



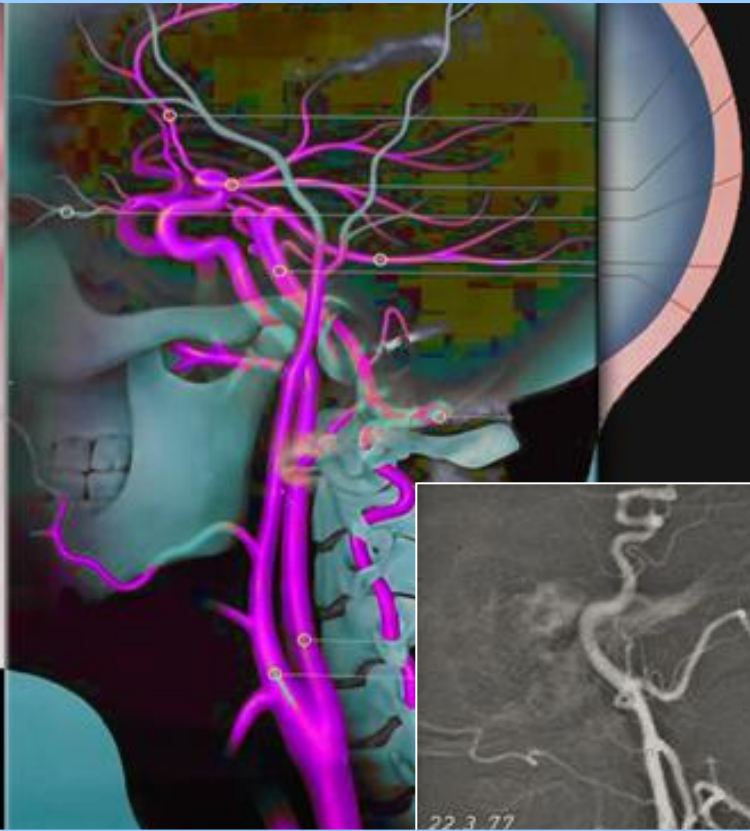
Lessons learned during ACST I and II

Prof Dj Radak MD PhD



**“Dedinje” Cardiovascular Institute
Belgrade**

CAROTID ATHEROSCLEROTIC DISEASE



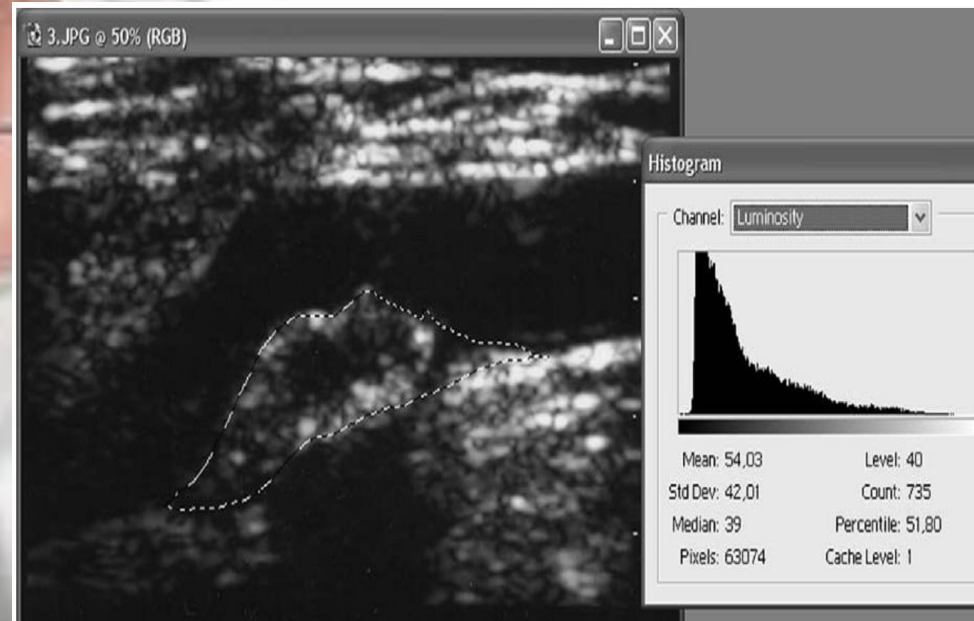
**More than 1.000 Carotid
reconstuction per year**

