



HEPMP

HIGHER EDUCATION PAIN MEDICINE PROJECT

Strengthening Capacities for Higher Education of Pain Medicine in Western Balkan countries – HEPMP

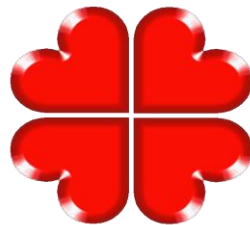


Co-funded by the
Erasmus+ Programme
of the European Union

The Importance of early recognition of Vascular Pain

Djordje Radak

“Dedinje” Cardiovascular Institute, Belgrade



Project number: 585927-EPP-1-2017-1-RS-EPPKA2-CBHE-JP (2017 – 3109 / 001 – 001)

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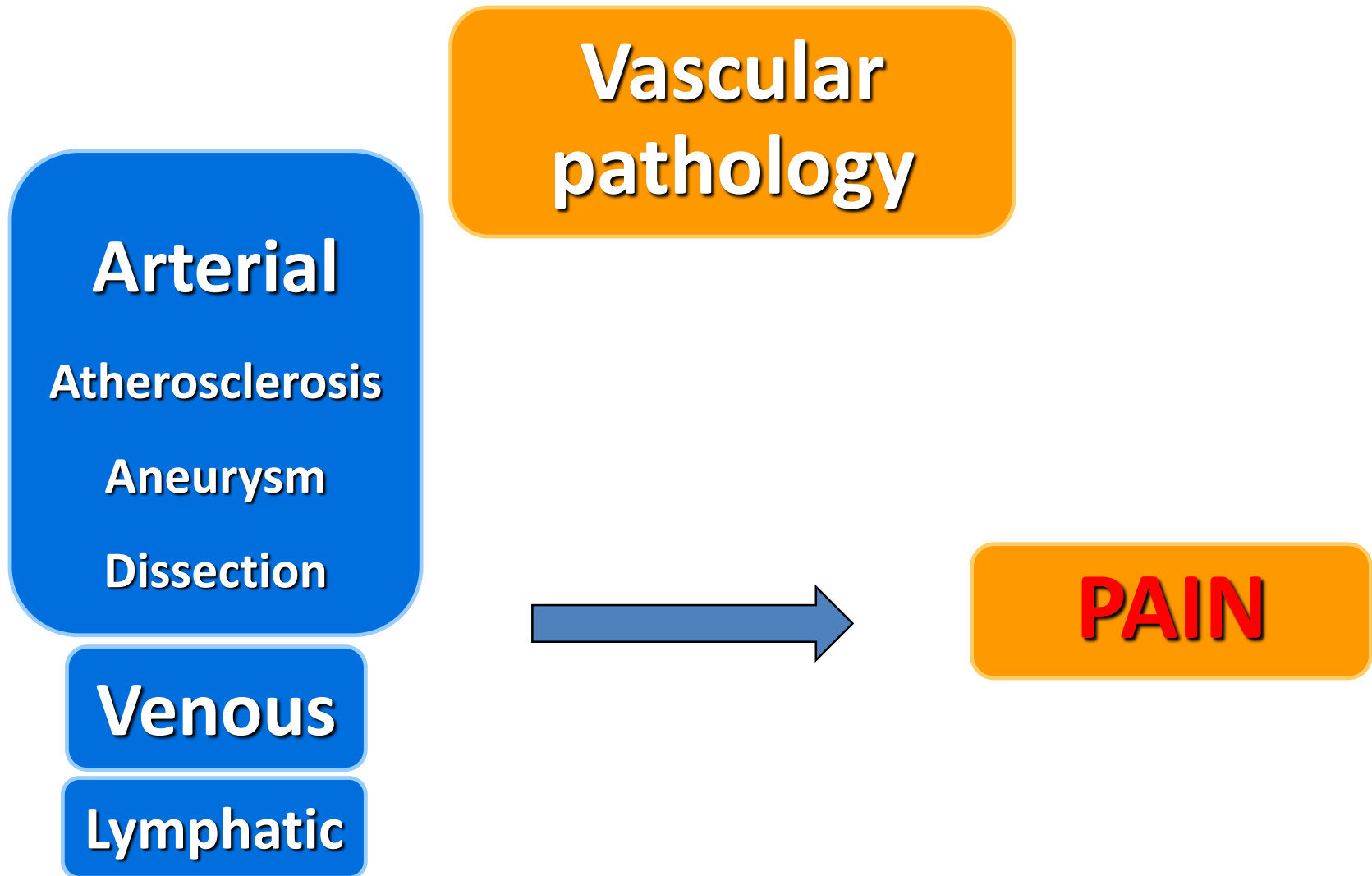
Definition Of Pain

Pain is an unpleasant sensory and emotional experience, associated with actual or potential tissue damage, or described in terms of such damage

International Association for the Study of Pain: Pain Definitions. Bonica JJ. The need of a taxonomy. Pain 1979;6:247–8

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Ischemic pain

Reduced arterial blood flow in conditions of increased consumption of oxygen and catabolic substrates leads to **tissue ischemia**



Local pH value drop and secretion of pain stimulating substances (bradykinin, substance P)



