

## Learning Objectives

The purpose of this review is to characterize the indications, technique, and outcomes for physician-modified endovascular grafts (PMEG).

## Background

Endovascular techniques have largely replaced open surgery as the preferred treatment for abdominal aortic aneurysm (AAA) in patients with suitable anatomy due to significant reduction in perioperative mortality. Conventional endovascular aneurysm repair (EVAR) requires 10-15 mm of proximal landing zone (distal to renal arteries) to accommodate standard devices. However, many patients present with complex AAAs as defined by juxtarenal/pararenal involvement and thus inadequate landing zone. PMEG is a new treatment option for complex AAAs, with the potential to extend survival benefit to patients even with challenging anatomy. Extensive pre-procedural planning is crucial, with utilization of imaging to determine size and position of visceral branch origins. This information is used by physicians to modify the graft with custom fenestrations tailored to the patient's anatomy, marked by radiopaque suture for fluoroscopic visualization. During the procedure, the stent graft is positioned such that the fenestrations align with visceral branch origins. Once the stent graft is deployed, visceral branches are selected via contralateral groin access. Finally, covered stents are extended into the visceral branches to ensure adequate graft seal and maintain vessel patency.

## Results

A review of the literature was performed using PubMed. Included in our analysis was a single-center prospective study of 43 PMEGBs, a single-center study retrospective study of 41 PMEGBs and 41 conventional grafts, and a meta-analysis of 909 PMEGBs. Overall technical success rate was 99.4% for PMEG [1]. Survival at 30-days follow-up was 88%, with visceral branch patency rates ranging from 89-93% at a follow-up of 14±12 months [2]. Major adverse events at 30-days follow-up occurred in 15.5% of patients. No differences in perioperative complications, overall length of stay, type I or III endoleak, or survival were observed between PMEG and conventional EVAR at 1-year follow-up [3].

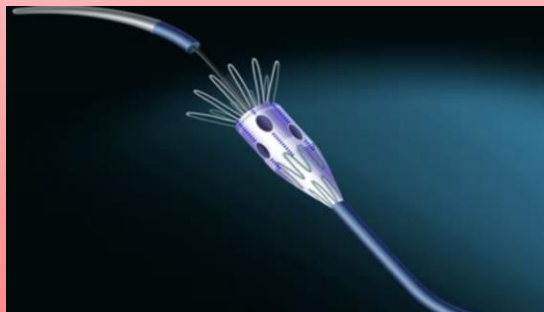


Figure 1. Unsheathed stent graft with custom fenestrations corresponding to the position of the superior mesenteric artery (SMA) and renal arteries



Figure 2. Stent graft deployed endovascularly in appropriate position, indicated by fenestrations aligning with visceral branch origins



Figure 3. Covered stents extending into visceral branches



Figure 4. Additional graft component extending into iliac arteries

Adapted from: Starnes et al., University of Washington (2013)

## Key Points

- PMEG is a viable option for management of complex AAAs, offering **survival benefit and perioperative outcomes** that are **comparable** to the conventional EVAR techniques used in more favorable anatomy.
- **Conclusions are limited** by the current lack of high quality data and long-term follow-up.
- Further studies are necessary to investigate **long-term outcomes of PMEG**.

## References

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