Quantification of Tissue Ultrastructure

Assesment of drug efficacy on Atherosclerosis Regression

Carotid duplex

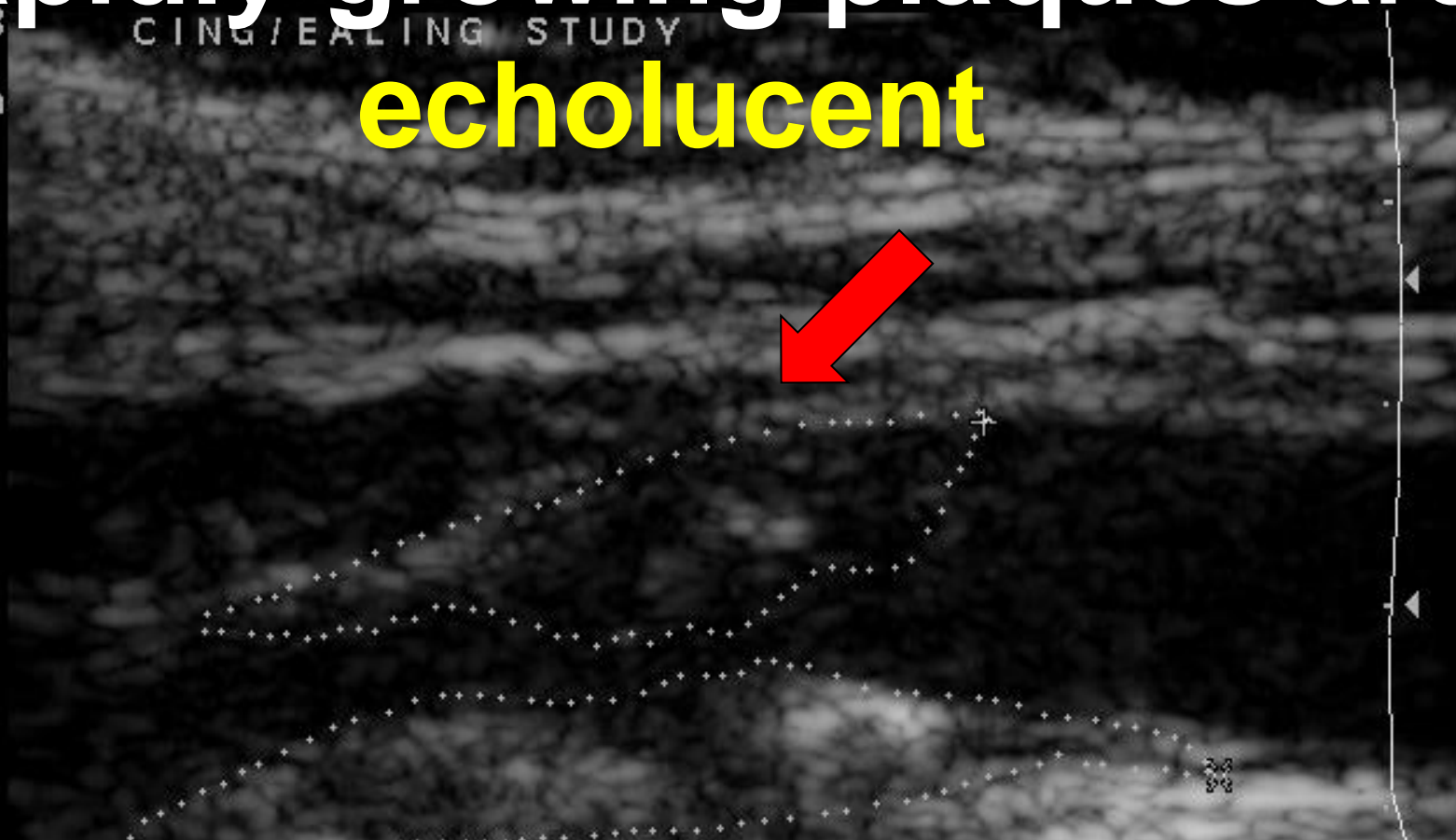
Ultrasound wand



Rapidly growing plaques are echolucent

Map I
DynRg 60dB
Persist Low
Fr Rate High

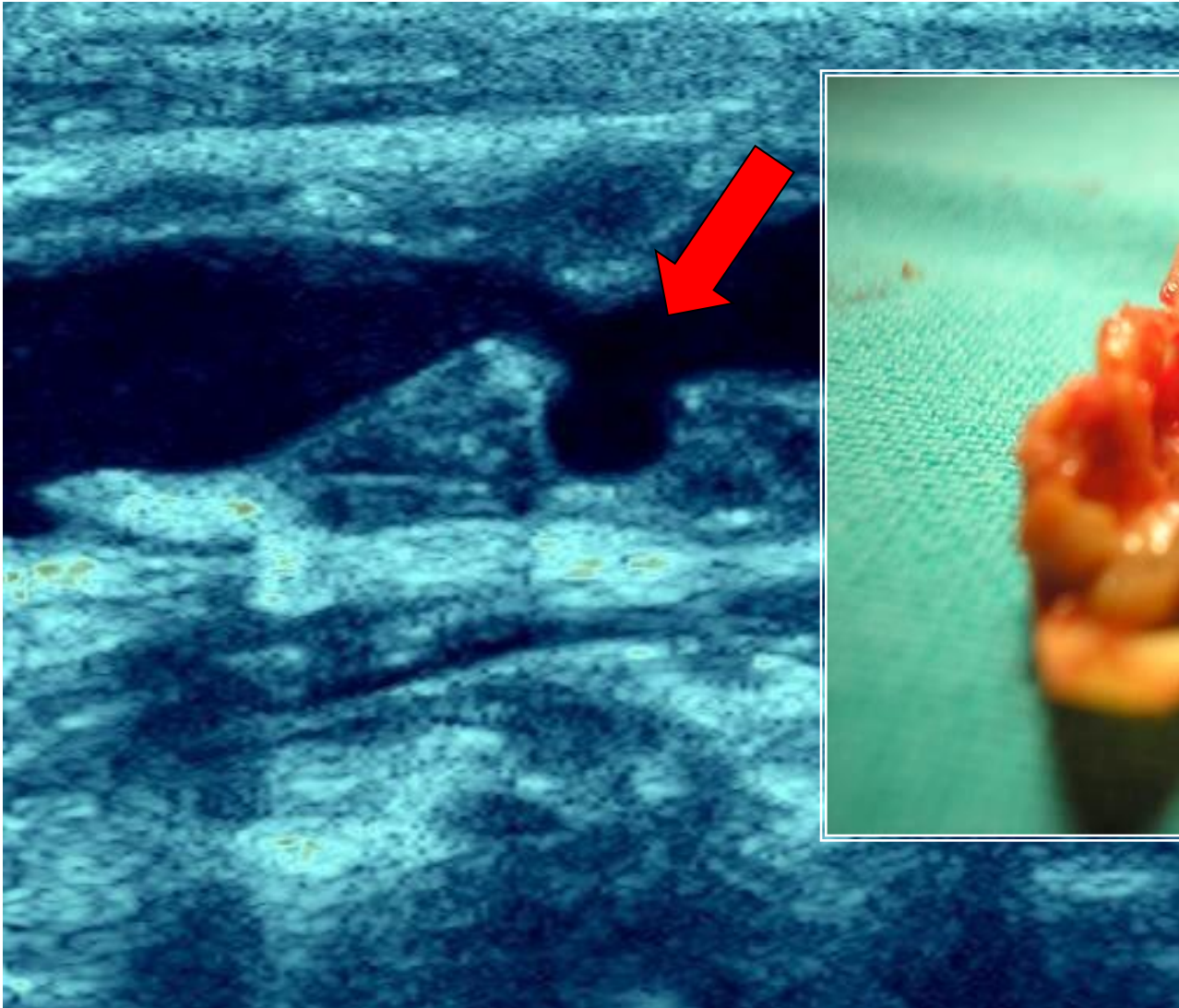
CINQUEALING STUDY



Plaque echolucency is associated with a higher ipsilateral stroke risk

Heterogenous Ulcerated plaque

Crescendo TIA with Focal Symptoms



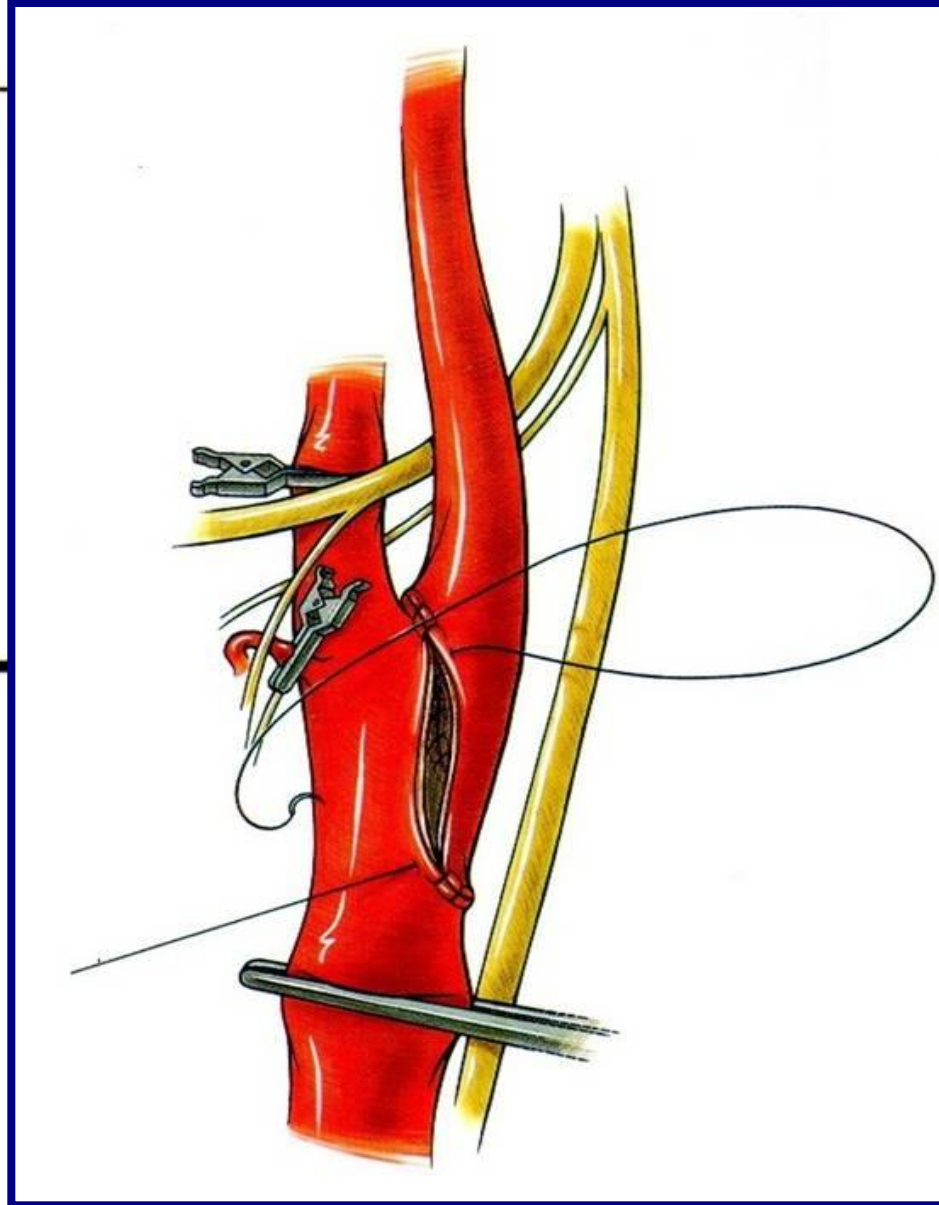
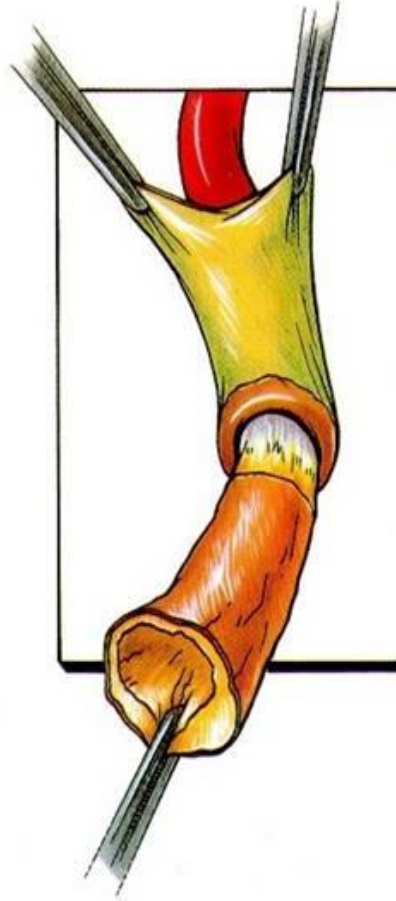
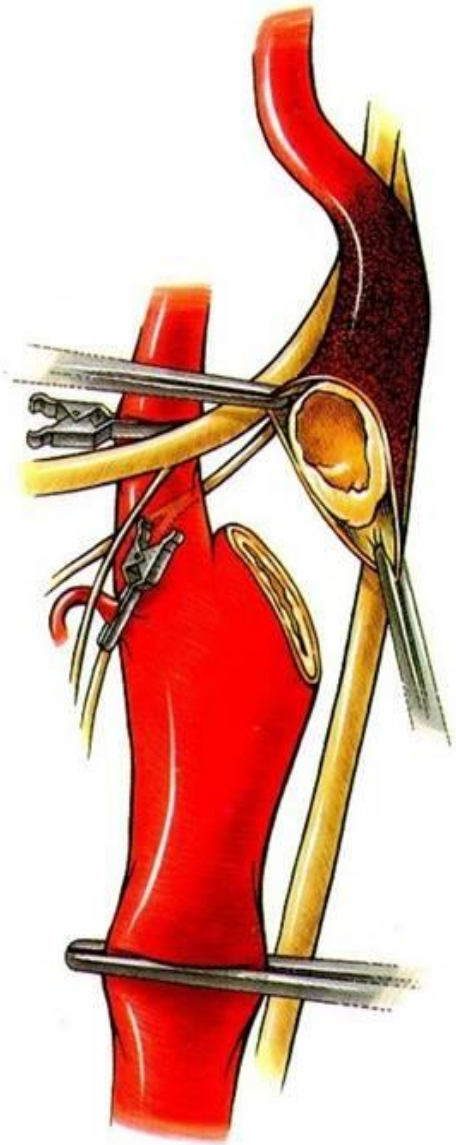
Brain does not forgive



**Too early is
unnecessary**

**Too late is
useless**

Eversion Carotid Endarterectomy



Eversion endarterectomy



Shorter clamping time

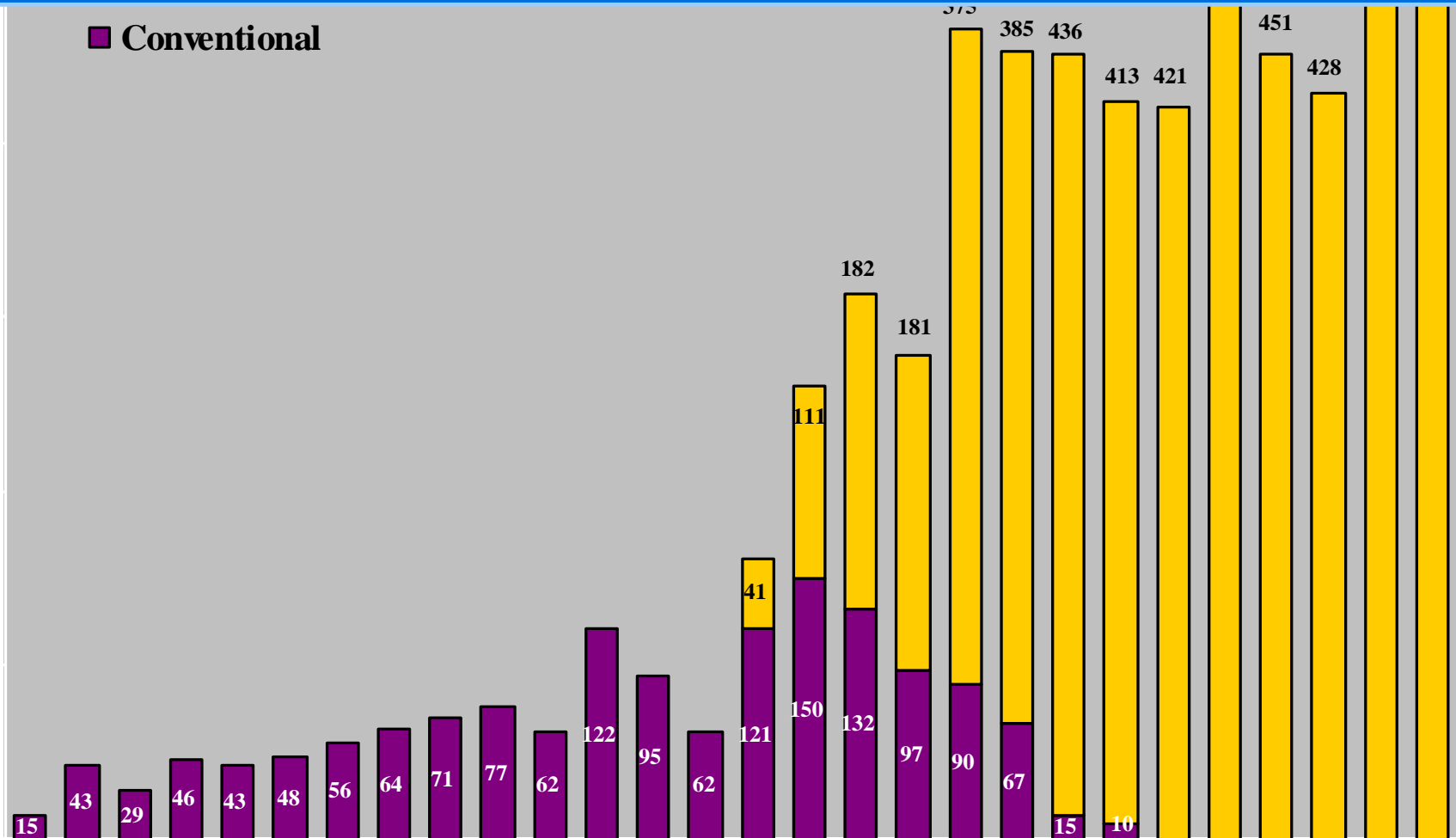
Transverse Suture line

No Patch

Simple resection of Kinks and Coils

High volume is improving the learning curve

Eversion endarterectomy introduced in 1991 by 1998 completely replaced traditional technique 13.624 Carotid Endarterectomies 1977-2015



