Angioplastie Carotidienne ACTUALITES

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BIARRITZ, APPAC, Juin 201

Conflit d'intérêts

- Le seul : j'appartiens à un service qui pratique l'angioplastie carotidienne depuis février 1995

Quelques Rappels Utiles

- Lésions carotidiennes représentent entre 15 et 20 % des causes d' accident vasculaire cérébral
- La détection des lésions carotides est devenu facile grâce aux progrès de l'échographie- Doppler
- Les sténoses carotides sont découvertes fortuitement (asymptomatiques) ou après un accident ischémique transitoire ou AVC majeur mineur (symptomatiques) . Les expressions scanner ou I.R.M. sont toujours considérées comme asymptomatiques ?
- La première endartériectomie carotidienne date de 1953 et la première angioplastie carotidienne sans stent date de 1977 .
- L'étude NASCET date de 1991 et ACAS de 1995 .

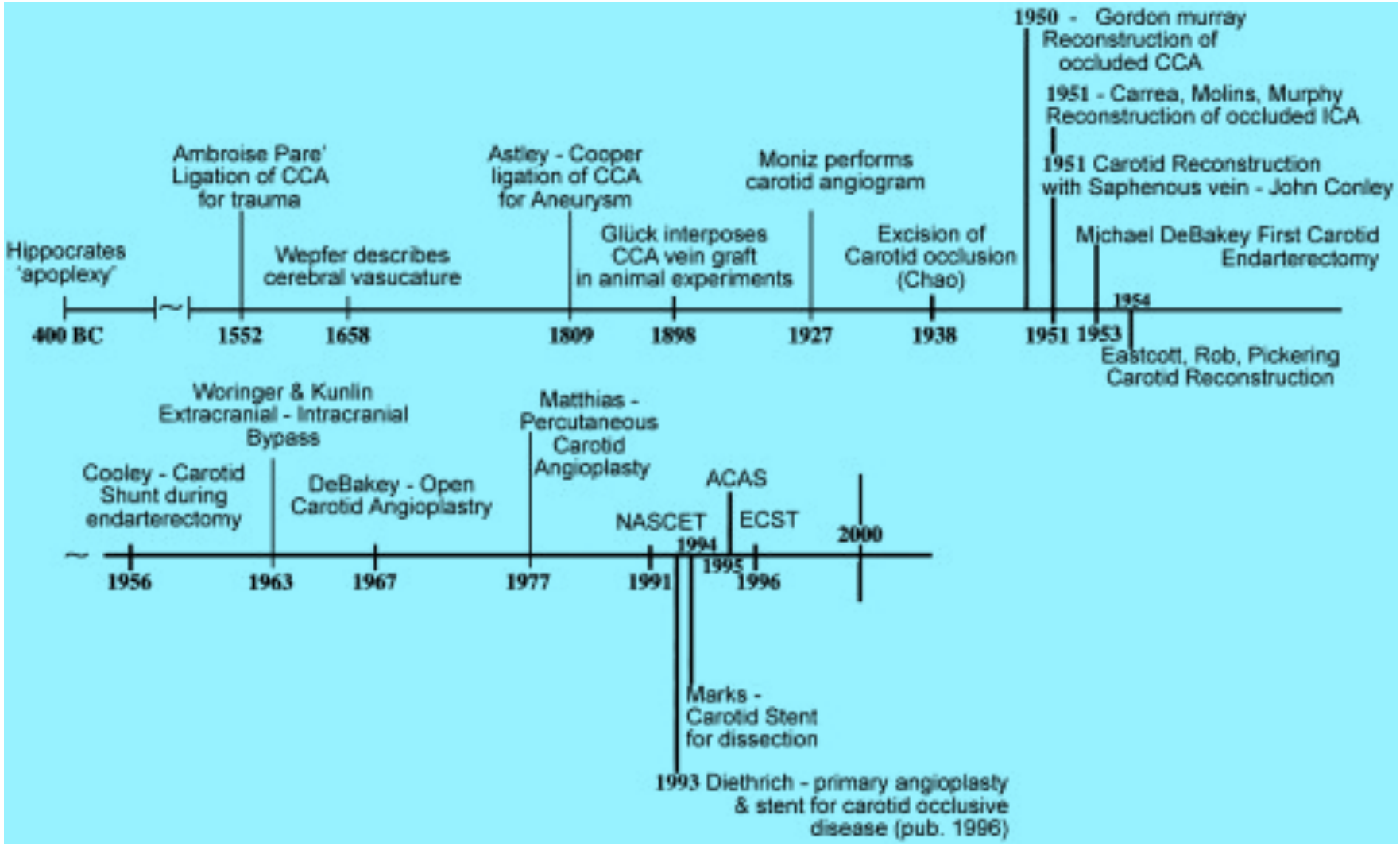


Table 1. Major events in the development of carotid surgery

F Robicsek, T.S Roush, J.W Cook, M.K Reames

From Hippocrates to Palmaz-Schatz, The History of Carotid Surgery

European Journal of Vascular and Endovascular Surgery, Volume 27, Issue 4, 2004, 389–397

Les grandes études randomisées : Chirurgie≠Traitement médical (BMT)

- Les grandes études NASCET, ESCT … ont montré la supériorité du traitement chirurgical (endartériectomie) sur le traitement médical chez les patients symptomatiques de moins de 6 mois avec des sténoses > 50 %

- Les études ACAS et ACST ont montré la supériorité du traitement chirurgical sur le traitement médical chez les patients asymptomatiques avec des sténoses > à 75 %

Stenting versus Chirurgie

- L'apparition du stenting carotidien dans les années 90 à semé le trouble dans ce duel chirurgie v traitement médical.
- Sur quels malades (symptomatiques ou asymptomatiques), sur quelle lésion , par quelle voie(fémorale radiale), parce quelle technique ,par quel système de protection, par quel stent, par quel opérateur…
- À ce duo il faut rajouter un un troisième médecin, le neurologue qui privilégie toujours le traitement médical

PLAN

- **Quand faut-il intervenir ?**
- **Les actualités techniques du stenting carotidien**
- **Les résultats à long terme**
- **Quelques recommandations**
- **Débuter un programme d'angioplastie carotide en cardiologie**

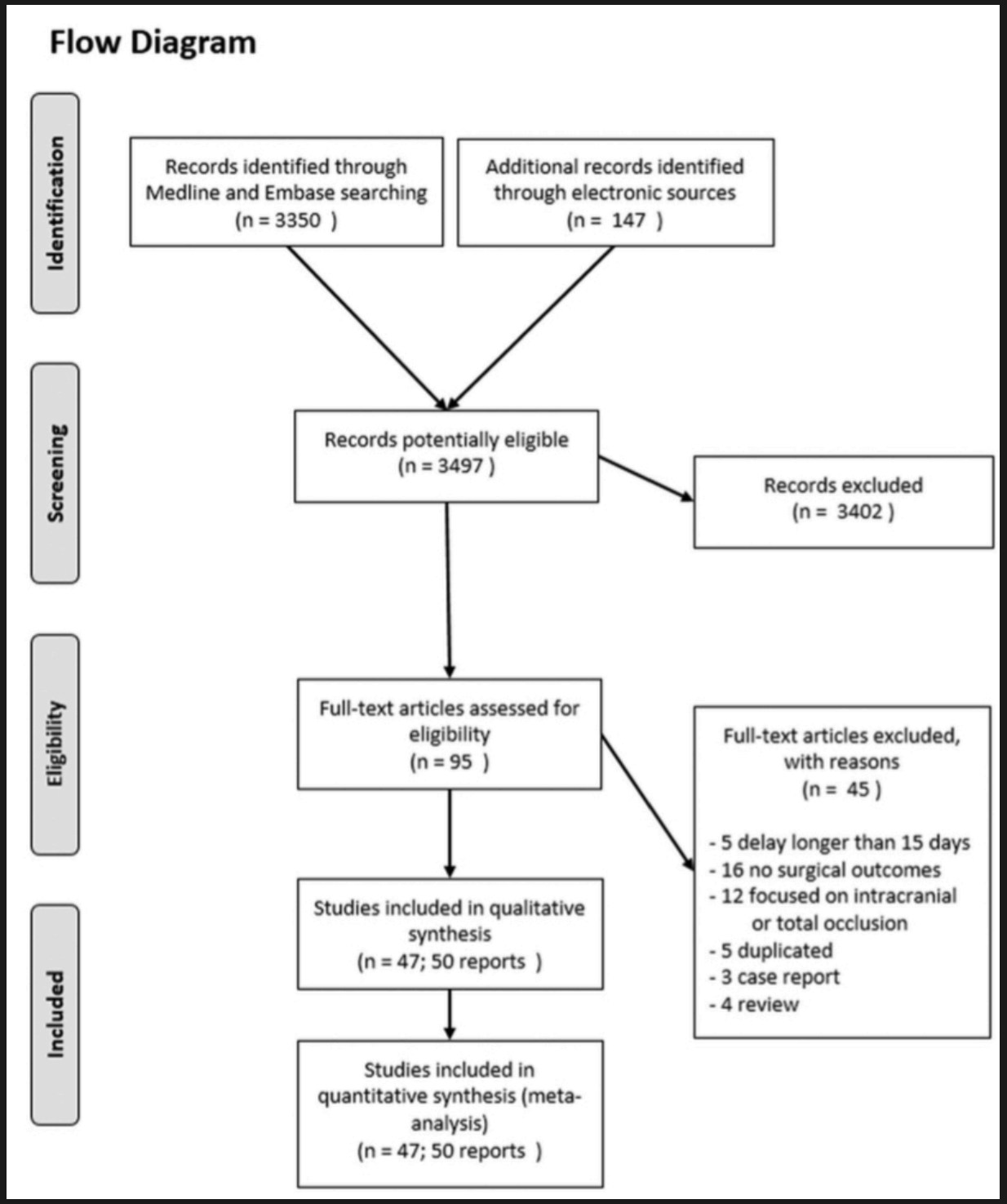
Timing of Carotid Treatment

Summary of Evidence on Early Carotid Intervention for Recently Symptomatic Stenosis Based on Meta-Analysis of Current Risks

Paola De Rango, MD, PhD; Martin M. Brown, MD; Seemant Chaturvedi, MD; Virginia J. Howard, PhD; Tudor Jovin, MD; Michael V. Mazya, MD, PhD; Maurizio Paciaroni, MD, PhD; Alessandra Manzone, MS; Luca Farchioni, MD; Valeria Caso, MD, PhD

Stroke 2015; 46: 3423-36

From I van Herzele



Multidisciplinary

47 studies

- 35 on CEA
- 7 on CAS
- 5 on CAS + CEA

Reported on CEA/ CAS within

15d from neurological event

	Periop Stroke % Proportion (95% CI)
CEA - TIA subgroup	
0-15 days	1.64 (0.72-2.94)
0-7 days	1.51 (0.47-3.10)
0-48 hours	2.74 (0.45-6.87)
CEA - Stroke subgroup	
0-15 days	4.99 (3.55-6.61)
0-7 days	5.31 (2.74-8.67)
0-48 hours	7.95 (4.58-12.15)
CAS – TIA subgroup	
0-15 days	2.07 (0.17-6.02)
0-7 days	1.93 (0.11-5.91)
0-48 hours	2.07 (0.17-6.02)
CAS – Stroke subgroup	
0-15 days	7.96 (2.31-16.58)
0-7 days	7.94 (1.26-19.61)
0-48 hours	7.94 (1.26-19.61)

Pooled Periprocedural Stroke Risk

< 15 days
CEA 3.4%
CAS 4.8%

<7 days
CEA 3.3%
CAS 4.8%

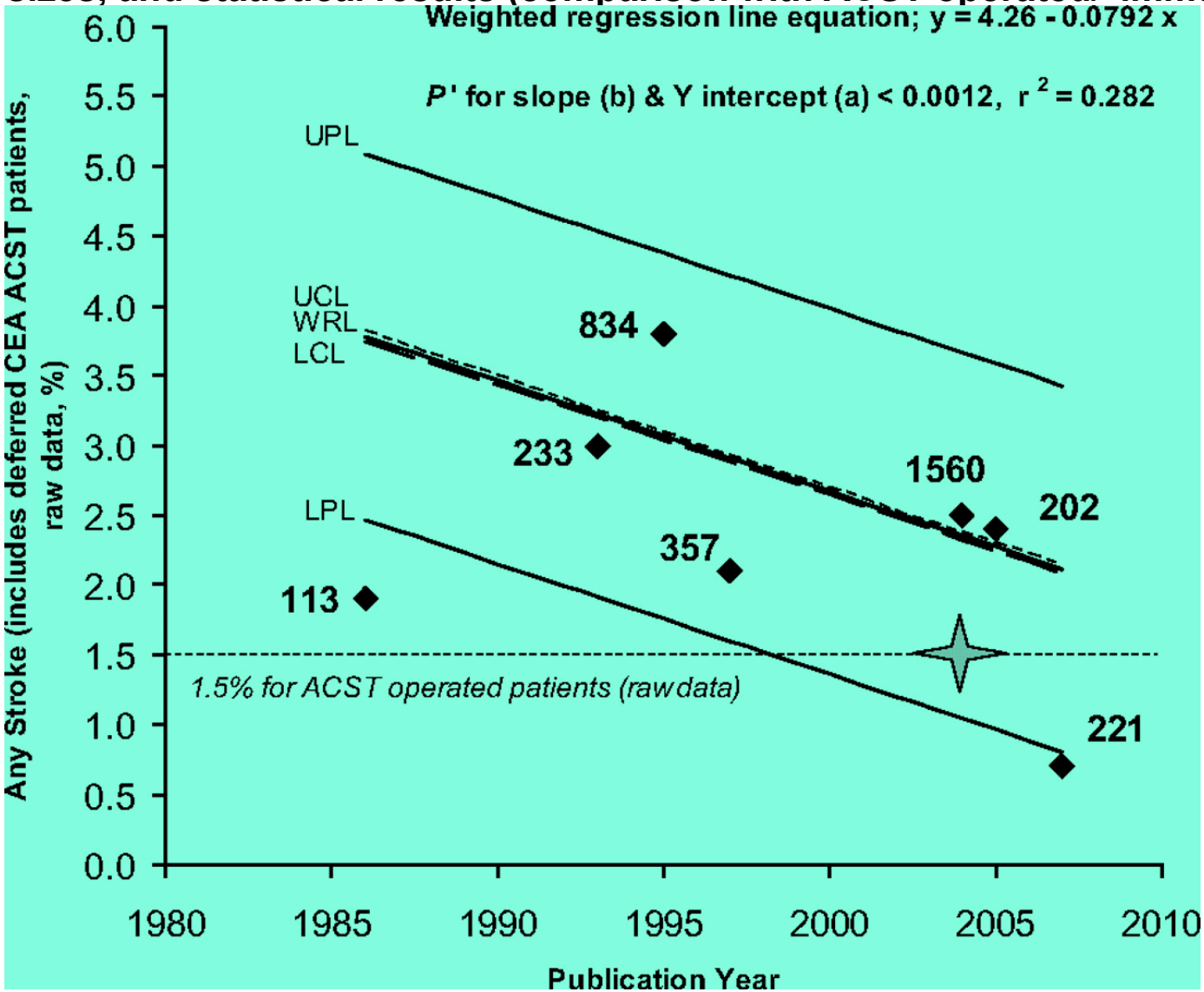
<48 hours
CEA 5.3%
TIA 2.7%, Stroke 8%

CAS 2.1%
TIA 2.1%, Stroke 7.9%

Quelques recommandations

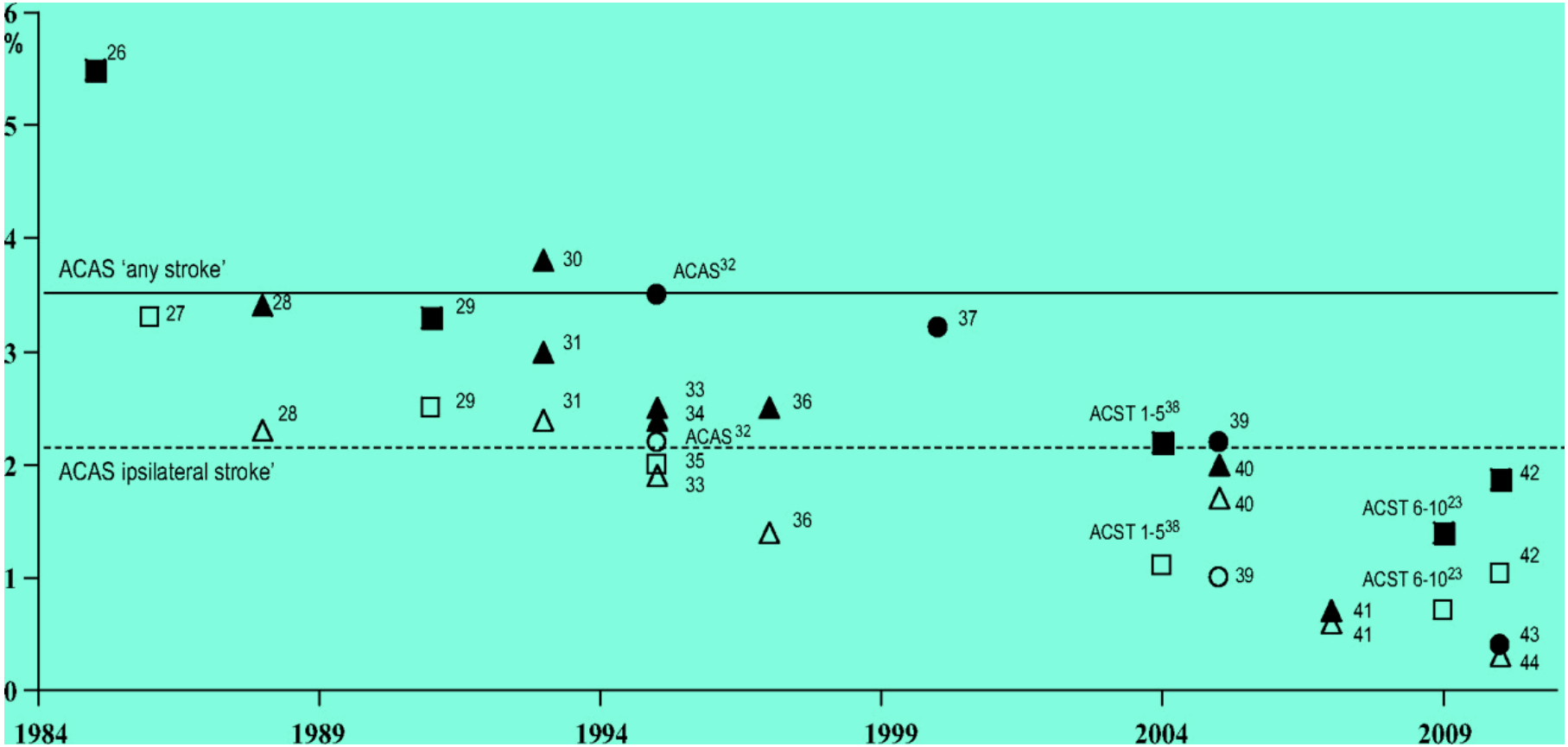
- Les patients avec AIT peuvent être opérés à tout moment et si possible avant deux semaines après l'incident initial. Ils doivent être impérativement mis sous traitement médical intensif.
- Les patients avec AVC mineur sont à risque pour l'angioplastie et la chirurgie. Ils doivent être opérés entre sept jours et 14 jours
- Les patients avec AVC majeur sont des candidats au traitement médical.
- Les patients asymptomatiques ????

