

Background

- Immune evasion allows cancer cells to grow and proliferate, and underlying immune dysfunction can alter cancer prevalence and outcomes.
- Solid organ transplantation and chronic immunosuppression are associated with increased lung cancer risk and significantly reduced survival.
- The therapeutic approach to lung cancer is uniquely complex in this immunosuppressed population.
- This study examines latency to lung cancer diagnosis after transplant (TTDx) and overall survival (OS) in this population.

Methods

- Retrospective review of patients with both lung cancer and solid organ transplant treated at the Sidney Kimmel Comprehensive Cancer Center at Jefferson Health, 2016–2023.
- Patients transplanted after their lung cancer diagnosis were excluded.
- Data collected: diagnosis date, stage, histology, molecular/fusion status, PD-L1%, cancer-directed therapy, progression and last-treatment dates, transplant date, immunosuppressant therapy, and date of death.
- Primary outcomes: time to lung cancer diagnosis from transplant (TTDx) and overall survival (OS).
- Fisher's exact test was used to compare categorical variables; analyses were performed using SAS software.

Results

- 34 patients met inclusion criteria (mean age at diagnosis 72.3 years; 67.6% male; White 61.7%, Black 35.3%, Asian 2.9%).
- Most common transplanted organs: kidney (55.9%) and liver (23.5%); 5.9% received dual kidney/liver transplants.
- Tacrolimus was the most common immunosuppressive agent (79.4%); 64.7% were on ≥ 2 agents at diagnosis.
- 56% of patients had advanced-stage (III–IV) disease; adenocarcinoma (41.2%) and squamous cell carcinoma (38.2%) were the most common histologies.
- Of 16 patients with molecular testing, 81.2% had no targetable mutation (18.8% EGFR-mutant); PD-L1 ($\geq 1\%$) was positive in 14 of 19 tested patients, yet no patient received immunotherapy.
- Median TTDx was 109.9 months; median OS was 20.6 months.
- No significant association was found between degree of immunosuppression and stage ($p=0.50$), PD-L1 status ($p=0.56$), or OS ($p=0.44$); nor between OS and transplanted organ type ($p=0.73$).

