Comparative Learning Curves & Procedural Times For TF-CAS & TCAR – The Latter Is Easier

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Learning Curve: TF-CAS

Large European data sets reporting year-on-year outcomes for CAS

N = 2837

Smout J, Macdonald S et al
International Journal of Stroke 2010;5: 477-482

Systematic Review - Relationship Between Volume & Complication Rate: TF-CAS

Meta-regression analysis:

Years of experience

Negative Event Rate = 7.70 x Exp(-0.00220 x Number of Procedures Performed)

Numbers of Procedures

Negative Event Rate | Number of Procedures Performed (95% CI)
---|---
6% | 114 (37, 224)
5% | 197 (107, 325)
4% | 298 (193, 449)
3% | 429 (304, 609)
2% | 614 (460, 834)

VEITH 2015

Disclosures:

CMO of Silk Road Medical

VEITH 2015
Influence of Site & Operator Characteristics on Carotid Artery Stent Outcomes: Analysis of CAPTURE 2

180 US hospitals, 459 operators

N = 3388 asymptomatic non-octogenarians

* minority symptomatic population in CAPTURE 2
* no agreed (AHA) S/D thresholds for octogenarians

Outcomes as a function of the number of patients per physician in CAPTURE 2

Important Elements of the Learning Curve:

Catheterisation of Arch / Great Vessel Origins

* 20-40% of strokes during CAS be linked to access related difficulties

** In EVA3S, 5% randomized to CAS were crossed over emergently to CEA due to access problems; 15% had a stroke before CEA

Round 1: Anatomic Criteria

ACCESS:
- Low bifurcation / short CCA
- Tortuous CCA
- Diseased CCA
- Diseased / Occluded ECA

ARCH:
- Severe arch atheroma
- Severe arch origin disease
- Type III arch
- Bovine arch

TARGET VESSEL:
- Pinhole stenosis (flow beyond)
- Angulated ICA origin
- Angulated distal ICA
- Circumferential calcification of ICA

Towards Safer Carotid Artery Stenting

A Stenting System for Anatomic Suitability

Shaneen MacIntosh, FACP, FCR, MD; Robert Lee, MSc; Robin Williams, FBCL; Grey Sealy, FRCS, MD; on behalf of the Delphi Carotid Stenting Consensus Panel*

*Gray WA et al The CAPTURE Registry. Catheterization & Cardiovascular Interventions 2007;70:1025-1033

**Mas JL et al. NEJM 2006;355:1660-1671

Stroke 2009;40:1698-1703
Normal access ECA problem Diseased CCA

Normal target vessel

Angulated distal ICA

Normal arch

Standard lesion

Pinhole stenosis

Bovine arch

Standard lesion

Pinhole stenosis

Type III arch

Standard lesion

Pinhole stenosis

Bovine arch & Type III arch

Standard lesion

Pinhole stenosis

No arch atheroma

Arch atheroma

Delphi Validation: VR Simulation

Procedure Time

Willaert W et al; Ghent, St Mary’s (London), Freeman Hospital, Newcastle

Learning Curve: TCAR

Procedure times as measured from incision to arterial closure

30 minutes

Procedure Times for TCAR in ROADSTER

Compared with TF-CAS and CEA procedure times in CREST*

69 171 74
CONCLUSIONS:

• A major consideration during TF-CAS is catheterization of the arch & great vessel origins – a hazardous, rate-limiting step

• Learning curves for TF-CAS are impacted significantly by arch conditions

• Direct carotid access eliminates the complexity of arch navigation & may be more predictable than TF-CAS regarding procedural times