Figure 2. Any-territory stroke rates of hospital-based asymptomatic patients undergoing medical intervention alone2,10,11,78,80,81 and 1560 "deferred CEA" ACST patients12 by publication year with sample sizes, and statistical results (comparison with ACST operated/"immediate CEA"



Anne L. Abbott Stroke. 2009;40:e573-e583

Average annual stroke rates in medically treated patients with asymptomatic carotid stenosis. ■ indicates any stroke 70% to 99% stenosis; •, any stroke 60% to 99% stenosis; ▲, any stroke 50% to 99% stenosis; □, ipsilateral stroke 70% to 99% stenosis; ○, ipsilateral stroke 60% to 99% stenosis; Δ, ipsilateral stroke 50% to 99% stenosis.



A. Ross Naylor Stroke. 2011;42:2080-2085

Les patients asymptomatiques

- Les patients avec une sténose de moins de 75 % ne sont pas des candidats au traitement radical .
- Au-delà d'une certaine sévérité de sténose, et malgré le traitement médical intensif, le risque d'accident vasculaire cérébral homolatéral reste élevé.
- Ces risques sont mesurés en fonction de différents paramètres :
  - Caractère irrégulier ou ulcéré de la lésion
  - Présence d'accident ischémique silencieux à l'I.R.M. au scanner
  - Évolutivité de la lésion sur des échographies successives
  - Bilatéralité des lésions
  - Chirurgie majeure envisagée

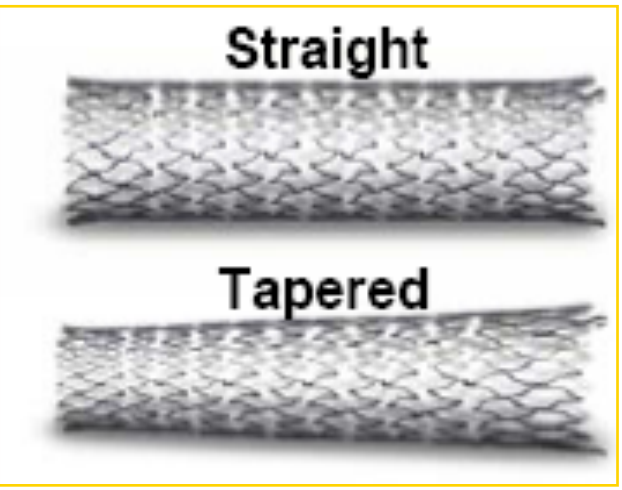
The natural history of asymptomatic severe carotid artery stenosis

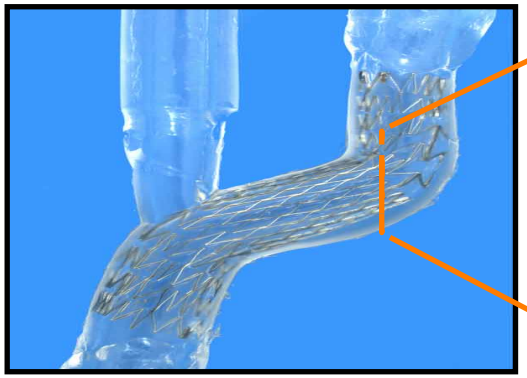
Medically managed patients with Asymptomatic carotid severe stenosis develop ipsilateral neurological symptoms early, especially in patients with very severe stenosis.

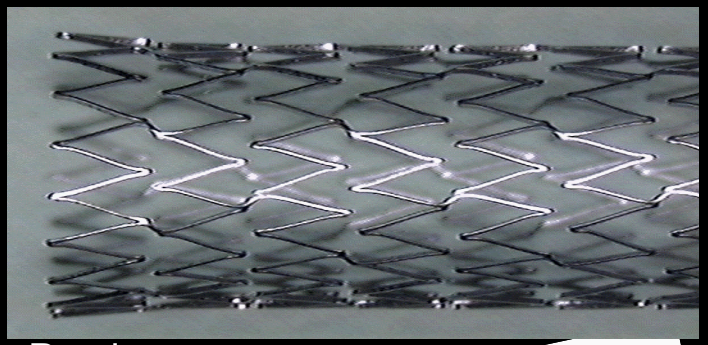
Medical therapy with aspirin and statins failed to control asymptomatic patients thus validating the role of CEA in these patients as promulgated in multiple current treatment guidelines.

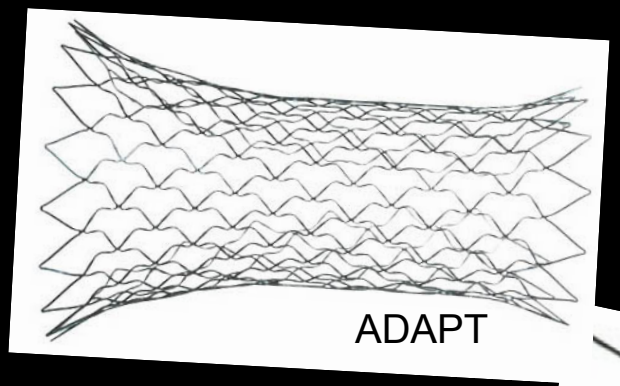
Conrad MF and all 1.
J Vasc Surg. 2014 Nov;60(5):1218-25

Carotid stents

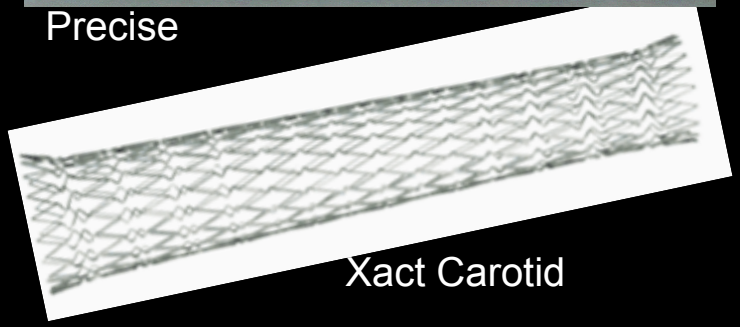


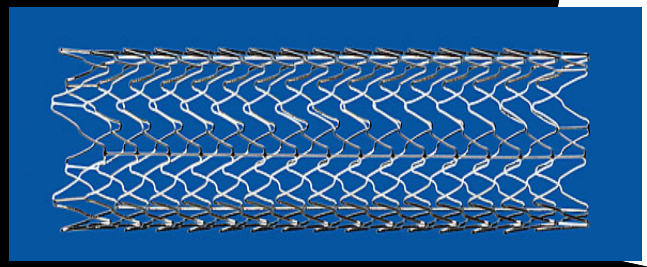



Precise

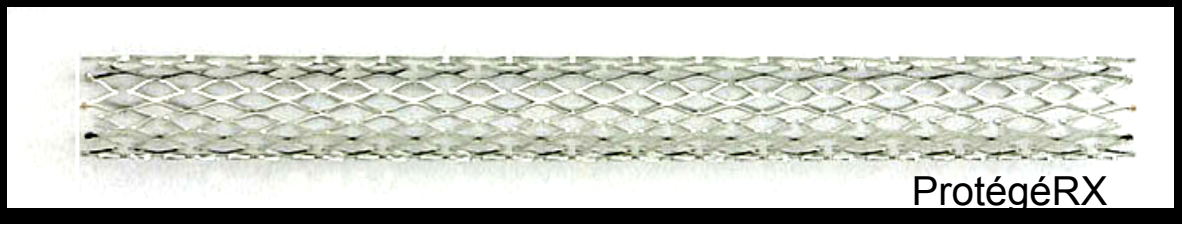

ADAPT


Exp


Xact Carotid

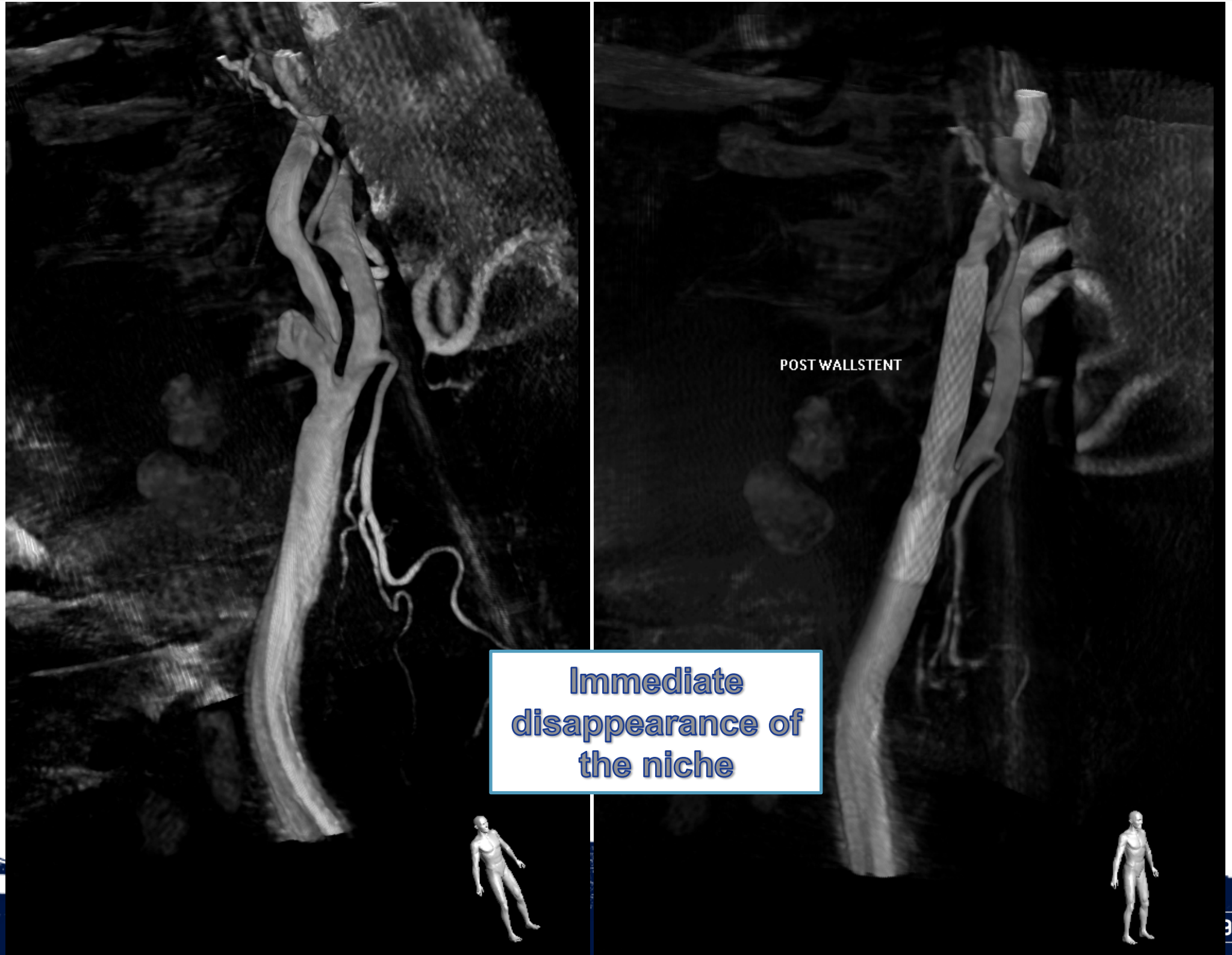



Carotid Wallstent

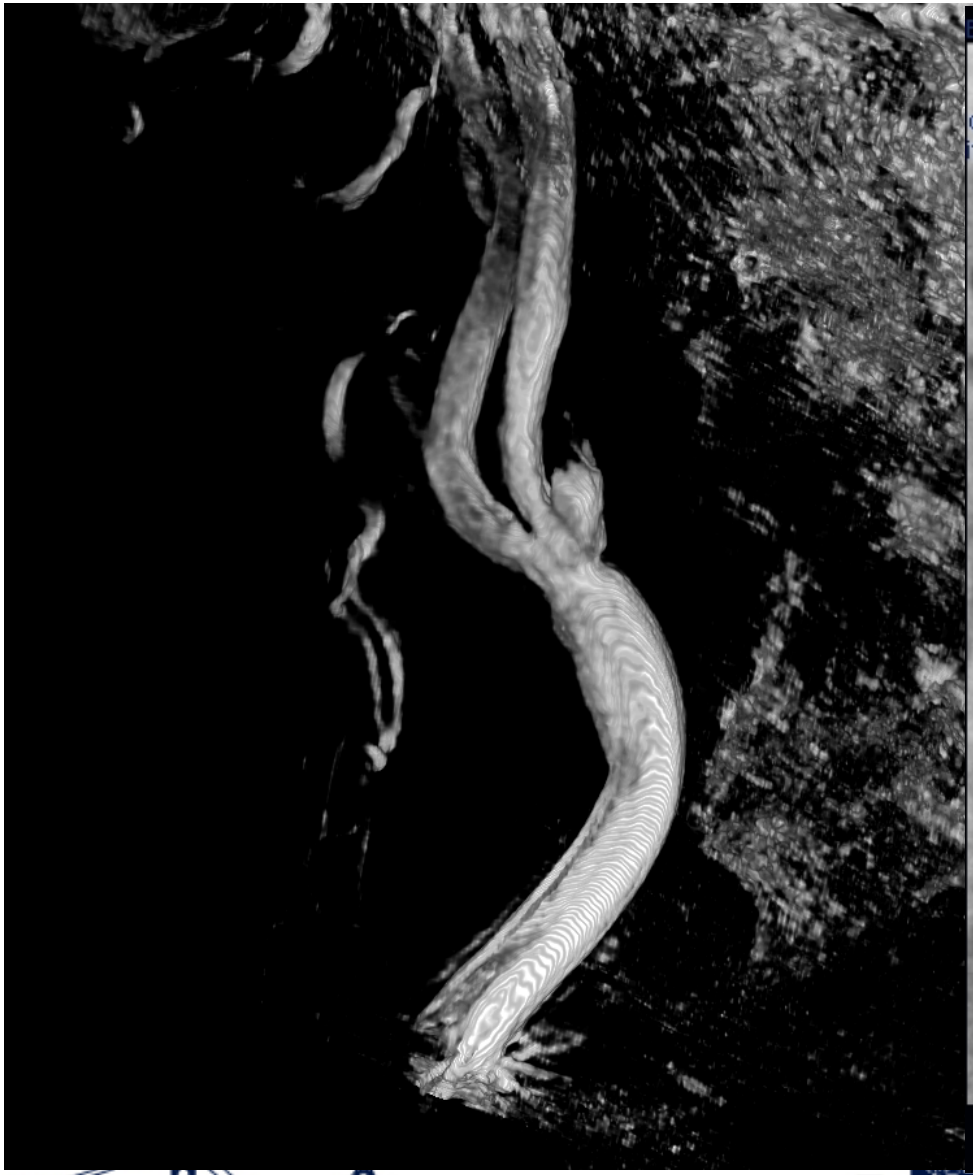

ProtégéRX

Les Stents Carotides

Cellules fermées	Cellules ouvertes	Hybride
• Xact Carotid Stent System (Abbott Vacular) • Carotid Wallstent Endoprothesis (BSC) • Adapt Stent (BSC) • Roadsaver (Terumo) • CGuard (Minguard) • Scaffold (WL Gore)	• RX Acculink Carotid Stent System (Abbott Vascular) • Precise stent system (Cordis) • Protégé RX Carotid Stent System (Covidien) • Zilver 518 Vascular Self-Expanding Stent (Cook Medical) • Vivexx Carotid Stent (Bard Peripheral Vascular, Inc.)	• Cristallo Ideale Carotid Self-Expanding Stent Syetm (Medtronic Inc.) • Sinus-Carotid-RX & • Sinus-Carotid-Conical-RX (OptiMed Medizinische Instrumente GmbH)