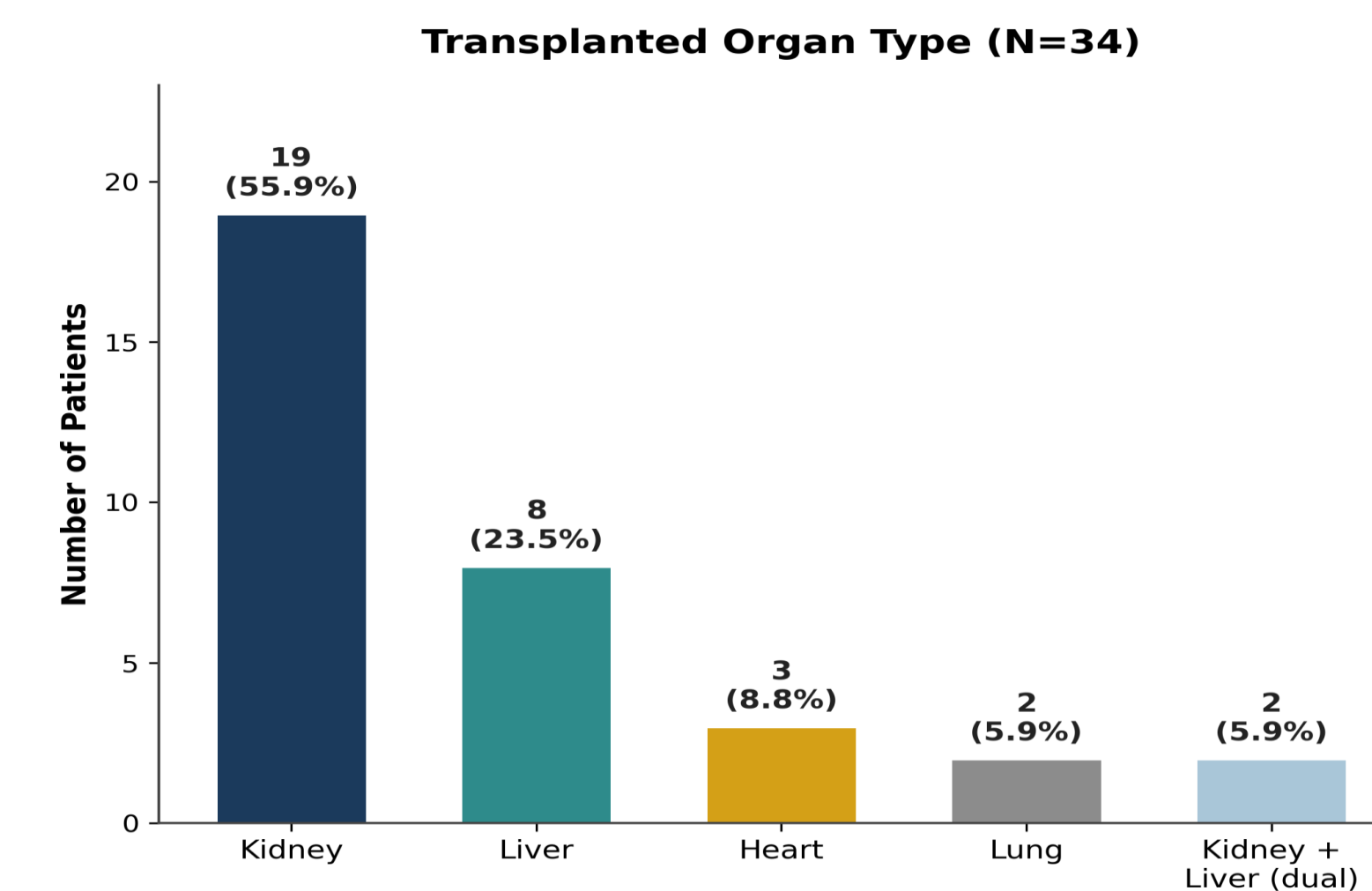


Figure 1. Transplanted organ type (N=34).

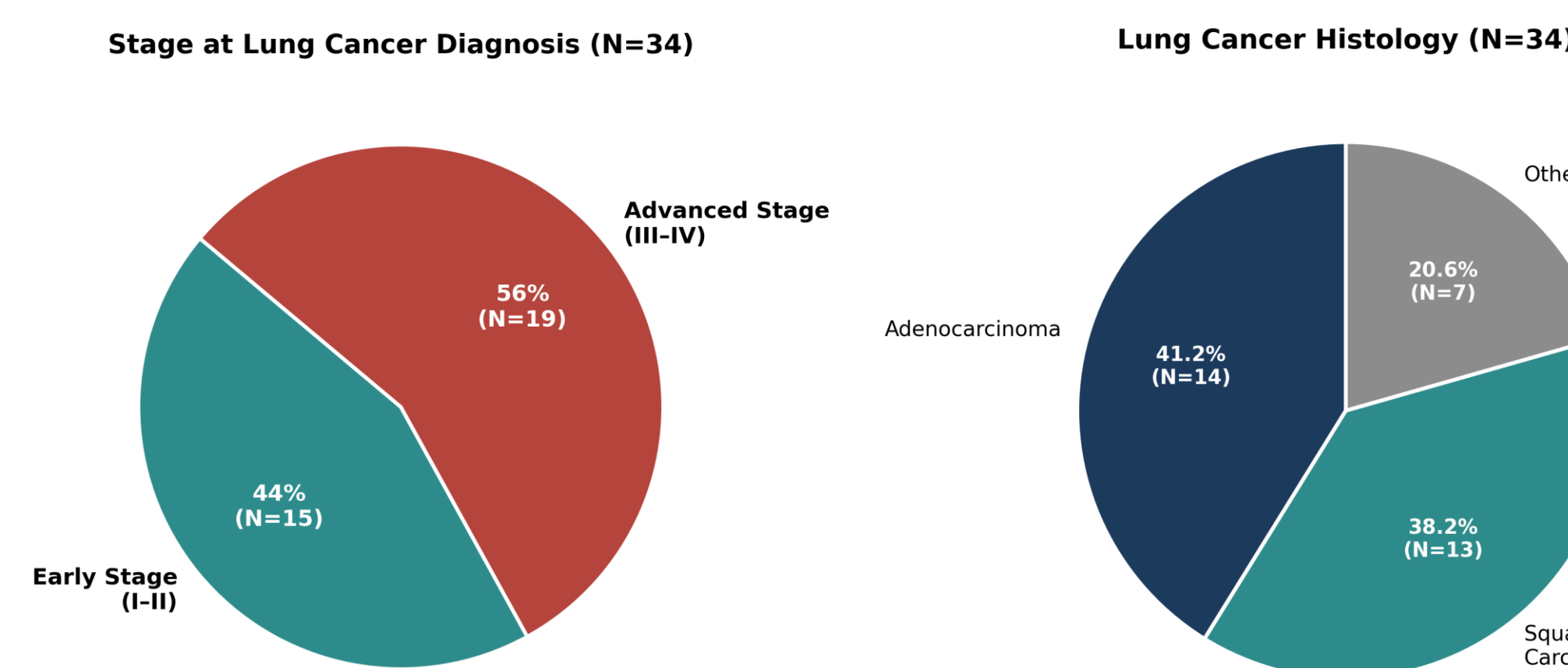


Figure 2. Stage at diagnosis (N=34).