Nociceptive receptor activation interpreted as pain

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Atherosclerosis

Cause of 52% Death Worldwide



Cerebrovascular disease

Coronary artery disease

Renal artery stenosis

Visceral arterial disease

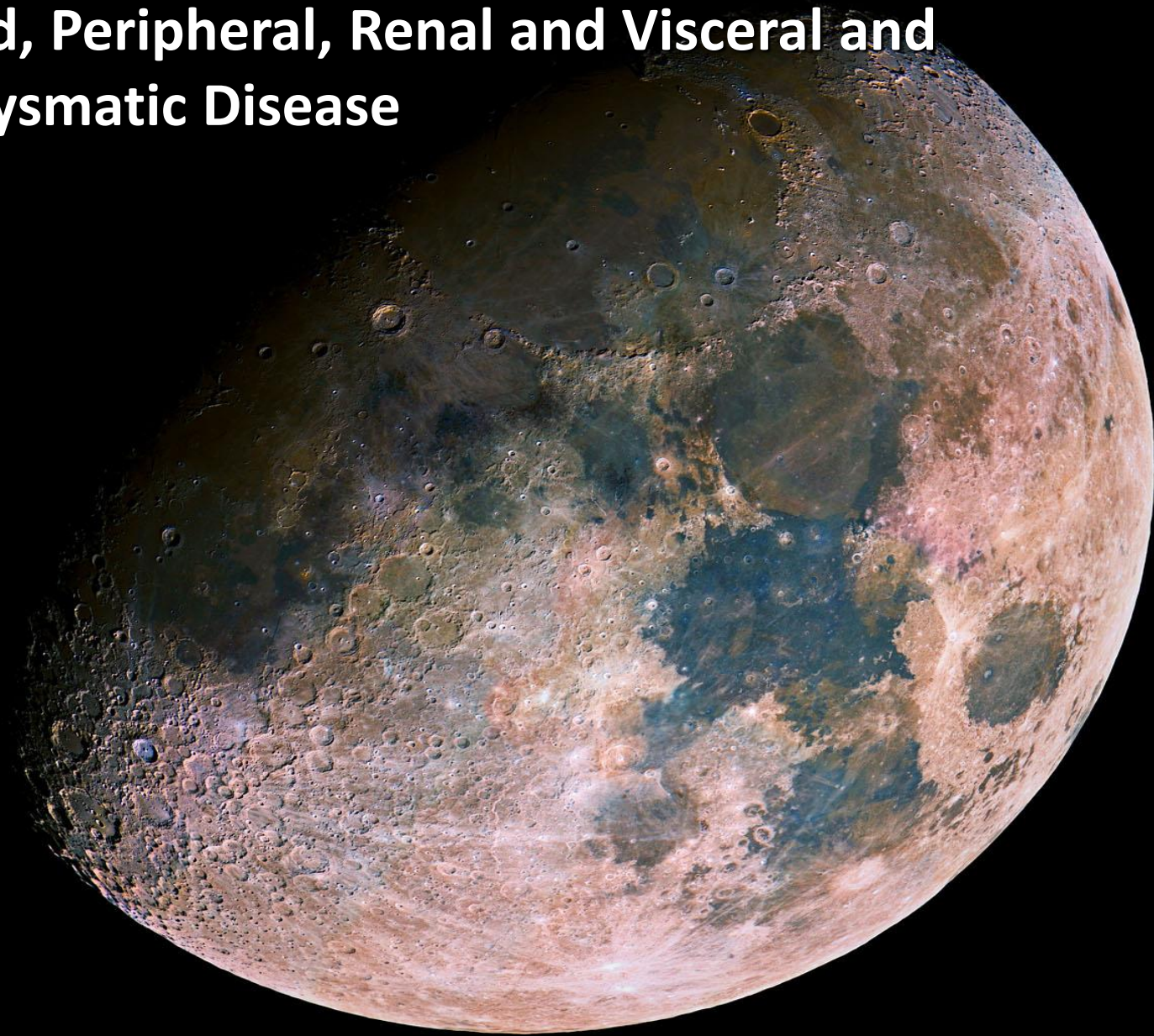
Peripheral arterial disease

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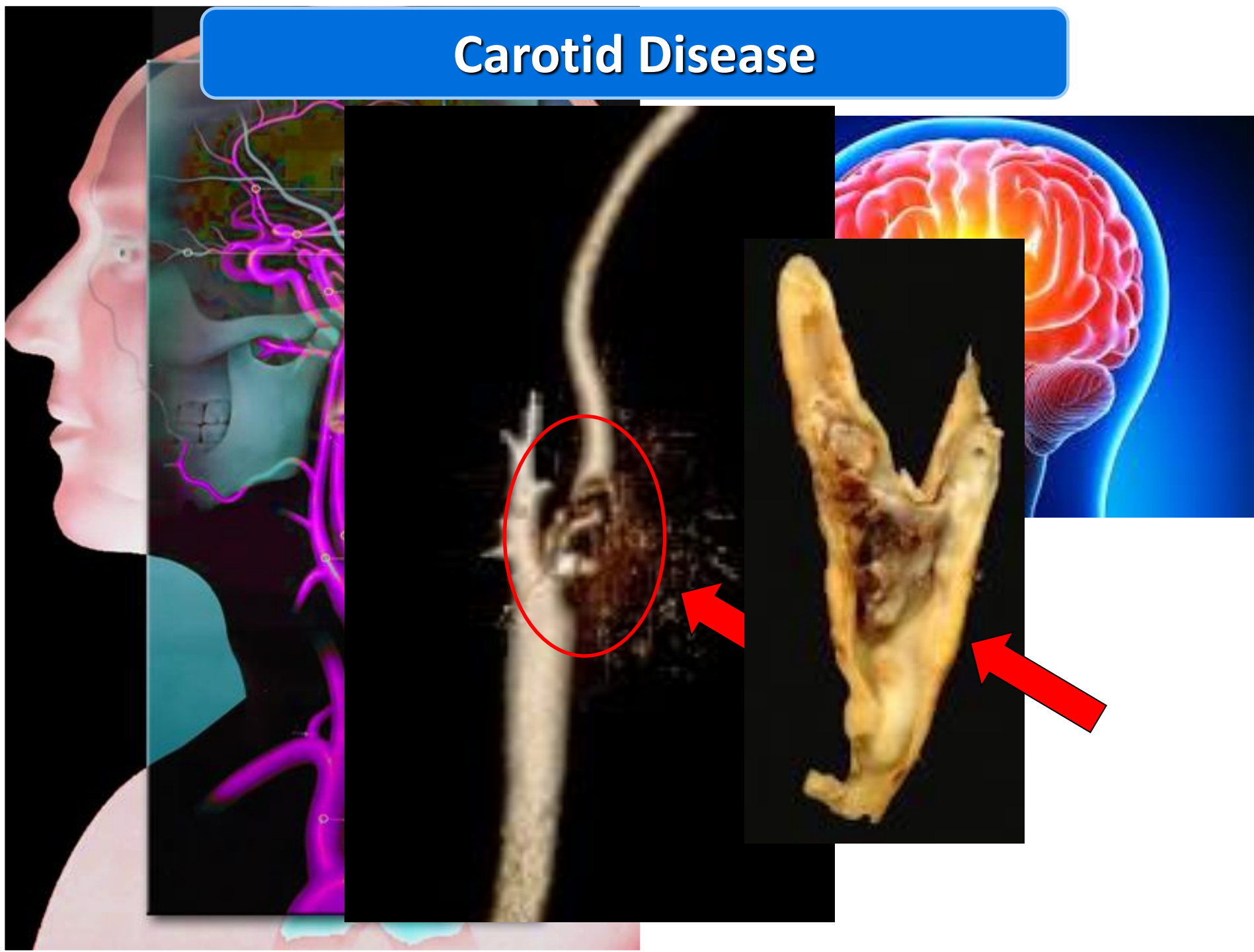
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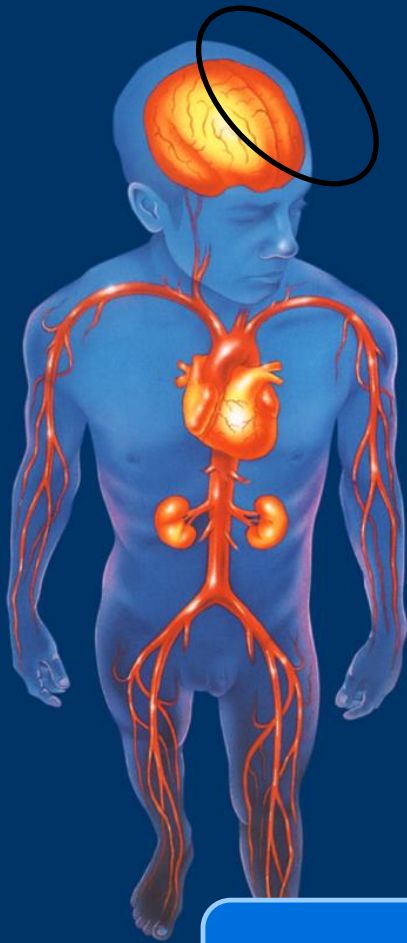
Uncharted Side of the Moon

Carotid, Peripheral, Renal and Visceral and
Aneurysmatic Disease



Carotid Disease





Brain ischemia

2° most frequent cause of Dementia

1° most frequent cause of Invalidity



19% of women in Serbia dies of stroke

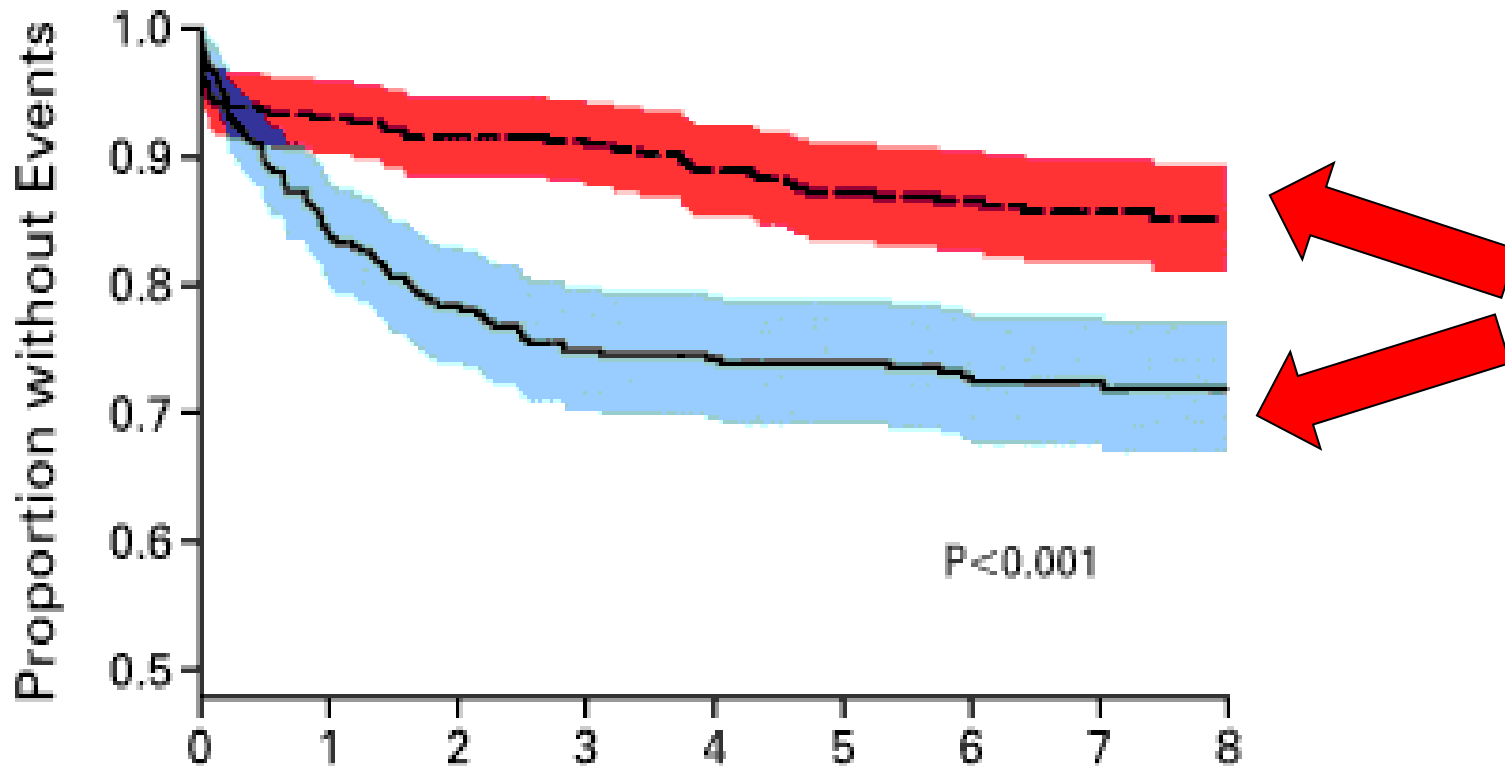
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North American Symptomatic Carotid Endarterectomy Trial **NASCET**
European Carotid Surgery Trial **ESCT**
Veterans Administration **VA Symptomatic Trial**

Any Ipsilateral Stroke, 70–99% Stenosis



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Ultrasound diagnostics

Stenosis

Surface of the plaque

Histologic composition

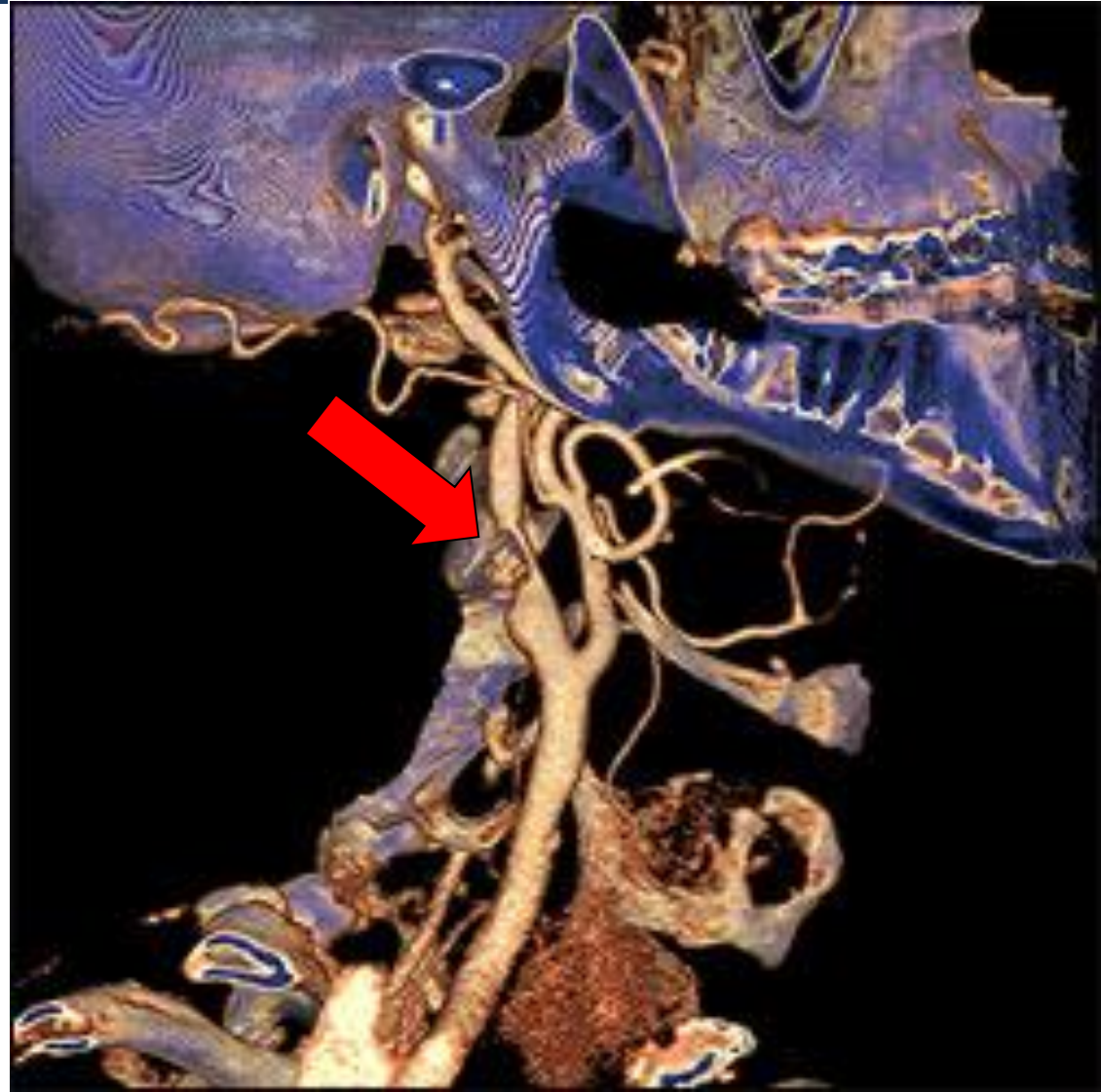




MSCT

Arteriography

**Resolving Controversal
Findings**



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The brain tolerates, but does not forgive