POST WALLSTENT
Immediate disappearance of the niche

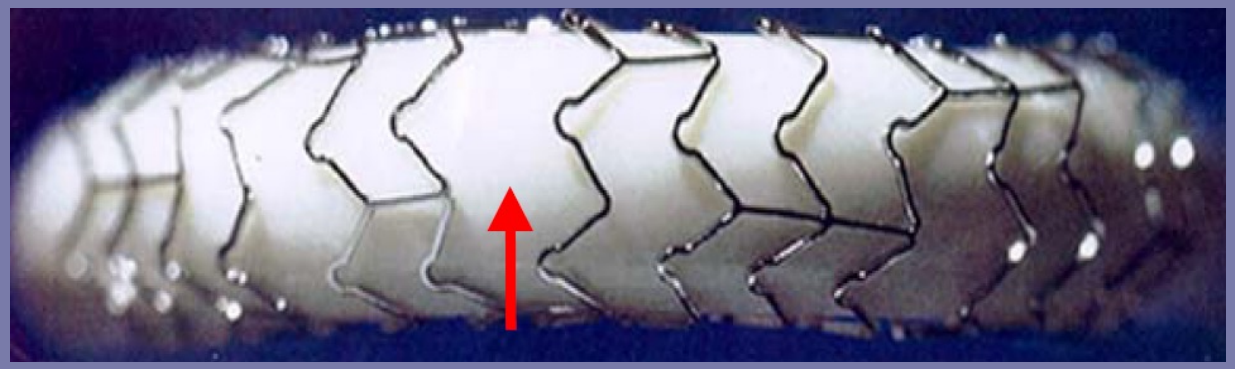
Open cells protruding in the the ulcerated niche

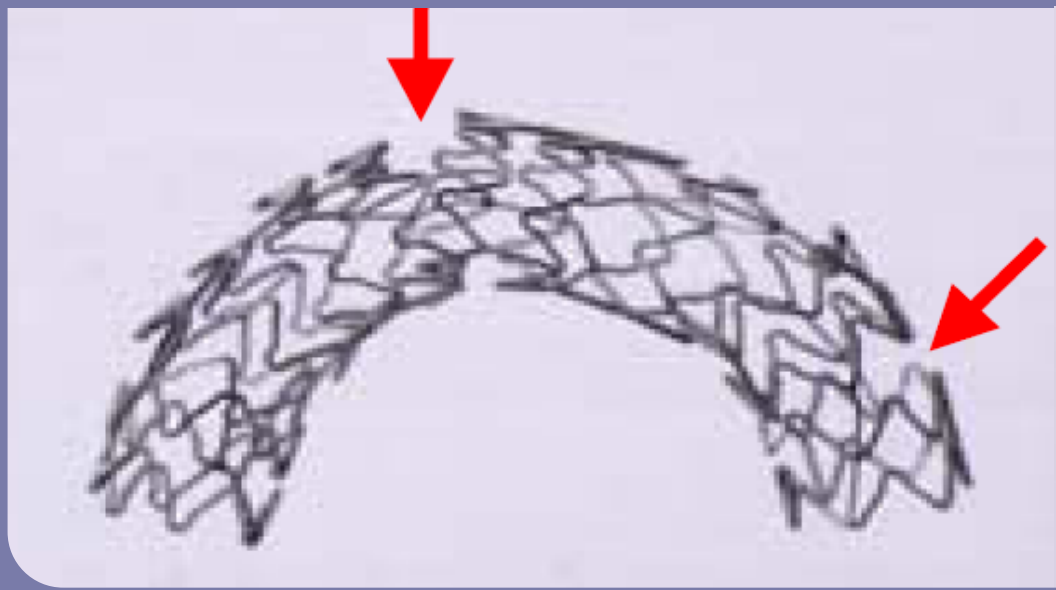


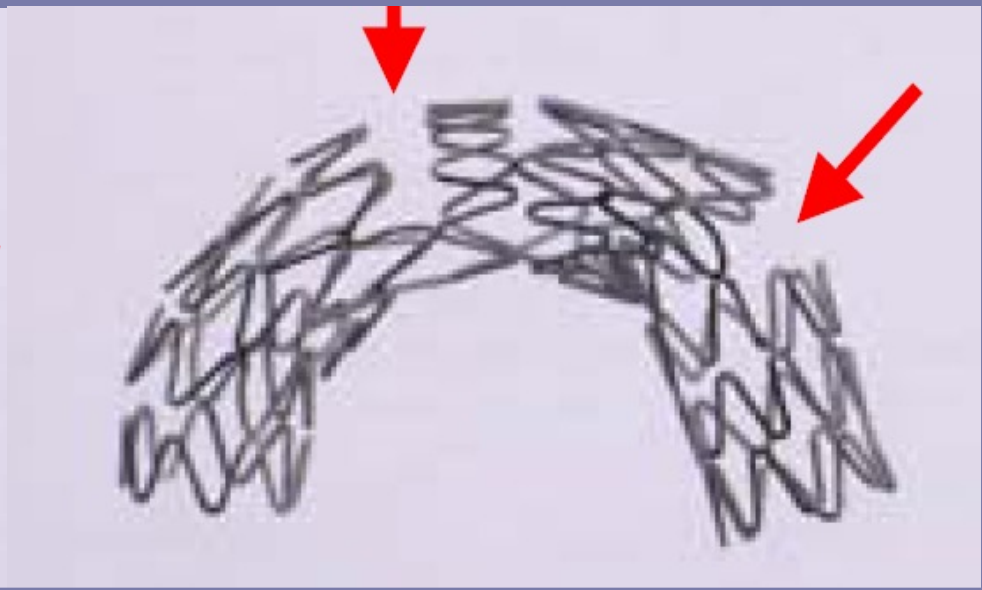
“Stent design”: why closed cell?

- Open cell designs in tortuous curvature

PROLAPSE

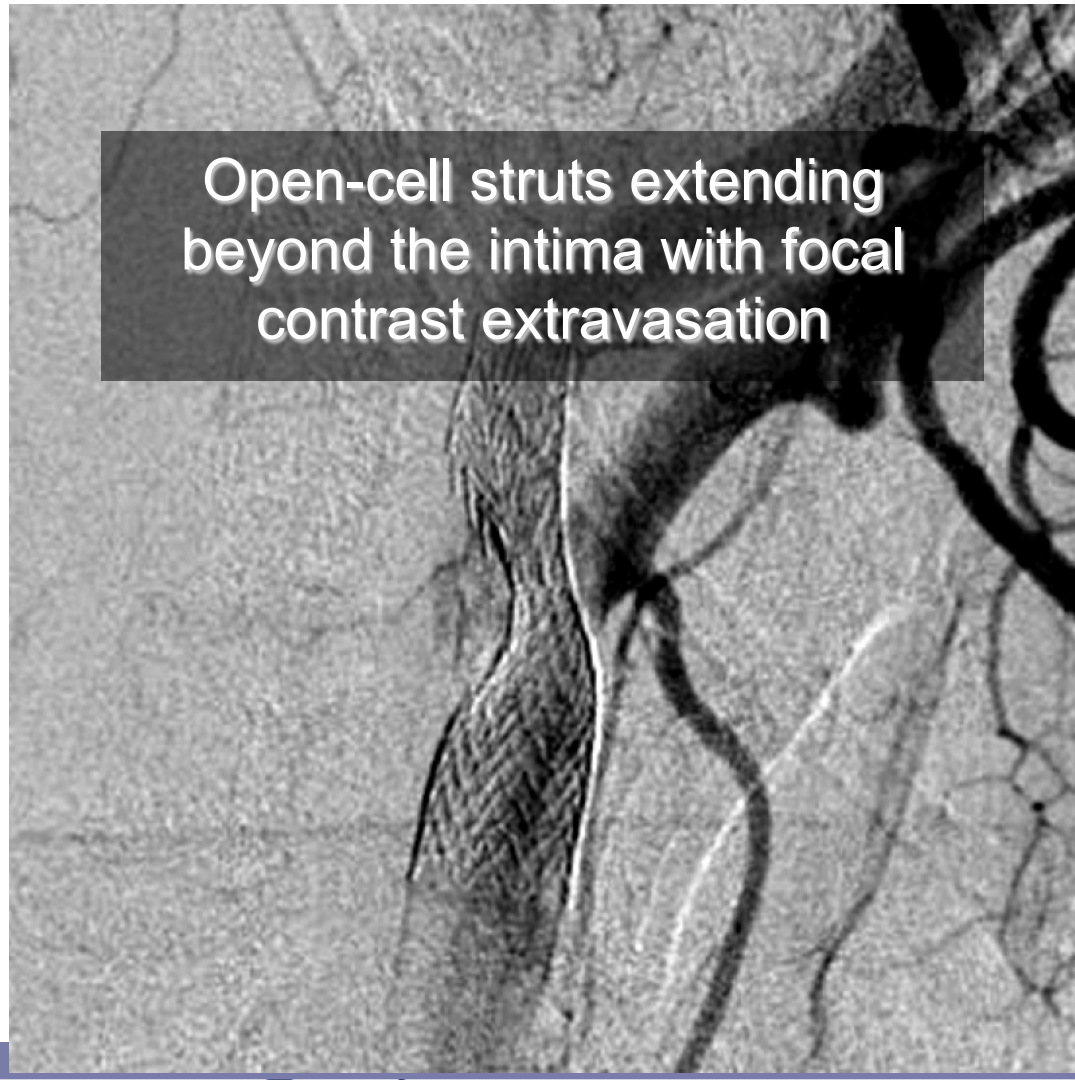




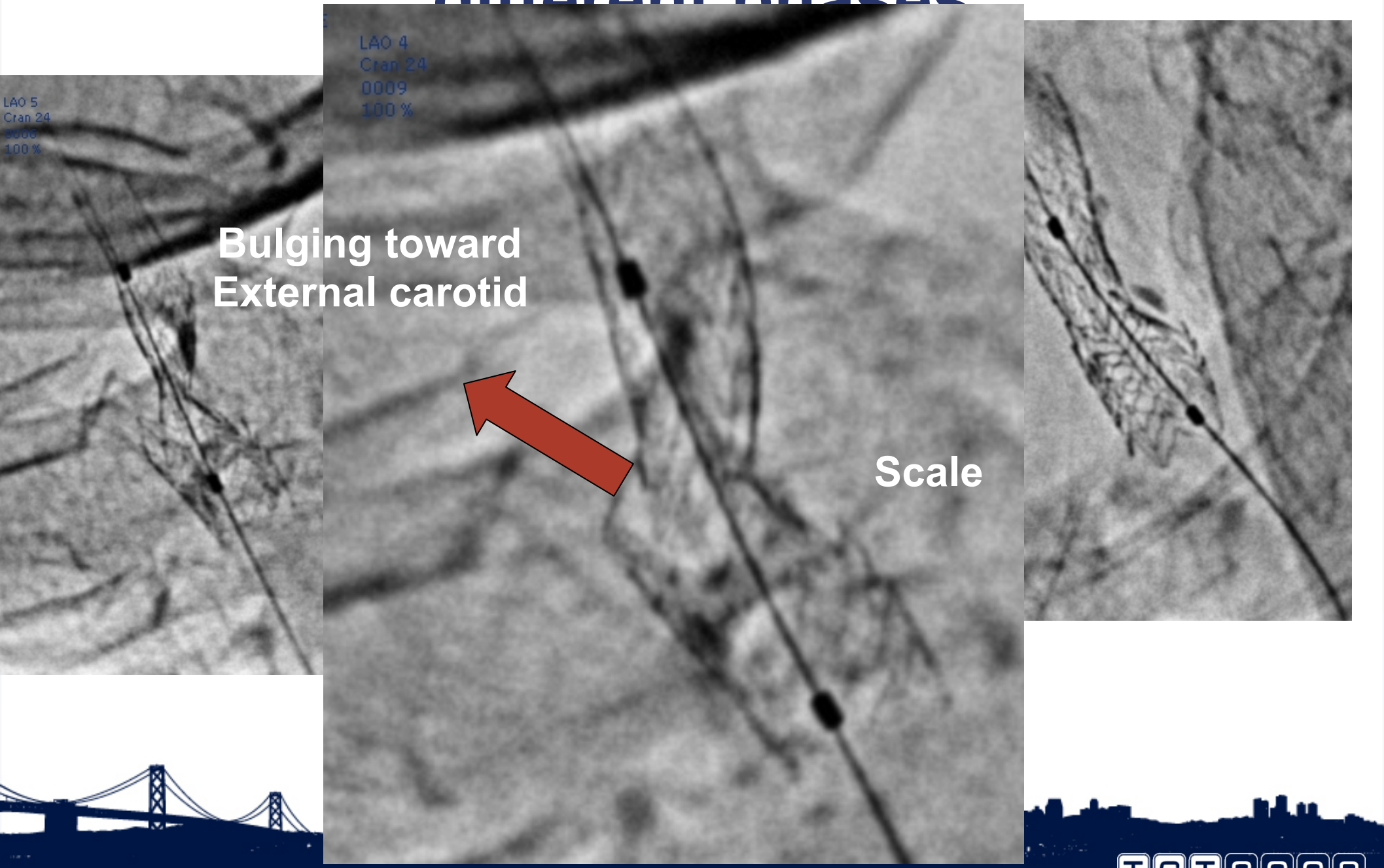


Courtesy of MH Wholey

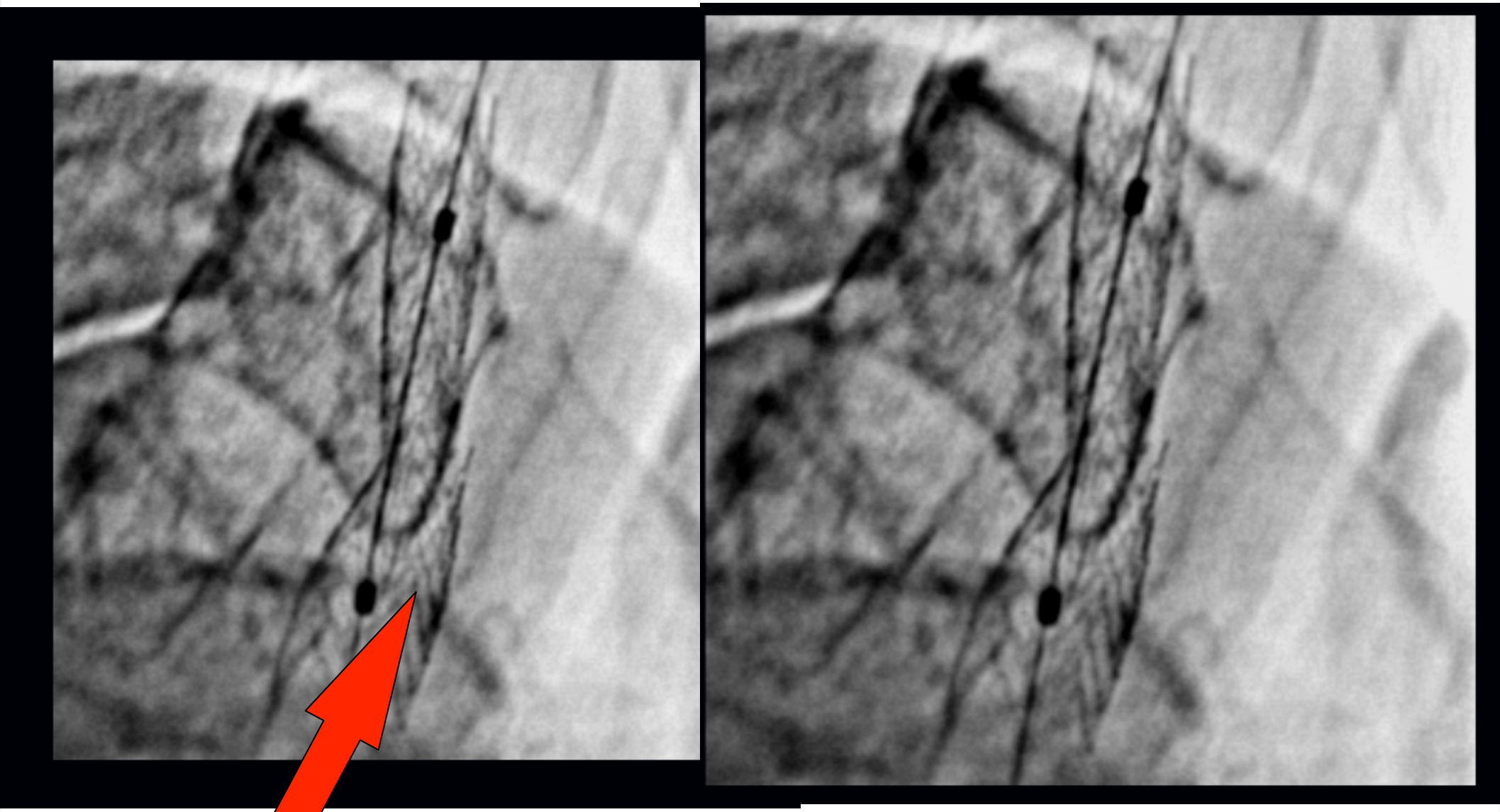
“Stent design”: why closed cell?