Figure 3. Lung cancer histology (N=34).

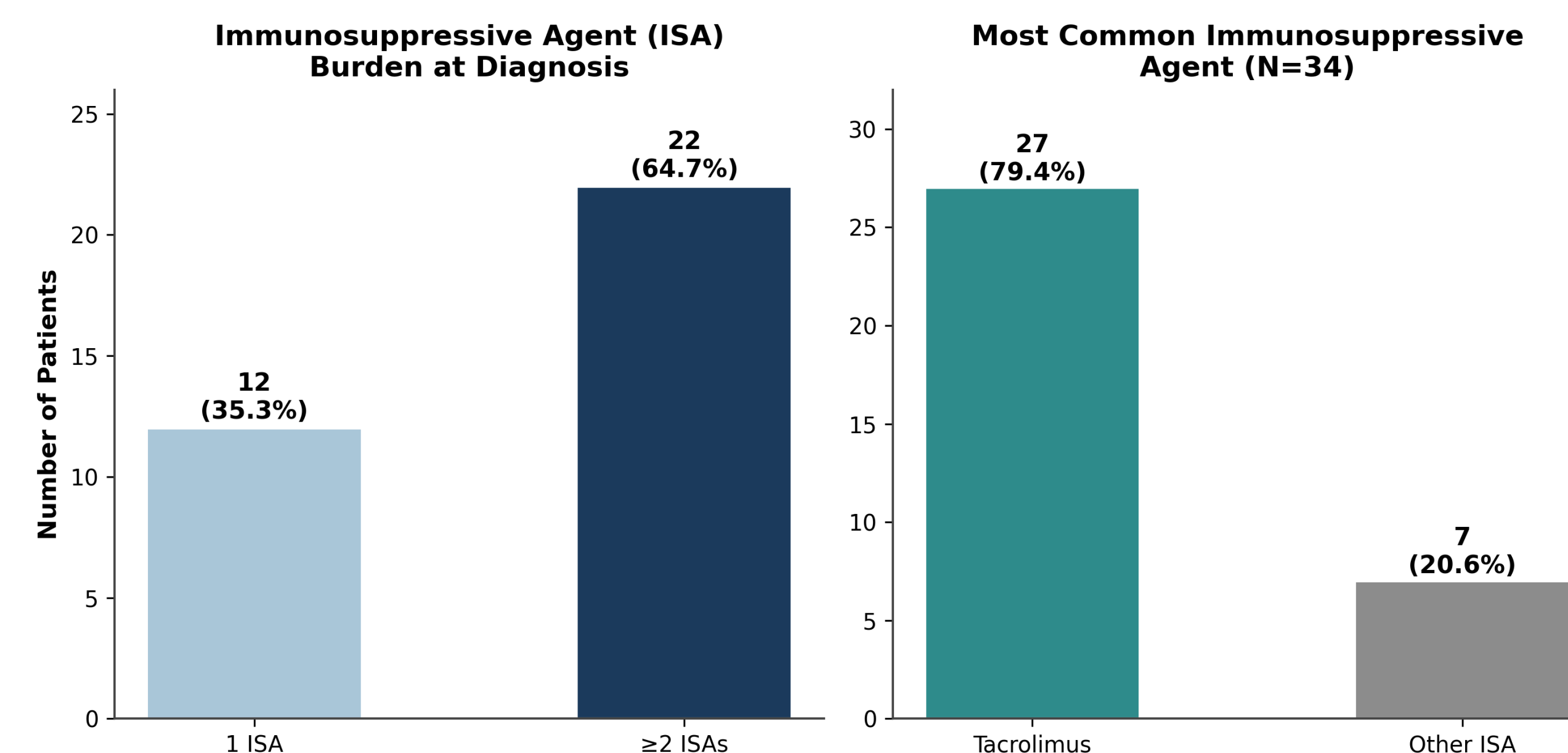


Figure 4. Immunosuppressive agent (ISA) burden and most common ISA (N=34).