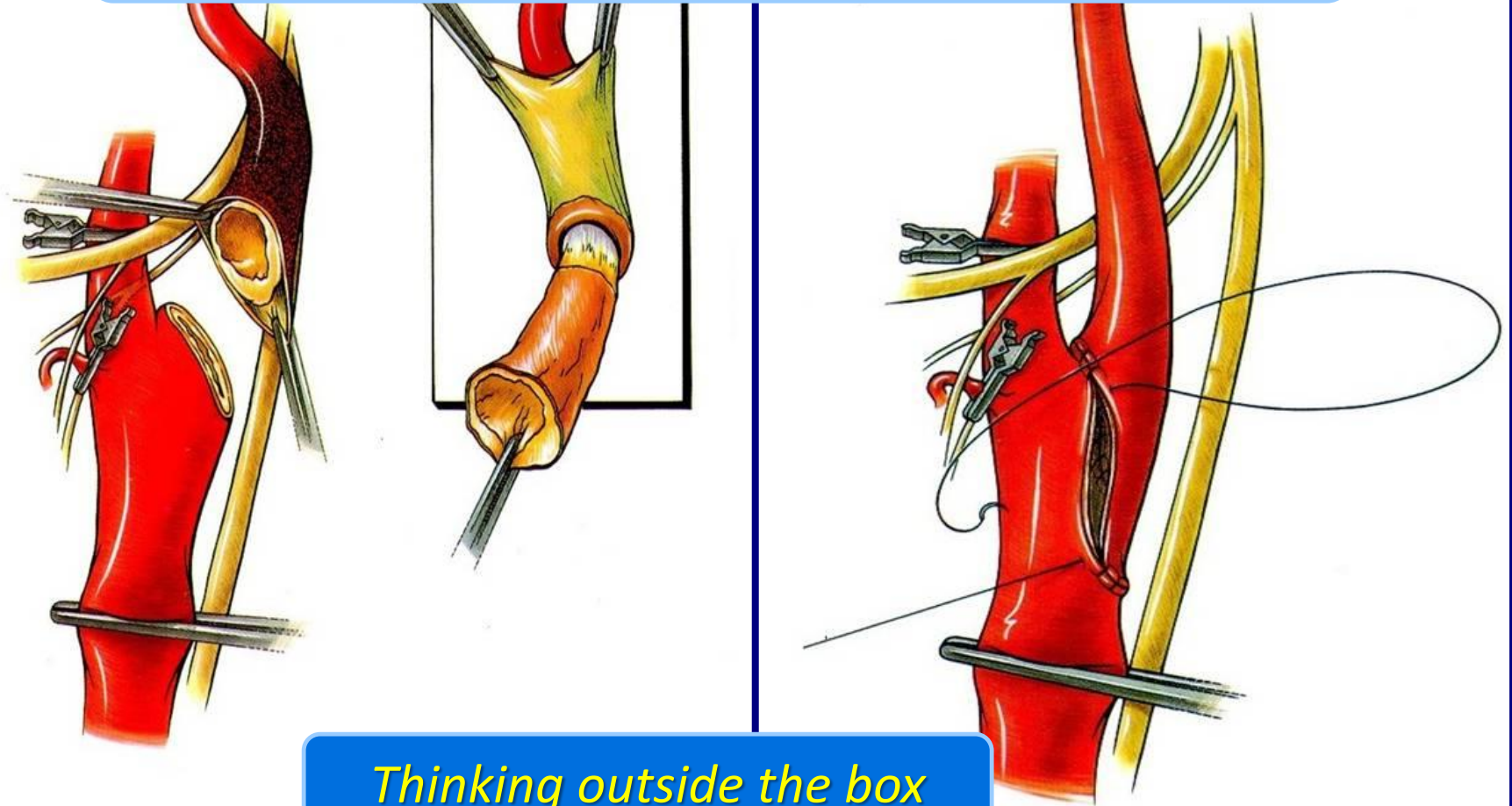
Too early is unnecessary

Too late is pointless

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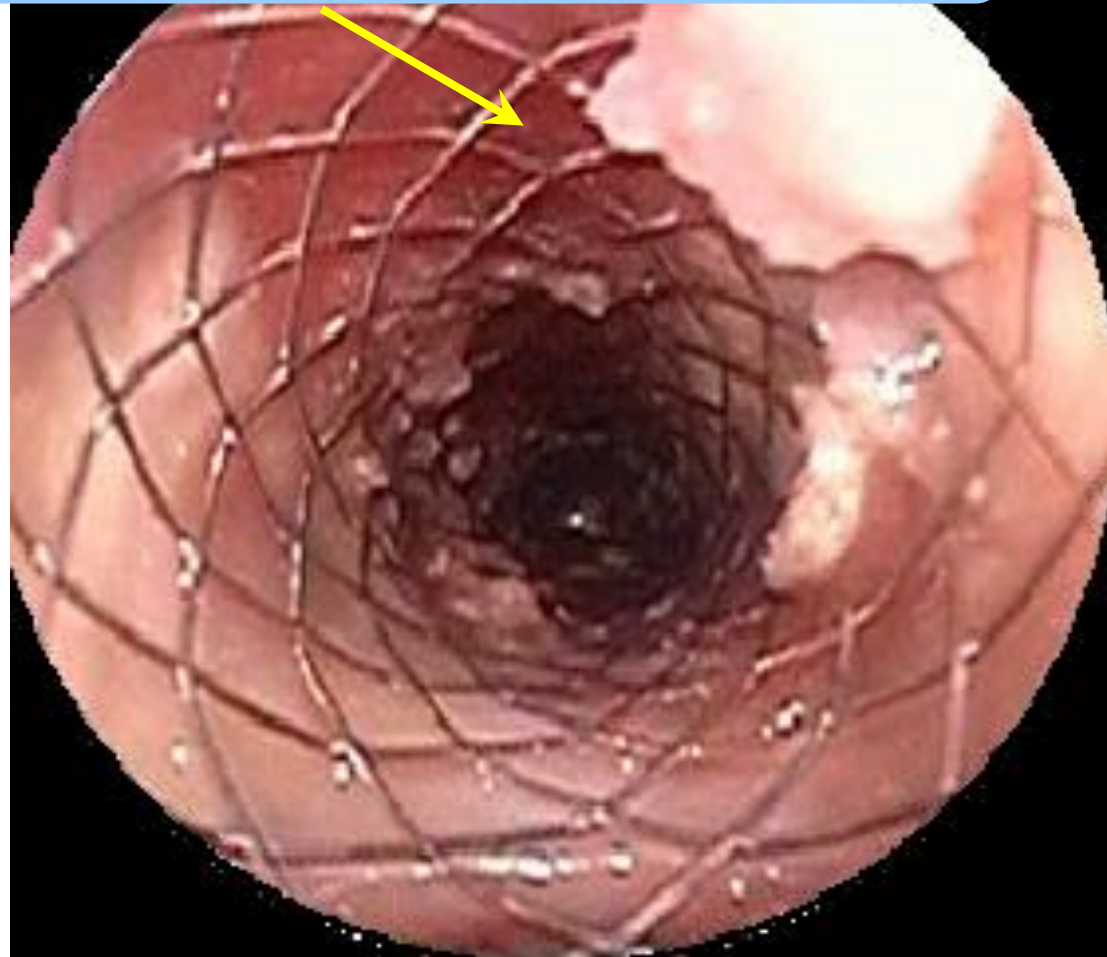
Eversion Endarterectomy



Thinking outside the box

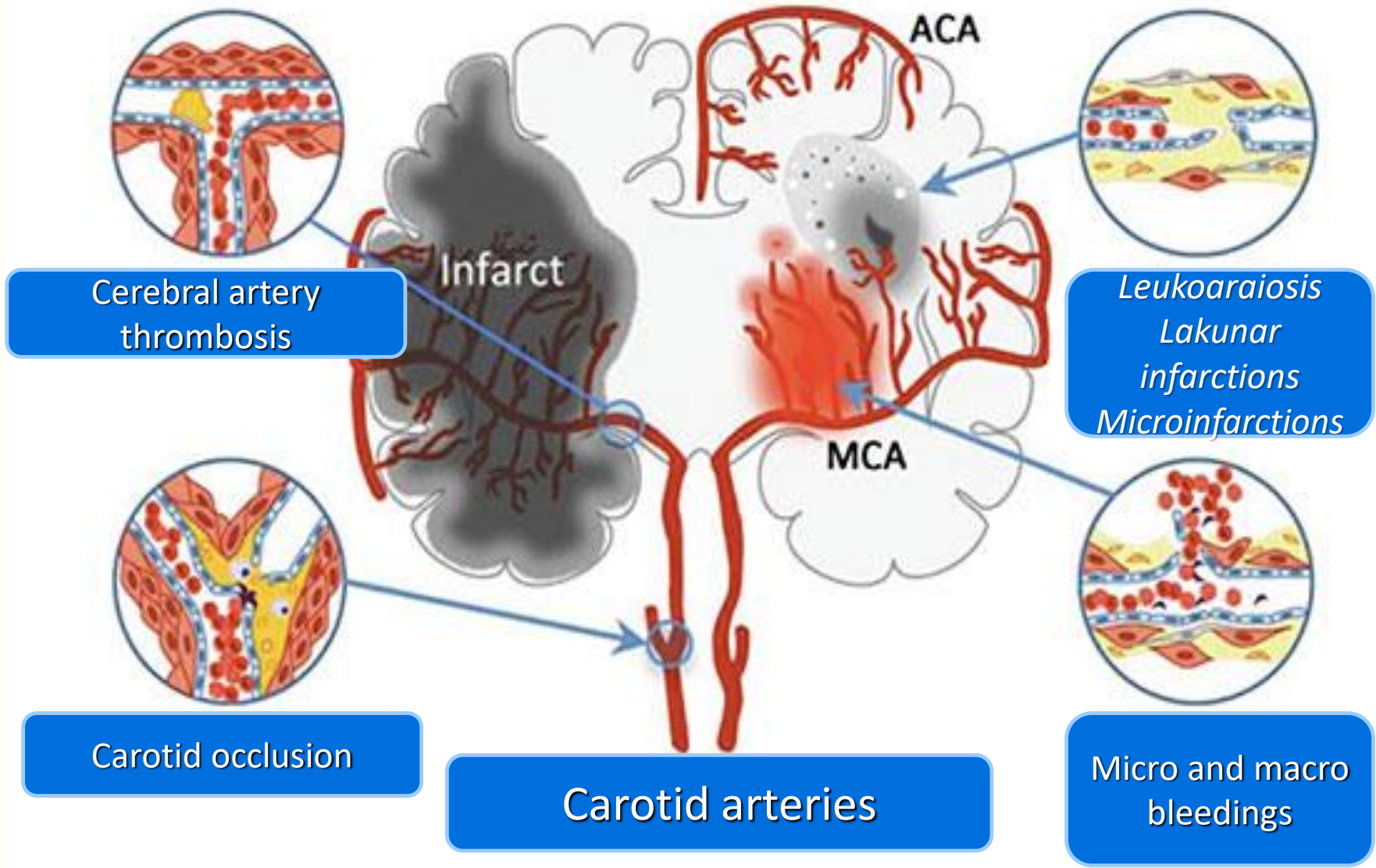
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Endovascular procedures