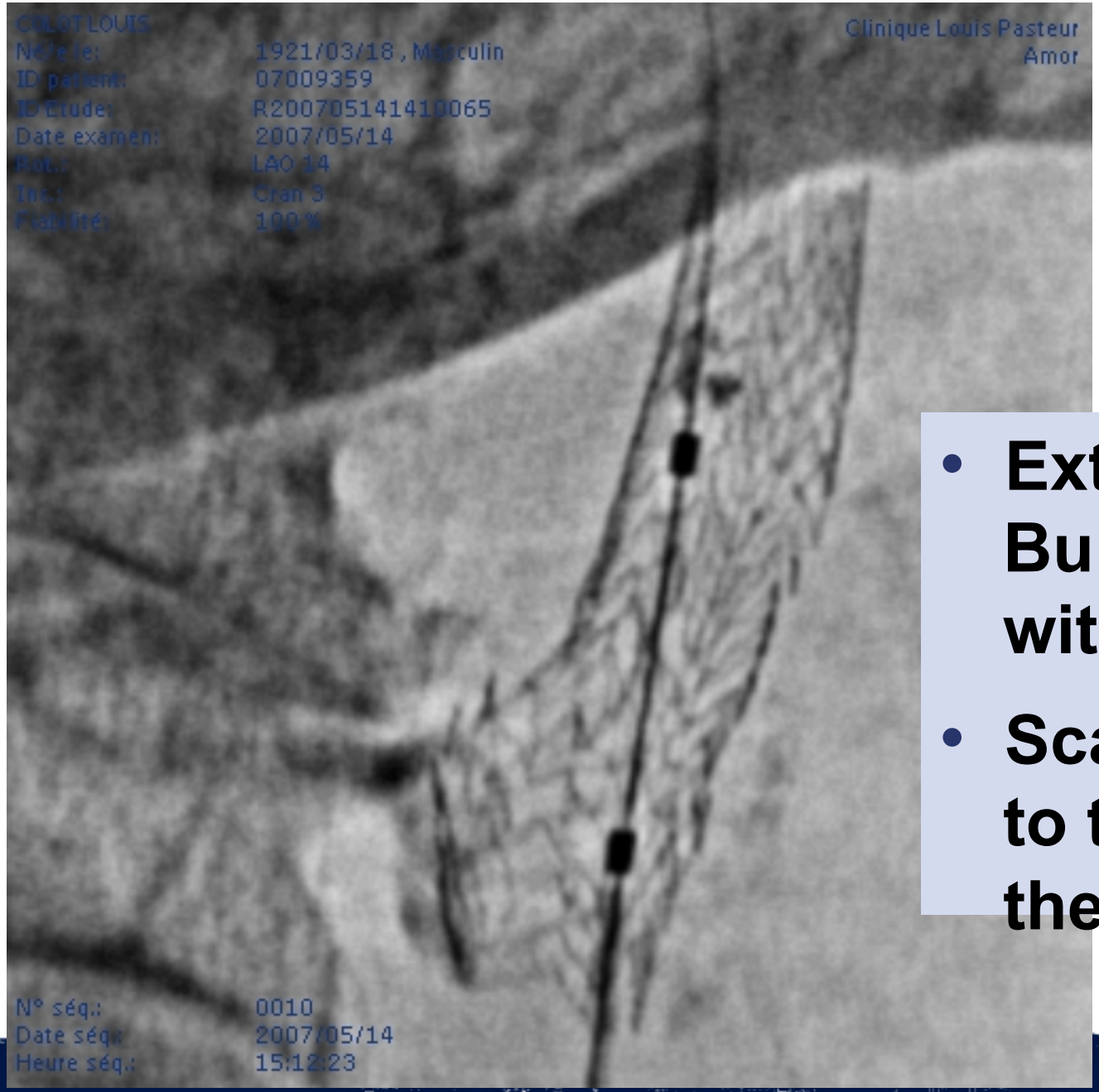
Stentboost of an open cell stent at different phases



Chimney !

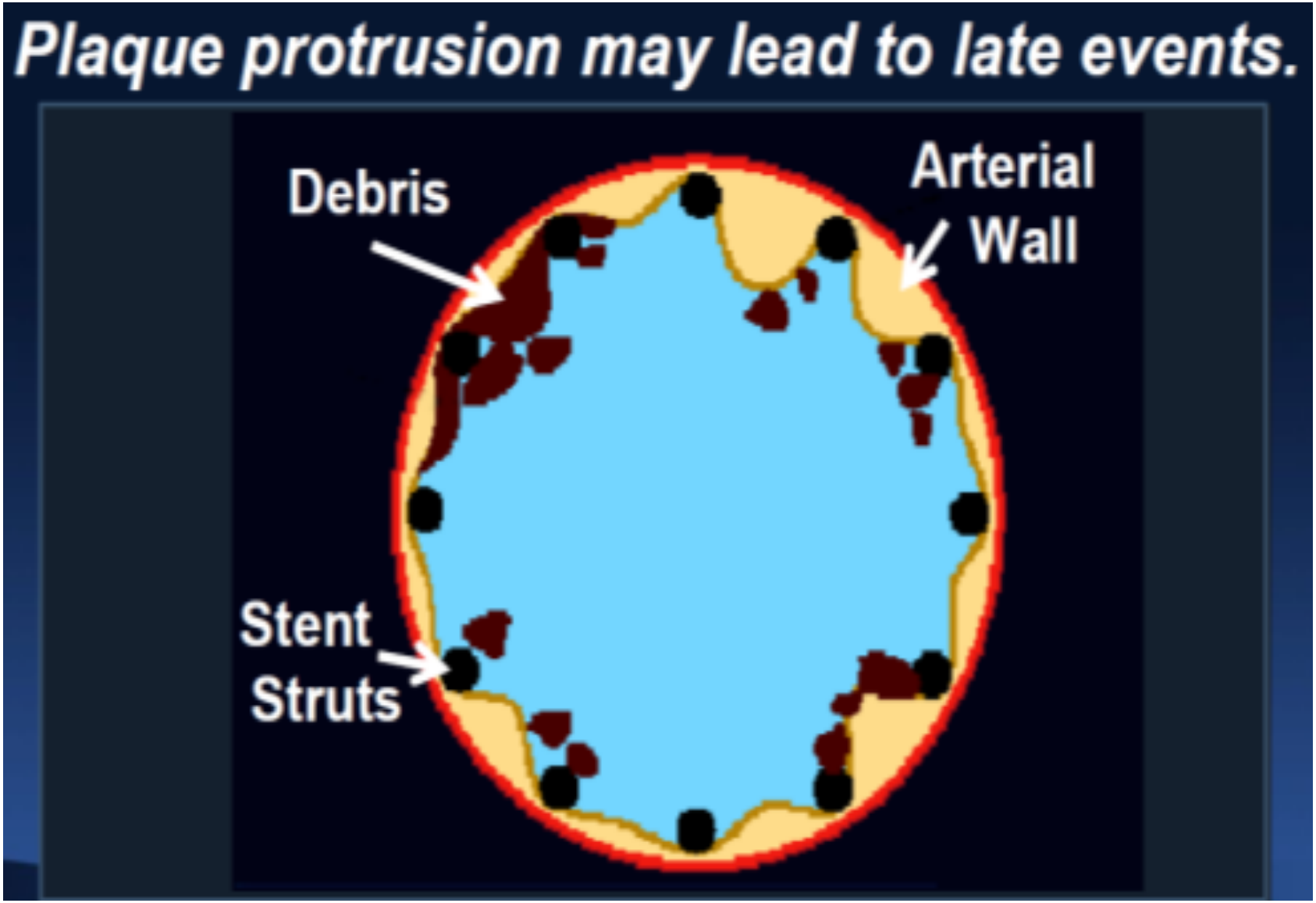


The open cell stent signature



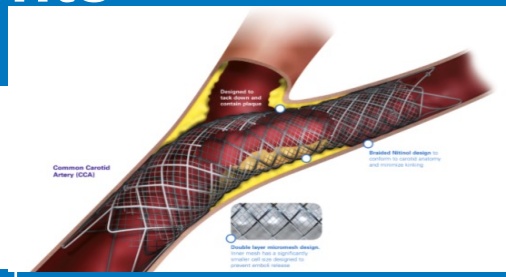
- **External Carotid Bulging with or without teeth**
- **Scale protruding to the lumen or the wall**

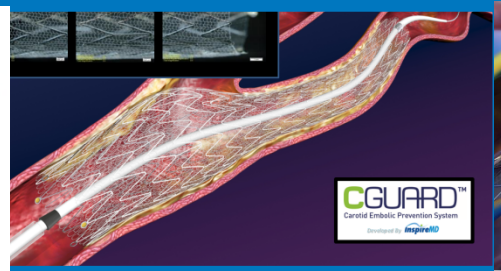
Causes of Late Embolization



Prof. Dr. Klaus Mathias, TCT 2013

Tentative Summary of the main characteristics of the 3 Micromesh Stents

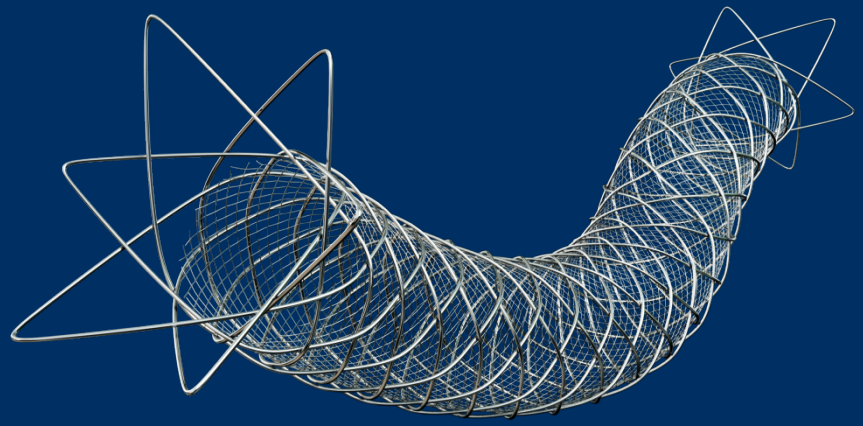


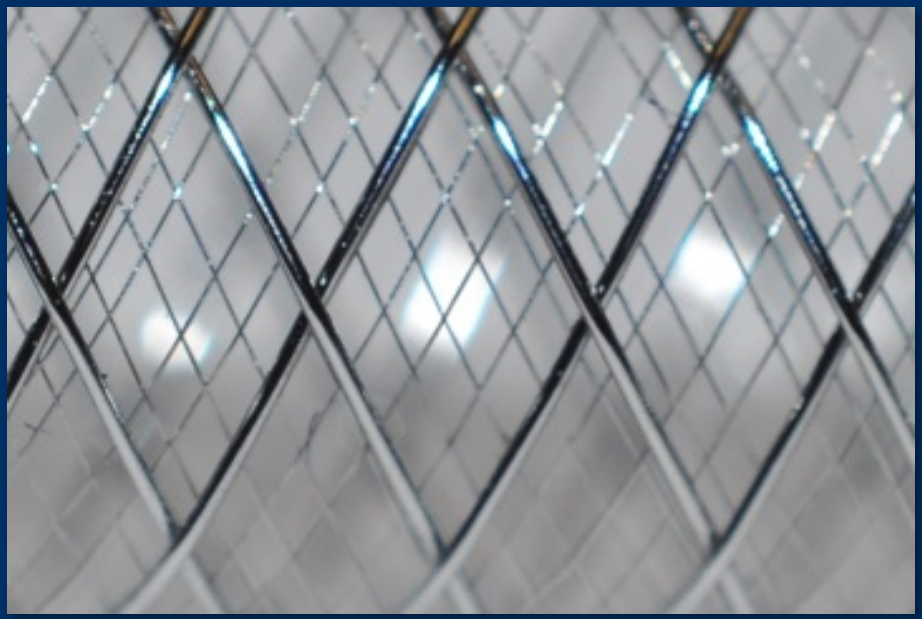


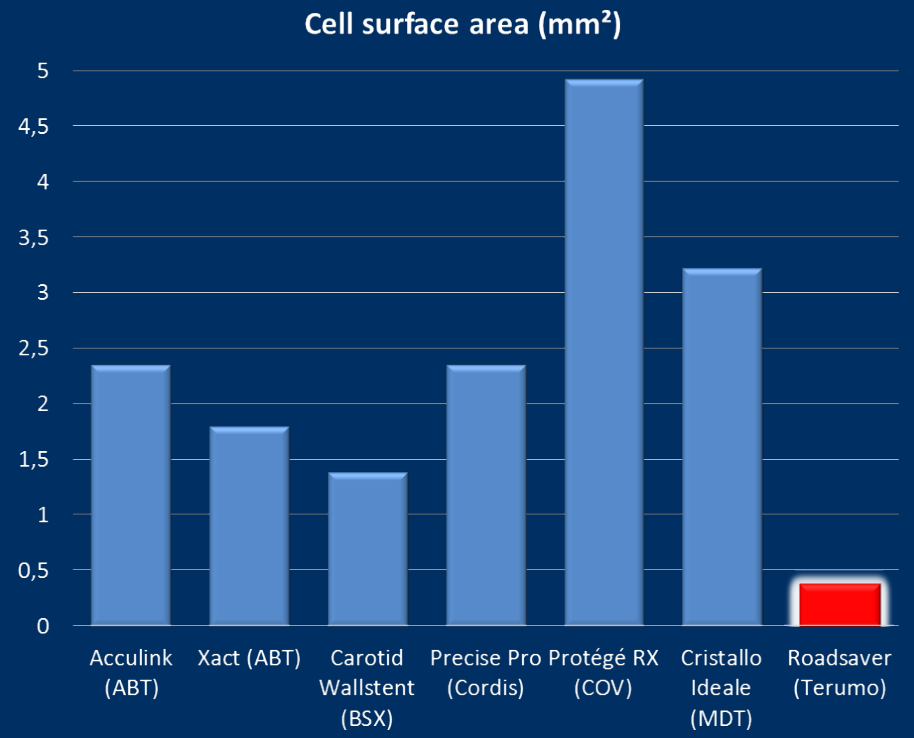
	Roadsaver	CGuard™	Gore Carotid
Company	Microvention / Terumo	Inspire MD	WL Gore
Material (Stent/ Micromesh)	Nitinol /**Nitinol**	Nitinol/**PET**	Nitinol/**PTFE/ CBAS Coating**
Size of delivery	**5F**	6F	6F
Size of Pores µ	**375-500**	**150-180**	**500**
Flared tips	**yes**	no	no
Retrievable/ Repositionable	**yes**	no	no
Accuracy	++	+++	++
Conformability	+++	++	++
Crossability	+++	+	++
ECA preservation	yes	?	??
EPD compatibility	All	All	All

Roadsaver – dual layer micromesh Carotid stent

- Braided Nitinol carotid stent with a built-in Nitinol micromesh for sustained embolic protection







Are we able to provide delayed embolic protection without loosing the long term benefit of Carotid Nitinol Stent ?

