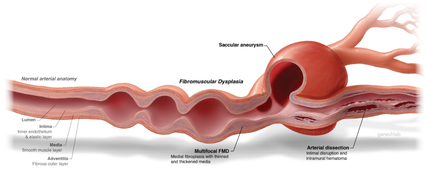
Does Fibromuscular Dysplasia Cause Chronic Kidney Disease? A Two-Sample Mendelian Randomization Study

Frederick J. Boehm
Min-Lee Yang
Xiang Zhou
Santhi K. Ganesh
University of Michigan

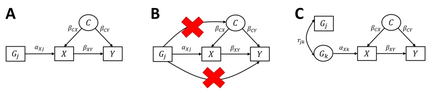
Introduction

Fibromuscular dysplasia (FMD) is a systemic disease of artery walls that decreases target organ perfusion. Approximately 90% of FMD cases are women. Investigators have identified **chronic kidney disease (CKD)** as a possible consequence.



- FMD often affects renal arteries [Oli+12].
- FMD complications include stroke, dissection, & aneurysm [Oli+12].

Mendelian Randomization



[Lee+22]

CKD GWAS [18]

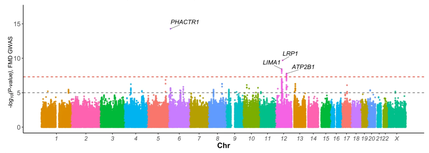
- 194,174 female UK Biobank subjects [Byc+18]

We failed to detect a causal effect of FMD on CKD. However, due to the **small FMD GWAS sample size**, we had **limited power**.

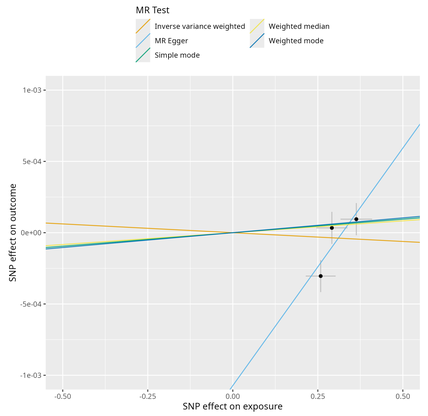
Take a picture to visit the Github repository

FMD GWAS Meta-analysis [Geo+21]

- Six case-control studies from USA and Europe
- 1556 cases & 7100 controls
- Tested 5.5 million SNPs
- Identified four risk loci for FMD: *PHACTR1, LRP1, LIMA1, ATP2B1*



MR Results



Conclusion

- No MR evidence that FMD causes CKD
- Larger FMD GWAS needed

Contact

Fred Boehm frederick.boehm@gmail.com
`https://fboehm.us`
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References

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[18] *UK Biobank GWAS*. `http://www.nealelab.is/uk-biobank/`. Accessed: 2024-04-15. Aug. 2018.

[Geo+21] Adrien Georges et al. "Genetic investigation of fibromuscular dysplasia identifies risk loci and shared genetics with common cardiovascular diseases". In: *Nature communications* 12.1 (2021), p. 6031.

[Lee+22] Christiaan de Leeuw et al. "Understanding the assumptions underlying Mendelian randomization". In: *European Journal of Human Genetics* 30.6 (2022), pp. 653–660.