UTILITY OF USING ONLY LEFT-SIDED ADRENAL VEIN SAMPLING DATA IN LATERALIZING PRIMARY ALDOSTERONISM

W Brandon, H Carmichael, B Launer, RC McIntyre Jr., L Fishbein, MB Albuja-Cruz, PS Trivedi, CD Raeburn

University of Colorado School of Medicine, Aurora, CO

University of Colorado
Denver | Anschutz Medical Campus

Background

- Primary Aldosteronism (PA) is hypersecretion of aldosterone from unliteral adrenal adenomas or bilateral hyperplasia.
- Adrenal vein sampling (AVS) is a procedure in which aldosterone and cortisol are sampled from each adrenal gland and the IVC.
- AVS is the gold standard diagnosis, however it is technically challenging.
- Failure rates have been reported to be as high as 50% at some facilities.[1]
- Difficulty cannulating the right adrenal vein with its anatomic variations and angulating course is largely to blame for high failure rates.[1]
- It has been hypothesized that left adrenal vein (LAV) and IVC data can predict laterality by comparing aldosterone/cortisol ratios.
- Previous groups reported LAV/IVC aldosterone/cortisol ratios of >5.5 and <0.5 accurately predicted left- and right-sided disease, respectively.[2]
- We hypothesize that these cutoffs can accurately predict laterality at our institution.

Results

- AVS was successful on first attempt in 60 patients (89.6%) with 7 patients undergoing successful repeat AVS.
- Based on assessment of complete AVS data, 48 patients (71.6%) had unilateral and 19 (28.4%) had bilateral disease.
- If only the LAV/IVC data were utilized (Figure 1), the upper cutoff (>5.5) was 100% specific (100% PPV) for correctly predicting left lateralization; however, the sensitivity was only 14% (3 of 21 patients met the > 5.5 cutoff).
- The lower (<0.5) LAV/IVC cutoff was only 90% specific (85% PPV) and would have resulted in 4 out of 19 patients in the bilateral cohort being incorrectly identified as lateralizing to the right.
- Lowering the LAV/IVC cutoff to <0.1 resulted in 100% specificity/PPV for both high and low cutoffs, but would have resulted in 33/48 patients with unilateral disease having inconclusive results.
- This would still allow for ~22% (15/67) of patients to avoid repeat AVS if these guidelines were followed.

Conclusion

- Published LAV/IVC "5.5-0.5" criteria would have correctly predicted laterality in 26/48 (54%) of our patients with unilateral disease, but would have incorrectly predicted unilateral disease in 4/19 (21%) patients with bilateral disease, leading to unnecessary surgery.
- Adjusting the LAV/IVC criteria to "5.5-0.1" achieved 100% PPV but limited the utility, as only ~20% of AVS patients would meet the criteria.
- Thus, the LAV/IVC ratio may be useful in guiding management of PA in select patients with unsuccessful AVS; however, the decision of whether to repeat AVS versus proceed to surgery should be based on careful discussion between surgeon and patient.

References

1. Rossi GP, Auchus RJ, Brown M, et al. "An expert consensus statement on use of adrenal vein sampling for the subtyping of primary aldosteronism." Hypertension 2014;63:151-60.
2. Pasternak, Jesse D., et al. "Diagnostic Utility of Data from Adrenal Venous Sampling for Primary Aldosteronism despite Failed Cannulation of the Right Adrenal Vein." Surgery, vol. 159, no. 1, 2016, pp. 267–274., doi:10.1016/j.surg.2015.06.048.

Methods

- Retrospective review was performed on all patients undergoing AVS at our institution from 2012-2019 (n=67).
- AVS was performed with ACTH stimulation, adrenal veins were cannulated sequentially with a selectivity index (AV/IVC cortisol level) > 5 defined successful cannulation.
- Only patients with complete AVS data were included.
- A lateralization index (high-side aldosterone/cortisol over low-side aldosterone/cortisol) > 4 defined unilateral disease.
- Results were then analyzed as if the RAV data was unavailable, utilizing only the LAV/IVC "5.5-0.5" criteria to predict laterality.
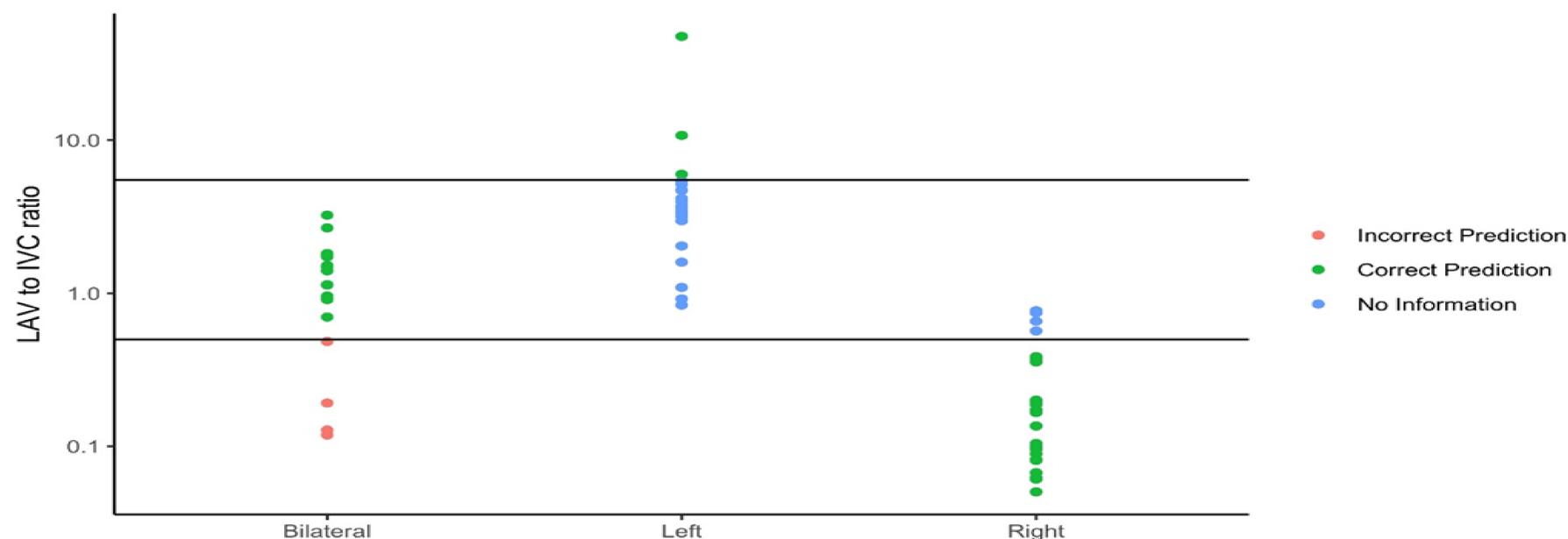

Figure 1. Analysis of LAV/IVC aldosterone/cortisol "5.5-0.5 Rule"