Abstract

This report presents findings from a logistic regression analysis examining predictors of disease occurrence in post-transplant patients. Data from patients' years since transplant (TST), gender (Sex), and genetic type (Type) were analyzed.

Binary Logistic Regression Analysis Report

MACHINE LEARNING (CS-324)

**Logistic Regression Analysis Report**

**Overview**

This report presents findings from a logistic regression analysis aimed at exploring the relationship between predictor variables and the likelihood of disease occurrence in patients post-transplant.

**Model Summary**

The logistic regression model utilized the following predictor variables:

* **TST (Years Since Transplant)**: A continuous variable indicating the number of years since transplant.
* **Sex**: A categorical variable representing the gender of the patient.
* **Type**: A categorical variable describing the genetic type of the patient's condition post-transplant.

The outcome variable of interest was the presence or absence of disease post-transplant.

**Odds Ratios**

The odds ratios for each predictor variable, along with interpretations, are as follows:

* **TST**: For each additional year since transplant, the odds of disease occurrence increase by approximately 1.52 times (OR = 1.52).
  + Interpretation: Patients further out from their transplant date are at increased odds of developing the disease compared to those closer to the transplant date.
* **Sex (Female)**: Females have odds of disease occurrence approximately 1.09 times higher than males (OR = 1.09).
  + Interpretation: Gender does not significantly affect disease odds, with females only slightly more predisposed than males.
* **Type (Genetic Type)**:
  + **Leu/Pro**: Patients with the Leu/Pro genetic type have odds of disease occurrence approximately 7.81 times higher than those with other types (OR = 7.81).
    - Interpretation: Genetic type strongly influences disease susceptibility, with Leu/Pro carriers significantly more likely to develop the disease.
  + **Pro/Pro**: Patients with the Pro/Pro genetic type have odds of disease occurrence approximately 6.48 times higher than those with other types (OR = 6.48).
    - Interpretation: Pro/Pro carriers also show a significantly increased likelihood of disease compared to other genetic types.

**Comparing Odds for Different Durations Since Transplant**

To further explore the impact of time since transplant on disease odds:

* **For TST = 3 years**:
  + Odds increase approximately 3.48 times (OR = 3.48).
* **For TST = 7 years**:
  + Odds increase approximately 18.39 times (OR = 18.39).
* **Comparison**:
  + Patients 7 years post-transplant have approximately 5.28 times higher odds of disease compared to patients at 3 years post-transplant.

This comparison underscores the progressive nature of disease risk with increasing years post-transplant.

**Conclusion**

In conclusion, the logistic regression analysis highlights significant associations between predictor variables (TST, Sex, Type) and disease occurrence post-transplant. Patients with longer durations since transplant, certain genetic types (Leu/Pro, Pro/Pro), and possibly female gender are identified as having increased odds of developing the disease. These findings are crucial for informing clinical management and personalized care strategies for post-transplant patients.

This report provides a comprehensive overview of the logistic regression findings and their implications in assessing disease risk post-transplant.