

### INTRODUCTION

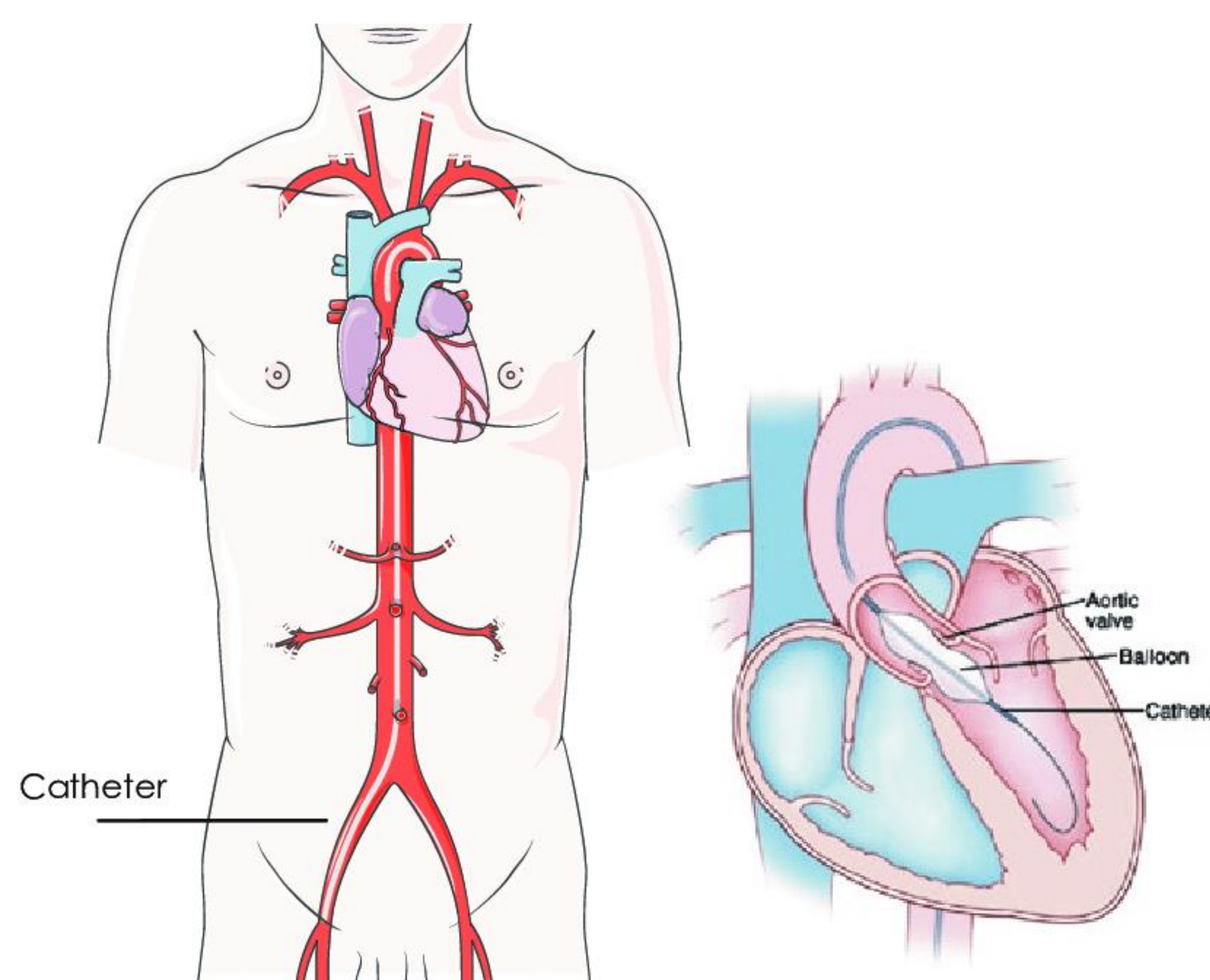
- ❖ Patients with end-stage renal disease (ESRD) and aortic stenosis (AS) have generally worse outcomes following transcatheter-aortic valve intervention (TAVR) compared to non-ESRD patients.<sup>1,2</sup>
- ❖ Management of chronic hypotension and symptomatic orthostasis in ESRD patients is challenging as the etiology is often multifactorial.
- ❖ This requires integrating complex mechanisms that mediate blood pressure regulation often with competing solutions.

