An Overlooked Cause of Heart Failure in Patients on Hemodialysis

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Background

- Cardiac output is usually normal or low in patients with heart failure (HF), but a minority of patients present in a high-output state, which has historically been referred to as high-output HF
- Pathophysiology is believed to be related to decreased systemic vascular resistance (Figure 1)
- When end-stage renal disease (ESRD) patients present with volume overload, generally inadequate dialysis and/or systolic or diastolic dysfunction are thought to be the culprits
- clinicians should be aware of the possibility of development of high output HF particularly in dialysis patients due to shunting of high volumes of blood through the arteriovenous fistula (AVF)

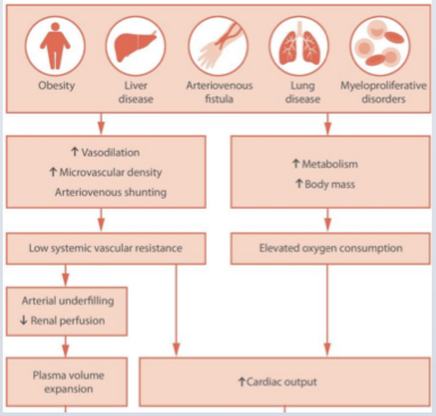

Figure 1. Pathophysiology of High-Output Heart Failure

Clinical History

- A 53 year old female with ESRD on dialysis and pulmonary hypertension on sildenafil with multiple prior admissions for shortness of breath
- presents with complaints of generalized weakness and worsening dyspnea
- Remained symptomatic despite being dialyzed aggressively with removal of over 15L of fluid
- Echo:
  - Hyperdynamic LV
  - reduced right ventricular function with moderate RV hypetrophy
  - severely elevated pulmonary pressures
  - high cardiac output (CO) of 11L/min, and elevated left sided filling pressures
- right heart catheterization:
  - CO of 10.5L/min
  - Wedge of 30mmHg
  - Pulmonary artery pressure
  - 93/39/61 mmHg
  - systemic vascular resistance (SVR) 798 dynes
- findings of high cardiac output with low SVR we consistent with possibility of high output HF
- After ruling out other etiologies of high output HF we concluded that the hemodialysis AVF was the likely culprit
- Vascular surgery was consulted and surgical plication of the AVF was done
- A follow up echo showed CO had decreased to 7L/min and the patient's symptoms significantly improved

Conclusions

- It is imperative for clinicians to be aware of potential complication of developing high output state through AVF shunting in dialysis patients.
- This case also highlights the value of obtaining hemodynamic data by the use of echo in suspected HF patients in determining the underlying etiology of their HF

References

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Disclosures

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