Carotid Endarterectomy

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Introduction

Stroke –

- 3rd cause of mortality
- 2nd Cardiovascular after MI
- mortality
- morbidity with socioeconomic burden for the patient, family & society

- **Incidence cases/year (per 1 million inhabitants):**
  - **500 transient ischemic attacks**
  - **2,400 strokes (75%: first ever strokes**

History

- 1875 – Gowers: first report stroke/extracranial disease
- 1937 – Monitz: Angiography for carotid disease
- 1954 – Eastcot: first successful operation for carotid stenosis

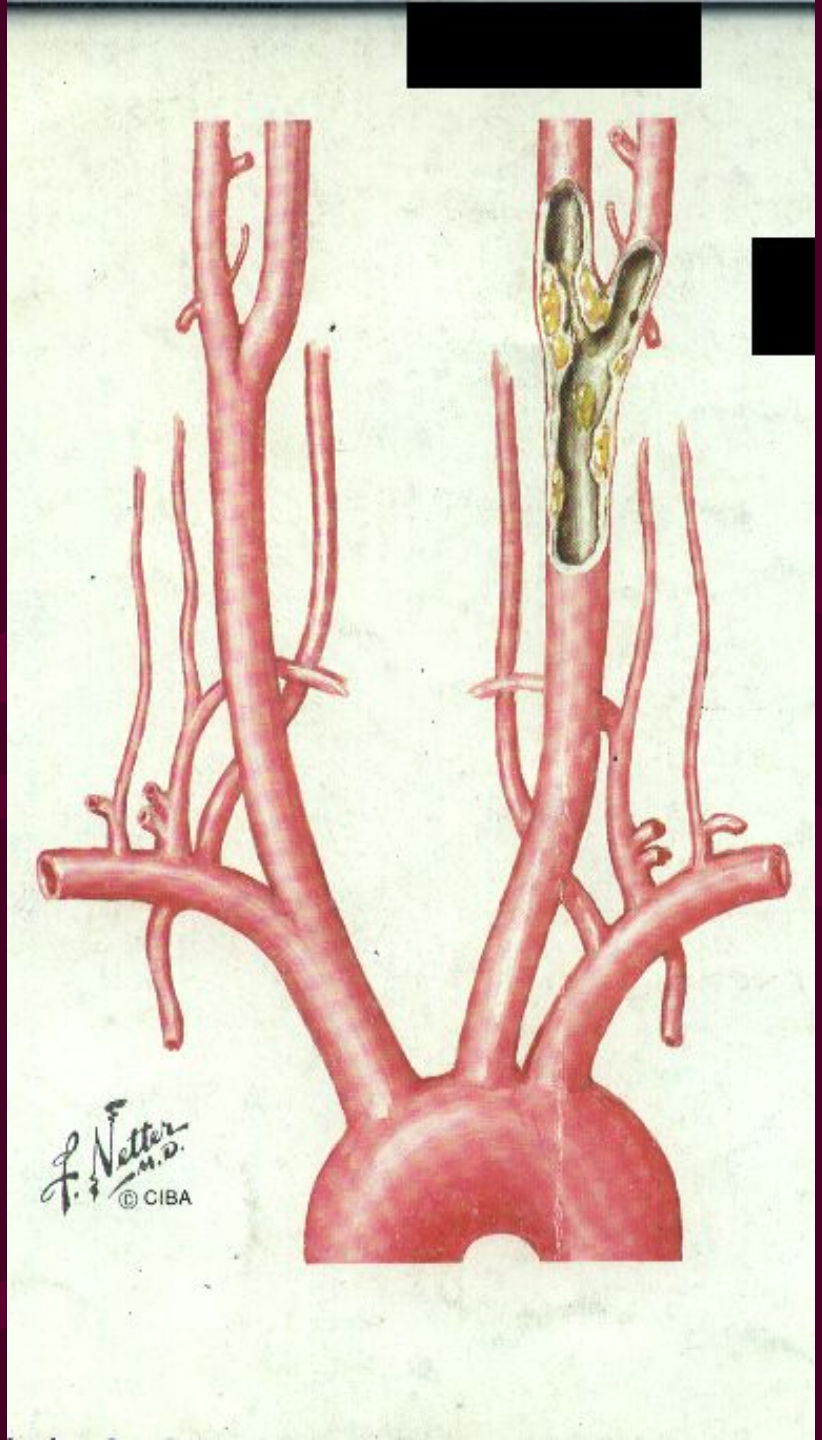
Aim

- **Ameliorate neurological symptoms**
- **Prevent stroke**

Anatomy

95% Aorta

- Innominate Lt carotid Lt Subclavian
- Rt Subclavian Rt carotid
- ICA ECA


F. Netter M.D.
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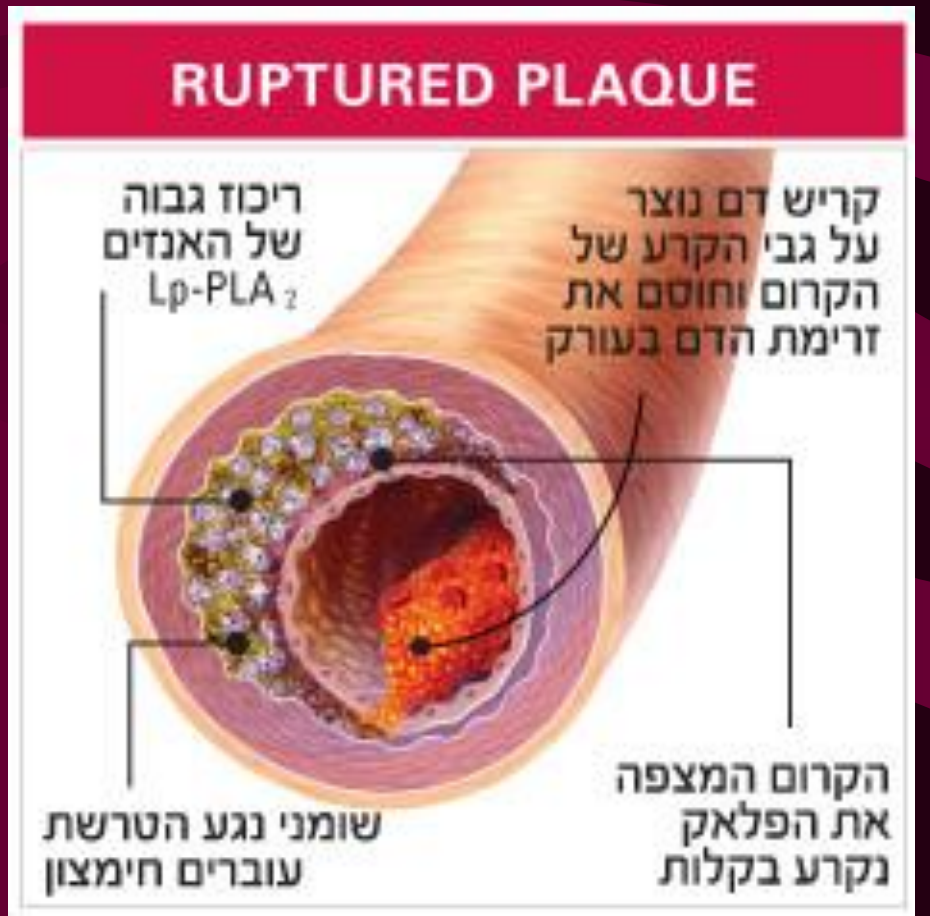
Pathology

- Atherosclerosis 90%
- Usually in bifurcation
- Intracranial : Extracranial
  33% 67%

Plaque growth: - Slow
- Rapid (Intraplaque hemorrhage)


STABLE PLAQUE