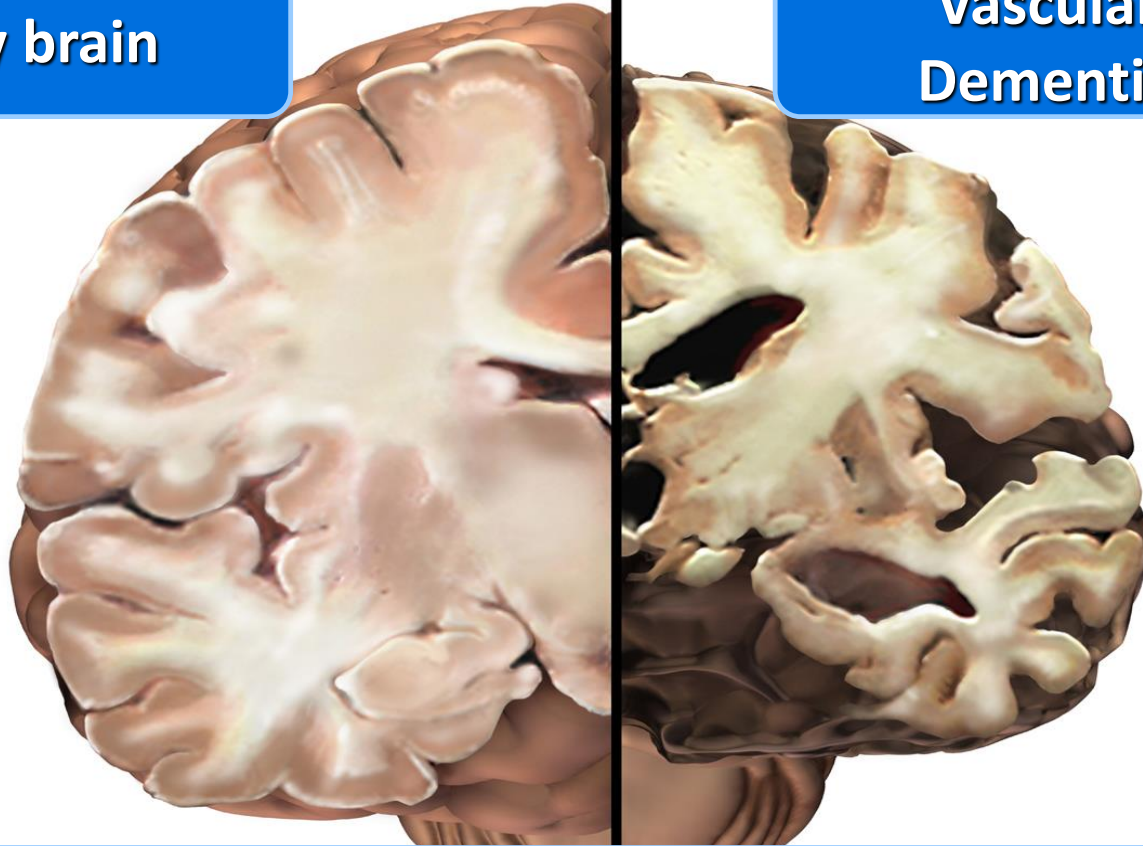
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Vascular lesions of the brain

Healthy brain



Vascular
Dementia

Cognitive and emotional disorders

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Yalta conference 1945.



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**Restoration of the blood supply to the brain
could reverse the neuropsychological damage**

Vasc Endovasc Surg 2007;41(1):5-13



Chronic limb ischemia

Stage	Symptoms
I	Asymptomatic / Non-specific discomfort
II	Intermittent claudications
(IIa)	> 200 m of walking
(IIb)	< 200 m of walking
III	Rest pain
IV	Ischemic ulcer / Gangrene

Fontaine's classification

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Chronic limb ischemia

Intermittent claudication is a typical exertional limb pain, easily alleviated by short-term rest

Rest pain is a persistent pain in the distal parts of the limb, more prominent in elevation, accompanied by clinical signs of limb ischemia

Peripheral neuropathy – underestimation !

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Long-lasting chronic limb ischemia

Arteriogenesis

Angiogenesis

Less pain

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Acute limb ischemia

6 Ps

Pain

Pallor

Poikilothermia

Pulse deficit

Paresthesia

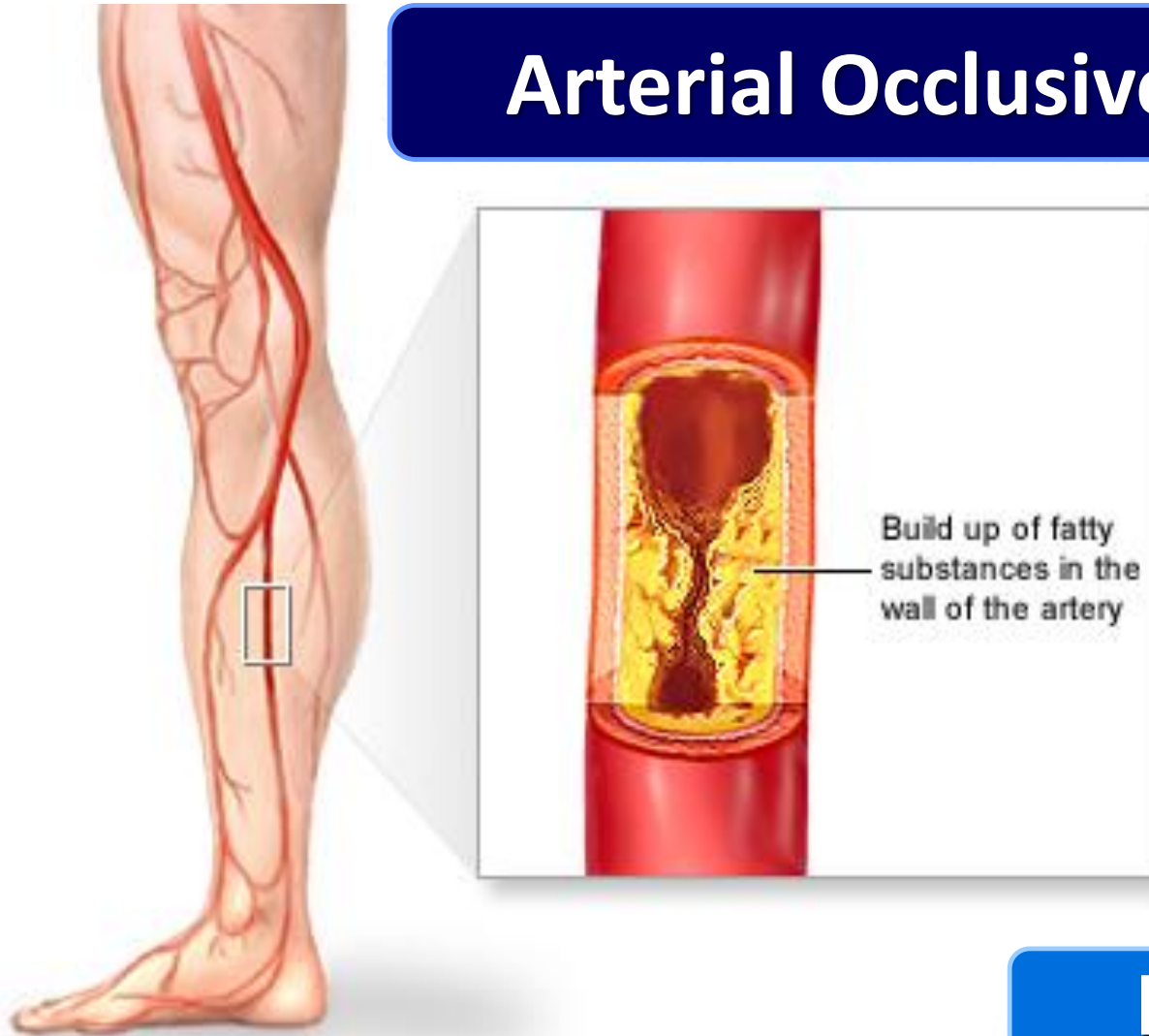
Paralysis

Urgent revascularization !!!

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Arterial Occlusive Disease



PAOD

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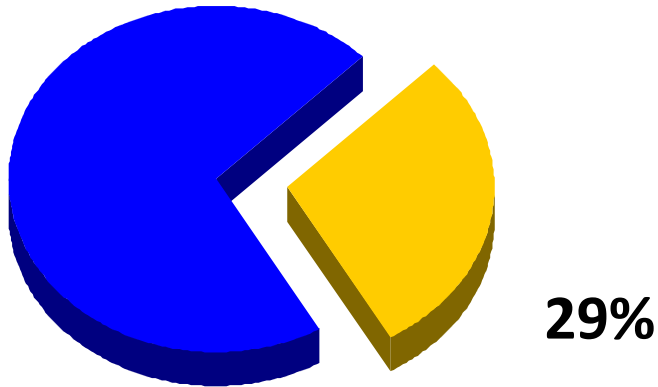
Intermittent Claudication

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Prevalence of PAD

PARTNERS* program evaluated 6,979 patients in physicians' offices



**29% of patients
with PAD**

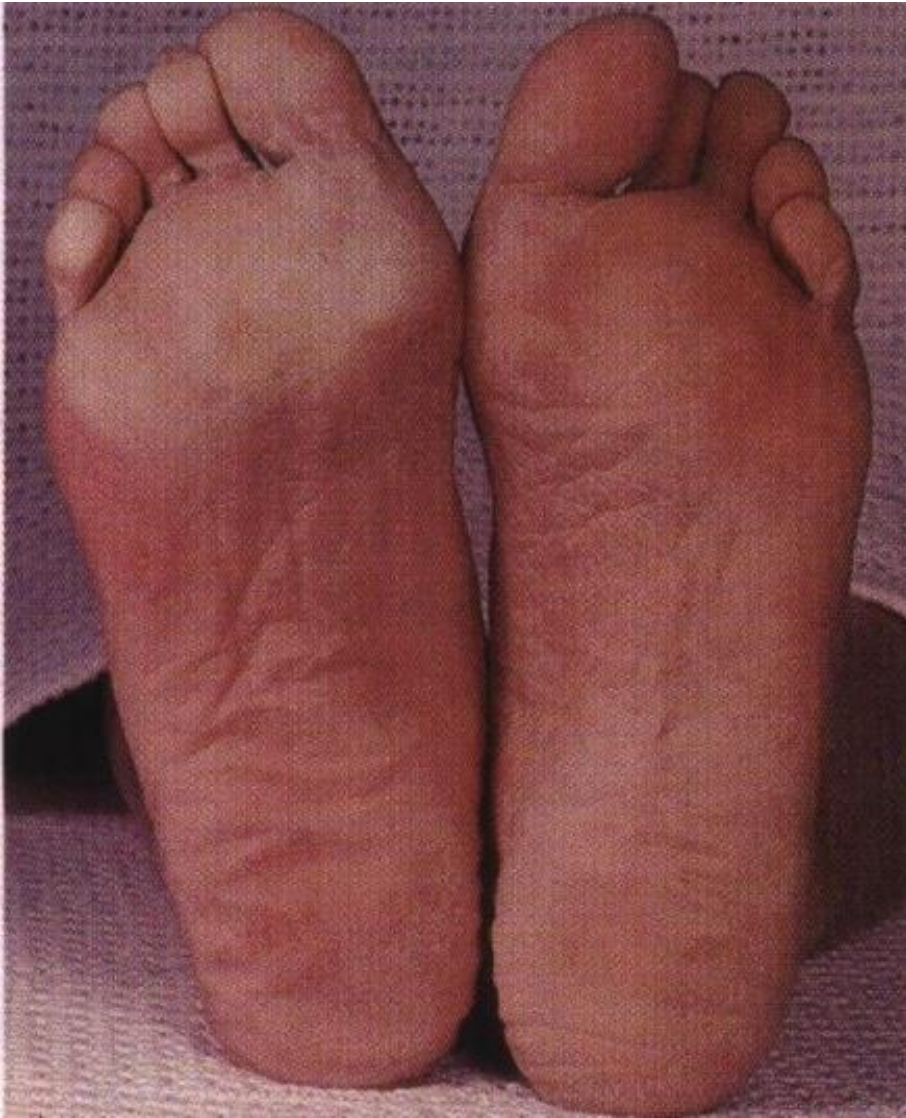


Patients ≥ 70 years

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* PARTNERS=PAD Awareness, Risk, and Treatment: New Resources for Survival.

