

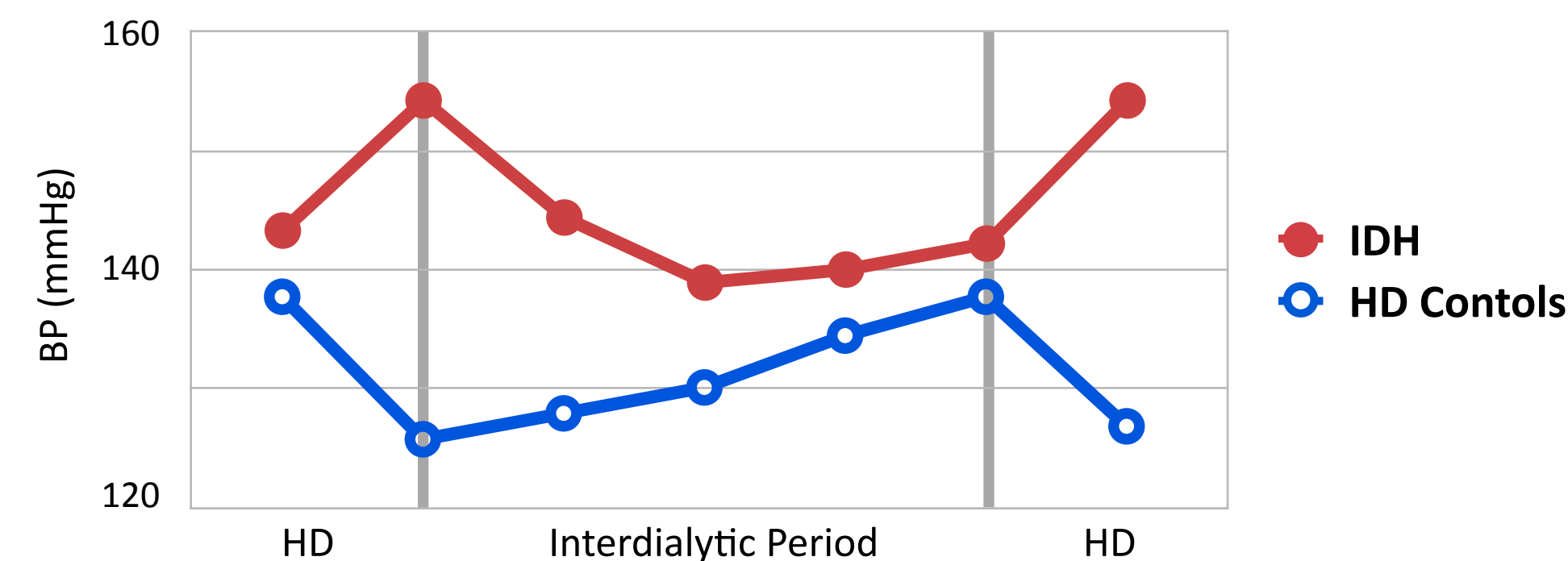
# The Effect of Extracellular Volume Status on Intradialytic Hypertension

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## INTRODUCTION

- Intradialytic hypertension (IDH), defined as an increase in systolic blood pressure (BP) >10 mmHg from pre to post-hemodialysis (HD), occurs frequently in 15% of HD patients.
- Patients with IDH display higher overall ambulatory BP and have higher mortality rates when compared to HD controls.
- As extracellular volume (ECV) overload contributes to HTN in HD patients, it has been proposed that IDH patients have increased ECV.
- Still, atypical ambulatory BP patterns seen in IDH patients suggest ECV may not be a primary determinant of BP in this population.

**IDH Patients Challenge the Paradigm of Volume-dependent HTN**



- Hypothesis**  
Extracellular volume will be similar in patients with IDH and HD controls when adjusting for total body water.
- Specific Aim**  
To compare extracellular fluid in IDH patients and HD controls.

## METHODS

- In a case control study we recruited hypertensive HD patients with pre HD systolic BP >140 mmHg.
- Case subjects with IDH were defined as having systolic BP increases >10 mmHg from pre to post-HD.
- Control subjects were defined as having systolic BP decreases >10 mmHg from pre to post-HD.
- Total body water and extracellular water were measured before and after HD using bioimpedance spectroscopy.
- We compared the ratio of ECV to total body water between groups using t-tests for pre and post-HD measurements.

## RESULTS

**Table 1. Baseline Characteristics**

Patient Characteristics	Case Subjects n = 6	Control Subjects n = 5	p-value
Average Age	56.7	46	
Male Gender (%)	83	80	
African American (%)	16	20	
Hispanic (%)	66	60	
Current Tobacco Use (%)	16	0	
On Dialysis < 1 Year (%)	33	40	
Diabetes mellitus (%)	66	60	
Coronary artery disease (%)	0	40	
More Than 2 Antihypertensive Drugs (%)	50	40	
Average Predialysis Systolic BP	138.3 (15.2)	170 (22.7)	0.04
Average Postdialysis Systolic BP (mmHg)	161.2 (18.9)	143 (26.5)	0.2
Average Change in Systolic BP During Dialysis (mmHg)	22.9 (16.7)	-26.8 (26.5)	0.02
Dry Weight (kg)	72.6 (16.9)	85.7 (24.7)	0.3
Average Percent of Dry Weight Gained Between Treatments	3.4 (1.4)	4.2 (1.6)	0.4
Average Percent of Dry Weight Removed During Dialysis	3.4 (1.4)	4.0 (1.3)	0.6

**Table 2. Blood Pressure and Volume Status Results During Study Period**

	Case Subjects n = 8	Control Subjects n = 5	p-value
Predialysis Systolic BP (mmHg)	133.8 (10.8)	157.2 (33.8)	0.2
Postdialysis Systolic BP (mmHg)	157.3 (22.3)	143.2 (39.9)	0.5
Change in Systolic BP During Dialysis (mmHg)	21.9 (15.6)	-14 (23.3)	0.02
Predialysis Total Body Water (L)	47.7 (7.80)	48.9 (11.7)	0.9
Predialysis Extracellular Water (L)	22.9 (3.10)	22.5 (5.50)	0.9
Predialysis Extracellular/Total Body Water	0.482 (0.03)	0.458 (0.02)	0.2
Postdialysis Total Body Water (L)	45.5 (8.90)	45.5 (11.9)	0.9
Postdialysis Extracellular Water (L)	20.4 (3.70)	19.5 (4.80)	0.7
Postdialysis Extracellular/Total Body Water	0.45 (0.02)	0.429 (0.02)	0.1

## DISCUSSION

- The ratio of extracellular water to total body water was similar in subjects with IDH both before and after HD compared to HD controls.
- While a larger sample size will be required to establish whether extracellular volume status is different in this patient population, the results of this study suggest increased ECV is not the primary determinant of IDH.

## CONCLUSION

- Increases in extracellular volume is not a distinguishing feature of intradialytic hypertension.
- Further etiologies for increased BP including excessive vascular resistance should be explored to explain the phenomenon of intradialytic hypertension.