First clinical cases
33 Patients with high risk carotid artery lesions treated with Roadsaver dual layer stent

Midterm results

Single center experience

Clinique Louis Pasteur Essey Les Nancy France

First clinical cases
33 Patients with high risk carotid artery lesions treated with Roadsaver dual layer stent

Midterm results

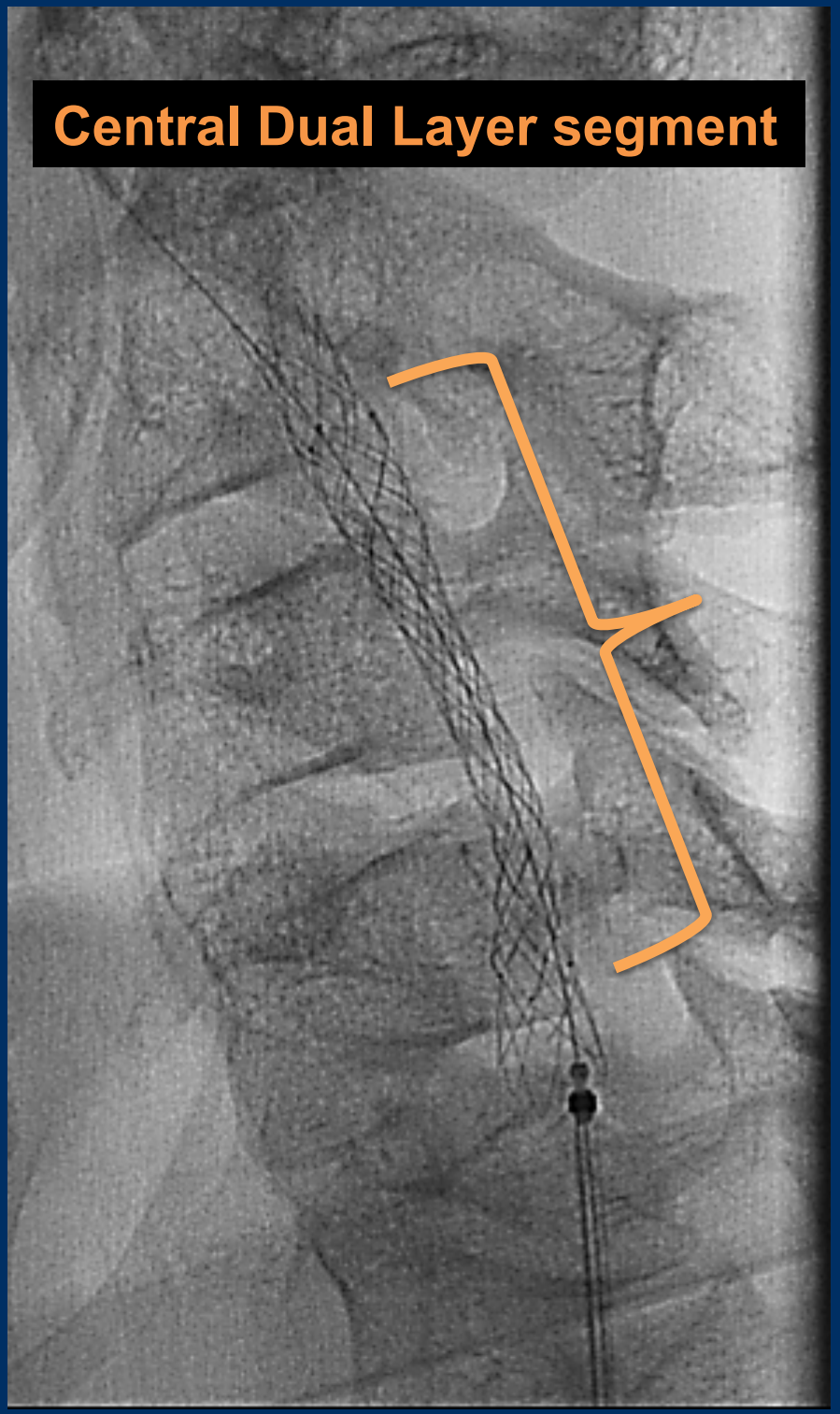
Single center experience

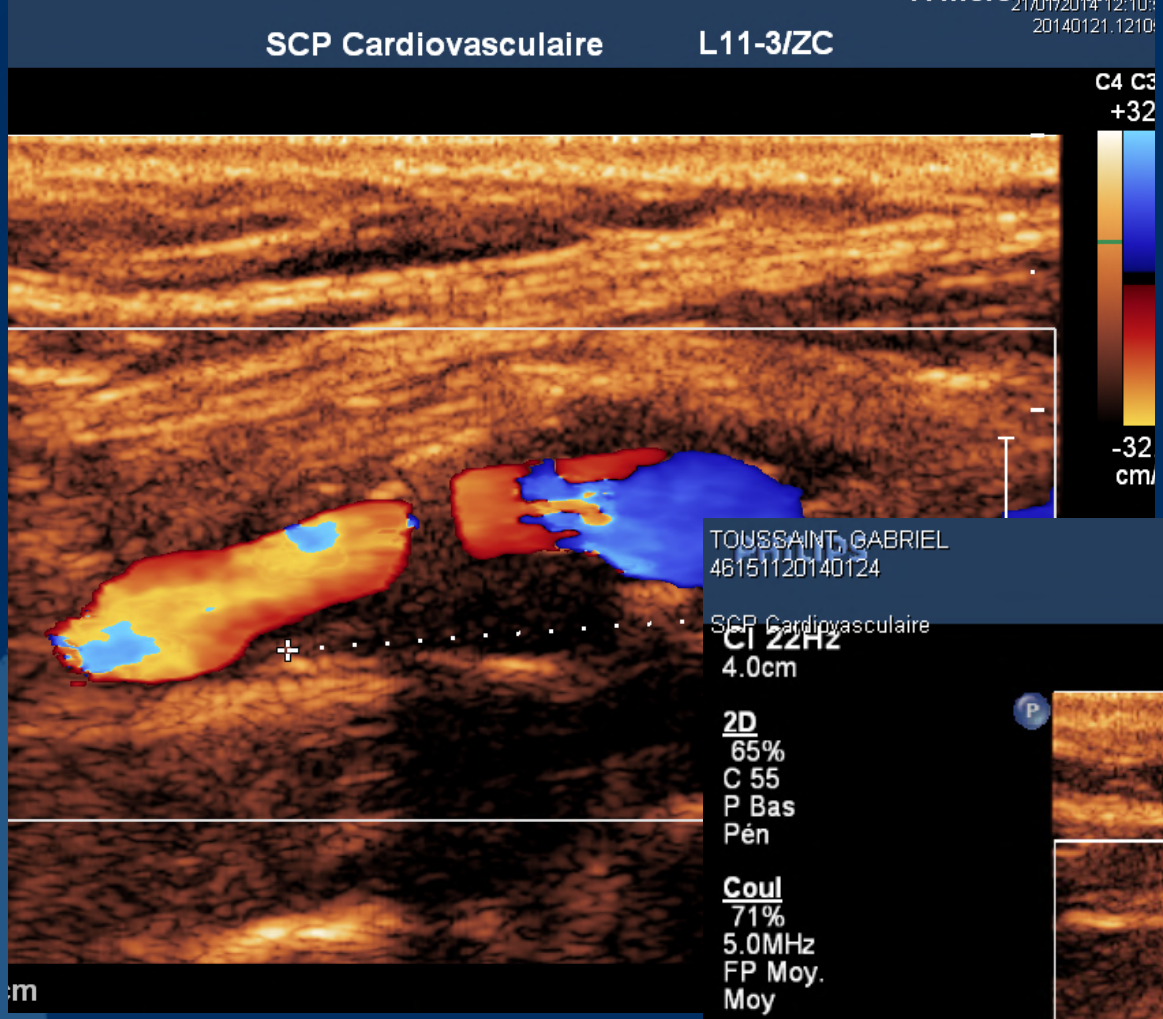
Clinique Louis Pasteur Essey Les Nancy France

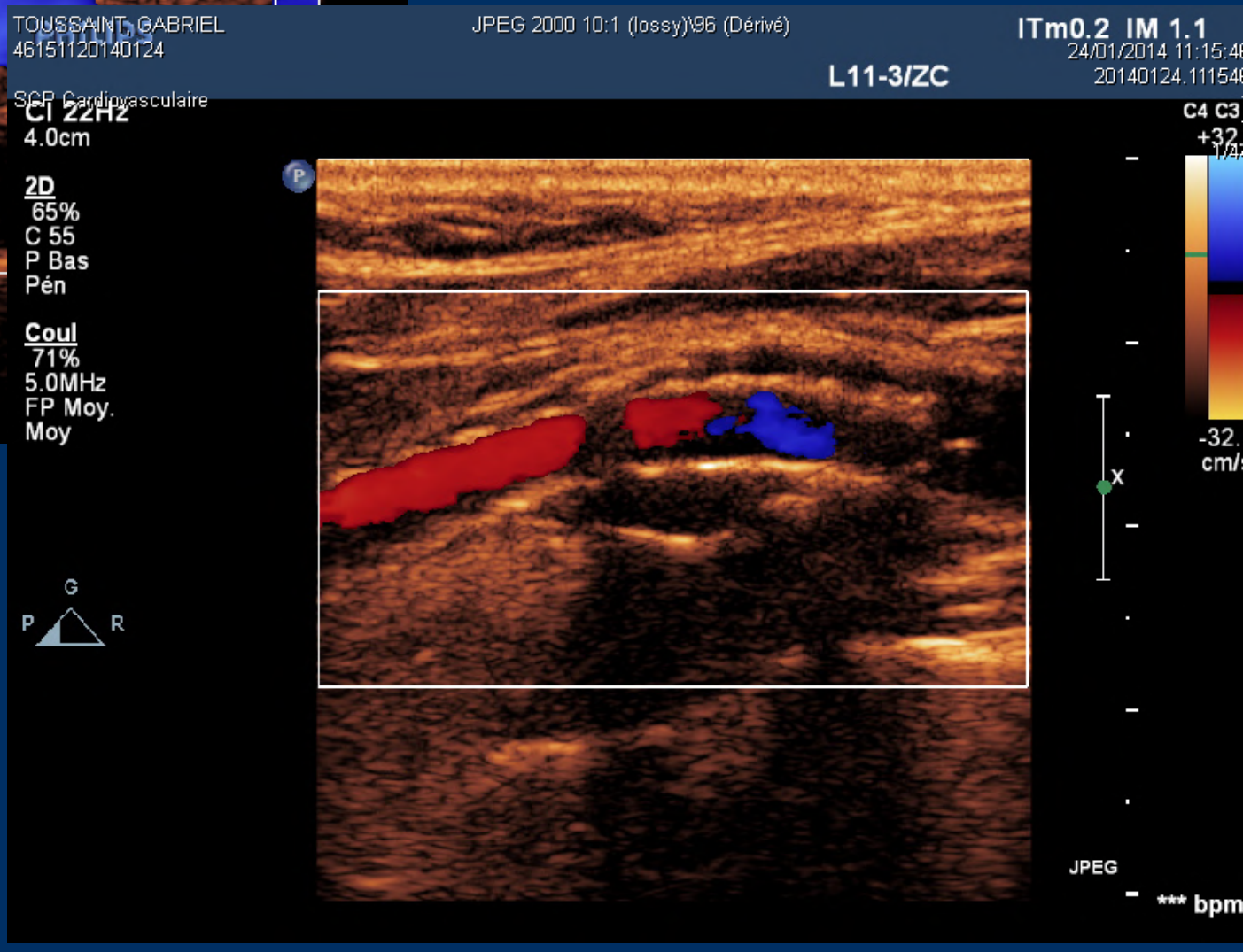
Pts)
(23 to 6 months , 16,7±6,6 months)

	Events	30th days	6 months	1 year
Clinical	Delayed embolisation	no		
	Neurological events	no	no	No
Anatomical	External Carotid Occlusion	no	no	No
	Restenosis		no	no
Stent Geometry	Migration	no	no	no
	Compression	no	no	no
	Defor			