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Critical Limb Ischemia

Wounds that will
not heal

Gangrene



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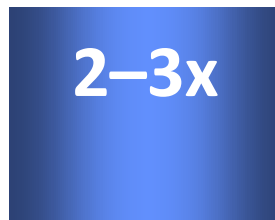
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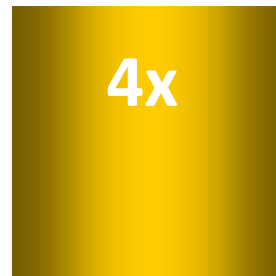
Cardiovascular Events with PAD

Impaired endothelial function
Inflammation

Increased Risk
of CV Mortality



Stroke



Fatal MI



**Death from
CVD**

**Patients with
symptomatic
PAD**

**6x greater
risk of death**

Propensity toward thrombosis

Reduced physical activity

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Doppler index ABI



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Doppler index

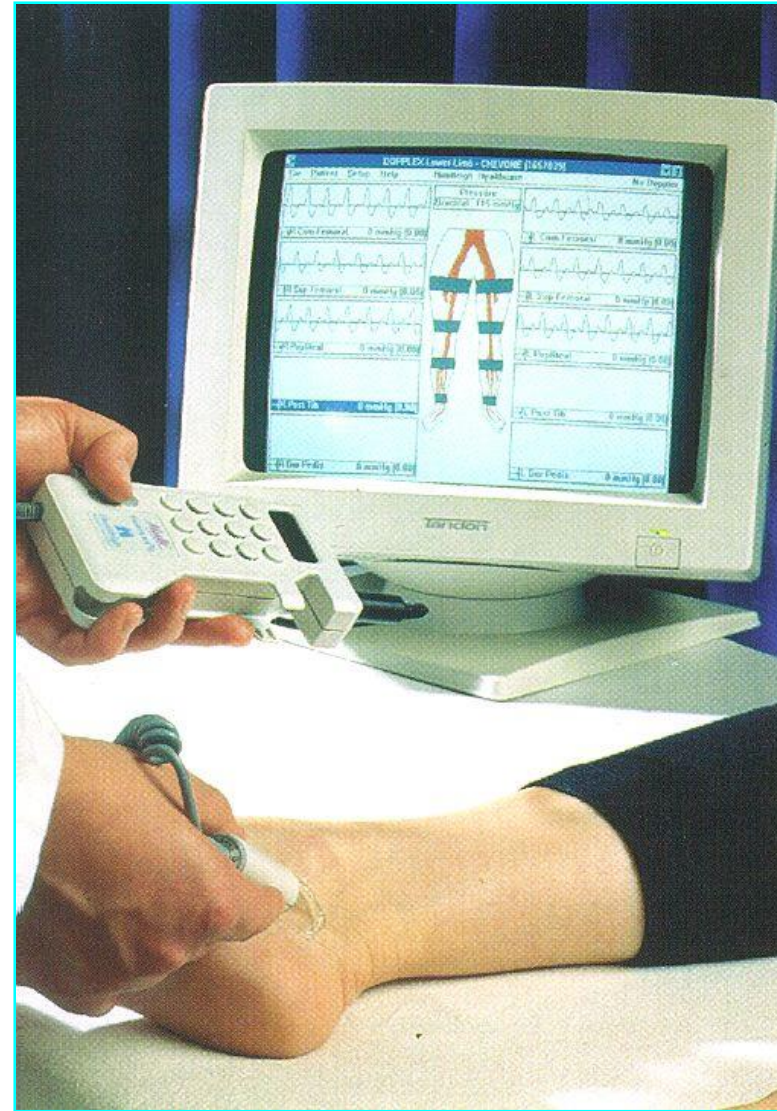
Segmental pressures

Pulse volume recordings

Doppler velocity

Waveform analysis

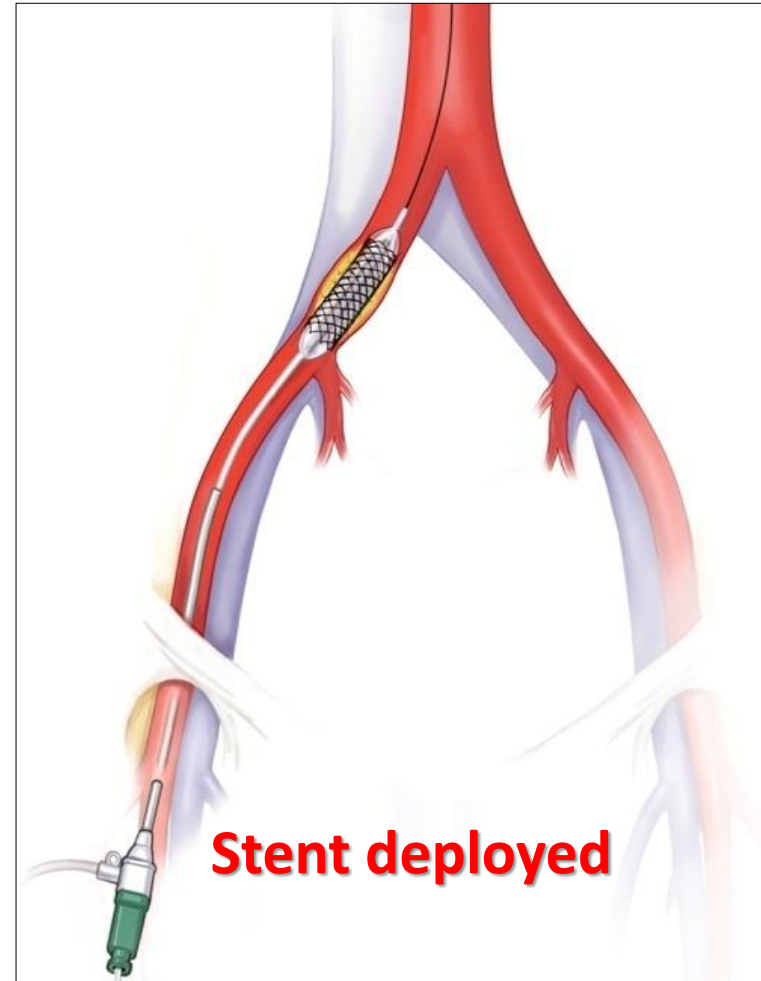
Treadmill exercise



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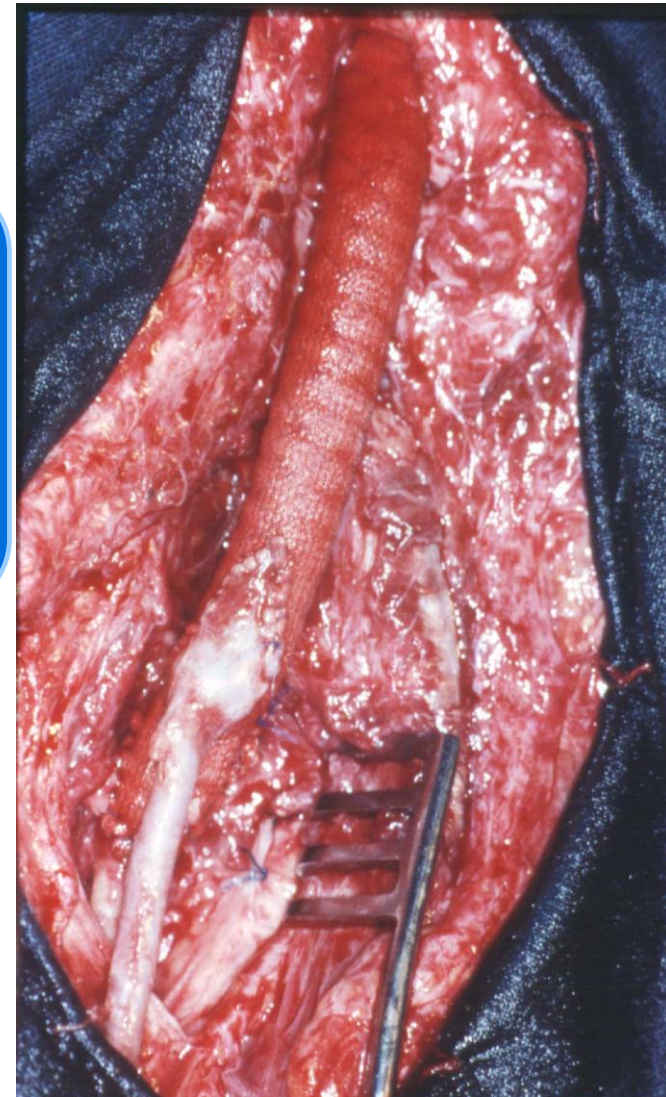
PTA for short segment occlusion



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**Limb salvage
Femoro-distal
Sequetial
*ByPass***



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Visceral ischemia

Abdominal angina is non-specific abdominal pain, which starts 30 minutes after meal commencement and lasts for several hours

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Dissections and aneurysm rupture

Pain is sudden and
“the worst ever felt”

