagenlecleucel
 - Need further data to increase confidence in result
- Demonstrates potential for clinical utility in treatment decisions for r/r DLBCL



Future Directions

- Repeat analysis with larger sample size using non-clinical trial patients
- Assess other factors that could predict outcome (cytokine levels, peak CAR T cell levels)

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