Prospective Data Basis



**Best Medical
Treatment**

Stenting

Operative

Follow up

Carotid Database

Demographic, Clinical and Interventional data

ANAMNEZA

JMBG 54545465 Ime i Prezime marko Telefon 5346357
Broj istorije Adresa bulevar Godina rođenja 2244

Resetuj Zatvori Sačuvaj

Telesna težina
Telesna visina
Obim struka

Trigliceridi mmol/L
Holesterol mmol/L
LDL mmol/L
HDL mmol/L
Kreatinin mmol/L
Hemoglobin g/l
Hemoglobin A1C %

Simptomi
 Nema
 Amaurosis fugax
 TIA
 Moždani udar
 Drugo

Periferna arterijska bolest **NE**
Aneurizmatična bolest **NE**
Hiperlipoproteinemija **NE**
Hipertenzija **NE**
Porođično opterećenje KVB **NE**
Prethodna revaskularizacija miokarda **NE**

PCI ACB

Dijabetes **NE**
Insulin Zavisni Nezavisni

Pušenje **NE**
Prethodni infarkt miokarda **NE**
Zastojna srčana slabost **NE**

Ejekciona Frakcija %

Krvni pritisak
Sistolni mmHg
Dijastolni mmHg
Frekvencija udara/min

Ranija hirurška intervencija na ipsilateralnim krvnim sudovima **NE**
Ranija angioplastika/stent na ipsilateralnim krvnim sudovima **NE**

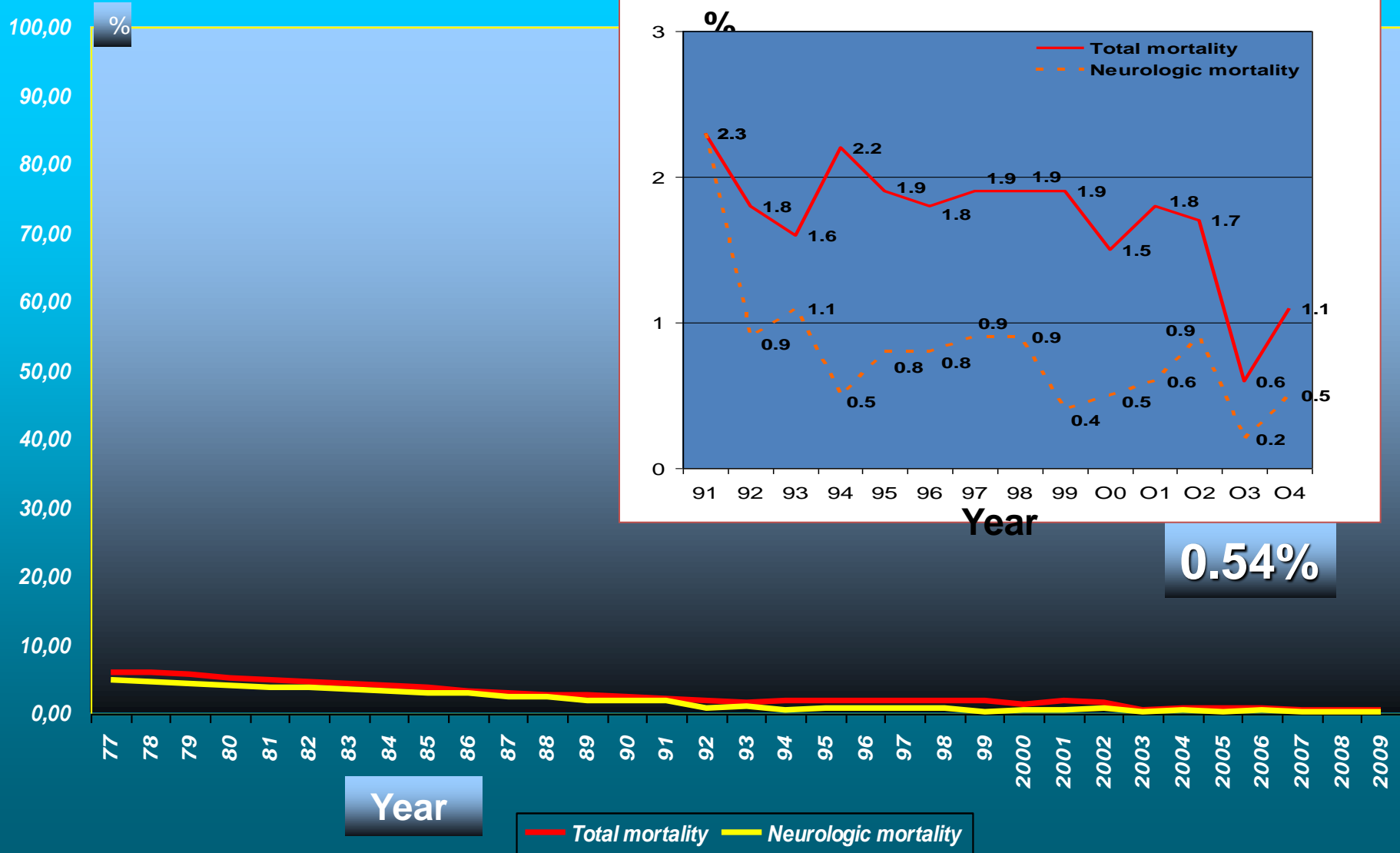
Ko je poslao pacijenta?
 Lekar opšte prakse Kardiolog
 Neurolog Oftalmolog
 Privatna praksa Pacijent se sam javio
 Radiolog Drugi hirurg

Terapija pre hirurgije ili angioplastike
 Ne Aspirin Clopidogrel OAK terapija Niskomolekularni Heparin Drugo
 ACEI Doza Beta blokatori
 NE Atorvastatin Rosuvastatin Simvastatin Pravastatin

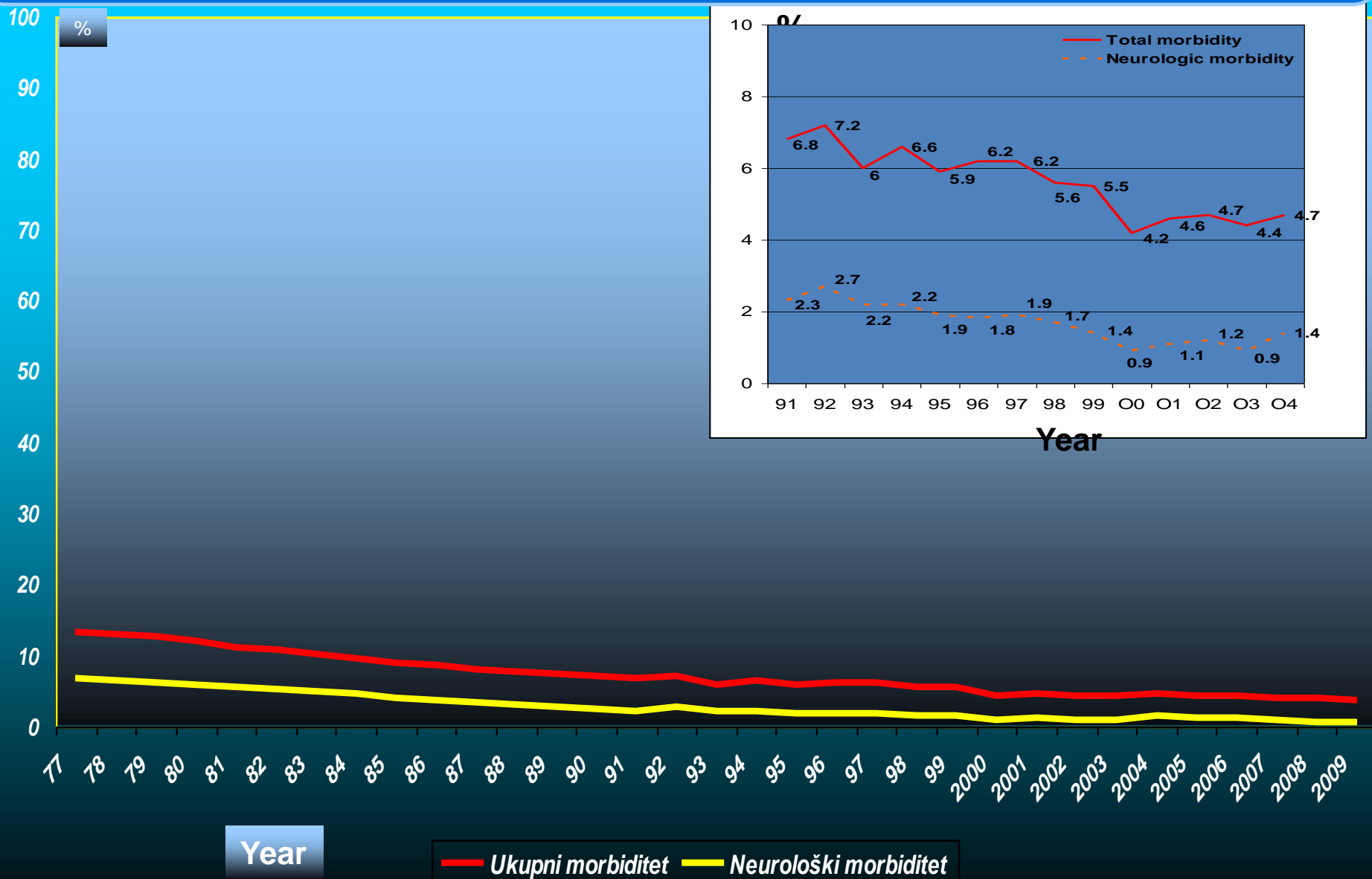
Statini pre intervencije dana Doza mg

Follow up

Total mortality declined over time to 0.7%



Total morbidity declined over time to 2.9%



Clinical Research

Eversion Carotid Endarterectomy—Our Experience After 20 Years of Carotid Surgery and 9897 Carotid Endarterectomy Procedures

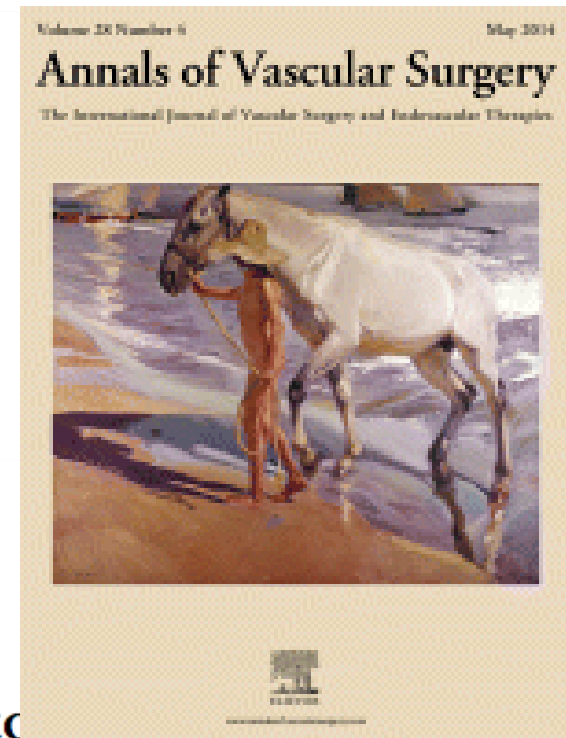
Institut za kardiovaskularne bolesti "Dedinje", Medicinski fakultet, Univerzitet u Beogradu

EVERZIONA
OPERACIJA

Đ. Radak



Eversion Carotid Endarterectomy vs Medical Treatment in Symptomatic Patients with Near Total Internal Carotid Occlusion: A Prospective Nonrandomized Trial



Eversion carotid endarterectomy is a reliable technique with low morbidity and mortality less than 0.7%

Anesthesia for carotid endarterectomy: where do we stand at present?