### CASE PRESENTATION

- ❖ 74-year-old male with a complicated medical history:
  - ESRD on home peritoneal dialysis
  - Recurrent bacteremia
  - Chronic hypotension (years) supported by an oral alpha-adrenergic agonist (Midodrine)
- ❖ Chief Complaint:
  - Recurrent syncopal episodes
  - Chronic hypotension, in the past one year, had worsened to the point that hemodialysis (HD) was not tolerated due to low blood pressures, and he had been converted to peritoneal dialysis (PD)
- ❖ Previous work-up:
  - During initial inpatient evaluation for syncope, the patient underwent a transthoracic echocardiogram (TTE) revealing severe AS
  - The patient was also treated for symptomatic staph epidermis bacteremia, with suspected source being PD access catheter associated
  - Supportive management was pursued with nephrology recommending less PD exchanges
  - Finally, percutaneous balloon aortic valvuloplasty (BAV) was performed
    - The mean gradient post-BAV across the aortic valve improved [Figures 2 & 3]: 43mmHg (severe) → 24mmHg (moderate) with a preserved ejection fraction (65%)
    - 12 days later, the patient returned to the hospital after another syncopal episode
- ❖ Outcome:
  - After multidisciplinary discussion, the patient was determined to be prohibitive risk for TAVR intervention due to:
    - Hypotension
    - Recurrent bacteremia
    - Demonstration that improvement in the valve obstruction DID NOT result in significant symptom improvement

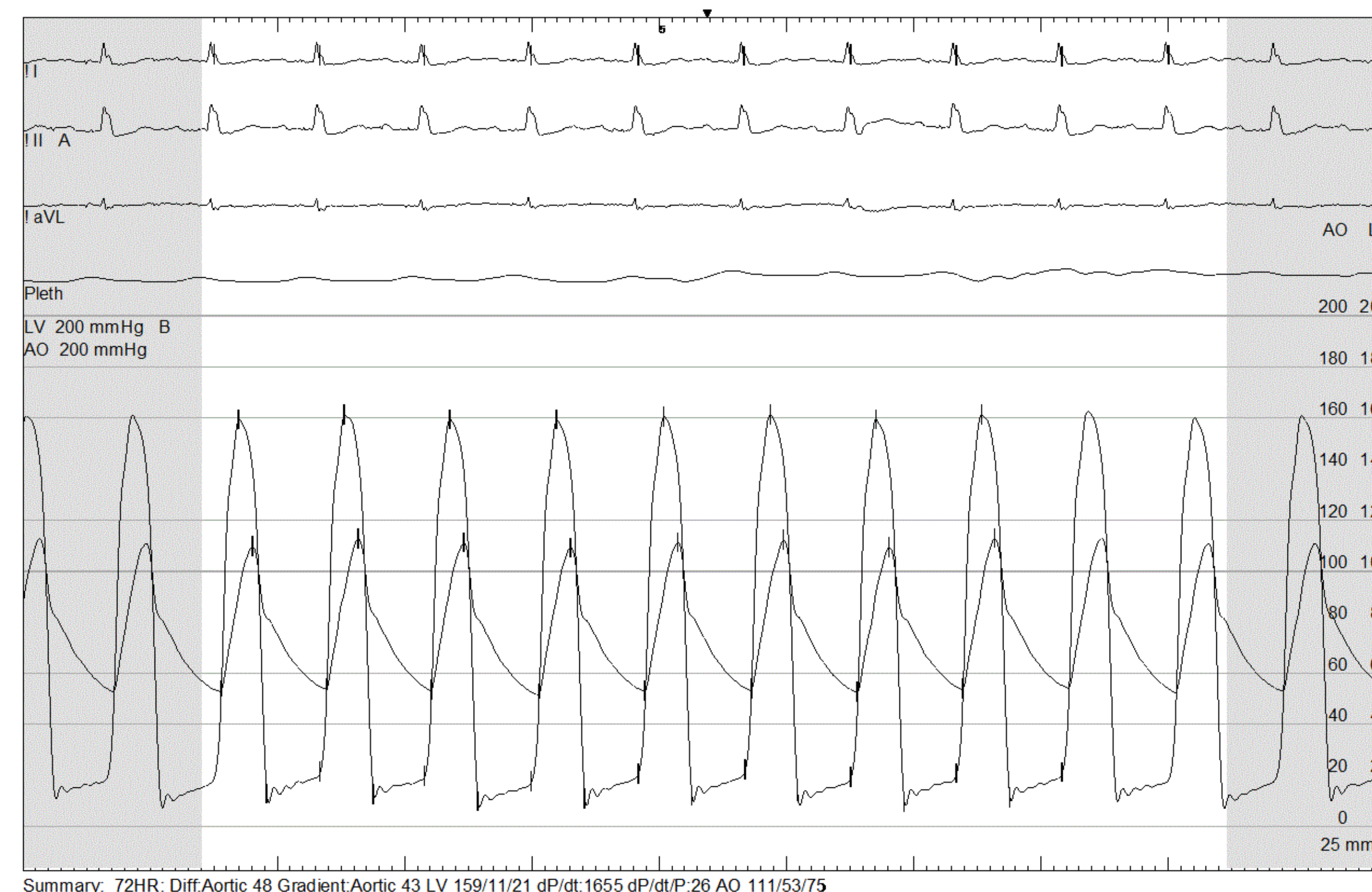
### FIGURES

**Figure 1: Balloon Aortic Valvuloplasty<sup>3</sup>**



*Balloon aortic valvuloplasty (BAV): The balloon catheter is advanced via femoral artery to the left ventricle and placed into the stenotic aortic valve where the balloon is inflated*