Urgent surgery

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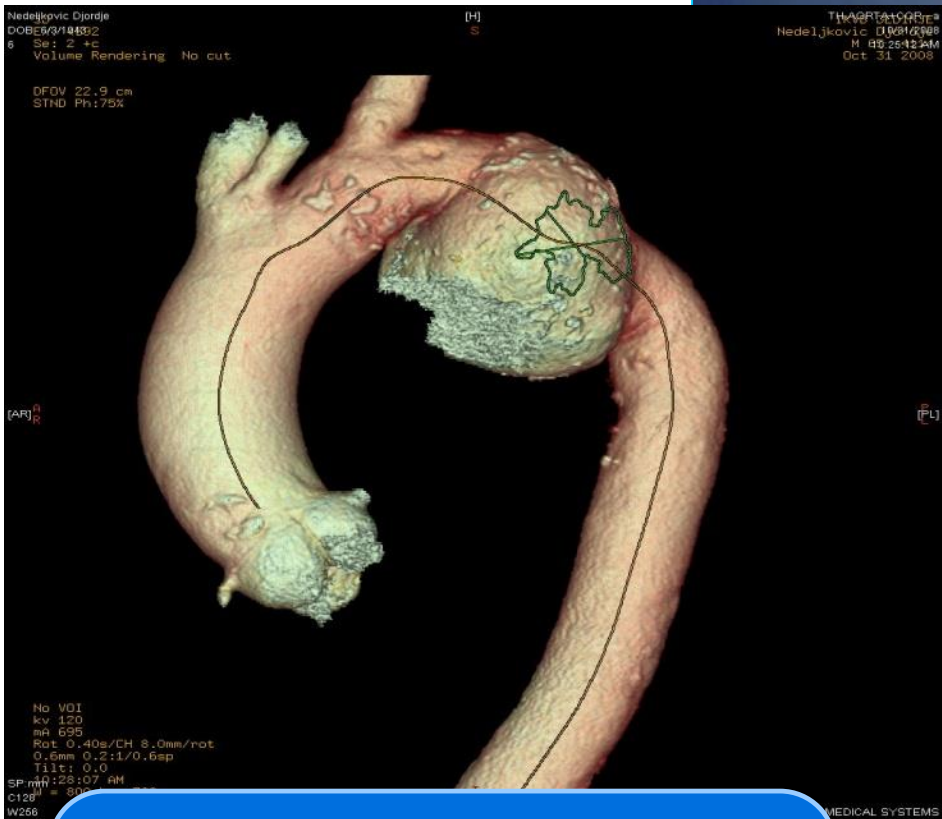
Treatment of Aneurysm

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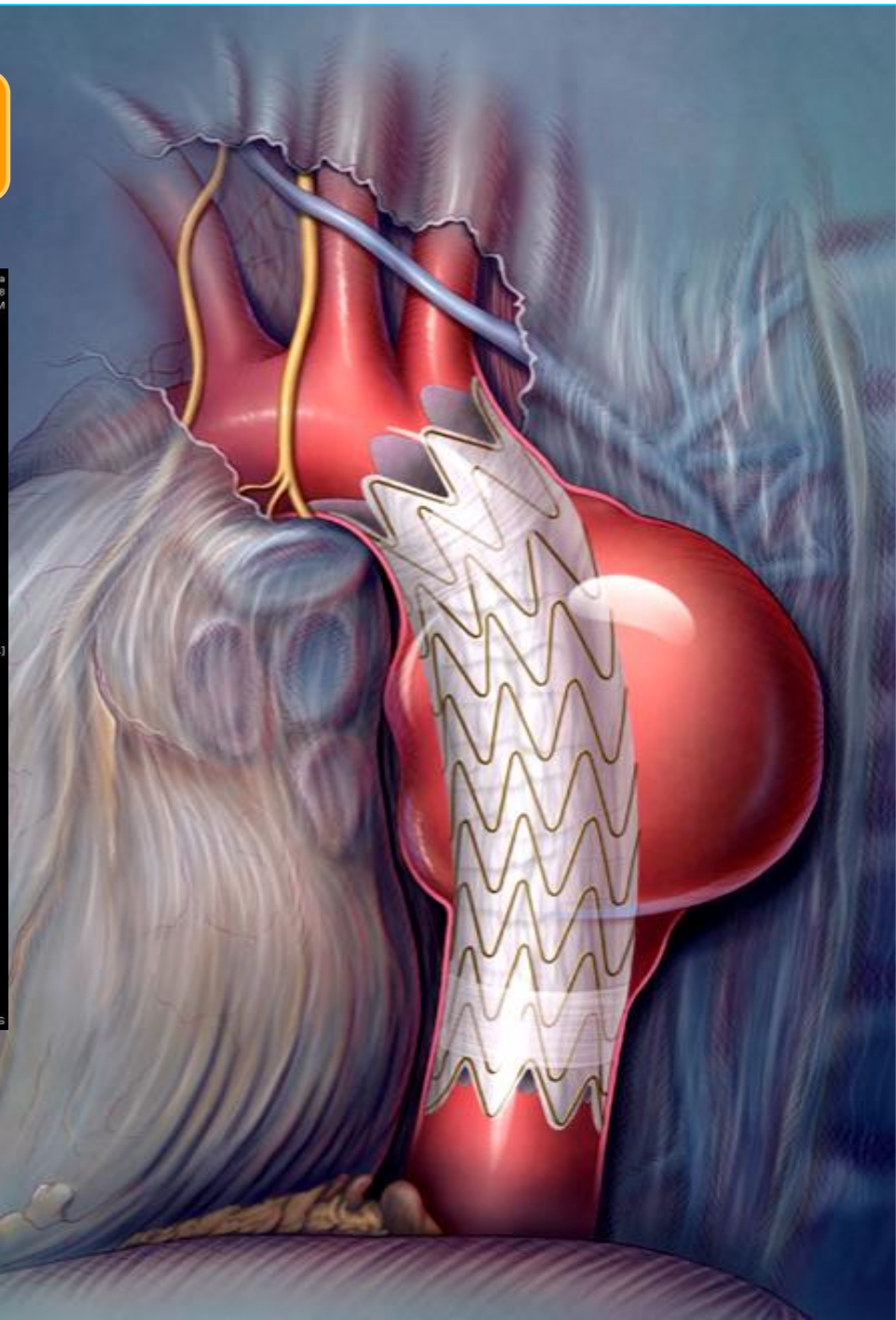
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Endovascular repair



Minimally invasive
Short recovery
Feasible in Elderly



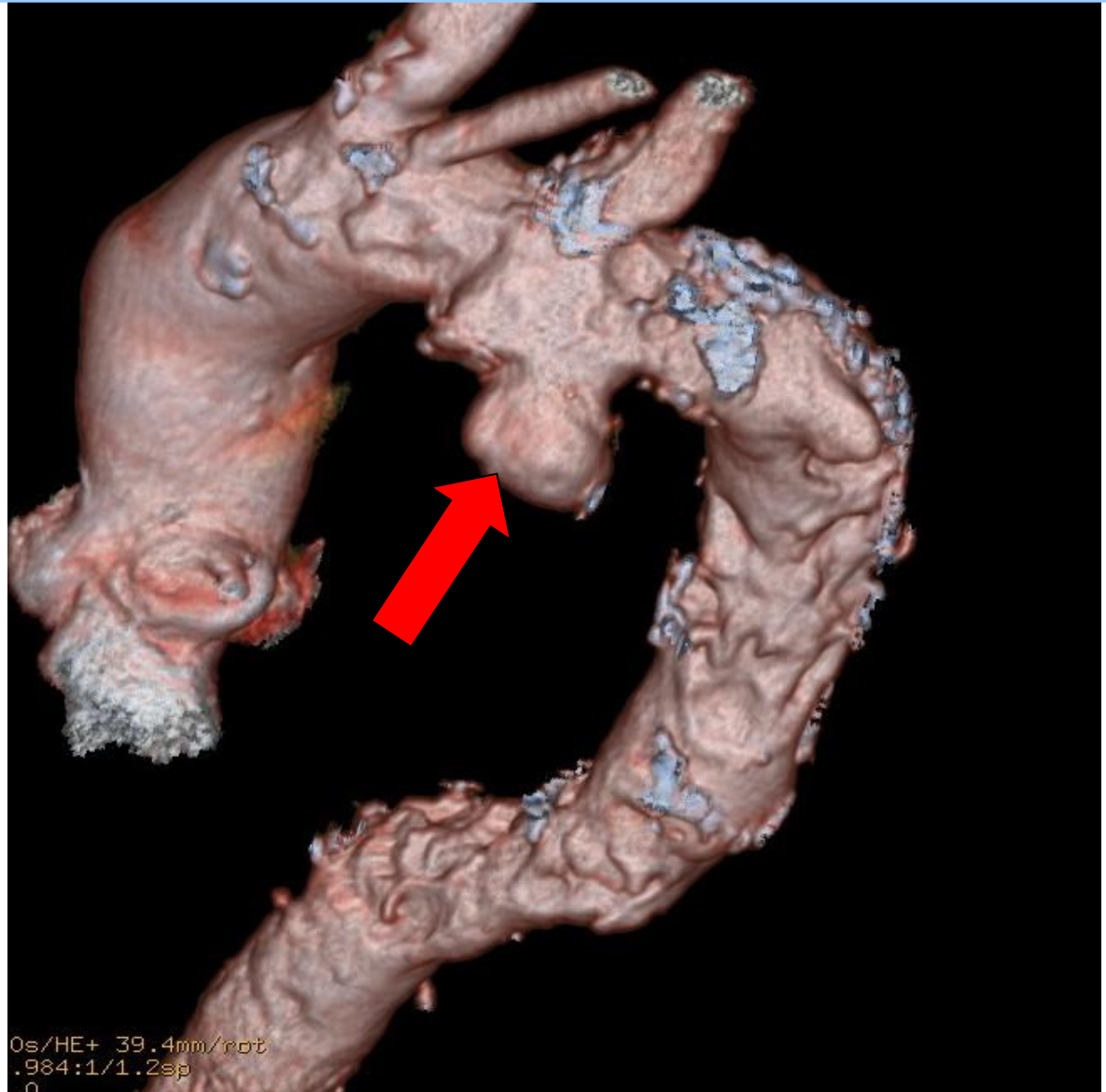
Extensive combined and hybrid procedures



New Entities

Mural Thrombosis/Penetrating Aortic Ulcer

Long-term
survival is
shorter



Before the Pain

Perioperatively
therapeutic dose
of LMWH?

Antiplatelet
Therapy?

Oral
anticoagulants?

