# The impact of the operator s learning curve on the outcomes of an off-the-shelf multi-branched endograft for the repair of complex abdominal and thoracoabdominal aortic aneurysms.

Andrea Vacirca, MD PhD, University of Bologna, Bologna, Italy
Enrico Gallitto, MD PhD FEBVS, University of Bologna, Bologna, Italy
Gianluca Faggioli, MD PhD, University of Bologna, Bologna, Italy
Antonio Cappiello, MD, University of Bologna, Bologna, Italy
Francesca Feroldi, MD, University of Bologna, Bologna, Italy
Marcello Lodato, MD, University of Bologna, Bologna, Italy
Fabrizio Cecere, MD, University of Bologna, Bologna, Italy
Antonino Di Leo, MD, University of Bologna, Bologna, Italy
Rodolfo Pini, MD PhD FEBVS, University of Bologna, Bologna, Italy
Mauro Gargiulo, MD PhD, University of Bologna, Bologna, Italy

**Objective:**

Branched endovascular aortic repair (BEVAR) has become a viable alternative to open surgery for pararenal (PAAAs) and thoracoabdominal aneurysms (TAAAs) in anatomically suitable cases. Off-the-shelf (OTS) endografts have shown reproducible outcomes worldwide for both elective and urgent procedures. However, these procedures are technically challenging, and the operator s learning curve may influence outcomes, especially in emergencies. This study aimed to report outcomes of OTS-BEVAR for PAAAs or TAAAs and analyze the impact of the operator s learning curve on early and mid-term outcomes.

**Methods:**

This retrospective, single-center, observational study considered all patients who underwent OTS-BEVAR (T-Branch, Cook Medical) from 2013 to 2023. The first and last 25 cases with at least 1-year radiological follow-up were grouped into Early Experience (EE) and Late Experience (LE) cohorts. Outcomes included technical success (TS), intraoperative target visceral vessel (TVV) loss, spinal cord ischemia (SCI), 30-day mortality, and TVV instability at 1 year. Secondary outcomes were procedure time, fluoroscopy time, radiation exposure, contrast media volume, and hospital stay.

**Results:**

Among 106 cases, 96/106 (91%) were TAAAs. Urgent repairs were performed in 73/106 (69%) patients. Multi-stage repairs were done in 88/106 (83%). TS was achieved in 87% cases, and intraoperative TVV loss occurred in 8%. Nineteen/106 (18%) patients died in the postoperative period; SCI occurred in 10% (permanent paraplegia in 3%). Median follow-up was 24 months. TVV instability rate at 1 year was 11%. Three-year survival and freedom from reintervention were 46% and 64%, respectively.

There were no differences between EE and LE in terms of demographics, cardiovascular risk factors, comorbidities and preoperative clinical or anatomical features. LE cases had higher TS (LE 100% vs. 68% EE, P=.004) and lower intraoperative TVV loss (LE 0% vs. 48% EE, P=.0001). LE cases also had reduced procedure (P=.04) and fluoroscopy times (P=.003), DAP (P=.04), contrast media volume (P=.005), and hospital stay (P=.03). LE had lower 1-year TVVs instability than EE (4% vs 32%, P=.04).

## Conclusion:

OTS BEVAR offers safe and effective treatment for PAAAs and TAAAs with satisfactory outcomes. LE cases showed improved technical success, reduced complications, and shorter procedure times, highlighting the importance of the operator s learning curve.