The dual-layer CGuard stent is safe and effective in emergent carotid artery stenting and in tandem occlusions: a multi-centric study

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Disclosure

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I do not have any potential conflict of interest

Background

Dual-layer stents have fallen into disrepute after several studies reported high rates of in-stent occlusions in acute stroke treatments

- Yilmaz et al. acute occlusion rate of 45% [1]
- Bartolini et al. 52.4% [2]
- Pfaff et al. 20.8% [3]

CGuard: single-center series including 33 patients (9% acute occlusion rate) reported by Klail et al [4]

Methods:

- Four German comprehensive stroke centers
- All consecutive AIS patients who underwent treatment with the CGuard stent
- Acute symptomatic extracranial ICA occlusion or high-grade stenosis with or without concomitant LVO
- NIHSS admission of ≥ 4 and a mRS score ≥ 3

Methods

- Successful recanalization (TICI) ≥ 2b
- Clinical, interventional and neuroimaging data were analyzed.
- Patency of the stent was measured using either CT, MRI or ultrasound within 72 hours.
- Intracranial hemorrhage and mRS at discharge were the main endpoints

Endovascualr procedure

- Tandem occlusions: A retrograde approach was preferred and an antegrade approach was only chosen if the passage of the proximal occlusion was not possible otherwise.

- There were no constraints regarding the use of stent retrievers or aspiration maneuvers for MT of the intracranial occlusion if applicable.

- In addition, there were no constraints regarding the succession of CAS with or without angioplasty and MT.

Periinterventional Heparin and DAP postinterventional

- i.v. heparin 3000 UI, and an additional 1000 IU for every additional hour during the intervention.
- i.v. acetylsalicylic acid (ASA) (500mg) or i.v. weight-adapted Tirofiban before stent-implantation.

- Residual stenosis was identified as stenosis ≥ 50% as assessed by intra-procedural angiography.
- Follow-up with cranial CT within 24 hours to exclude intracranial hemorrhage.
- If no contraindications were detected dual-antiplatelet therapy (DAPT) was started.

; posterior cerebral artery.

Results:

Successful deployment of all 96 stents without residual stenosis

	Acute carotid artery stenting with CGuard (n=96) (Mean ± STD) [N] , % (n/N) or median (IQR)
Age	70.2 ± 11.8
Gender	
Male	68.8% (66/96)
Female	31.2% (30/96)
Comorbidities	
Hypertension	57.3% (55/96)
Diabetes mellitus	27.1% (26/96)
Dyslipidemia	63.5% (61/96)
Atrial fibrillation	20.8.% (20/96)
Previous cardiovascular disease	36.5 % (35/96)
Preprocedural Characteristics	
Baseline ASPECTS	8 (7-9)
Baseline NIHSS	11 (7-17)
IV t-PA use	45.8% (44/96)
Admission mRS	4 (3-5)
Complete occlusion of the cervical ICA	76% (73/96)
Tandem lesions and intracranial occlusion site	86.4% (83 / 96)
Petrous or cavernous segment of ICA	4.8% (4/83)
Terminal segment of ICA	13.2% (11/83)
M1	59.0% (49/83)
M2	18.1% (15/83)
ACA	3.6% (3/83)
PCA	1.2% (1/83)
ICA Dissections	6.3% (6 / 96)

Peri- and postprocedural antiplatelet and anticoagulation therapy

	Acute carotid artery stenting with CGuard (n=96) % (n/N)
Periprocedural antiplatelet and anticoagulation therapy	
ASA	45.8% (44/96)
ASA + Heparin	14.6% (14/96)
Tirofiban	36.5% (35/96)
ASA + Heparin+ Tirofiban	3.1% (3/96)
Postprocedural antiplatelet and anticoagulation therapy	
ASA + Clopidogrel	58.3% (56/96)
ASA + Ticagrelor	37.5% (36/96)
ASA + Apixaban	1% (1/96)
Only ASA	3.1% (3/96)

95.8% DAPT

	Acute carotid artery stenting with CGuard (n=96) (Mean ± STD) [N] , % (n/N) or median (IQR)
Balloon Angioplasty **Predilation** **Postdilation**	 35.4% (34/96) 60.4% (58/96)
Applied stent **Stent diameter (mm)** **Stent length (mm)**	 8 (8-9.5) 40 (40-40)
TICI **2a** **2b** **3**	 2.1% (2/96) 52.1% (50/96) 45.8% (44/96)
Stent patency: **In-stent occlusion** **In-stent stenosis**	 5.2% (5/96) 3.1% (3/96)
Hemorrhagic transformation or intracranial hemorrhage **Total hemorrhage of any ECASS type** **HI1** **HI2** **PH1** **PH2** **sICH**	 17.7% (17/96) 9.4 % (9/96) 2.1% (2/96) 3.1 % (3/96) 3.1% (3/96) 5.2% (5/96)
Clinical outcome **mRS at discharge**	 2 (1-4)

Stent patency and outcome:

- **In-stent occlusion 5.2% (5/96)**
- **In-stent stenosis 3.1% (3/96)**
- **sICH 5.2% (5/96)**
- **mRS at discharge: 2(1-4)**
- **Follow-up between 6 to 12-months was available in 52 patients (54.2%) and all stents were patent**

- **In-stent occlusion 5.2% (5/96)**

a) **1 Patient treat with SAPT for AF with Apixaban**

b) **2 Patients with dissections**

- **In-stent stenosis 3.1% (3/96)**

a) **Only one patient with a in-stent stenosis > 70 and was retreated electively**

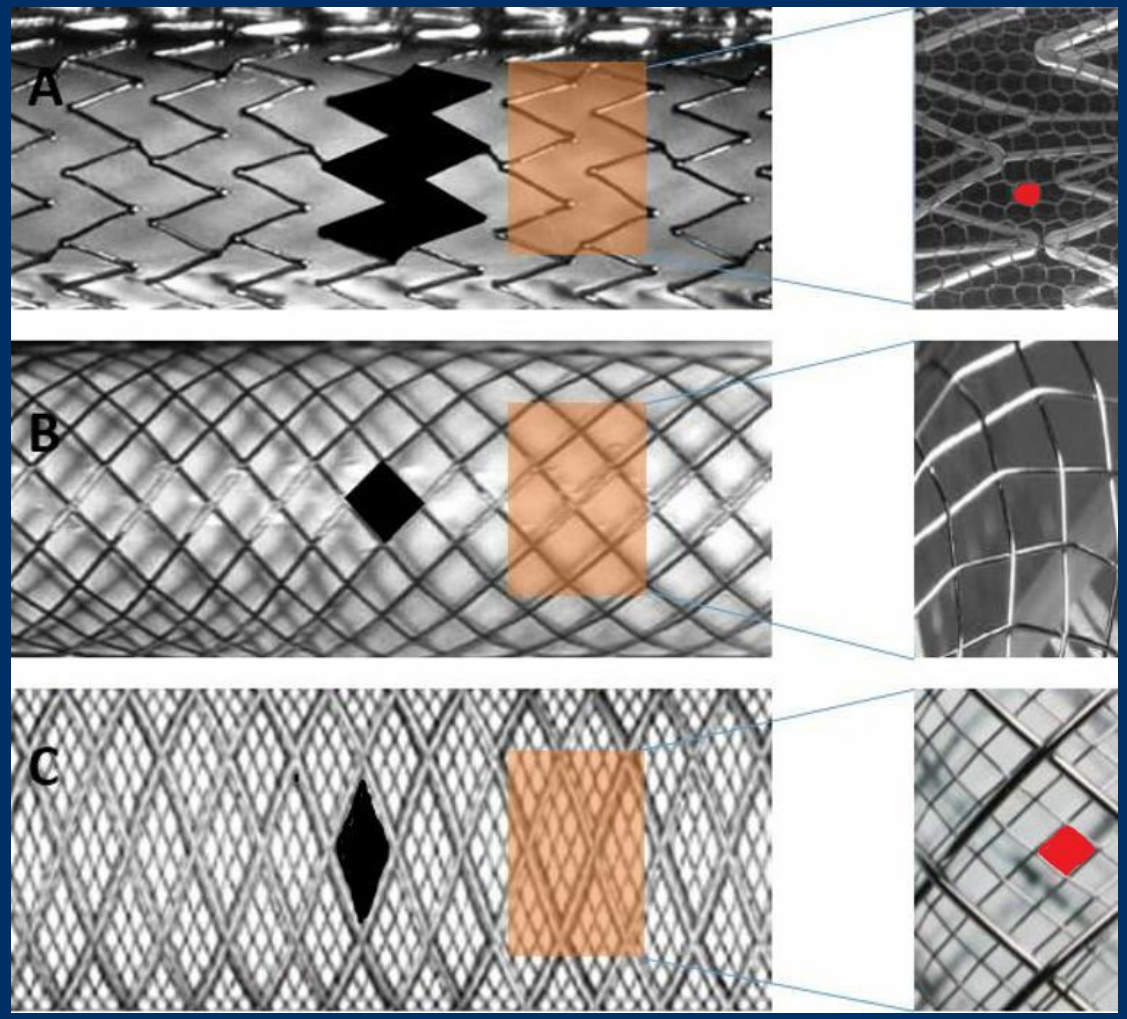
The subgroup analysis depending on the ***antiplatelet regimen*** did not reveal ***any significant differences*** regarding in-stent-occlusions or –stenosis

Conclusions:

Difference to other DLSs could be explained :

- by the difference in stent design
- insufficient antiplatelet therapy

Our study shows that the CGuard stent provides reduced thrombogenicity under adequate peri- and postprocedural antiplatelet therapy



Limitations

Retrospective and multicenter nature of the study implies:

- Heterogenous peri- and postinterventional medication regimes possibly influencing patient outcomes as well as the endpoints in-stent occlusion rate and intracranial hemorrhage rate.

- Long-term follow-up data was unavailable in almost half of the cases limiting the long-term assessment of stent patency.

References:

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Thank you for your attention!