DFOW 20.8 cm
STND/+

R

L

kv 120
mA Mod.
Rot 0.60s/HE+ 39.4mm/rot
1.2mm 0.984:1/1.2sp 0.7/MIP
SP 7mm
filt: 0.0
C128 15:32 PM
Wb256 800 L = 300

IKVB DEPTJE-a
Djakovic Sp 17/11/2009
F 74 12:44 PM
Nov 11 2009

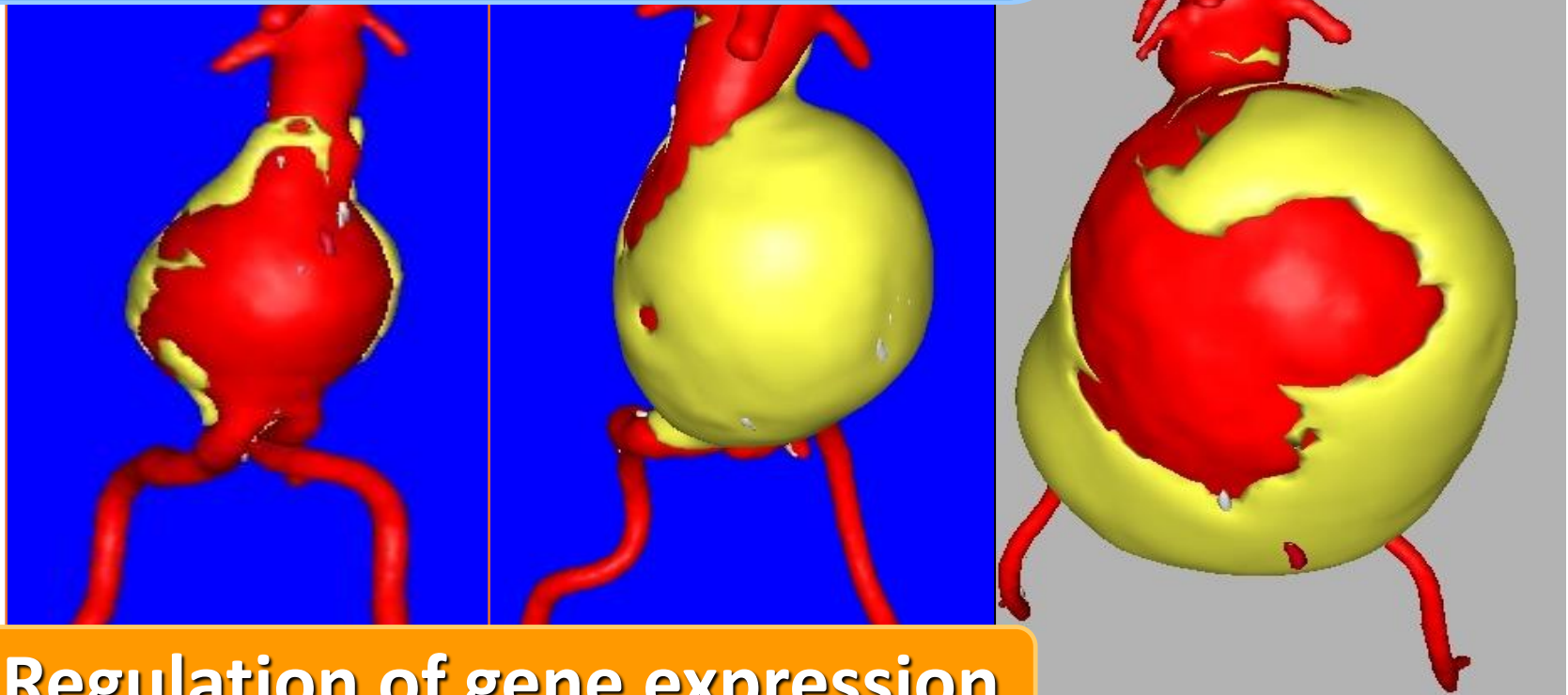
GE MEDICAL SYSTEMS

Prevention of aneurysm growth

Angiotensin-converting enzyme inhibition?

Statin?

Tetracyclines inhibition of MMP?



Regulation of gene expression



What triggers venous pain?

Chronic venous insufficiency leads to venous stasis
and venous hypertension

Venous nociceptors responds to **mechanical irritation**
(traction, stretch, distension, spasm)

Chemoreceptors respond to **chemical stimuli** available locally

Allogenic and proinflammatory chemical mediators as
cytokines from lymphocytes

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Chronic venous insufficiency

CEAP classification

Clinic
Etiology
Anatomy
Patology

**Pain correlation
is not clear!**

	Clinical manifestation
C0	No signs of venous disease
C1	Telangiectasia and/or reticular veins
C2	Varicose veins
C3	Oedema
C4a	Pigmentation and eczema
C4b	Lipodermatosclerosis and atrophie blanche
C5	Healed venous ulcer
C6	Active venous ulcer

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Diversity of pain in venous disease

Pain without signs (COs)

Pain with varicose veins

Pain with edema

Pain with venous ulcers

Inflammation parallels severity of Chronic Venous Insufficiency

Takase M et al. Ann Vasc Surg 2000;14:427-435 (C2-6)

Somers P et al. Angiology 2006;57:546-55

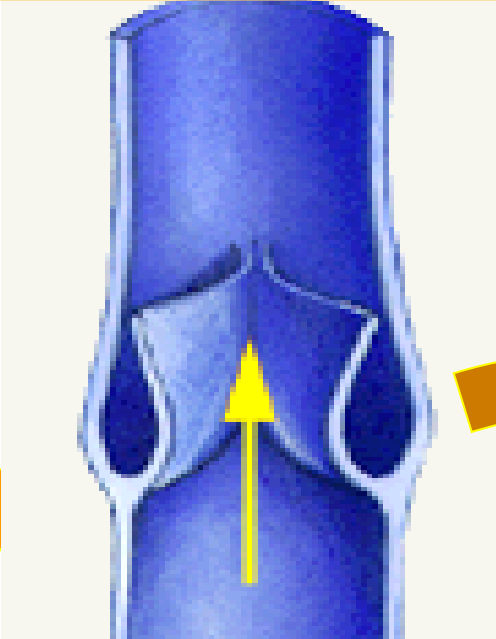
Aunapu M et al. Vasa 2005;34:170-75

Endothelial activation with increased expression of ICAM-1 in varicose veins wall, IL-1 & TNF- α in vein wall

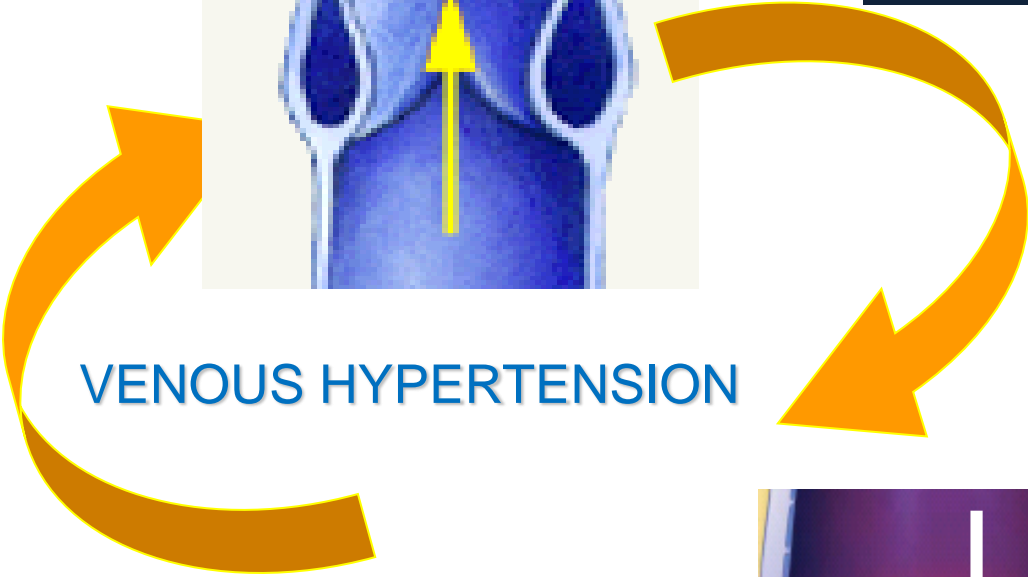
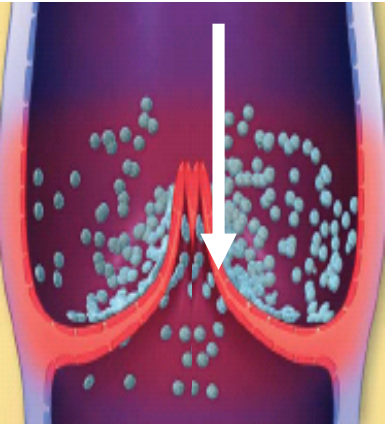
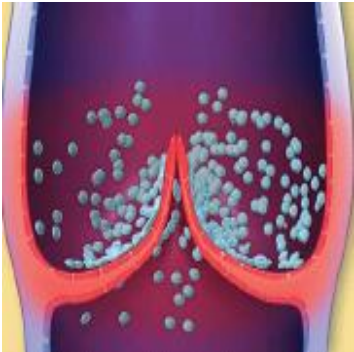
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Chronic venous disease

