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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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(*) indicates primary project advisor

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

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Introduction

- 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

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Introduction

- 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

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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.

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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

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Approach & Results

- Analysis
  - ROC AUC, Chi square (α=0.05)
- Findings
  - ROC AUC = 68%
    - Aggregate measure of metric performance
  - Cutoff value of 7 cm^2
    - Sensitivity = 100%, FPR = 50%
    - Next lowest FPR was 33% with sensitivity of 62.5% at 4cm^2 cutoff.
  - Chi square = 5.71 (p=0.017)

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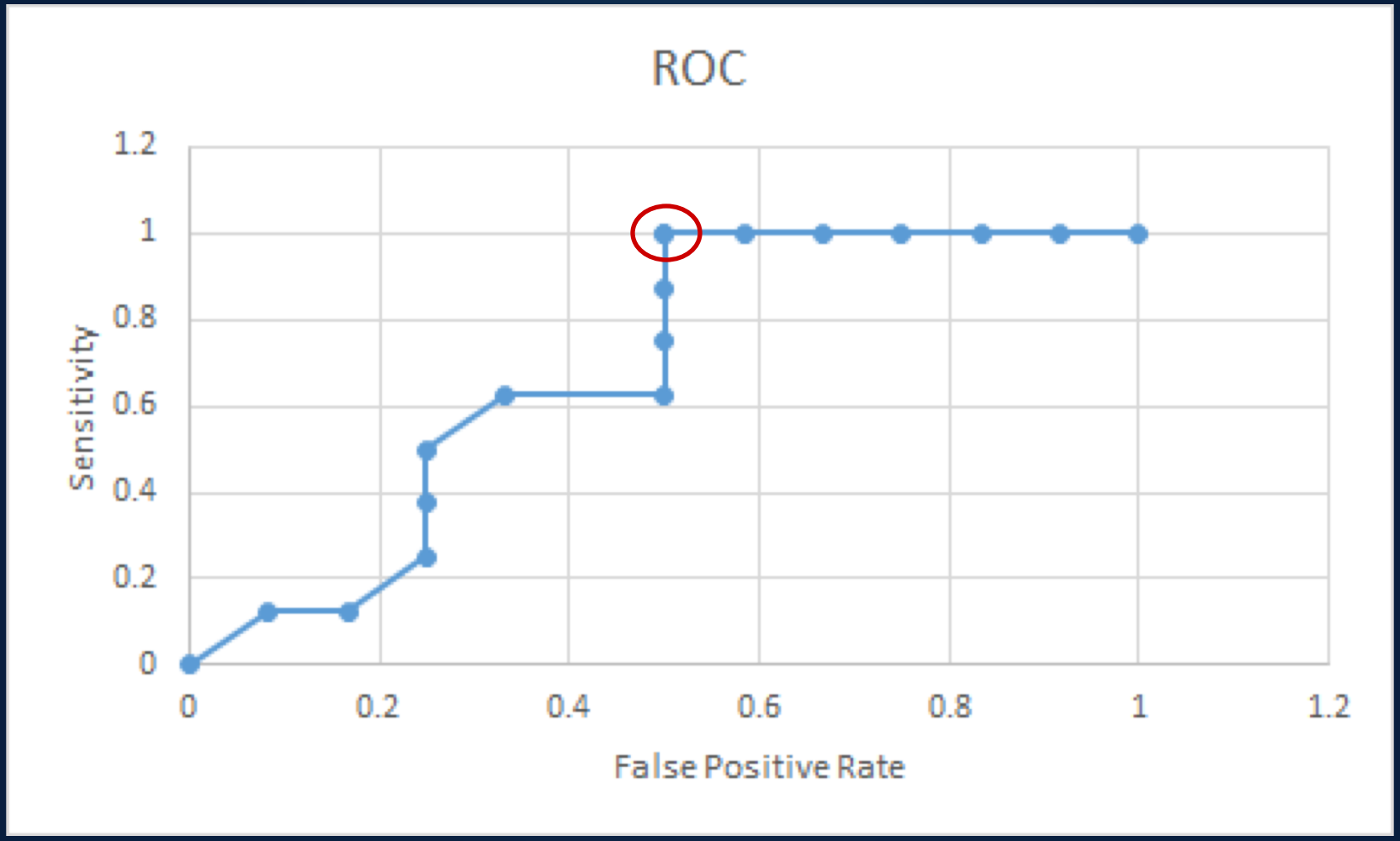

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Conclusions

- Low tumor bulk (<7cm^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

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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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