BY DRAGANA UNIC-STOJANOVIC,
PREDRAG MATIC, LJILJANA RANIĆ

PREDRAG MATIC, LJILJANA RANIĆ
BY DRAGANA UNIC-STOJANOVIC



REVIEW ARTICLE

*Paul G. Barash, MD
Giovanni Landoni, MD
Section Editors*

Anesthetics and Cerebral Protection in Patients Undergoing Carotid Endarterectomy

Miomir Jovic, MD, PhD,*† Dragana Unic-Stojanovic, MD,* Esmā Isenovic, PhD,‡ Rizzo Manfredi, MD, PhD,§
Olivera Cekic, MD,* Nenad Ilijevski, MD, PhD,¶|| Srdjan Babic, MD, PhD,|| and Djordje Radak, MD, PhD†||

Individual choice whether regional or general anesthesia is safer

depending on the clinical situation

Link Between Oxidative Stress and Acute Brain Ischemia

Djordje Radak, MD, PhD¹, Ivana Resanovic, MSc²,

Angiology
2014, Vol. 65(8) 667
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DOI: 10.1177/0003397113503487
ang.sagepub.com



Abstract ▾

Send to: ▾

Angiology. 2014 Sep;65(8):723-32. doi: 10.1177/0003397113503487. Epub 2013 Sep 23.

Changes in hypothalamus-pituitary-adrenal axis following transient ischemic attack.

Radak D¹, Resanovic I², Isenovic ER³.

Author information

226 *Current Vascular Pharmacology*, 2015, Vol. 13, No. 2

Abstract

Acute brain
hypoth
to is
kno
reg
act
foll

**Neuroprotective anaesthetics
can minimise metabolic demands
and oxidative stress**

**Propofol
Sevoflurane**

Anesthetic preconditioning

Practical Use of Near-Infrared Spectroscopy in Carotid Surgery

Djordje Radak, MD, PhD¹, Vuk Sotirovic, MD¹,
Milan Obradovic, MSc², and Esmā R. Isenovic, PhD²

Angiology
2014, Vol. 65(9) 769-772
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DOI: 10.1177/0003319713505133
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Copeptin Level After Carotid Endarterectomy and Perioperative Stroke

Vera Maravic-Stojkovic, MD, PhD¹, L. J. Lausevic-Vuk, MD, MA¹,
M. Obradovic, BSc², B. Jovanovic, MD¹, S. Tomic, MD¹

Angiology
2014, Vol. 65(2)
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DOI: 10.1177/0003319712473637
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Near-infrared spectroscopy
for the monitoring of cerebral
tissue oxigenation

Urgent carotid surgery



Crescendo TIA
at least 2 episodes in 24 h

**Stroke in
progression**



Urgent carotid endarterectomy in patients with acute neurological ischemic events within six hours after symptoms onset

P Gajin, Dj Radak,

Carotid endarterectomy should be performed early after a cerebral ischemic event in order to be most effective

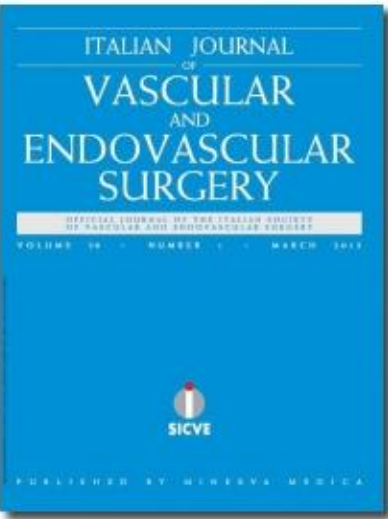
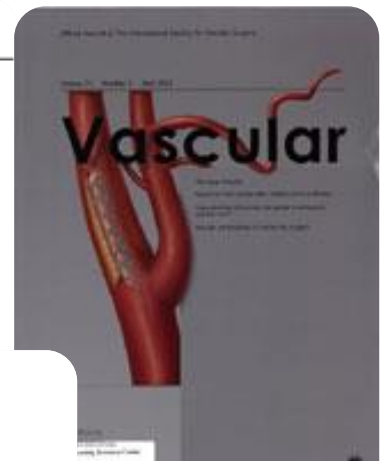
Karotidnu endarterektomiju treba uraditi što pre posle simptoma moždanih ishemija kako bi korist bila najv

Djordje Radak*†

*Cardiovascular Institute Dedinje, Clinic for Vascular Surgery, Belgrade Serbia;

†Serbian Academy of Sciences and Arts, Belgrade, Serbia

Emergency carotid endarterectomy following one-stage contralateral carotid endarterectomy and

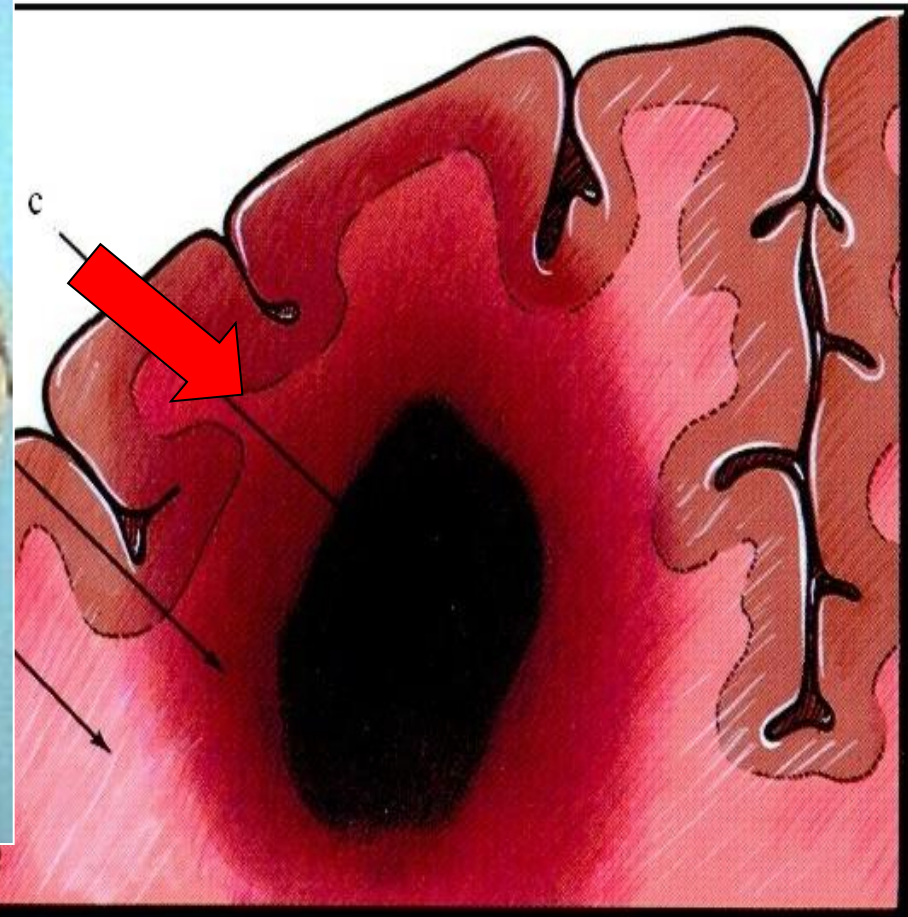
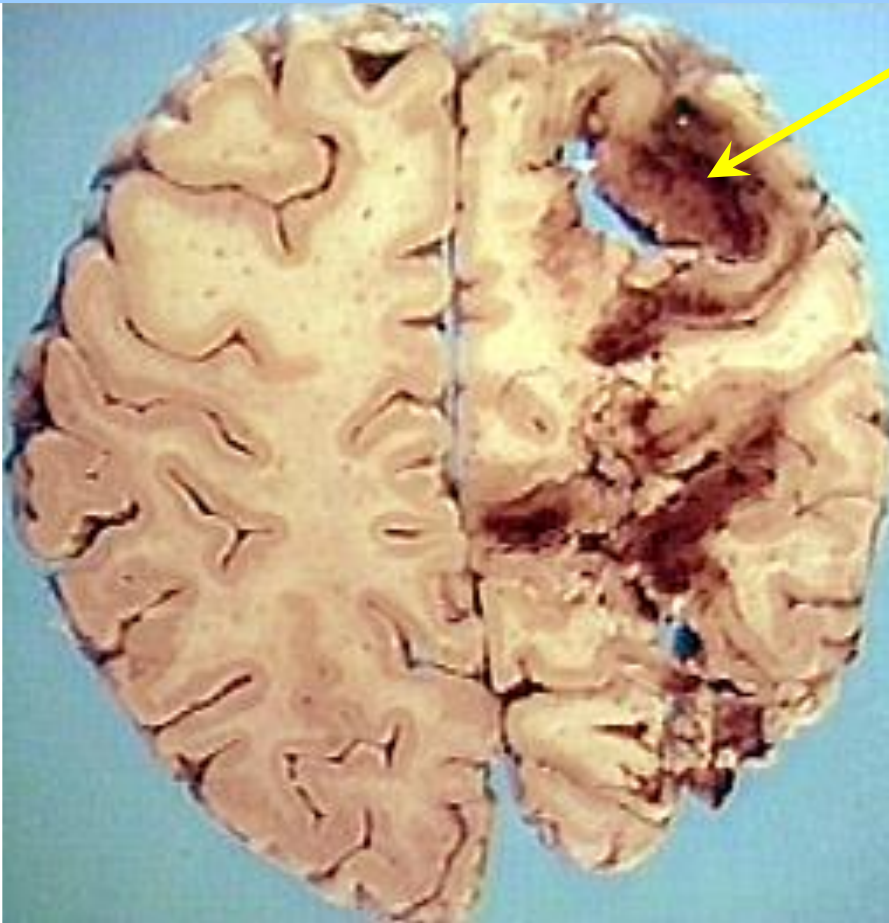


Urgent Carotid reconstruction is a safe and effective if performed within 6 hours after Crescendo TIA onset

Brain CT

Previous stroke lesion (acute/chronic, single/multiple, ischemia/hemorrhage)

Extensive Previous Multiinfarction could be contraindications for CEA



Correlation of Carotid Artery Disease Severity and Vasomotor Response of Cerebral Blood Vessels

