Prevalence and Correlates of Central Vein Occlusive Disease with Hemodialysis Arteriovenous Access Malfunction

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Introduction

Arteriovenous fistulas (AVFs) and arteriovenous grafts (AVGs) are the preferred modalities for long-term vascular access in patients undergoing maintenance hemodialysis. Despite their advantages, both access types are susceptible to malfunction, often due to thrombosis or venous outflow obstruction. Central vein occlusive disease (CVOD)—defined as ≥50% stenosis or complete obstruction of central thoracic veins—has emerged as a significant contributor to AV access dysfunction. CVOD is frequently underdiagnosed, particularly in low-resource settings, where delays in AV access creation and prolonged central venous catheter (CVC) use are common. In the Philippines, where imaging resources and vascular access planning are limited, the burden of CVOD remains poorly characterized. This study aims to determine the prevalence of CVOD among patients with malfunctioning AVFs or AVGs and to explore its clinical correlates and impact on intervention outcomes.

Methods

A retrospective cross-sectional study was conducted at the Philippine General Hospital, a national tertiary referral center, from January 2022 to July 2025. Adult patients (≥19 years) with end-stage renal disease who underwent endovascular or surgical intervention for AVF or AVG malfunction were included, provided venography was performed during the procedure. Data were extracted from operative logs, institutional databases, and patient charts, including demographics, access characteristics, prior CVC history, venographic findings, procedural outcomes, and complications. Descriptive statistics summarized baseline variables, while inferential analyses—including multivariate logistic regression—were used to identify associations between CVOD and

clinical factors such as age, sex, access type, catheter duration, and number of prior CVC insertions. Outcomes of thrombectomy and venoplasty were also compared between patients with and without CVOD.

Results

A total of 34 patients met inclusion criteria, with a mean age of 53.6 years (SD 11.1) and 38.2% female representation. The prevalence of CVOD among this cohort was 44.1% (95% CI: 27.4%–60.8%). CVOD lesions were most commonly located in the subclavian and innominate veins, with a mix of tapered occlusions, abrupt occlusions, and stenoses. Despite its high prevalence, CVOD was not significantly associated with thrombectomy success or post-intervention patency ($p > 0.05$). Multivariate analysis revealed no statistically significant correlation between CVOD and age, sex, access laterality, access age, duration of catheter use, or number of prior CVC insertions ($p > 0.05$ for all). Notably, many CVOD lesions were identified only during intervention, highlighting their subclinical nature. Procedural complications were infrequent and did not differ significantly between groups.

Conclusion

CVOD is a prevalent yet underrecognized contributor to AVF and AVG malfunction in the Filipino hemodialysis population. Its lack of association with traditional risk factors may reflect the limitations of small sample size or the multifactorial nature of central vein pathology. The frequent intraoperative discovery of CVOD underscores the need for routine pre-intervention venographic evaluation, especially in patients with prior catheter exposure. Early AV access planning and imaging may enhance procedural success and long-term patency, reducing the burden of repeated interventions. These findings support the integration of standardized vascular access surveillance protocols in resource-limited settings and lay the groundwork for future multicenter studies to better define CVOD epidemiology and outcomes.