Motivation

Endomyocardial biopsy (EMB) screening is the standard-of-care for assessing allograft rejections (Figure 1a)
• Manual interpretation of EMBs is affected by substantial inter-rater variability, leading to mistreatment with immunosuppressive drugs, unnecessary follow-up biopsies, and worsened transplant outcomes
• Objective and automated EMBs assessment could help mitigate these challenges

Evaluation & Results

• The model is trained on subset of data collected in USA
• Evaluation on 3 cohorts (Figure 1b) of diverse population, scanners & biopsy protocols, with results shown in Figure 3.
• Generalization to external cohorts without domain-specific adaptations

Reader-study

Independent reader study with 5 cardiac pathologists:
• AI-predictions are non-inferior to pathologists
• AI-assistance, in the form of attention heatmaps, reduce inter-rater variability & assessment time
• CRANE demonstrates potential of AI-integration into diagnostic workflow to
  • screen out negative cases
  • reduce inter-rater variability
  • increase efficiency of EMBs reads

Interpretability

Attention scores (Figure 4) enable visual interpretation of the predictive regions:
• High-attention (red) regions correspond to rejection morphology used by pathologist for diagnosis
• Low-attention (blue) scores are assigned mostly to benign tissue

Summary

• CRANE demonstrates potential of AI-integration into diagnostic workflow to
  • screen out negative cases
  • reduce inter-rater variability
  • increase efficiency of EMBs reads

AI-Model for Endomyocardial Biopsy Assessment

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