Predicting Anti-VEGF Therapy Response in Wet-AMD Patients

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**BACKGROUND**

Age-related Macular Degeneration (AMD) is predicted to affect almost 300 million people globally by 2040. Wet AMD rapidly progresses to blindness and accounts for about 90\% of blindness due to AMD.

Wet AMD's gold-standard treatment is lifelong anti-VEGF intravitreal injections, but about 10-20\% of patients are unresponsive to this therapy. For many patients, efficacy can currently be assessed after 3 injections.

**DATA**

566 Eyes | 487 patients
Average Age: 79 years (SD = 9)
Sex: 63\% Female
Race: White, Black, Asian, Native American, Other, Unknown

Medication: Aflibercept, Bevacizumab, Ranibizumab

**CLASSIFICATION**

After 3 injections, classes are:
- Strong: ΔETDRS > 5
- Moderate: -5 ≤ ΔETDRS ≤ 5
- Poor: ΔETDRS < -5

**CONCLUSION**

3D residual networks are promising tools for classifying anti-VEGF therapy responses as poor, moderate, and strong. Incorporating time series OCT images and additional clinical features has the potential to enhance the accuracy of predictions, leading to more personalized treatment plans for patients.

Accurately predicting anti-VEGF treatment response could aid healthcare professionals in making more informed decisions regarding future injections and overall treatment strategies, ultimately improving patient outcomes.

**BINARY CLASSIFICATION RESULTS**

Can Poor responders be distinguished from all others?
Can Strong responders be distinguished from all others?

**DEEP-LEARNING ARCHITECTURE**

We are creating a machine learning model that is capable of predicting wet AMD patients' responses to anti-VEGF therapies to help ophthalmologists choose optimal treatments on a personalized basis for each patient before they suffer irreparable eye damage.