Key Outcomes: Lung Cancer in Solid-Organ Transplant Recipients (N=34)

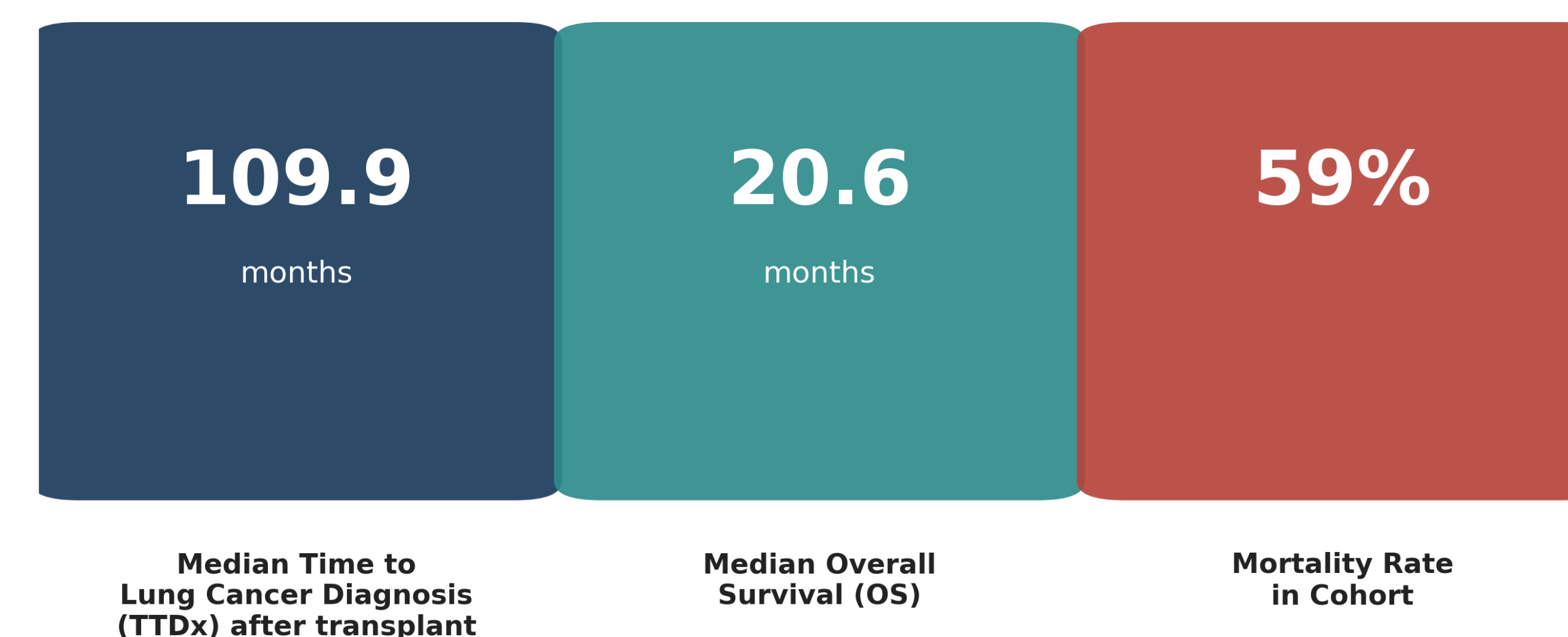


Figure 5. Key outcomes: median TTDx, median OS, and mortality rate (N=34).

Discussion

- Most patients (56%) presented with advanced-stage disease, and cohort mortality was high (59%).
- These findings align with prior literature showing worse lung cancer outcomes in solid organ transplant recipients, with cancer-specific mortality elevated even after adjustment for stage and treatment.
- The mean time to lung cancer diagnosis (8.9 years post-transplant) is consistent with prior studies and underscores the need for long-term cancer surveillance in this population.
- No patient received immunotherapy despite 50% PD-L1 positivity, reflecting historical exclusion of transplant recipients from immunotherapy trials due to concern for allograft rejection.
- Emerging evidence suggests immune checkpoint inhibitors may be safe and effective in carefully selected transplant recipients, with response rates approaching the general population.
- Recent meta-analyses report ~36% one-year acute rejection and 18% graft loss with checkpoint inhibitor use; concurrent mTOR inhibitors and low-dose steroids during immunotherapy may reduce this risk.
- Enhanced, tailored cancer screening protocols are needed in this high-risk population, as the high rate of advanced-stage disease at diagnosis suggests missed opportunities for earlier detection.

Conclusions

- Expanding access to solid organ transplantation in the US underscores the need to characterize disease burden and survival trends for lung cancer in this population.
- The safety and efficacy of immunotherapy in transplant recipients remains an important area for further research on cancer-directed therapy.
- Findings support the need for enhanced, tailored cancer screening protocols in solid organ transplant recipients.
- Future studies should directly compare outcomes with non-transplanted patients with lung cancer.

References

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