Angiology
2015, Vol. 66(5) 481-487
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DOI: 10.1177/0003319714538312
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ORIGINAL ARTICLE
ORIGINALNI RAD

DOI: 10.1515/sdj-2015-0014
UDC: 616.314.18:612.15

Ivana
Niki K
and Đ

Correlation Between Pulpal and Carotid Arteries Blood Flow in Two Age Groups


Bojan Dželetović¹, Nikola Aleksić², Djurica Grga¹, Tatjana Savić-Stanković¹, Ivana Milanović¹, Djordje Radak²

¹Univ *Editorial*

Serbia

²Vasc

“Summer Dizziness” as a Neglected Phenomenon of Antihypertensive Drug Overuse in Patients With Carotid

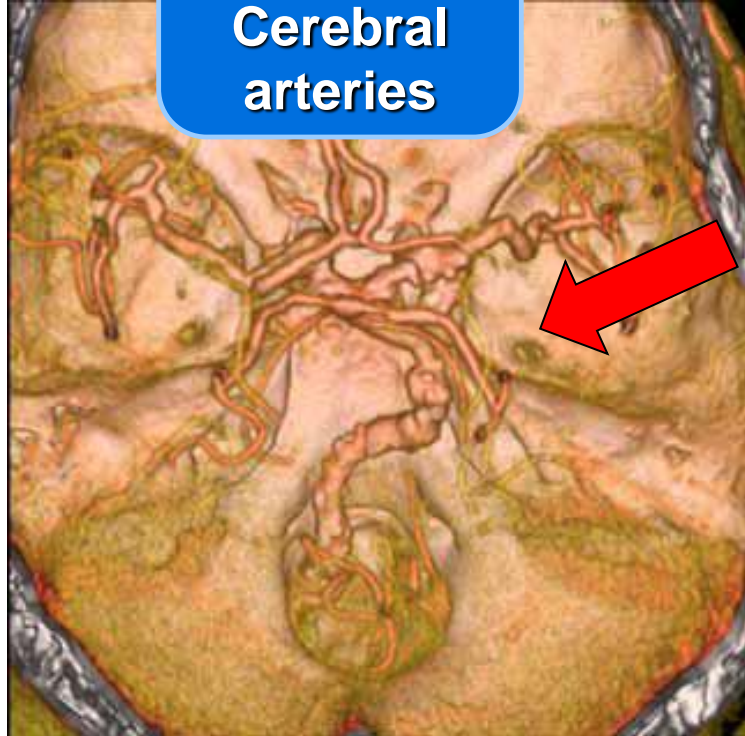
Angiology
1-2
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DOI: 10.1177/0003319715618482
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Cerebral **Vasomotor Response** is a measure of severity of brain macro and micro infarctions

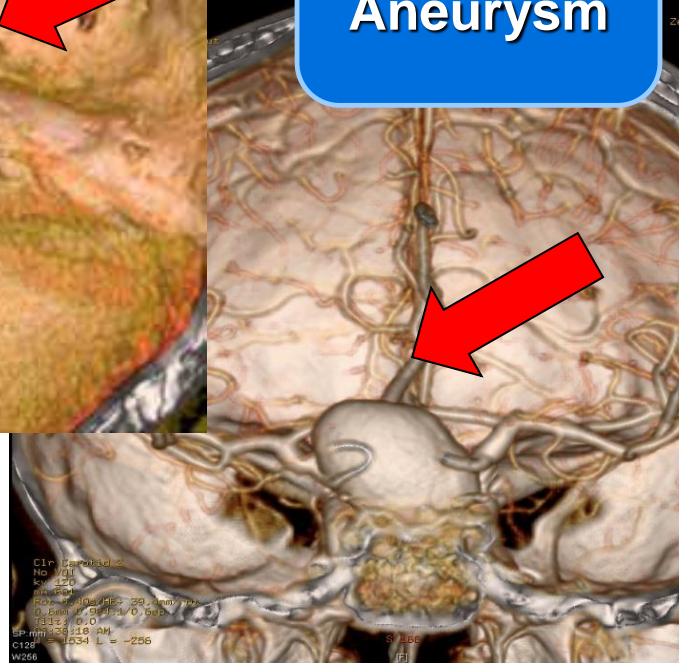
“**Summer dizziness**”
hypotensive TIAs in patients with carotid stenosis due to antihypertensive drug overuse

MsCT of Cerebral Arteries

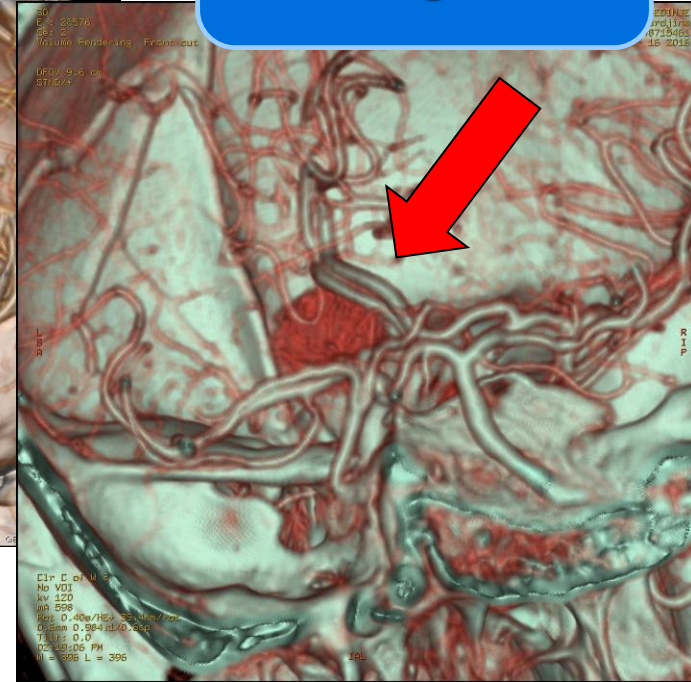
Circle of Willis and Cerebral arteries



Cerebral Aneurysm



Asymptomatic Meningeoma



Intracranial Aneurysms in Patients With Carotid Disease: Not So Rare As We Think

Djordje Radak, MD, PhD^{1,2}, Vuk Sotirovic, M Slobodan Tanaskovic, MD^{1,2}, and Esma R. Ise

Angiology
2014, Vol 65(1) 12-16
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DOI: 10.1177/0003319712468
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Is It Possible That This Patient is Asymptomatic? The Role of Multidetector CT Angiography in Detection of Ulcerated Plaques in Patients with Asymptomatic Carotid Stenosis: Case Report

Slobodan Tanasković¹, Srdjan Babić¹, Nikola Aleksić², Predrag Matić^{1,3}, Predrag Gajin^{1,3}, Dario Jocić¹, Djordje Radak^{1,3}

¹Vascular Surgery Clinic, "Dedinje" Cardiovascular Institute, Belgrade, Serbia;
²Department for Angiology, "Dedinje" Cardiovascular Institute, Belgrade, Serbia;
³University of Belgrade, School of Medicine, Belgrade, Serbia

Anatomy and radiology of aortic arch branch

G. Vučurević¹, S. Marinković², L. Puškaš³

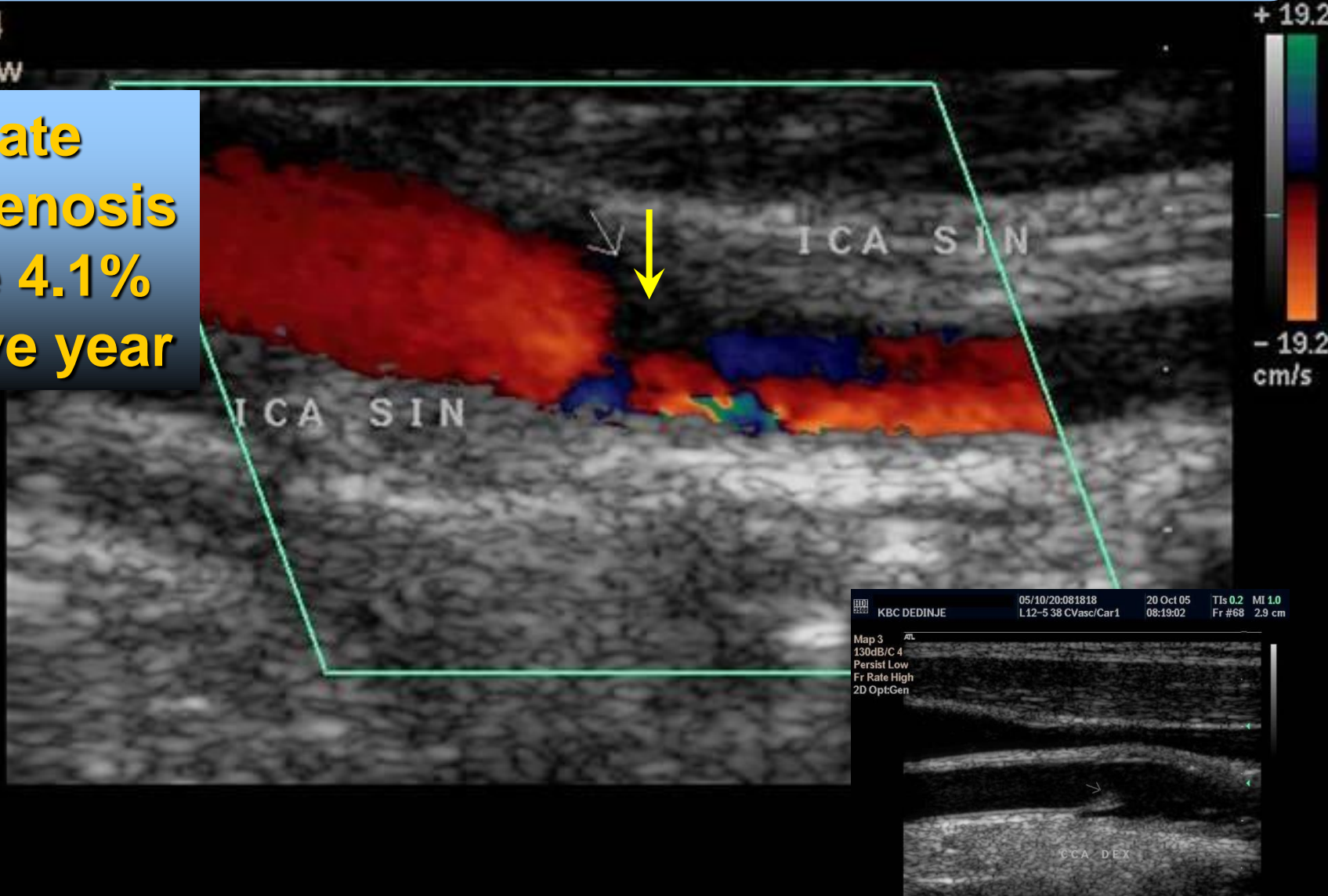
¹Vascular Surgery Clinic, Dedinje Cardiovascular Centre, Faculty of Dentistry, Pancevo, Serbia
²Institute of Anatomy, Faculty of Medicine, University of Belgrade, Belgrade, Serbia
³Neurosurgical Clinic, Faculty of Medicine, University of Belgrade, Belgrade, Serbia

