Microvascular Burden as a Risk Factor for Ménière's Disease

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Background

- Inner ear ischemia has been proposed as a contributor to Ménière's disease (MD).[1]
- Microvascular disease (small-vessel and endothelial dysfunction) can reduce perfusion across multiple end organs, including the inner ear, and managing vascular risk factors may improve MD control.[2,3]
- ACEi/ARBs and GLP-1 receptor agonists are both associated with improved endothelial function, suggesting they may also affect inner ear microvascular health.[4,5]
- **Objective:** To evaluate the association between microvascular conditions and incident MD, and to determine whether ACE inhibitor/ARB or GLP-1 receptor agonist use modifies MD risk.

Methods

- **Design:** Retrospective cohort study using TriNetX US Collaborative Network (~3.3M patients, 70 healthcare systems); queried Sep 19-20, 2025.
- **Cohorts:** Adults 40–80 years with hypertension, T2DM, CKD or retinopathy (≥1y disease duration), identified by ICD-10 codes.
- **Exclusions:** Prior MD, brain/cranial nerve neoplasms, BPPV, pre-existing hearing loss.
- **Analysis 1:** Each condition cohort *vs.* matched controls without microvascular conditions → Incident MD **(Figure 1)**.
- **Analysis 2:** Within each condition cohort, ACEi/ARB or GLP-1 RA exposure *vs.* no exposure → Incident MD **(Figure 2)**.
- **Statistics:** 1:1 propensity-score matching (nearest neighbor, caliper 0.1); odds ratio with 95% CI.

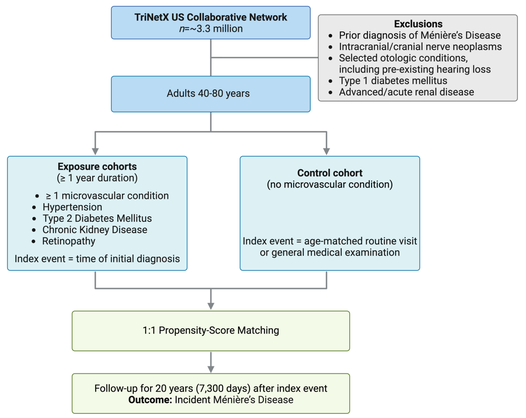


Figure 1. Study Design for Primary Analysis

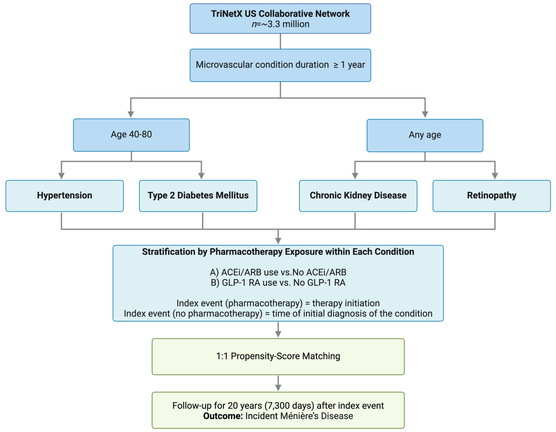


Figure 2. Study Design for Secondary Analysis

Results

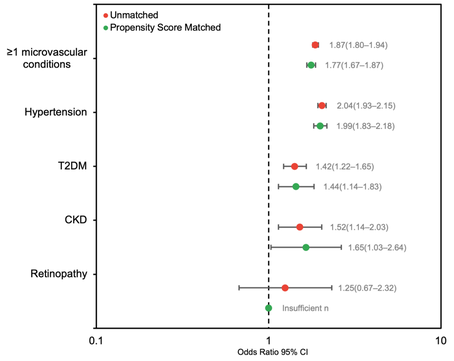


Figure 3. Association of microvascular conditions with incident MD before (red) and after PSM (green)

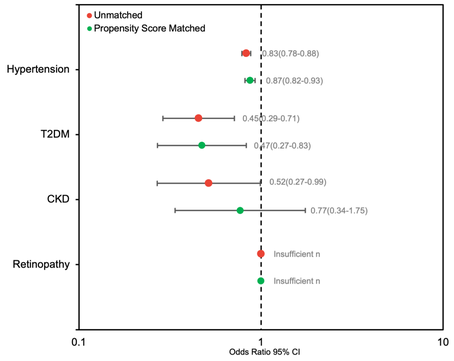


Figure 4. Association between ACEi/ARB use and incident MD across microvascular conditions before (red) and after PSM (green)

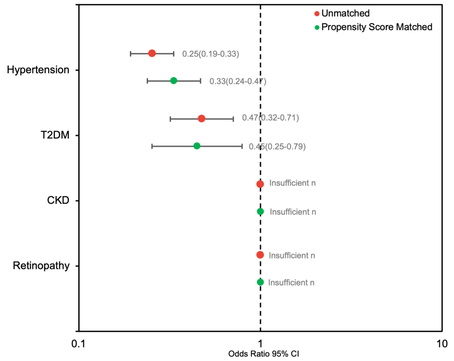


Figure 5. Association between GLP-1 RA use and incident MD across microvascular conditions before (red) and after PSM (green)

Key Findings

Any microvascular condition was associated with **77% higher odds** of incident Ménière's disease (OR 1.77) vs. matched controls.

- Hypertension (OR 1.99), T2DM (OR 1.44), and CKD (OR 1.65) were each independently associated with increased MD risk.
- Retinopathy showed a similar but unadjusted trend (OR 1.25); sample size was insufficient for a matched analysis.
- ACEi/ARB use was associated with lower odds of incident MD in hypertension (OR 0.87) and T2DM (OR 0.47); CKD showed a similar but non-significant trend (OR 0.77).
- GLP-1 RA use showed an even larger protective association in hypertension (OR 0.33) and T2DM (OR 0.45); sample sizes were insufficient for CKD or retinopathy analyses.

Conclusions

- Hypertension, T2DM, and CKD were associated with increased odds of incident MD.
- ACEi/ARB and GLP-1 receptor agonist use were associated with lower odds of MD in patients with hypertension and T2DM.
- These findings support a potential role for vascular and endothelial mechanisms in MD pathogenesis and warrant prospective investigation.

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