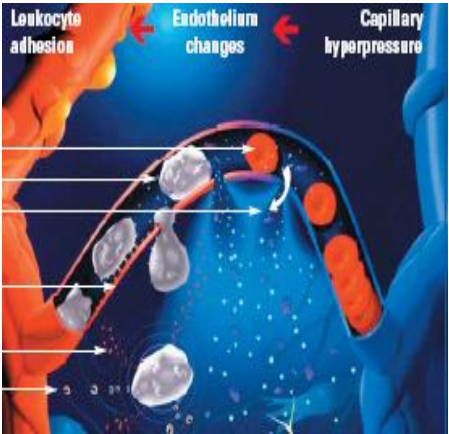


Venous wall distension
Valve distortion



VENOUS HYPERTENSION

Varicose veins

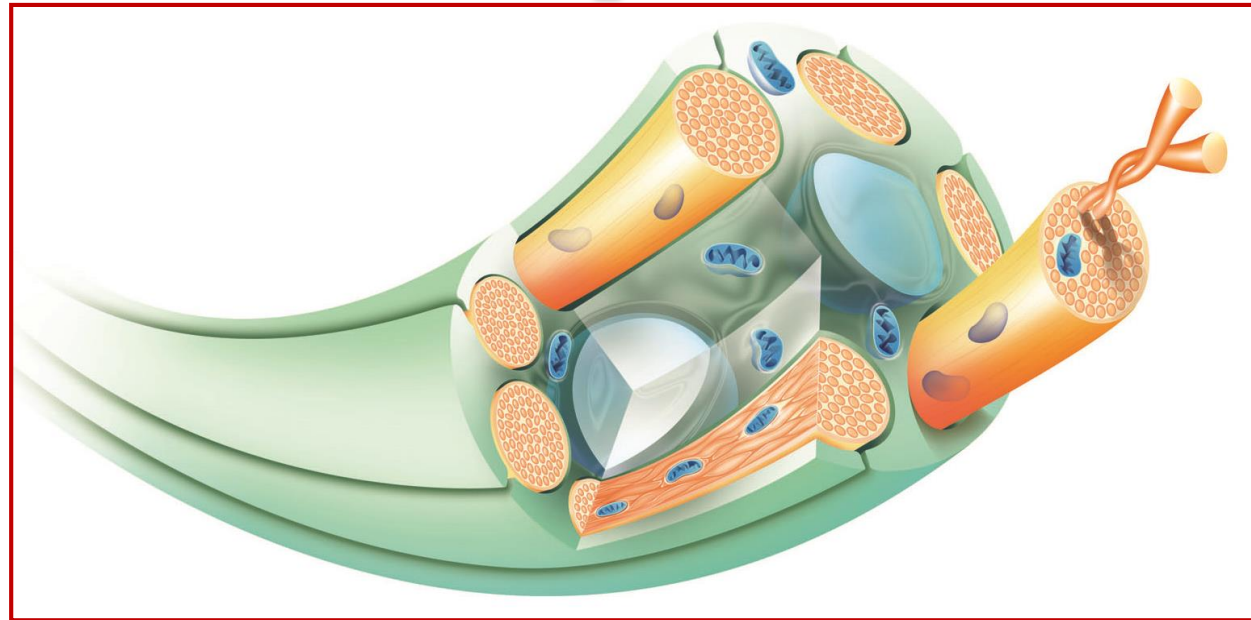


Skin changes
Ulcer

Response to venous inflammation

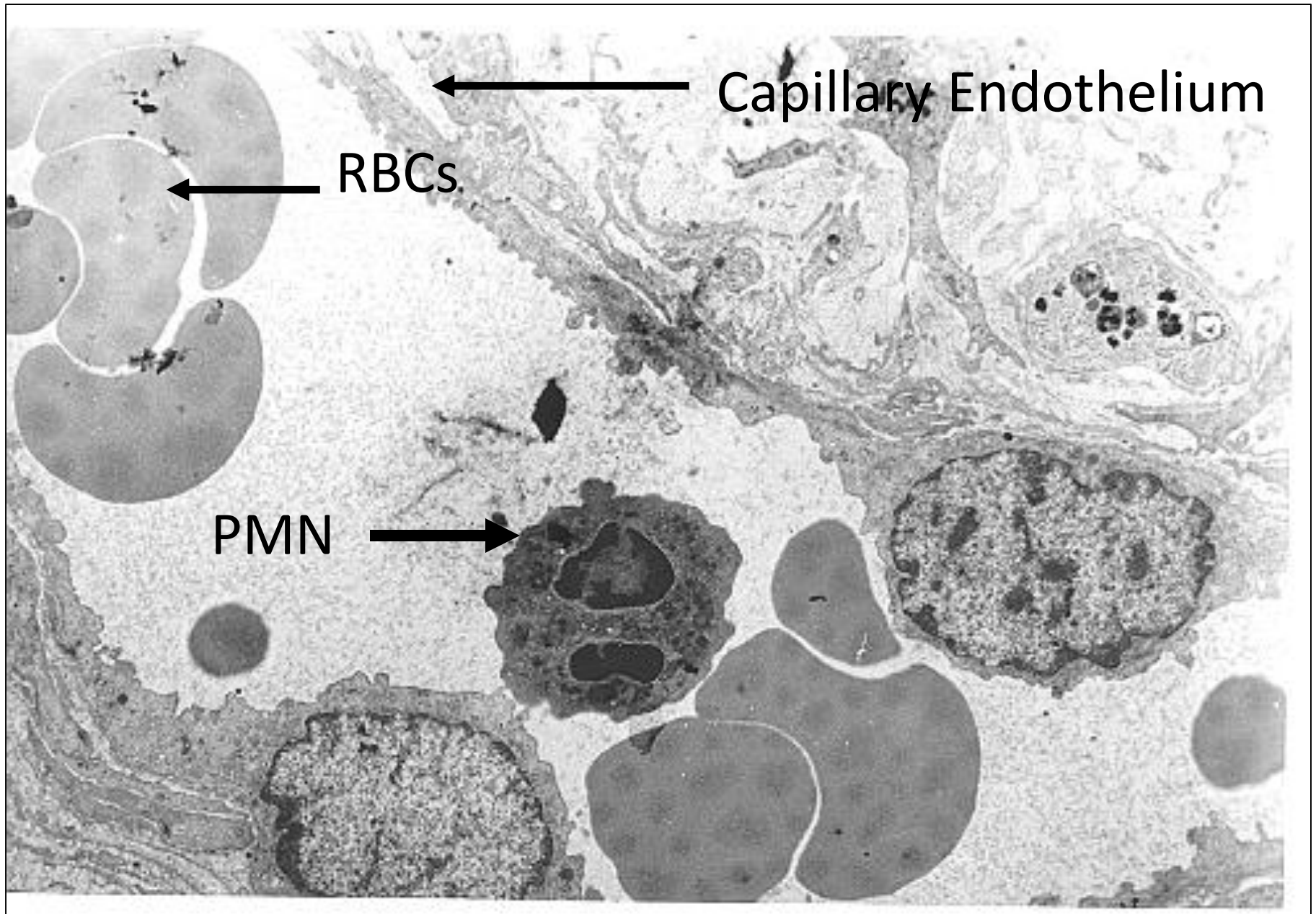
**Nociceptive response
via C-fibers**

Heaviness
Pain, aching
Swelling
Burning
Night cramps
Tingling
Itching
Restless legs
Leg tiredness
Fatigue

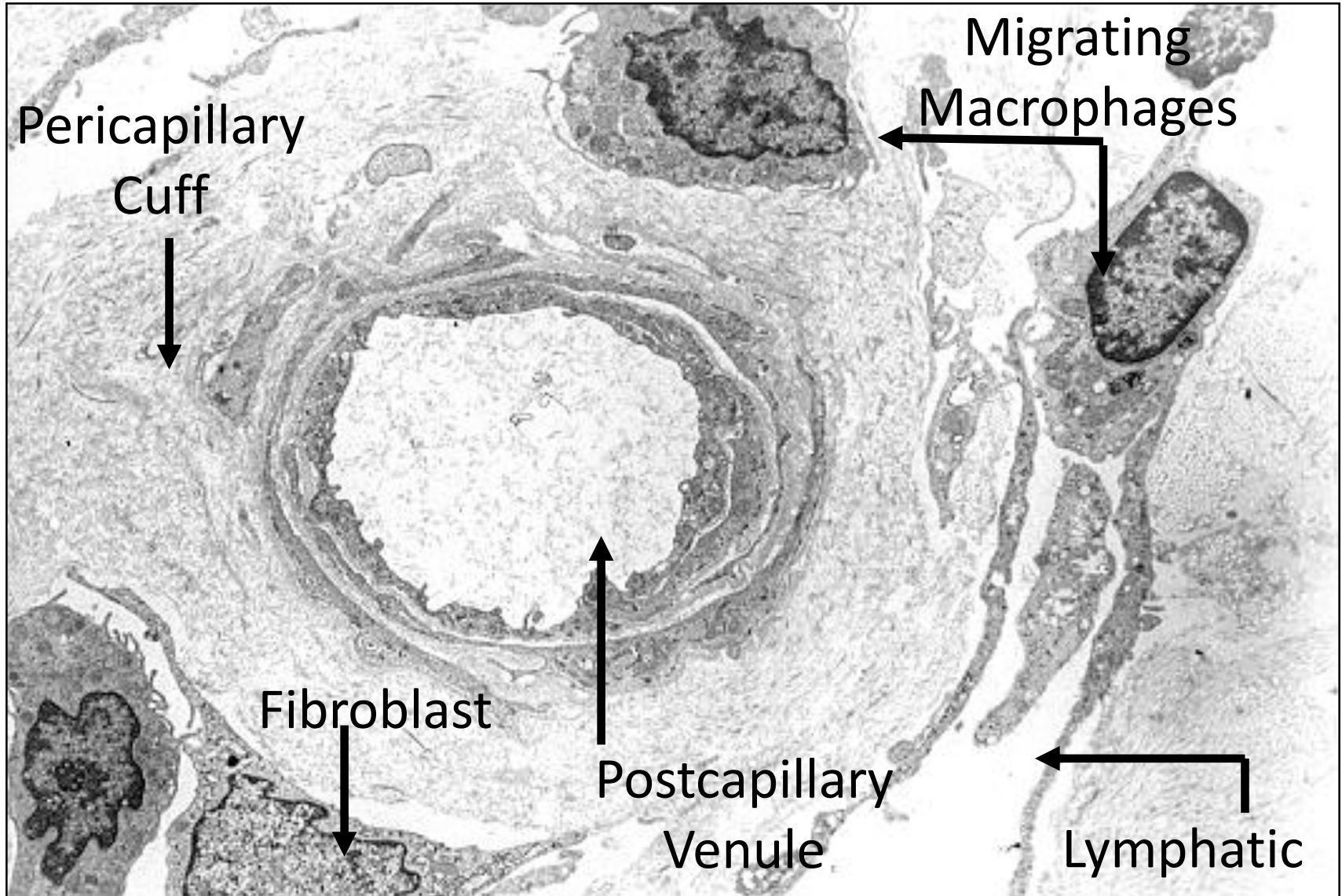


1. Eklof B et al. *J Vasc Surg.* 2009;49:498-501. - 2. Strigo IA et al. *Pain.* 2002;97:235-246.
3. Vital A et al. *Angiology.* 2010;19:73-77.

Traveling leukocytes sense the inflamed endothelium



Pericappillary fibrosis and fibroblasts activating macrophages





Venous pain resembles visceral pain in comparison with cutaneous pain:

- **Less localized diffuse character**
- **Perceived as more unpleasant**
- **Emotional impact**

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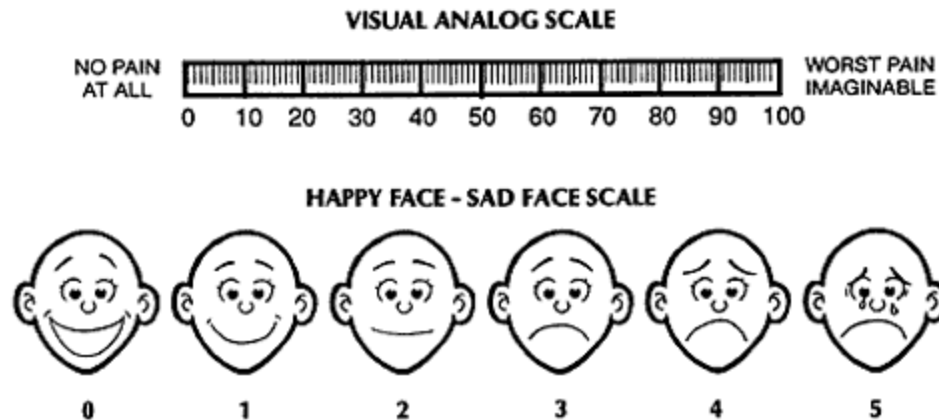
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Time of exacerbation

“Symptoms of Chronic Venous Disease, particularly are exacerbated by heat or dependency in the day’s course, and relieved with leg rest and/or elevation.”

Time of exacerbation	% of VCP pts	Time of exacerbation	% of VCP pts
End of the day	57.4	During summer	30.1
After prolonged standing	45.1	After prolonged sitting	20.2
During night	38.5	When walking	16.4

Visual Analogue Scale (VAS) for Pain



Patients with severe pain require investigation of the ilio caval venous outflow tract

**Outflow obstruction is the reason
for “Venous claudication”**

**Bursting persistent pain and uncomfortable tightness in
the thigh or calf on walking, with a long resolution
time at rest**

**Deteriorates with exercise
ABI index unchanged**

**Poor correlation between pain and Reflux
COs patients do exist**

Stenting of the venous outflow eliminated venous
claudication in all patients



Acute venous disease

Phlebothrombosis is a deep vein thrombosis caused by venous wall injury, venous stasis and/or hypercoagulable state (Virchow's triad)

Thrombophlebitis is a superficial vein thrombosis, which happens spontaneously or after (accidental or iatrogenic) trauma

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Renal Cell Cancer with Tumorous Thrombus extension in the Inferior Vena Cava and Right Atrium





Conclusions

Pain is an important part of clinical picture
of all vascular disorders

Knowledge of **typical characteristics** of
vascular pain can be crucial in effective
and timely treatment of these patients

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*Wisdom lives in the future and from there
it speaks to us.*

Paul Valery

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Exponential Growth of Vascular Patients

Ageing of Population

“Times of plenty”

New Noninvasive Diagnostic MDCT

Endovascular interventions

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New Age Vascular Medicine

Antiageing Medicine

Redefinition of Treatment Aims

Quality of Life

“Informative Noise”

Burn out in Patients and Doctors

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