MDCT angiography

Cerebral aneurysms were found in 12% of the patients undergoing carotid interventions

Turbulent Flow and Neointimal Hyperplasia postoperative Follow up

Late Restenosis rate 4.1% in five year



Inflammation as a Marker for the Prediction of Internal Carotid Artery Restenosis Following Eversion Endarterectomy—Evidence From Clinical Studies

Slobodan Tanaskovic, MD¹, Esma R. Isenovic, PhD², and Djordje Radak, MD, PhD¹

Djordje Radak, MD, PhD¹, Slobodan Tanaskovic, MD¹, Esma R. Isenovic, PhD², and Djordje Radak, MD, PhD¹

Metabolic syndrome and restenosis

Meta

Clinical Significance of Internal Carotid Artery Restenosis Following Carotid Endarterectomy

Djordje Radak, Slobodan Tanasković, Srdjan Babić, Nikola Aleksić



Inflammation markers – hsCRP, fibrinogen and C3 complement have significant role in carotid restenosis development

Co221: Genotype CYP2C19 Effects on Therapeutic Response During Clopidogrel Treatment in Patients with Carotid Artery Stenosis

D. Bačković, M. Kovac, B. Calija, E. Strugarevic, D. Radak, L. Rakicevic, J. Kusić-Tišma, S. Ignjatovic

esvs
Journal
European Journal of
Vascular & Endovascular Surgery

INFLUENCE OF CYP2C19*2 GENE VARIANT ON THERAPEUTIC RESPONSE DURING CLOPIDOGREL TREATMENT IN PATIENTS WITH CAROTID ARTERY STENOSIS

UTICAJ CYP2C19*2 VARIJANTE GENA NA TERAPIJSKI ODGOVOR U TOKU PRIMENE KLOPIDOGRELA KOD BOLESNIKA SA STENOZOM KAROTIDNE ARTERIJE

Dražana Bačković¹, Svetlana Ignjatović^{1,2}, Ljiljana Rakićević³, Jelena Kusić-Tišma³,

Dual antiplatelet therapy after carotid interventions is necessary

Genotype testing for measuring the therapeutic response

Editorial

Effect of Statins on rates of Long-Term Cardiovascular Events and Restenosis Following Carotid Endarterectomy

Vasilios G. Athyros¹, Niki Katsiki¹, Asterios Karagiannis¹ and Djordje Radak²



Curr Vasc Pharmacol. 2014 Oct 17. [Epub ahead of print]

Effect of Statins on rates of Long-Term Cardiovascular Events and Restenosis Following Carotid Endarterectomy.

Athyros VG¹, Katsiki N, Karagiannis A, Radak D.

Statins

at least 2 weeks before, during and after the Carotid Surgery provide substantial clinical benefits

Increasing life expectancy and improving quality of life

RESEARCH ARTICLE

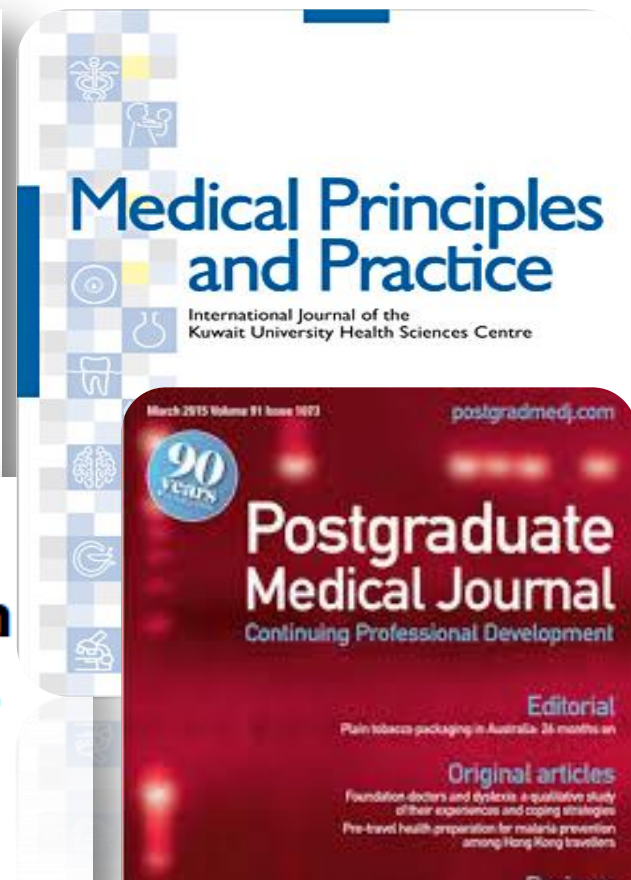
Open Access

Prevalence of the metabolic syndrome in patients with carotid disease according to NHLBI/AHA and IDF criteria: a cross-sectional study

Milos

Frequency and characteristics of metabolic syndrome in patients with symptomatic carotid atherosclerosis

Milos Maksimovic¹, Hristina Vlajinac², Djordje Radak³,
Jadranka Maksimovic², Petar Otasevic³,
Jelena Marinkovic⁴, Jagoda Jorga¹.



Metabolic syndrome is a risk factors
for **premature atherosclerosis** and
carotid restenosis

Relationship between Abdominal Obesity and Other Cardiovascular Risk Factors: Cross Sectional Study of Patients with Symptomatic Carotid Disease

Miloš Maksimović¹, Hristina Vlajinac², Djordje Radak^{3,4}, Jelena Marinković⁵,
Jadranka Maksimović², Jagoda Jorga¹

¹Institute of Hygiene and Me
²Institute of Epidemiology, S
³Dedinje Cardiovascular Insti
⁴School of Medicine, Universi
⁵Institute of Medical Statistic

94

Mini-Reviews in Medicinal Chemistry, 2016, 16, 94-10

Benefits of L-Arginine on Cardiovascular System

Emina Sudar-Milovanovic¹, Milan Obradovic¹, Aleksandra Jovanovic¹,

**Critical Reviews
in Clinical
Laboratory
Sciences**

<http://informahealthcare.com/lab>
ISSN: 1040-8363 (print), 1549-781X (electronic)

Grit Rev Clin Lab Sci, 2015; 52(2): 70-85
© 2014 Informa Healthcare USA, Inc. DOI: 10.3109/10408363.2014.992063

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REVIEW ARTICLE

Oxidized low-density lipoprotein as a biomarker of cardiovascular

Oxidised LDL could be the
biomarker for cardiovascular
disease



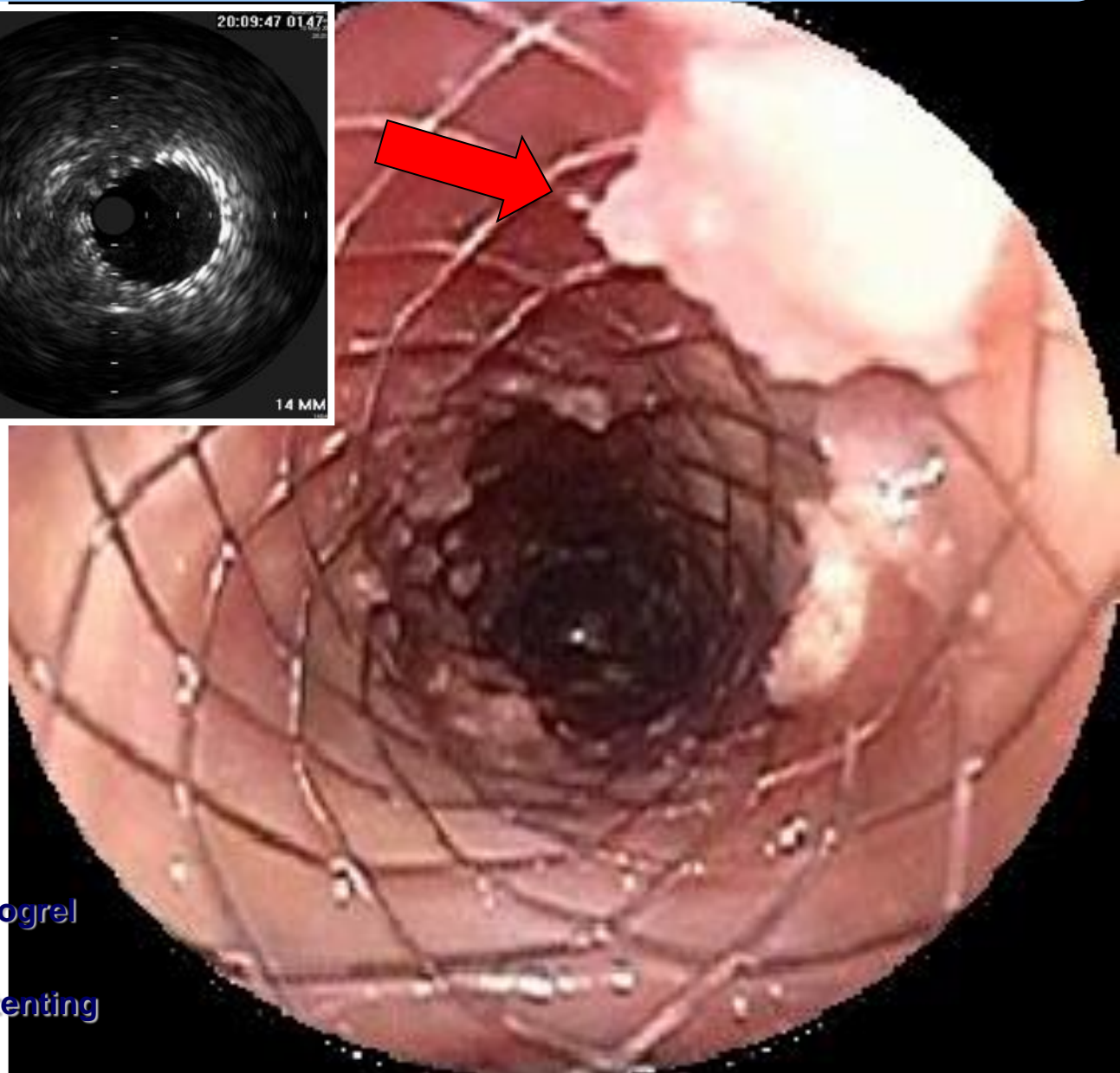
Critical Reviews
in Clinical
Laboratory
Sciences