ריכוז נמוך
של האנזים
Lp-PLA2
מצבור שומנים
בנגע הטרשת
קרום עבה ונוקשה
מכסה את נגע
הטרשת


RUPTURED PLAQUE
ריכוז גבוה
של האנזים
Lp-PLA2
קריש דם נוצר
על גבי הקרע של
הקרום וחוסם את
זרימת הדם בעורק
שומני נגע הטרשת
עוברים חימצון
הקרום המצפה
את הפלאק
נקרע בקלות

Risk Factors

- Diabetes
- Smoking
- Hyperlipidemia
- Hypertension
- Genetics

Completed Stroke

- Embolic occlusion of critical artery
- Thrombosis of end vessel (local or propagation)
- Sudden decrease in blood flow due to proximal occlusion and no collaterals

.T.I.A

- **Arterial Stenotic Theory ?**

  CBF ↓

- **Cerebral Embolic Theory ?**

10-15% of patients have a stroke within 3 months, with half occurring within 48 hours

– Diagnosis

- Duplex
- CT Angiography
- MRA
- Angiography

ABCD-I

- Age (>60 yrs. = 1 point)
- Blood Pressure (>140/90 = 1 point)
- Clinucal Signs (hemisyndrome = 2; speech =1)
- Diabetes (DM=1; Duration: <10 min=0; >60=2)
- I –Imaging (Duplex/CTA for Carotid Stenosis)
  (MRI/MRP for minor stroke)
  (Recurrent TIA)

Max -13 points. More than 7=8% stroke in 48 hrs.