Long LICA Lesion




SCP Cardiovasculaire
L11-3/ZC
C4 C3
+32
-32
cm/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L11-3/ZC
SCP Cardiovasculaire
CI 22H2
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2D
65%
C 55
P Bas
Pén
Coul
71%
5.0MHz
FP Moy.
Moy
G
P
R
C4 C3
+32
-32
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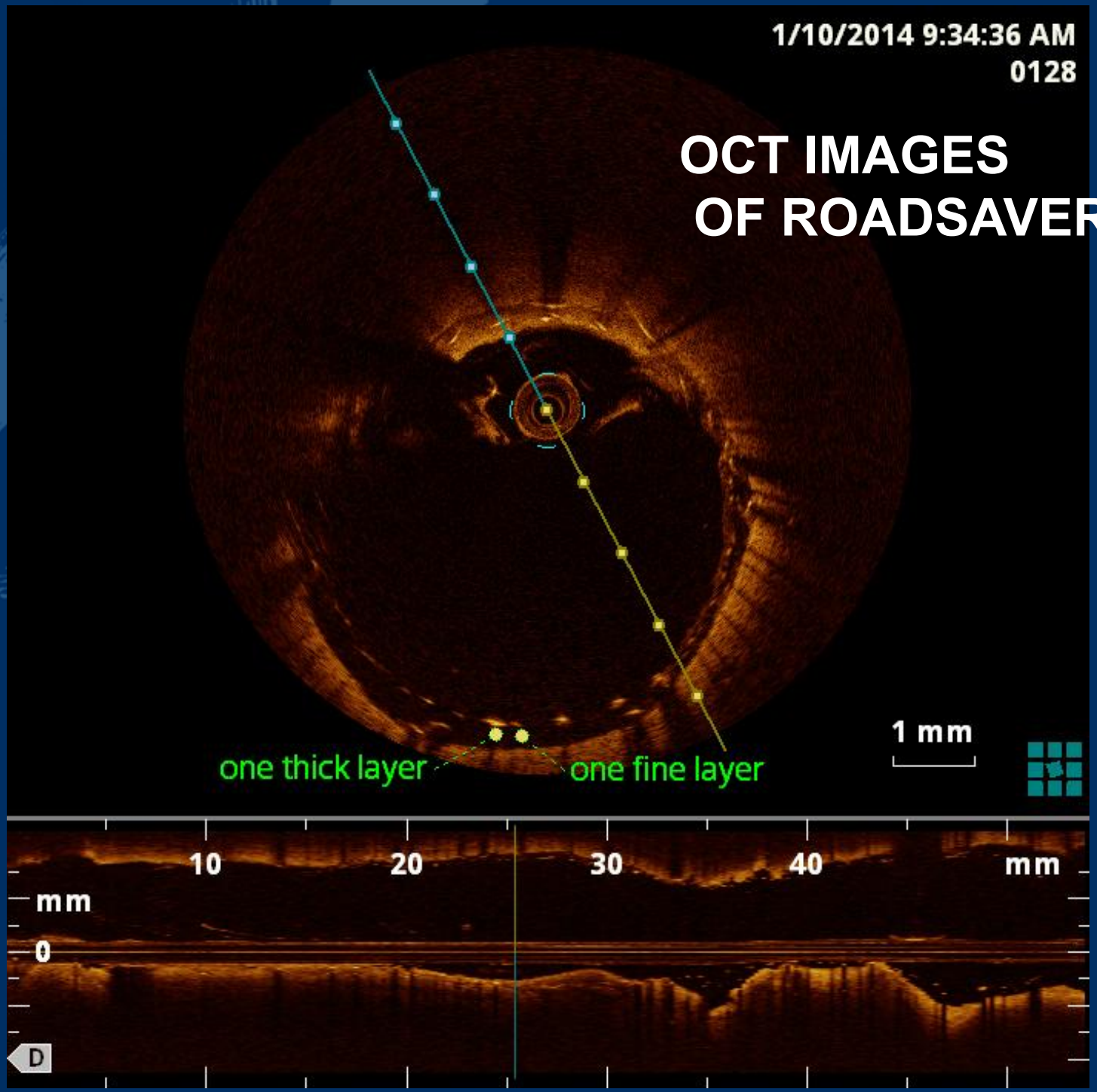
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OF ROADSAVER
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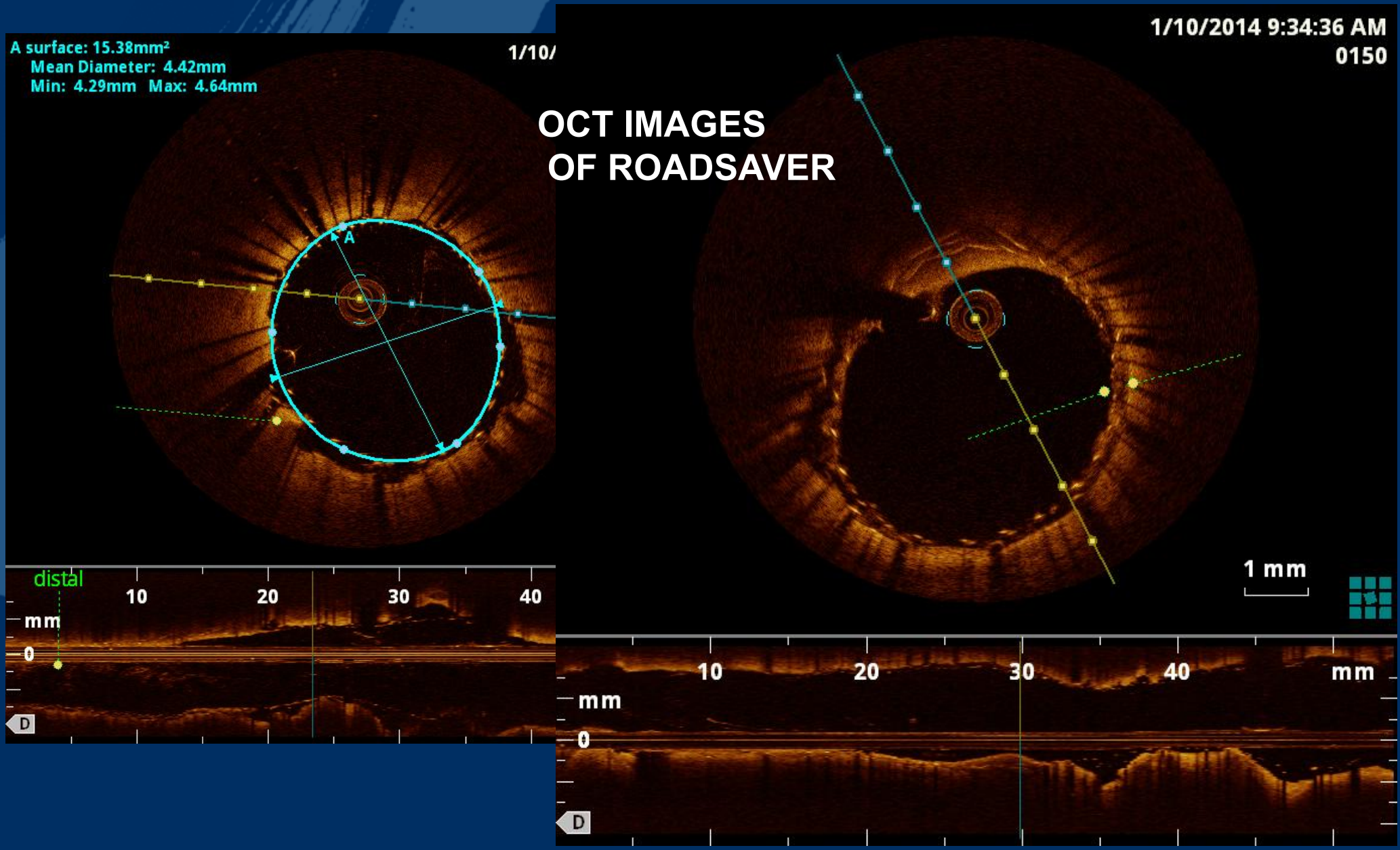
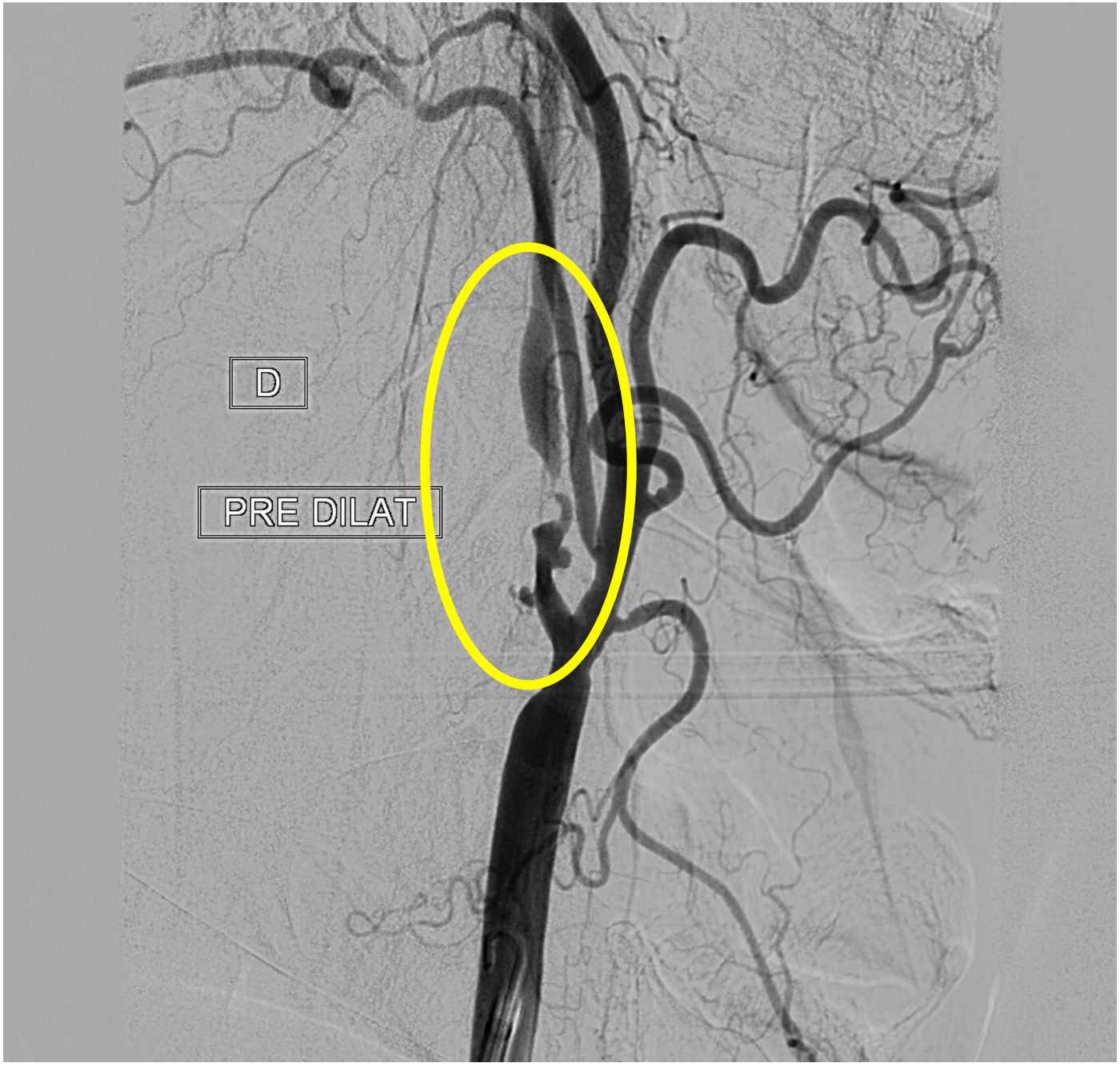
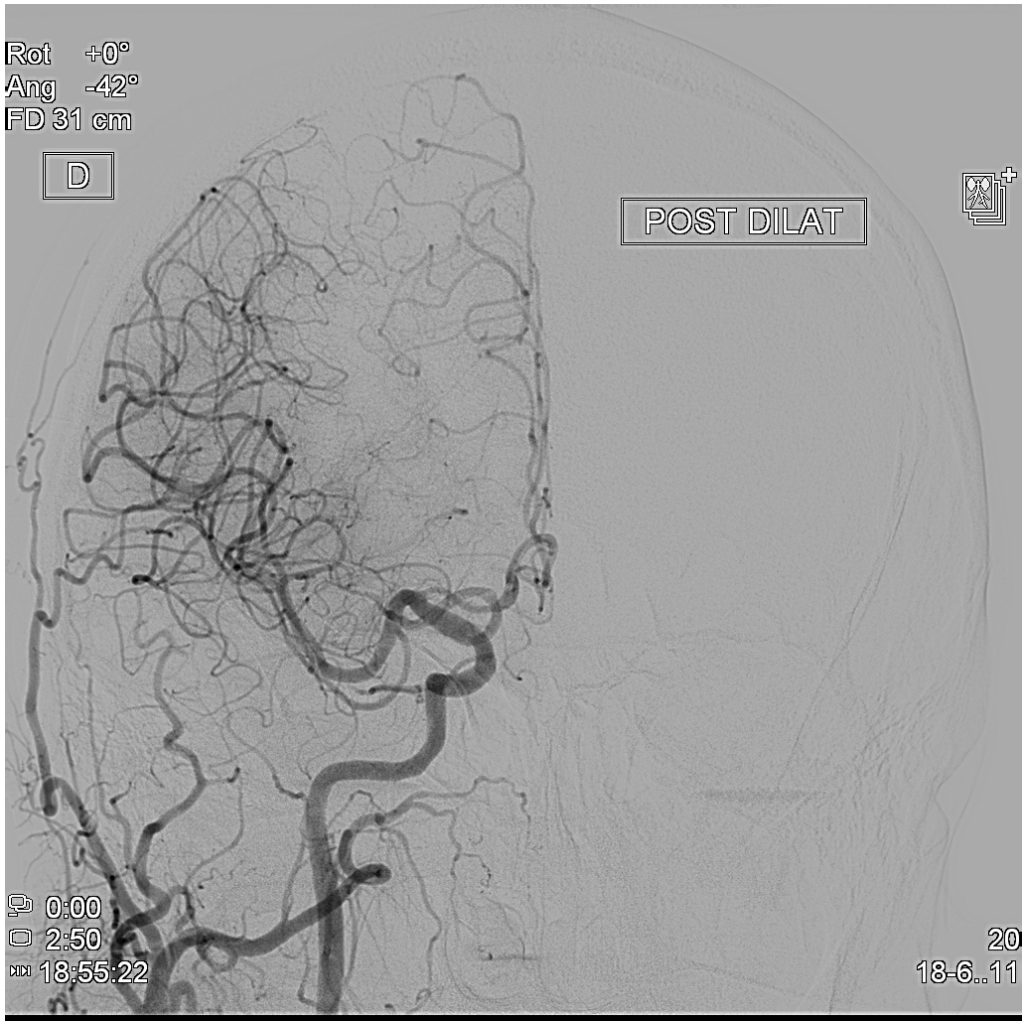
Harmonious deployment



Severe Symptomatic RICA stenosis with multiple ulcerations



After ROADSAVER Stent 10x30mm placed under filter protection


Rot +0°
Ang -42°
FD 31 cm
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POST DILAT
0:00
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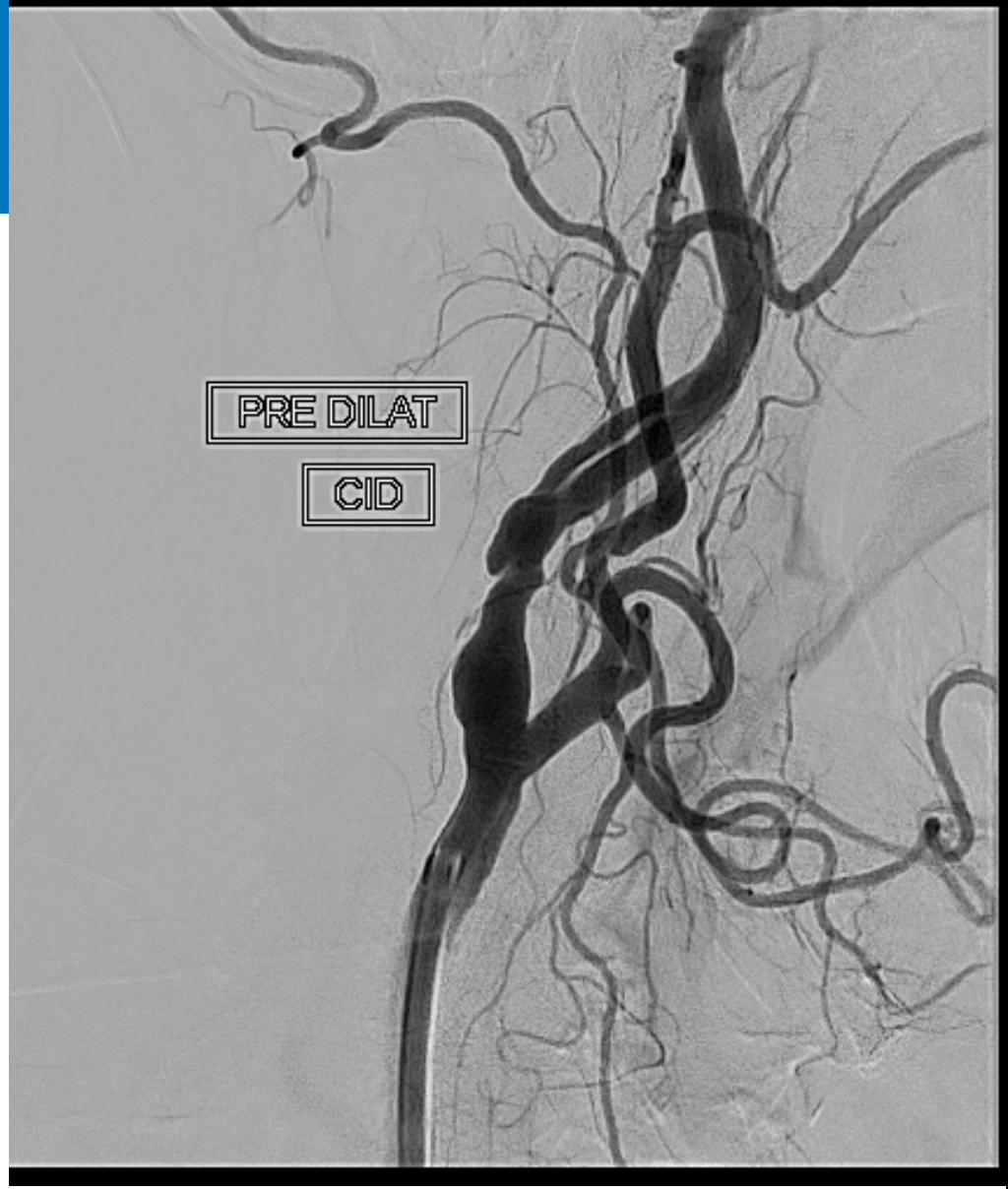
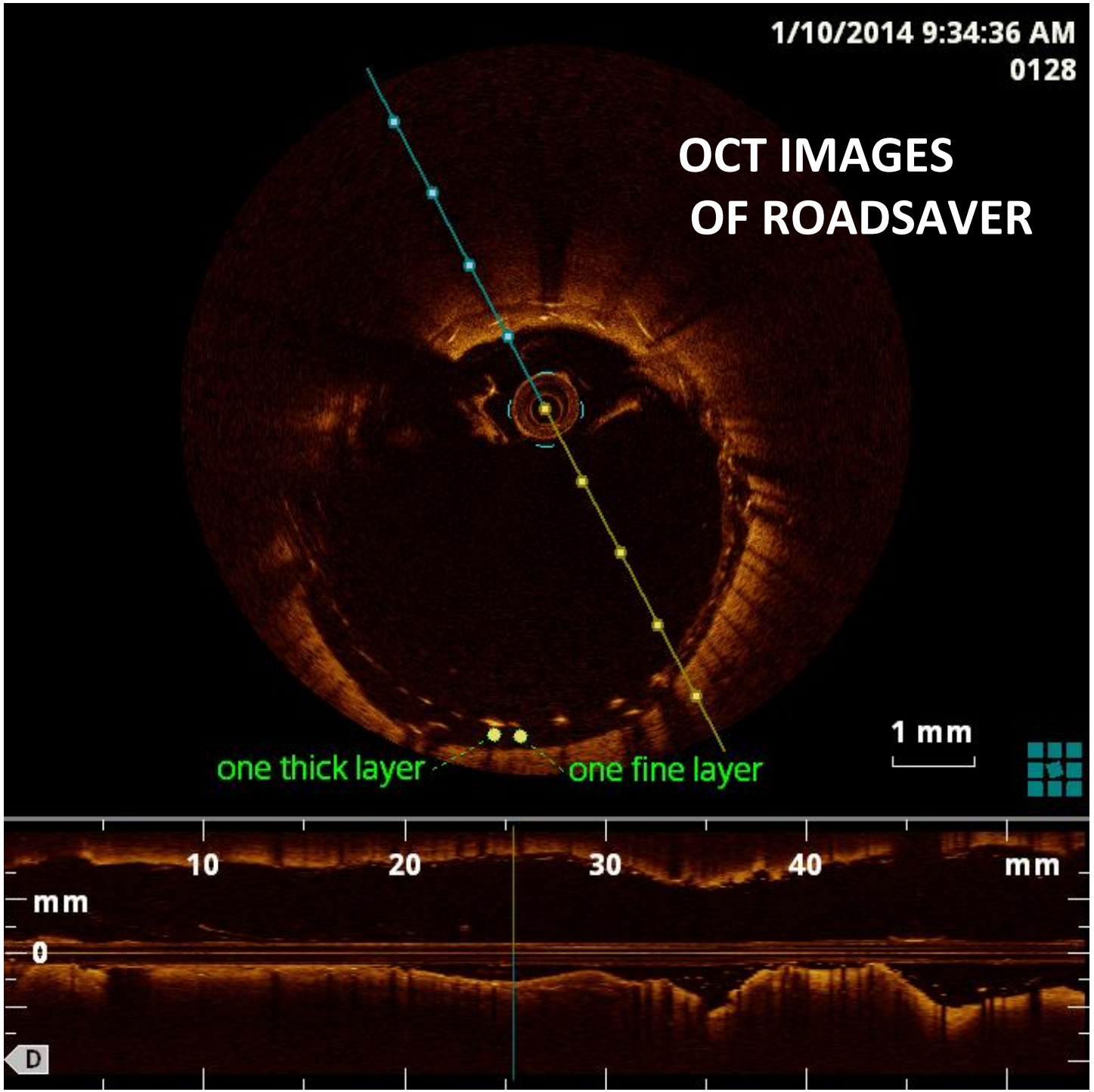
18:55:22
20
18-6..11