Editor-in-Chief — Julia S. Benoit
Executive Editor — Lynn C. Alban

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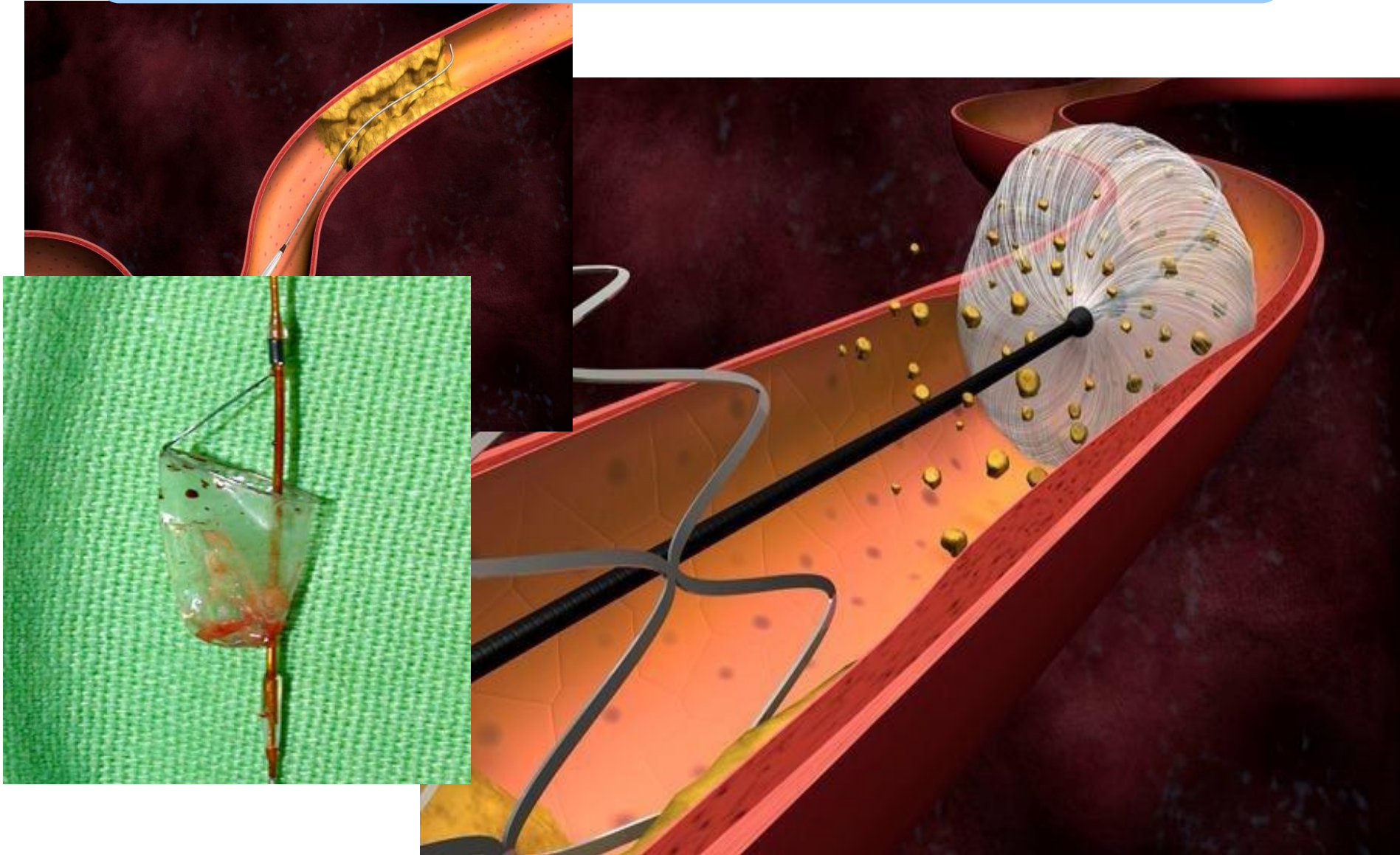
informa
healthcare

Carotid Stenting is minimally invasive



Acetylsalicylic acid and Clopidogrel
before, during and
at least 1 month after carotid stenting

Cerebral Protection



Fiber-based filter conforms to asymmetrical vessels Particle entrapment as small as 40 μm



Does the Endovascular Era Affect the Clinical

Srdjan Babic^{1*} and Djordje Radak²

¹Department of Vascular and Endovascular surgery, Institute for Cardiovascular disease, "Dedinje", Belgrade, Serbia

²Belgrade University School of Medicine

IS CREST STUDY A TURNING POINT IN DETERMINING INDICATIONS FOR CAROTIDE DISEASES TREATMENT BY STENT DILATATION?

Djordje Radak, Predrag Jovanović

Simultaneous stenting of the left main coronary stem and internal carotid artery in a hemodynamically unstable patient

Istovremeno rešavanje stenozе glavnog stabla leve koronarne arterije i unutrašnje

Endovascular era opens new horizons in the treatment of carotid disease

3D
Ex: 10963
Sep 2 '06
Volume Rendering: No cut

DFOV: 24.7 cm
STRIP:



CardioVascular and Interventional Radiology
The official journal of the Cardiovascular and Interventional Radiological Society of Europe

CLINICAL INVESTIGATION

Initial and Long-Term Results of Endovascular Therapy for Chronic Total Occlusion of the Subclavian Artery

Srdjan Babic · Dragan Sagic · Djordje Radak · Zelimir Antonic ·
Petar Otasevic · Vladimir Kovacevic · Slobodan Tanaskovic ·
Dusan Ruzicic · Nikola Aleksic · Goran Vucurevic

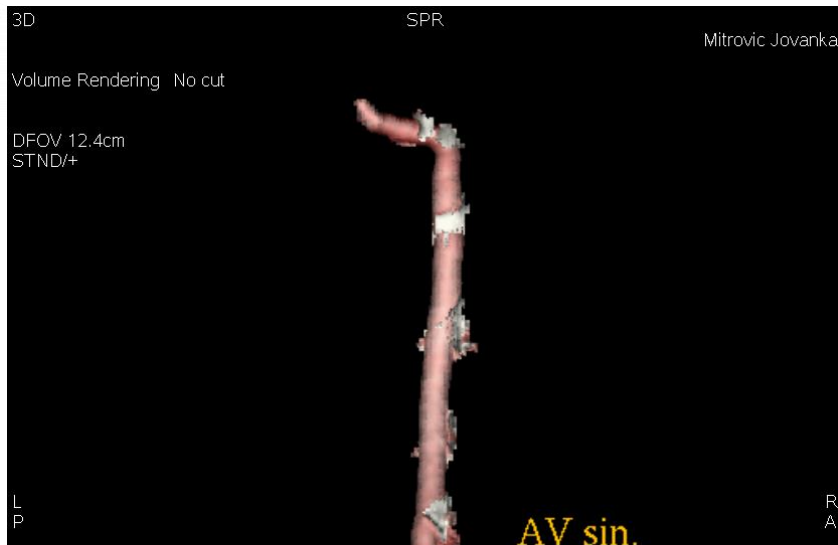


Endovascular treatment of symptomatic
Subclavian artery stenosis is a safe and
effective

even without use of cerebral protection devices

Endovascular treatment of symptomatic high-grade vertebral artery stenosis

Djordje Radak, MD, PhD,^{a,b} Srdjan Babic, MD, PhD,^a Dragan Sagic, MD, PhD,^{a,b} Slobodan Tanaskovic, MD,^a Vladimir Kovacevic, MD,^a Petar Otasevic, MD, PhD,^a and Zoran Rancic, MD, PhD,^c *Belgrade, Serbia; and Zurich, Switzerland*



Endovascular treatment of symptomatic
Vertebral artery stenosis is a safe and
effective

with low risk and good long-term results

Carotid angioplasty and stenting is safe and effective for treatment of recurrent stenosis after eversion endarterectomy

Djordje Radak, MD, PhD,^{a,b} Slobodan Tanaskovic, MD,^a Dragan Sagic, MD, PhD,^{b,c} Zelimir Antonic, MD,^c Srdjan Babic, MD, PhD,^a Petar Popov, MD, PhD,^{a,b} Predrag Matic, MD,^a and Zoran Rancic, MD, PhD,^d Belgrade, Serbia; and Zurich, Switzerland



Stenting Versus Endarterectomy for Restenosis Following Prior Ipsilateral Carotid Endarterectomy *An Individual Patient Data Meta-analysis*

Margriet Fokkema, MD,*† Joyce E. P. Vrijenhoek, MD,*‡§ Hester M. Den Ruijter, PhD,‡¶
Rolf H. H. Groenwold, MD, PhD,¶ Marc L. Schermerhorn, MD,† Michiel L. Bots, MD, PhD,¶
Gerard Pasterkamp, MD, PhD,‡ Frans L. Moll, MD, PhD,* and Gert Jan De Borst, MD, PhD*; on behalf of the
TREAT CARE Study Group



**Carotid artery stenting is safe
and reliable procedure for
Carotid Restenosis**

Are the carotid kinking and coiling underestimated entities?

Da li su morfološke abnormalnosti karotidne arterije (*kinking* i *coiling*) beznačajne?

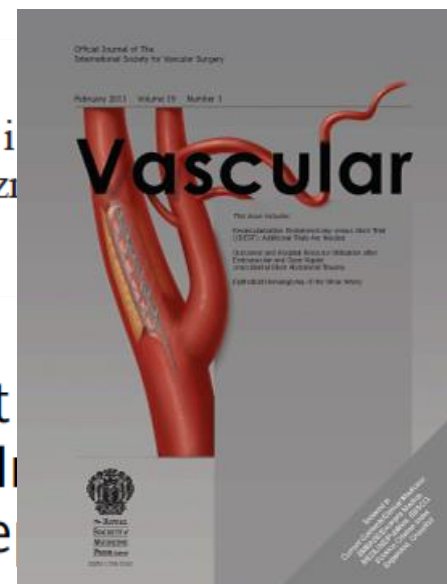
Djordje Radak^{*†‡}, Srdjan Babic^{*†}, Slobodan Tanaskovic^{*†}, Predrag Matic^{*†},

Therapeutic Choice for the Treatment
Subcranial Positioned Bilateral Kinking of Internal
Carotid Artery With Dissection: Case Report

*Srdjan Babic, MD, Djordje Radak, MD, PhD,
Slobodan Tanaskovic, MD, and Nenad Ilijevski, MD, PhD*

PATOLOŠKE ELONGACIJE KAROTIDNIH ARTERIJA: DIJAGNOSTIKA I
HIRURŠKO LEČENJE

PATHOLOGICAL ELONGATIONS OF THE CAROTID ARTERIES:
DIAGNOSTICS AND SURGICAL TREATMENT



Kinks and Coils are frequently found with
carotid atherosclerosis
and
simple to remove using Eversion technique