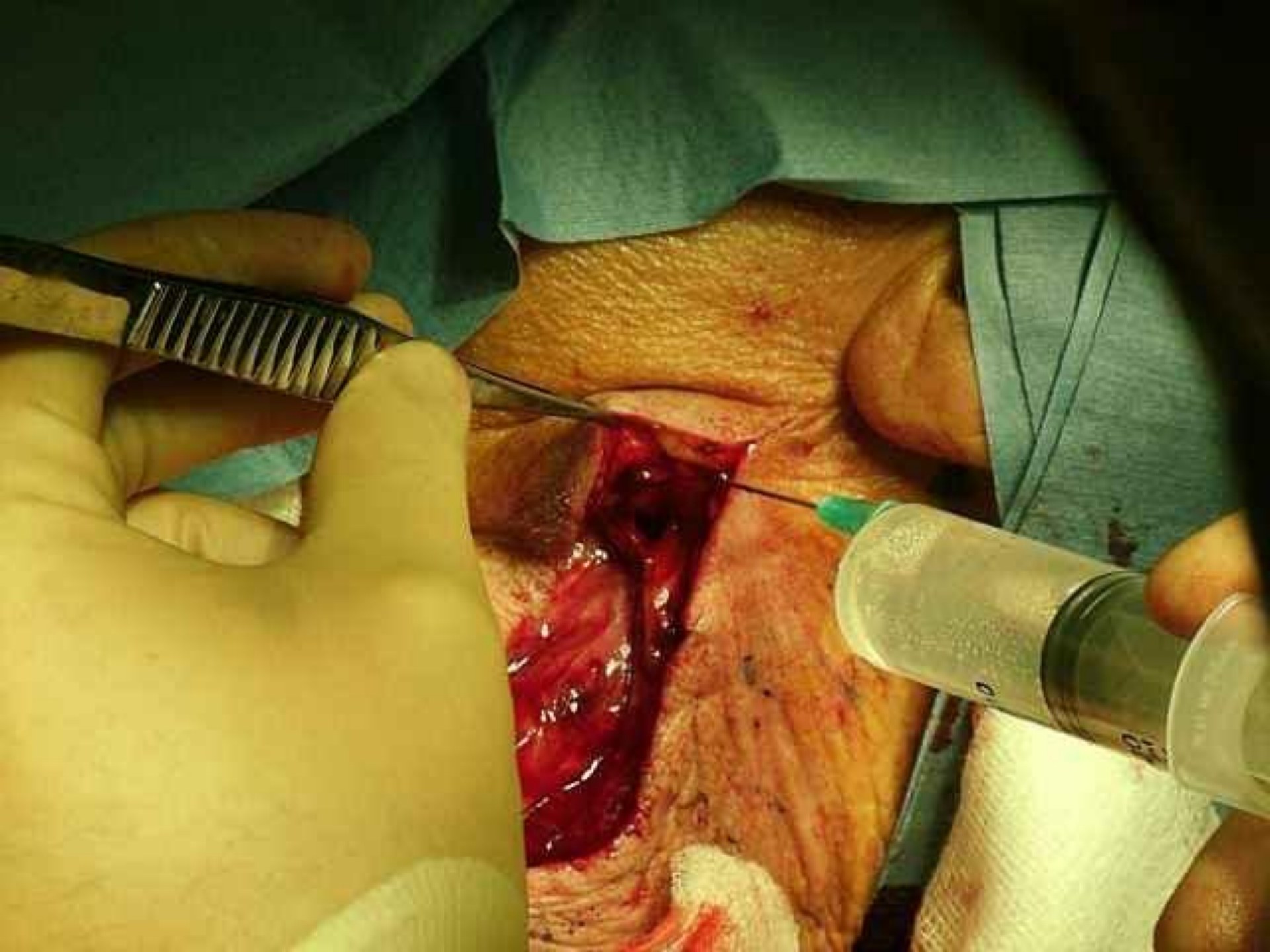
Surgery

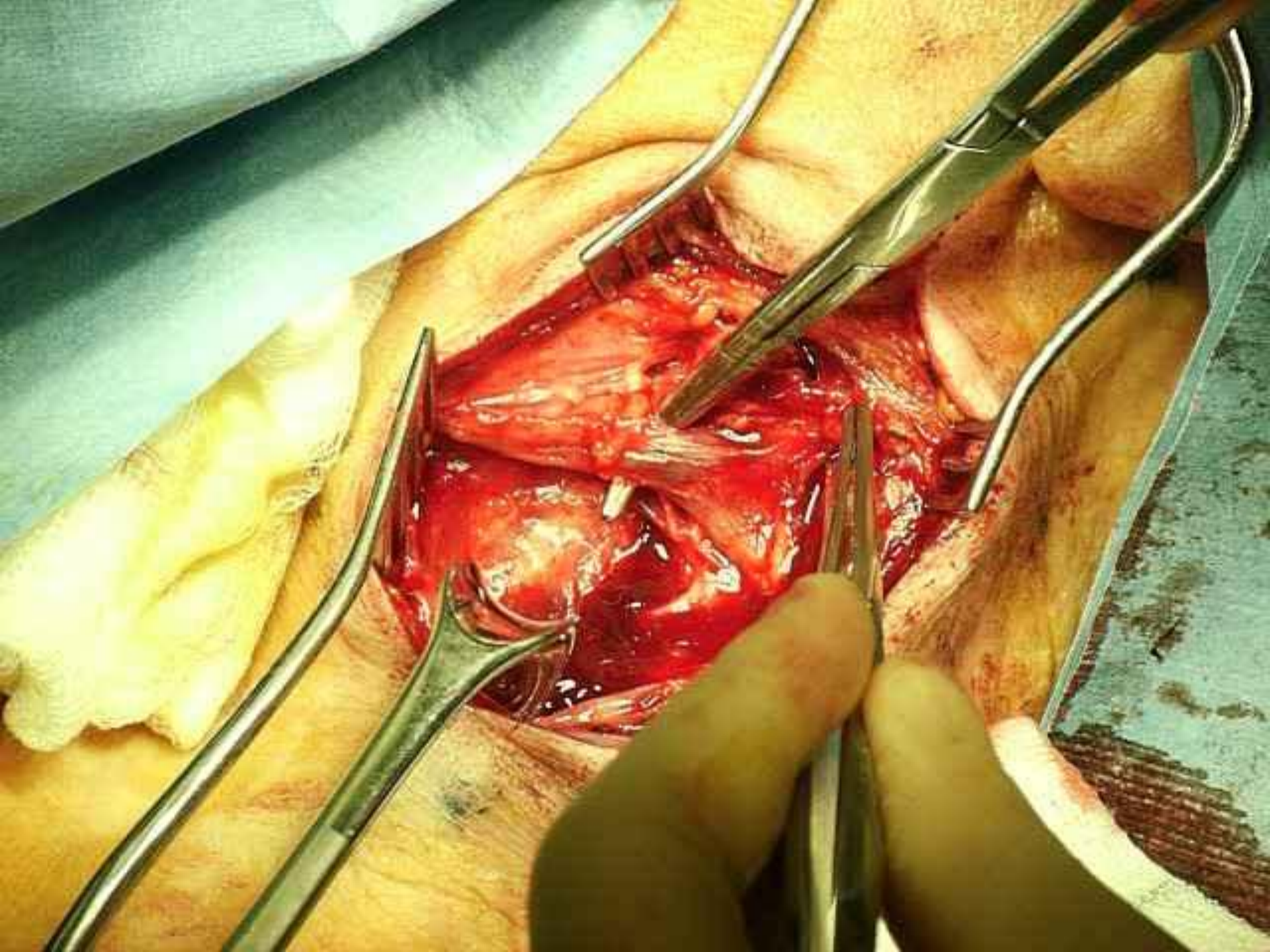
- *Symptomatic* :

- Severe stenosis > 70%
- Good surgical risk patients with Moderate stenosis 50-70% and expected morbidity <3%

- *Asymptomatic* :