**Figure 2: Pressure Waveform Pre-BAV with MPG of 43mmHg**



Summary: 72HR: Diff:Aortic 48 Gradient:Aortic 43 LV 159/112/21 dP/dt:1655 dP/dt:P:26 AO 111/53/75

### DISCUSSION

- ❖ This case illustrates the challenges of managing both orthostatic hypotension in ESRD patients and severe AS.
- ❖ BAV is performed with a catheter-based balloon which is positioned across the stenotic aortic valve and inflated.<sup>4</sup>
- ❖ BAV relieves stenosis however it generally offers only transient symptomatic and hemodynamic relief.<sup>5</sup>
- ❖ The temporizing of the valve obstruction can be both diagnostic and therapeutic as it affords the ability to assess symptomatic response to potentially more invasive yet durable valve intervention.
- ❖ Our patient's orthostasis and syncope returned just one week after the procedure. Repeat TTE at that time showed valve gradients consistent with the post-BAV measurements and suggestive that severe AS was not the principal mechanism of his symptoms.
- ❖ Persistence of hypotension despite all efforts suggests autonomic dysfunction as the primary etiology. The patient's blood pressures marginally improved with midodrine as well, further supporting autonomic dysfunction as the primary cause of his hypotension.
- ❖ **In conclusion, this case illustrates how BAV was used to help unravel the primary etiology of symptomatic orthostatic hypotension in an ESRD patient and demonstrated that a high risk TAVR would not have resolved his symptomatology or improved quality of life and therefore was not pursued.**

**Figure 3: Pressure Waveform Post-BAV with MPG of 24mmHg**



Summary: 69HR: Diff:Aortic 22 Gradient:Aortic 24 LV 147/114/22 dP/dt:1318 dP/dt:P:21 AO 125/55/80

### REFERENCES

- <sup>1</sup>Mentias A, Desai MY, Saad M, Horwitz PA, Rossen JD, Panaich S, Jneid H, Kapadia S, Vaughan-Sarrazin M. Management of Aortic Stenosis in Patients With End-Stage Renal Disease on Hemodialysis. *Circ Cardiovasc Interv.* 2020 Aug;13(8):e009252. doi: 10.1161/CIRCINTERVENTIONS.120.009252. Epub 2020 Aug 10. PMID: 32772570; PMCID: PMC7422925.
- <sup>2</sup>Takuya Ogami, Paul Kurlansky, Hiroo Takayama, Yuming Ning, Ziad A. Ali, Tamim M. Nazif, Torsten P. Vahl, Omar Khalique, Amisha Patel, Nadira Hamid, Vivian G. Ng, Rebecca T. Hahn, Dimitrios V. Avgerinos, Martin B. Leon, Susheel K. Kodali and Isaac George. Long-Term Outcomes of Transcatheter Aortic Valve Replacement in Patients With End-Stage Renal Disease. *Journal of the American Heart Association.* 2021;10 (16)
- <sup>3</sup>Kogoj P, Devjak R, Bunc M. Balloon aortic valvuloplasty (BAV) as a bridge to aortic valve replacement in cancer patients who require urgent non-cardiac surgery. *Radiol Oncol.* 2014 Jan 22;48(1):62-6. doi: 10.2478/raon-2013-0078. PMID: 24587781; PMCID: PMC3908849.
- <sup>4</sup>Kawsara A, Alqahtani F, Eleid MF, El-Sabbagh A, Alkhouli M. Balloon Aortic Valvuloplasty as a Bridge to Aortic Valve Replacement: A Contemporary Nationwide Perspective. *JACC Cardiovasc Interv.* 2020 Mar 9;13(5):583-591. doi: 10.1016/j.jcin.2019.11.041. Epub 2020 Feb 12. PMID: 32061604
- <sup>5</sup>C M Otto, M C Mickel, J W Kennedy, E L Alderman, T M Bashore, P C Block, J A Brinker, D Diver, J Ferguson and D R Holmes Jr. Three-year outcome after balloon aortic valvuloplasty. Insights into prognosis of valvular aortic stenosis. *Circulation.*1994;89:642-650.