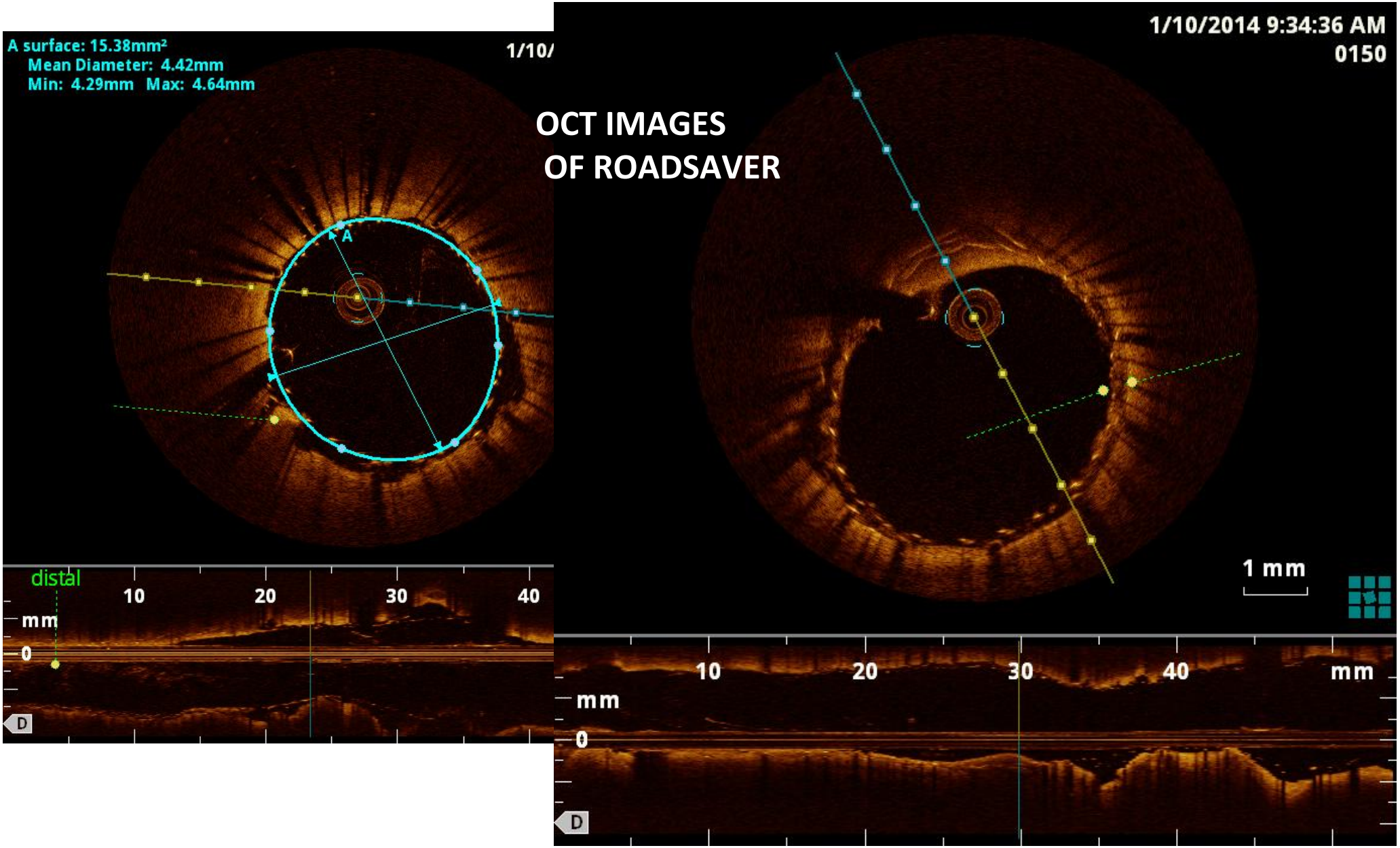
Symptomatic chronic Dissection & Ulcerated RICA Stenosis

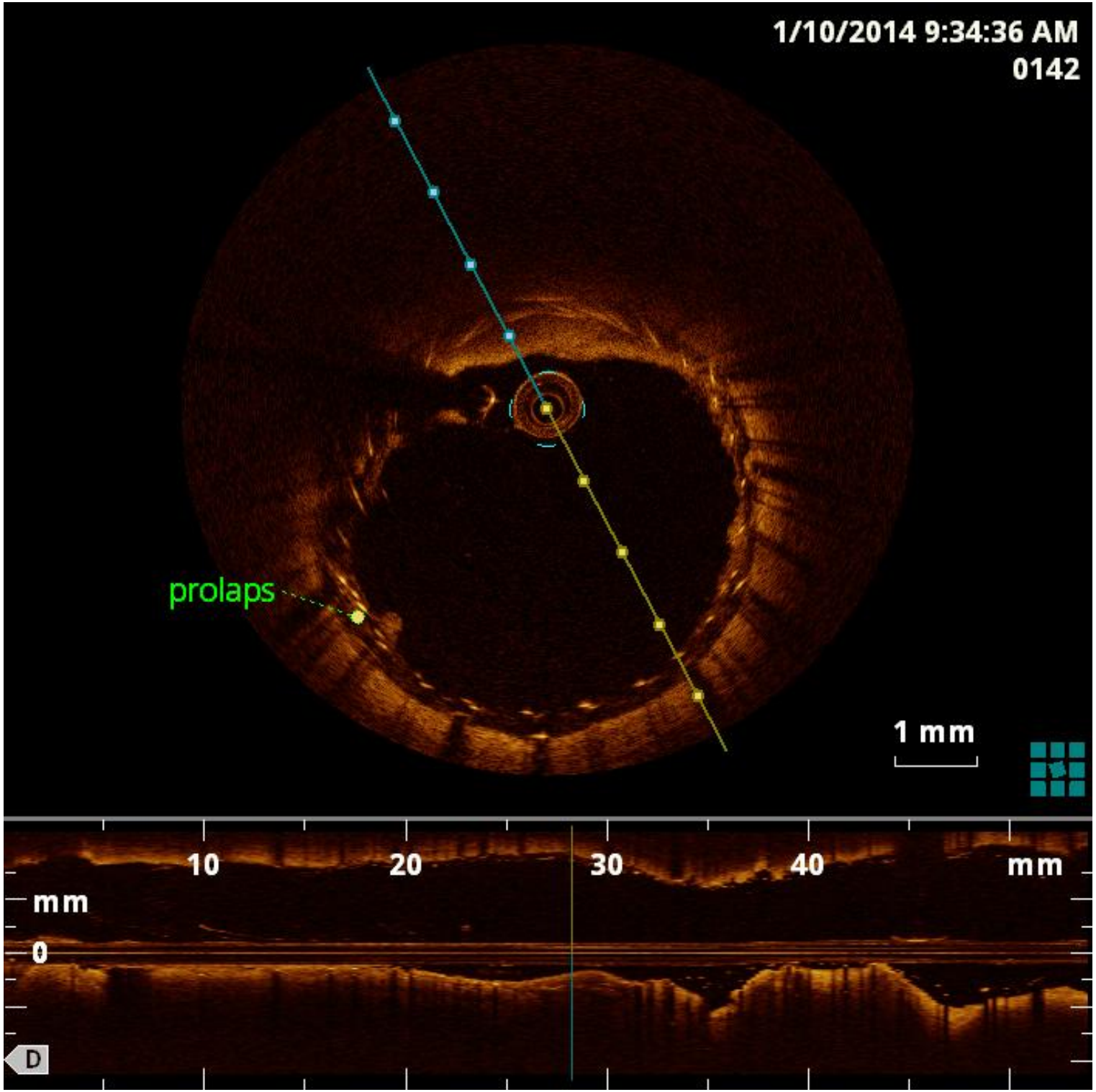
euro PCR 2014



euro PCR 2014

Harmonious deployment

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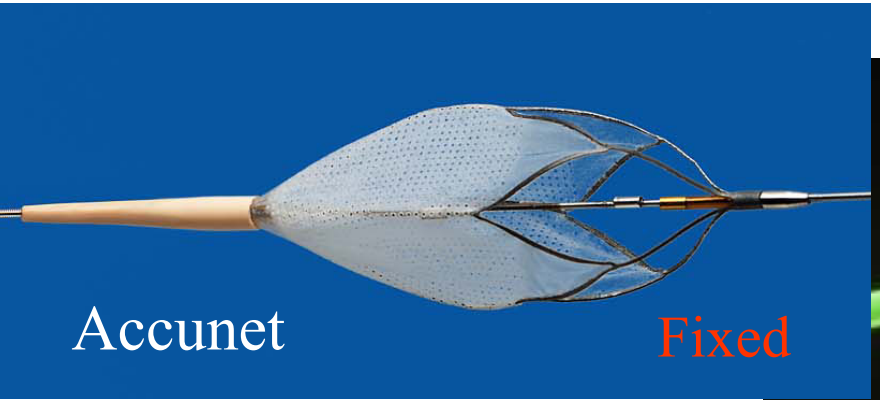
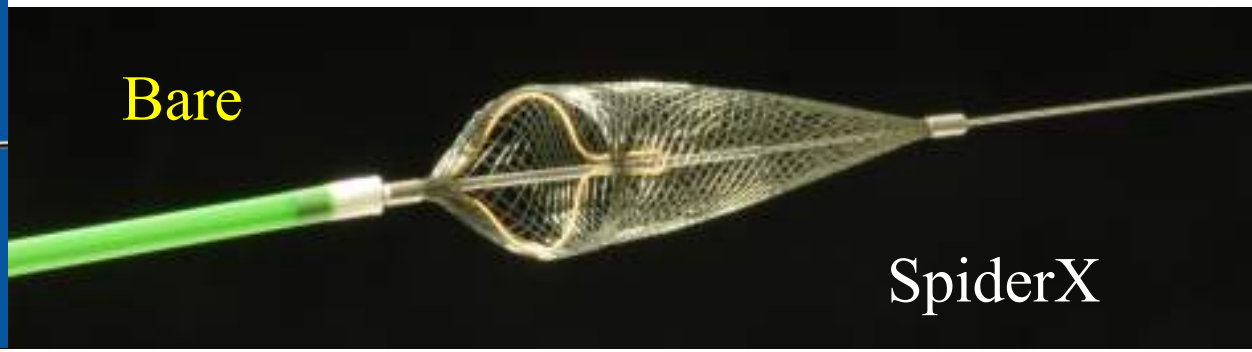
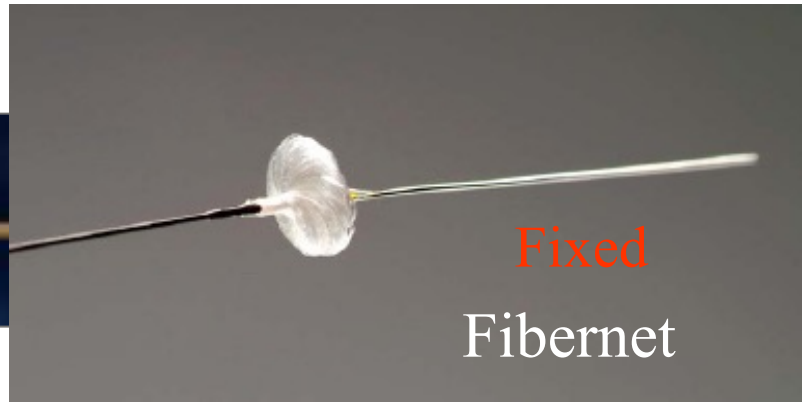
Main filters in 2010







Les systèmes de protection

Protection cérébrale proximale avec inversion du flux cérébral	Protection cérébrale distale	
	Filtre solidaire du guide	**Filtre indépendant du guide**
• **Mo.Ma Ultra Proximal Cerebral Protection Device (Medtronic, Inc.)** • **Neuroprotecting system (WL Gore)**	• FilterWire EZ Embolic Protection System(Boston Scientific Corporation) • RX Accunet filter (Abbott) • Angioguard RX Emboli Capture Guidewire System(Cordis Corporation) • FiberNet Embolic Protection System(Medtronic)	• Emboshield Nav6 (Abbott Vascular) • SpiderFX Embolic Protection Device (Covidien)

MO.MA

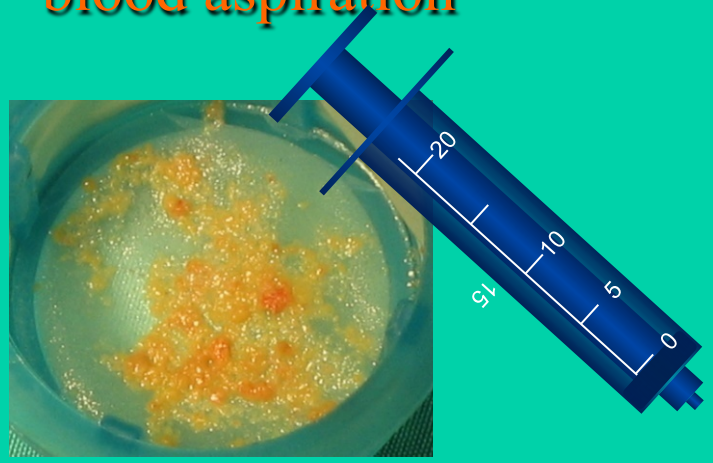
Overview

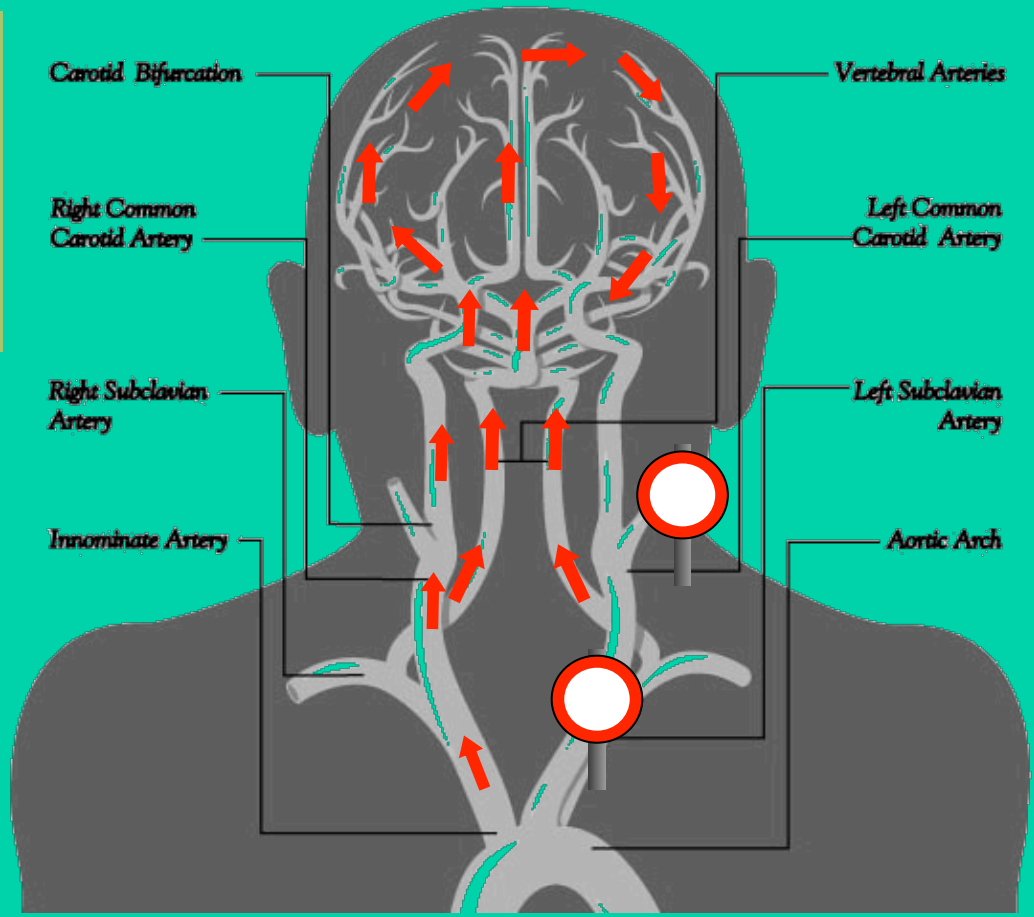
Proximal Flow Blockage Cerebral Protection Device

CCA clamping: blockage of antegrade blood flow

- ECA clamping: blockage of retrograde blood flow

- Debris removal: syringe blood aspiration





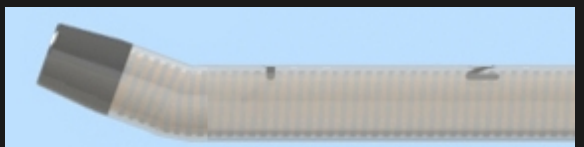
Cerebral ***Protection***

Results of the ROADSTER multicenter trial of transcarotid stenting with dynamic flow reversal