- Controversial

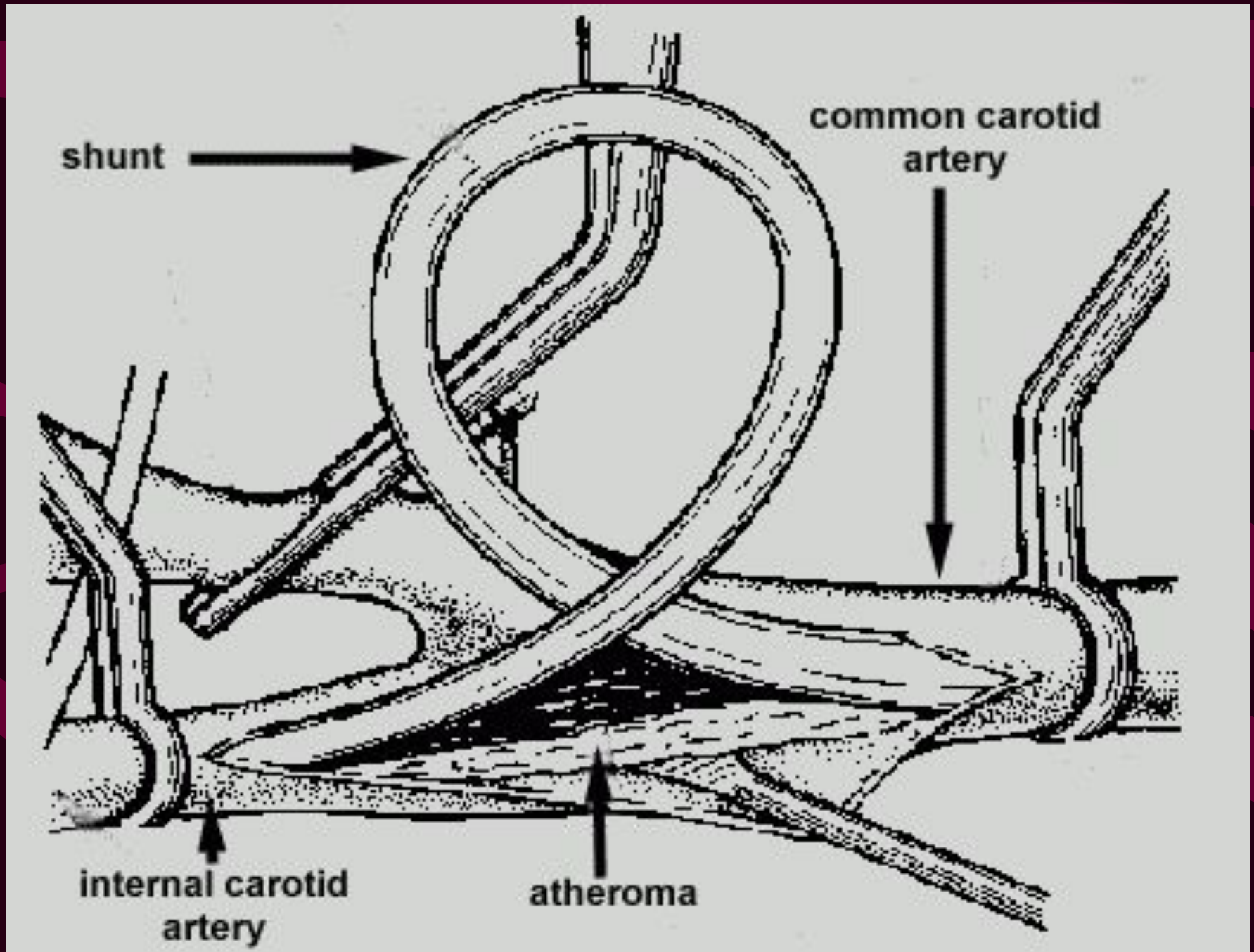


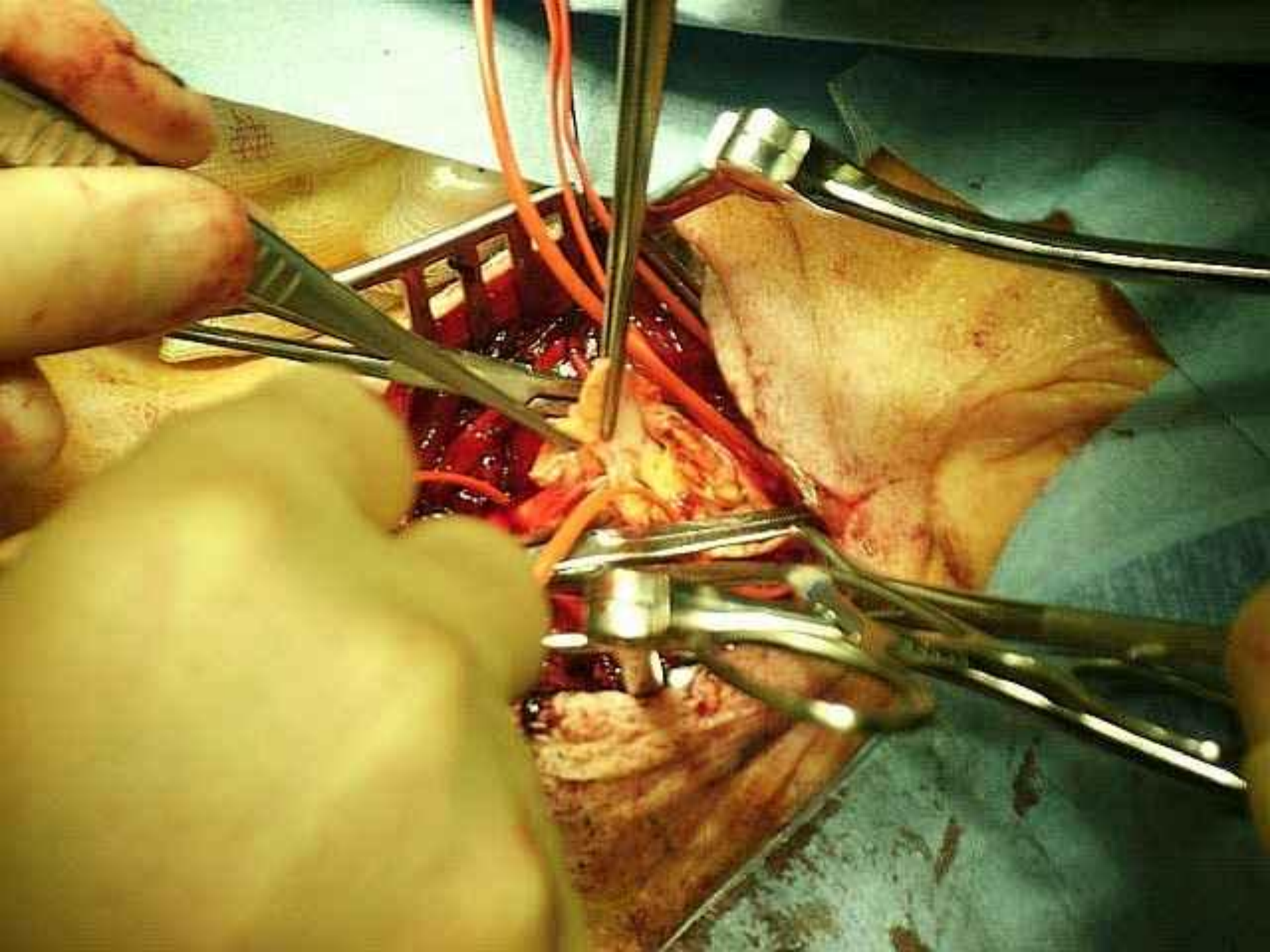


Cross clamping

Carotid Endarterectomy

- Stump pressure / Selective use of Javid Shunt
- Endarterectomy – longitudinal eversion
- Selective use of patch / Graft


shunt
common carotid artery
internal carotid artery
atheroma



COMPLICATIONS

- Hematoma
- Infection
- Hypo/Hypertension
- Intracranial hemorrhage
- Hyperperfusion
- CVA
- Re-stenosis