Carotid Angioplasty has its limitations

Complication Rate
Distal embolization

**Cost Benefit
Ratio**

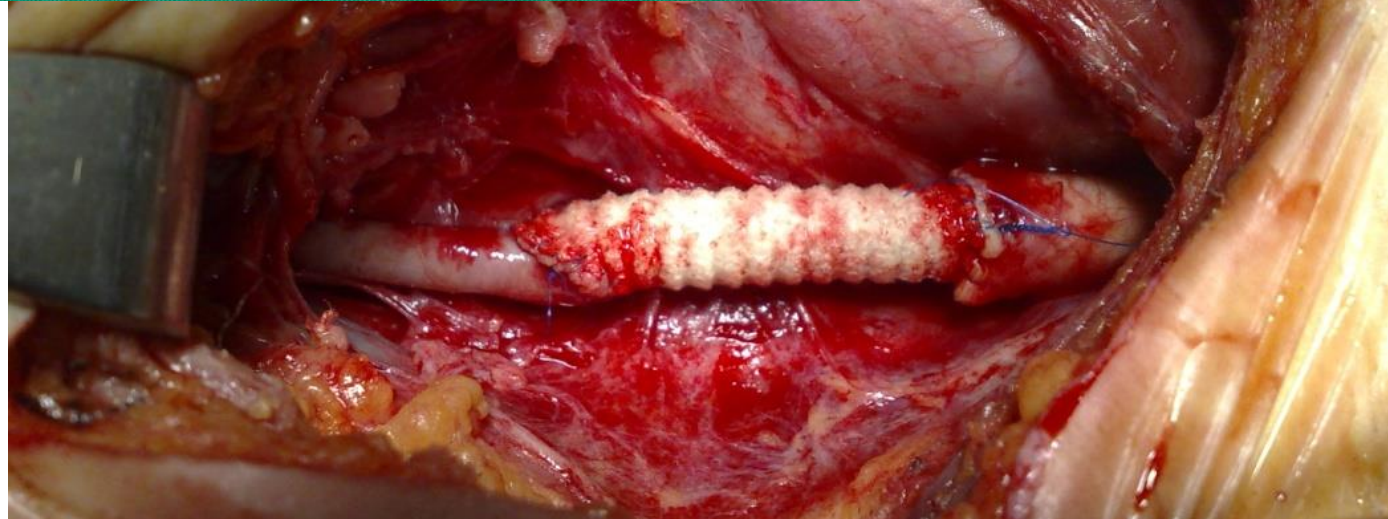
**Not always
feasible**

**Occlusion of
carotid artery**

Kinks, Coils

**Masive
calcification
“Gottic arch”**

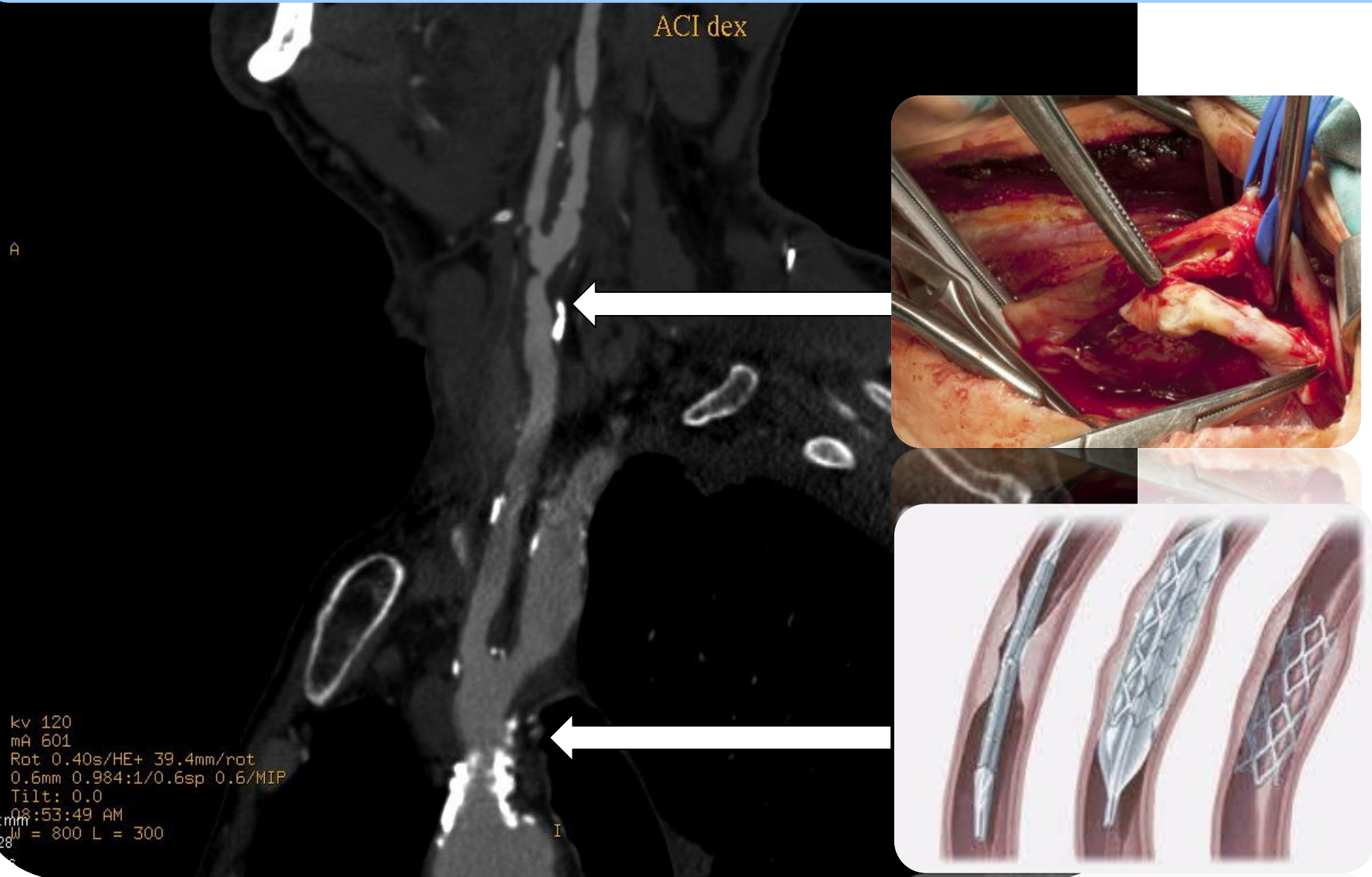
Carotid thrombosis after CAS



Surgery for resolving of the endovascular Complications

**Endovascular procedures are
not concurrent
but
complementary to carotid
surgery**

Carotid endarterectomy simultaneously with PTA of braciocephalic trunk

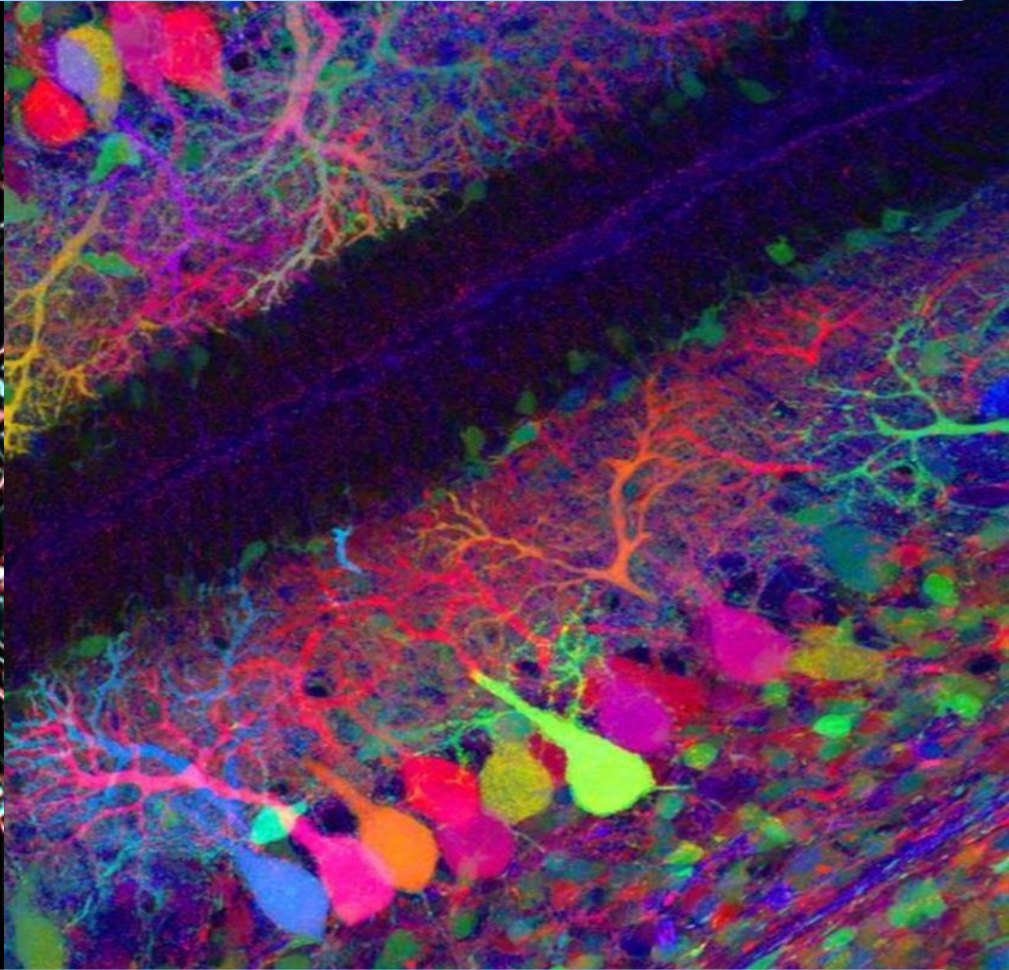
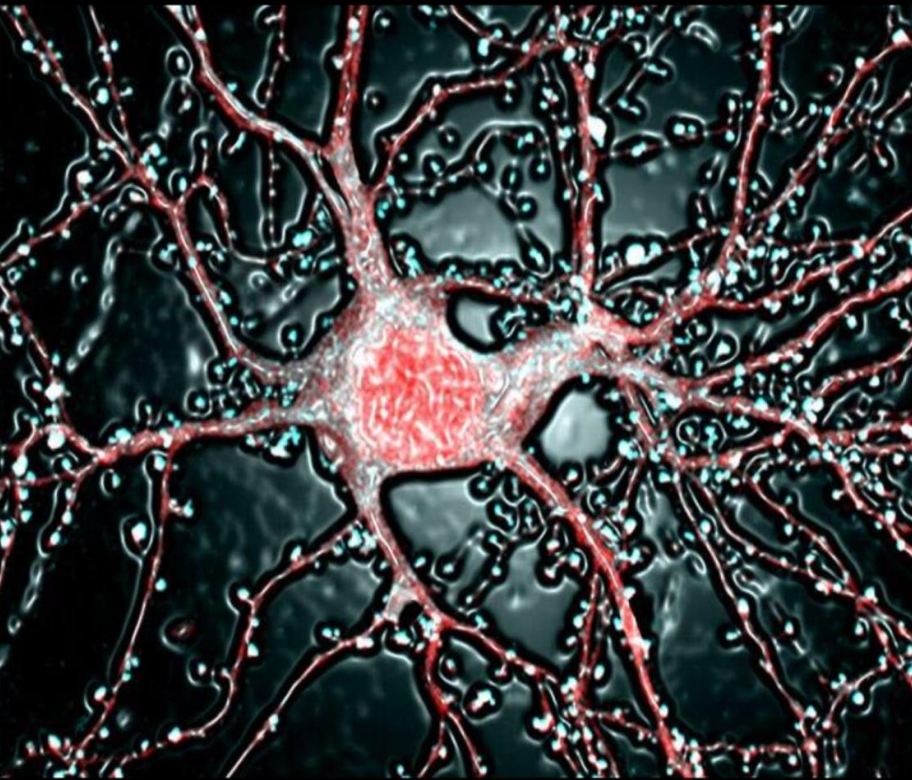


Hybrid procedure



Subclavian artery transposition and stent graft implantation for the aneurysm of thoracic aorta

Cognitive and Emotional Deterioration



**Restoration of brain blood supply could Reverse
the Neuropsychological damage**

Vasc Endovasc Surg, 41,1; 5-13, 2007

Wisdom in surgical decision making



Technical perfection

LIFE IS LIKE A BOX OF CHOCOLATES

YOU NEVER KNOW WHAT YOU'RE GONNA GET!



**Science is incomparably the most
successful enterprise human
beings have ever engaged**

Sir Peter Medawar