Christopher J. Kwolek, MD,[a] Michael R. Jaff, DO,[b] J. Ignacio Leal, MD,[c] L. Nelson Hopkins, MD,[d] Rasesh M. Shah, MD,[e] Todd M. Hanover, MD,[f] Sumaira Macdonald, MD,[g] and Richard P. Cambria, MD,[a]
Boston, Mass; Toledo, Spain; Buffalo, NY; Norfolk, Va; Greenville, SC; and Sunnyvale, Calif

J Vasc Surg 2015; 62: 1227-35

TCAR – Direct carotid access + Flow reversal



Uber-Flex Sheath tip
With 15° anterior bias

Introducer – working channel

Blood flow returned to femoral vein

Blood flow reversed from common carotid artery

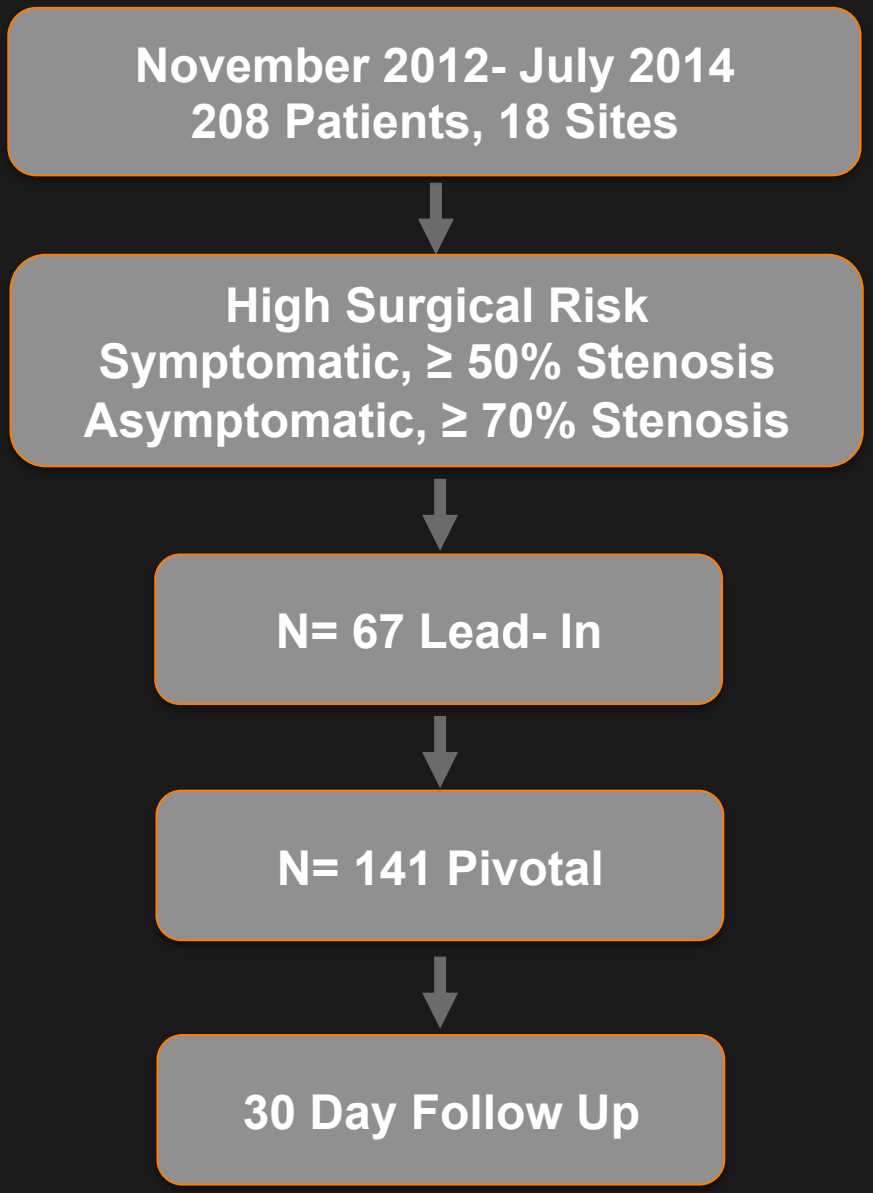
Dynamic Flow Controller
High / Low / Off

Embolic filter (200µ)

ROADSTER Study

- **DESIGN**: IDE study with OPC of 11% S/D/MI
- **OBJECTIVE**: Evaluate safety and efficacy of CAS with ENROUTE Transcarotid Neuroprotection System
- **INDEPENDENT REVIEW:** CEC, DSMB, Core labs (angiography, duplex ultrasound, cardiology)

- **PRIMARY ENDPOINT**
  - Composite of S/D/MI at 30-days post-procedure
- **SECONDARY ENDPOINTS**
  - Cranial nerve injury (CNI)
  - Stroke and death (S/D)
  - Procedural and technical success



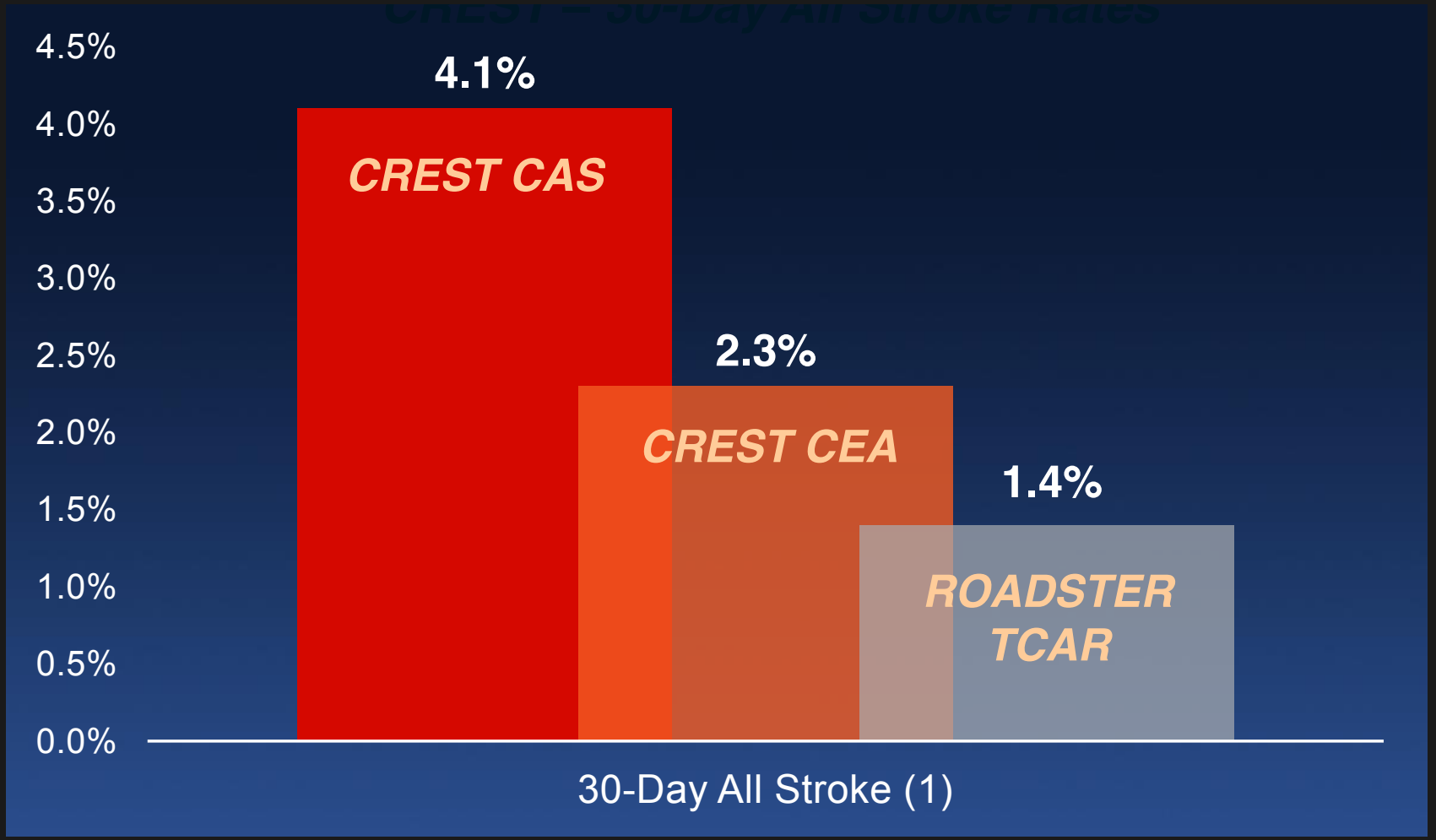
ROADSTER Study Outcomes

Intention to Treat & Per Protocol Groups

High Surgical Risk	Pivotal Group, ITT (N=141)		Pivotal Group, PP (N=136)	
S/D/MI*	5	3.5%	4	2.9%
Major Stroke	0	0%	0	0%
Minor Stroke	2	1.4%	1	0.7%
Death	2	1.4%	2	1.5%
MI	1	0.7%	1	0.7%
Stroke & Death	4	2.8%	3	2.2%
Cranial Nerve Injury (CNI)	1	0.7%	1	0.7%

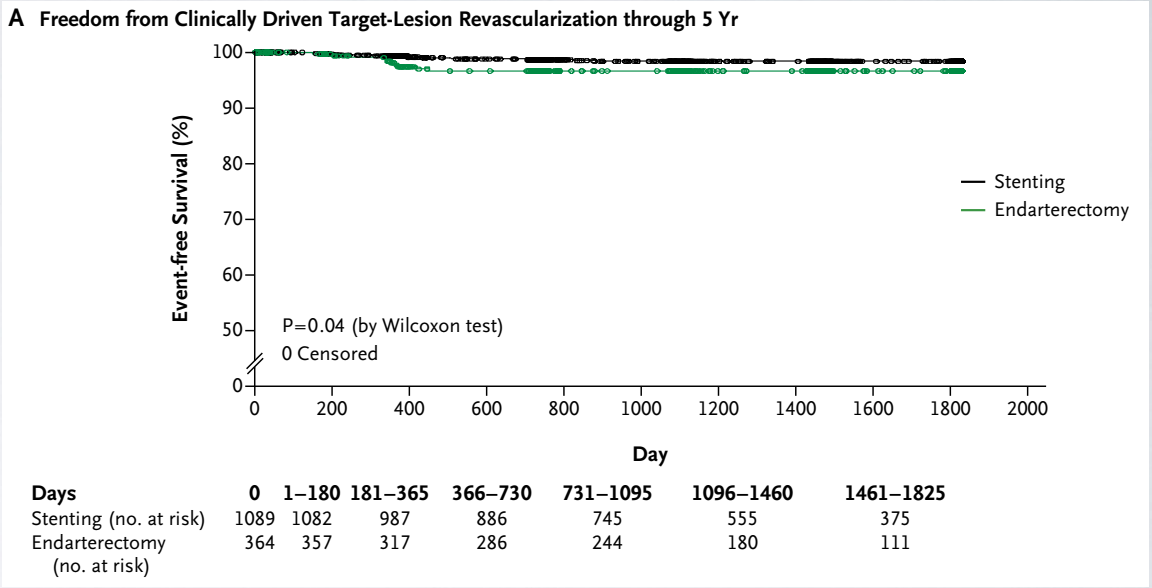
Per protocol excludes major protocol deviations

All FDA-approved carotid stent systems were used (Acculink, Xact, Precise, Protégé, Wallstent)

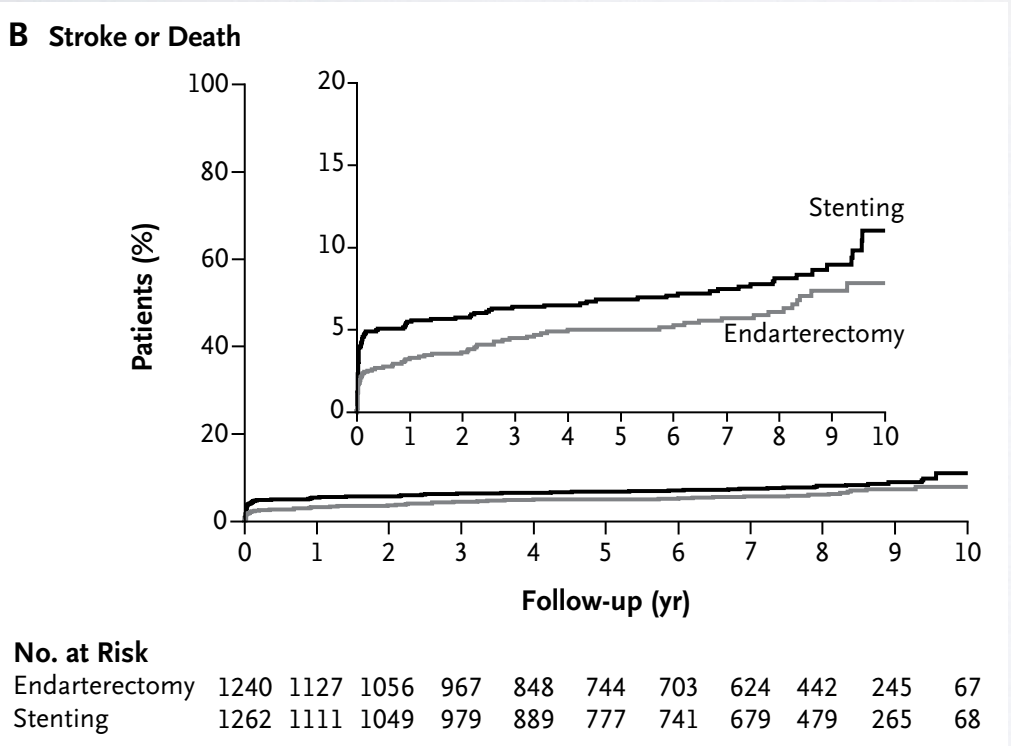


Kwolek C et al. JVS 2015; 62: 1227-35
Brott T et al . NEJM 2010; 363 (1): 11-23

Long-Term Outcomes



Brott T et al. *NEJM 2016; 374(11): 1021-31*



Rosenfield K et al. *NEJM 2016; 374(11): 1011-20*

30d Major stroke or death
2.9% CAS - 1.1% CEA

Minor stroke
2.4% CAS – 1.1% CEA

MI
0.5% CAS – 0.9% CEA

Facteurs de risque du stenting carotidien

Liés au patient	Liés à la lésion	Liés à la procédure
• **Âge > 80 ans** • **Symptomatique** • **Risque hémorragique** • **Insuffisance rénale** • **Mauvaise réserve cérébrale** • **Arche aortique type III** • **Athérome aortique** • **Instabilité tensionnelle**	• Ulcérée • Très calcifiée • Hypo échogène • Image intra-luminale • Englobant la carotide externe • Tortuosité artérielle proximale ou distale	• Inexpérience des opérateurs • Absence de protection cérébrale • Absence de stent carotide adapté • Délai entre l'évènement et l'angioplastie • « Open cell » vs « closed cell » stent • Intolérance au traitement anti-agrégant

Facteurs de risque de la chirurgie carotide

Liés au patient	Liés à la lésion	Liés à la procédure
• Âge > 79 ans • Angor instable • Infarctus de moins de 6 mois • Pontage aorto-coronaire • Insuffisance cardiaque • Insuffisance respiratoire • Diabète ou HTA mal contrôlés • Artérite	• Resténose post-chirurgie • Sténose post radiothérapie • Sténose en tandem • Sténose ostiale carotide commune • Sténose haut-située > C2 • Lésion intracrânienne associée • Occlusion carotide controlatérale	• Cou hostile • Trachéotomie • Paralysie des nerfs crâniens • Paralysie laryngée • Immobilité cervicale • Activité insuffisante du centre et/ou chirurgiens

Nature de la lésion	Angioplastie	Chirurgie
Courte	équivalence	
Longue	+++	+
Ulcérée	++	+++
Hypo échogène	++	+++
Calcification excentrée	++	+++
Calcification concentrique	0	+++
Bifurcation CE indemne	équivalence	
Bifurcation CE sténosée	+	+++
Lésions en tandem	+++	+
Lésions bilatérales	+++	+
Sténose haut située	+++	+
De novo	++	+++
Resténose	+++	+
Post-Rx	+++	-

Selection and access management for CAS

Common FEMORAL

POSSIBLE

IMPOSSIBLE

RADIAL APPROACH

SILK ROAD APPROACH

CONCLUSIONS

La voie radiale et la route de la soie (Silk Road) sont des opportunités pour les cardiologues afin de développer une activité d'angioplastie carotidienne en collaboration avec les chirurgiens vasculaires.

Les nouveaux stents à micro mailles sont un réel progrès dans le traitement des lésions carotidiennes complexes. Leur prise en charge en France n'est pas assurée.


GUESS
WHO'S
BACK?


CARDIOLOGIST CONVENTION
CUPID
CARTOONSTOCK .com
Search ID: dcrn1258
Dave Carpenter
"Our next speaker will be speaking on other matters of the heart."