Morbidity / Mortality

- Asymptomatic 1-3%
- Symptomatic 3-5%

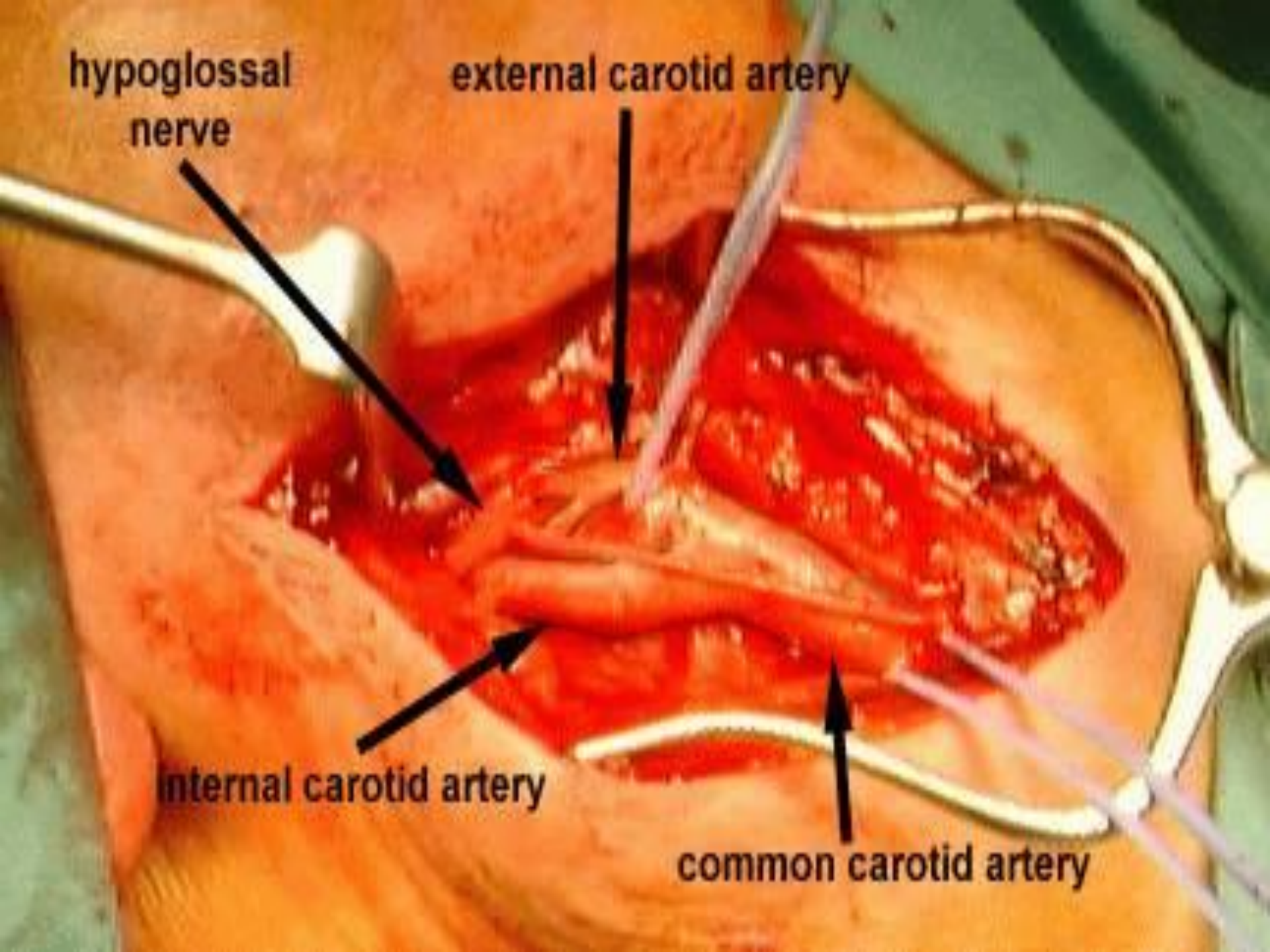
- **Cranial nerve Dysfunction:**
  - **Vagus- Rec Laryngeal**
    - **Sup Laryngeal**
  - **Hypoglossus**
  - **Glossopharyngeus**

