Perspective

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Percutaneous Dialysis Access: An Evolving Approach to Vascular Access Management

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Introduction

Reliable vascular access is essential for patients requiring long-term hemodialysis, as it directly influences treatment adequacy, patient quality of life, and overall outcomes. Traditionally, surgical creation of arteriovenous fistulas (AVFs) and grafts has been the standard approach to dialysis access. In recent years, percutaneous dialysis access has emerged as an innovative, minimally invasive alternative that utilizes endovascular techniques to create functional vascular access without open surgery. This approach has gained increasing attention due to advances in imaging, device technology, and operator expertise [1,2].

Discussion

Percutaneous dialysis access primarily refers to the endovascular creation of arteriovenous fistulas using catheter-based systems under imaging guidance. These procedures are typically performed using ultrasound and fluoroscopy, allowing precise vessel targeting while minimizing tissue disruption. Compared with surgical AVF creation, percutaneous techniques offer several advantages, including reduced procedural time, avoidance of surgical incisions, and faster patient recovery. The minimally invasive nature of the procedure may also lower the risk of wound-related complications and improve patient acceptance [3,4].

Two main endovascular systems are currently used for percutaneous AVF creation, each employing different mechanisms to establish a controlled anastomosis between adjacent arteries and veins. Patient selection is critical, as suitable vessel anatomy and adequate vessel size are required for successful access creation. Pre-procedural vascular mapping with duplex ultrasonography plays a vital role in identifying appropriate candidates and optimizing outcomes [5].

Clinical studies have demonstrated that percutaneous dialysis access can achieve maturation rates and patency outcomes comparable to surgically created fistulas. Additionally, these accesses may offer improved cosmetic results and preservation of future access sites. However, percutaneous dialysis access is not without limitations. The need for specialized equipment, operator training, and imaging resources may restrict widespread adoption. Furthermore, some patients may still require secondary interventions to promote maturation or maintain long-term patency.

Conclusion

Percutaneous dialysis access represents a significant advancement in the management of vascular access for hemodialysis patients. By offering a less invasive alternative to surgical fistula creation, it has the potential to improve patient comfort, reduce recovery time, and expand access options for selected individuals. While long-term data continue to evolve, current evidence supports its safety and effectiveness in appropriately chosen patients. Integration of percutaneous dialysis access into clinical practice should be guided by multidisciplinary collaboration, careful patient selection, and ongoing surveillance.

As technology continues to advance, percutaneous approaches are likely to play an increasingly important role in the future of dialysis access management.

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