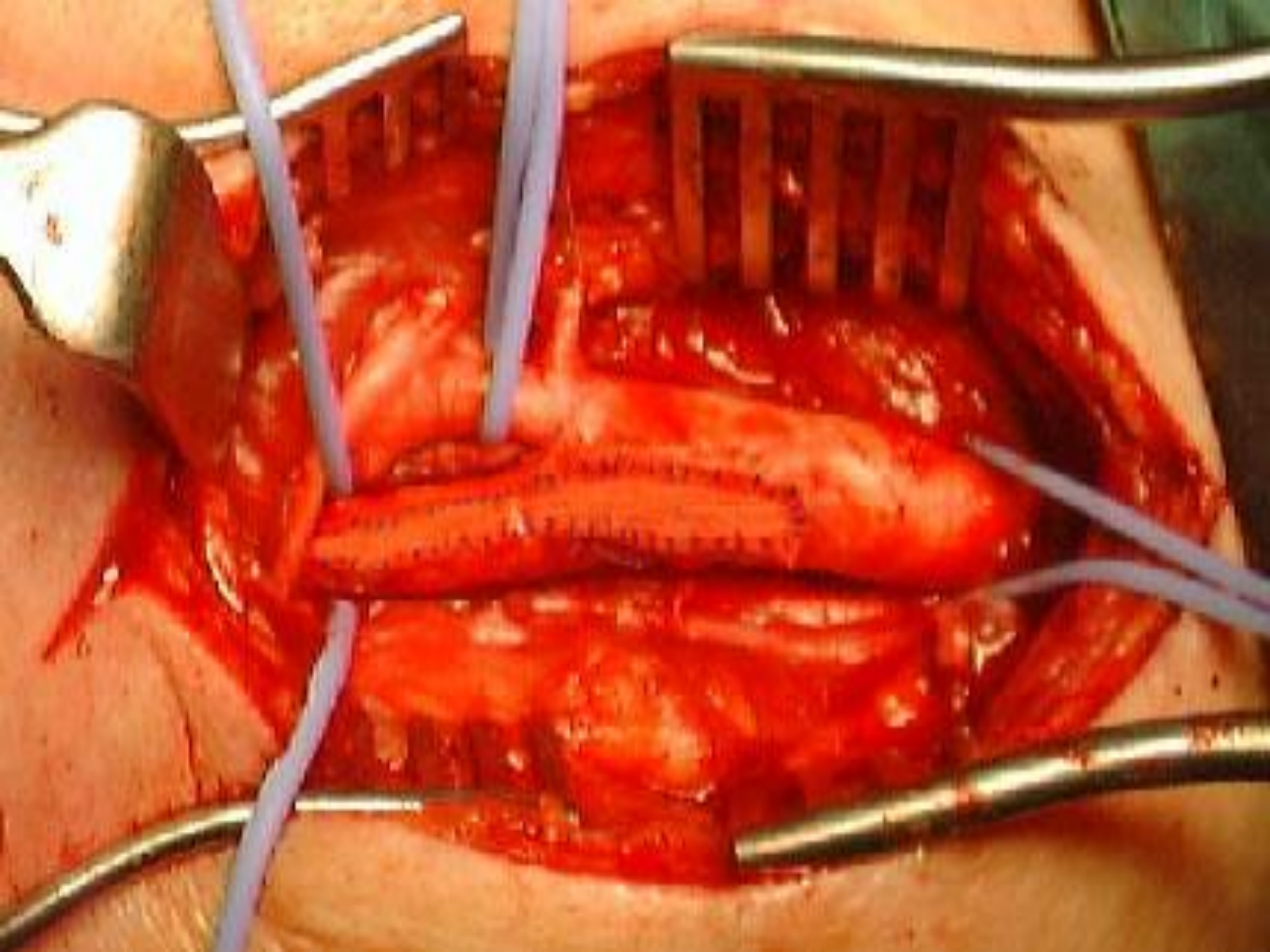
Contraindications

- Fresh CVA
- Severe non rehabilitated stroke
- High cardiac risk
- Short life expectancy

Advanced age

!!!not a contraindication


hypoglossal nerve
external carotid artery
internal carotid artery
common carotid artery



? Surgery or Stent

- Safety ?
- Efficacy ?
- Cost Effectiveness ?
- Long Term Results ?

Common Practice – CEA

- Numerous Reports
- Excellent Results
- Indications widend
- Contraindications Reduced

Missing Data for CAS

- Late Stroke Rate ?
- Late Re-Stenosis Rate ?

Comparative Studies
CEA VS. CAS

- CREST
- CARESS
- EVA-3S
- CAVATAS
- SPACE
- ARCHER

Does the high-risk patient for carotid endarterectomy really exist?

Pulli R, Dorigo W, Barbanti E, Azas L, Pratesi G, Innocenti AA, Pratesi C. Am J Surg. 2005 Jun;189(6):714-9

- To date, definitely accepted criteria to identify "high-risk" patients for carotid endarterectomy (CEA) do not exist

- CONCLUSIONS: Carotid endarterectomy is a safe procedure also in so-called high-risk subsets of patients. Severe comorbidites seem to affect only long-term survival.

Carotid artery stenting is associated with increased complications in octogenarians: 30-day stroke and death rates in the CREST lead-in phase . Hobson RW 2nd et al.

J Vasc Surg. 2004 Dec;40(6):1106-11

- Interim results from the lead-in phase of CREST show that the periprocedural risk of stroke and death after CAS increases with age in the course of a credentialing registry. This effect is not mediated by potential confounding factors.
- … **care should be taken when CAS is performed in older patient populations**.

CREST - *Conclusions*

- During the periprocedural period, there was a higher risk of stroke with stenting and a higher risk of myocardial infarction with endarterectomy.

Indications for CAS

- **Re-stenosis after CEA**
- **Post Irradiation**
- **“Hostile Neck”**
- **Stiff Neck**
- **“High Risk” for CEA**