Debata II: Carotidal stenting v.s. carotidal endatherectomy- surgical side

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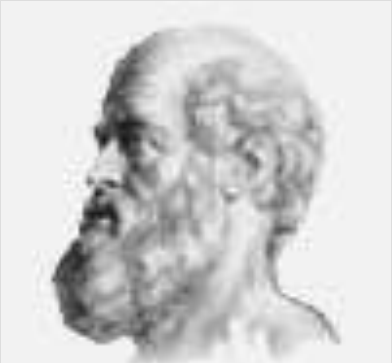
History


Hippocrates

Hippocrates, 400 B.C. carotid compression
Greek: Karos – “deep sleep”
Karoun – “to stupefy”

Chiari, 1905 - 7 of 400 consecutive autopsies with carotid artery
Occlusion 4 of 7 died of cerebral embolism
1927, Egas Moniz – 1st cerebral angio
1936, Sjoguist – 1st case of internal carotid occlusion by angio
1942, Hultquist – 1400 autopsies, 3% incidence of thrombosis


Miller Fisher

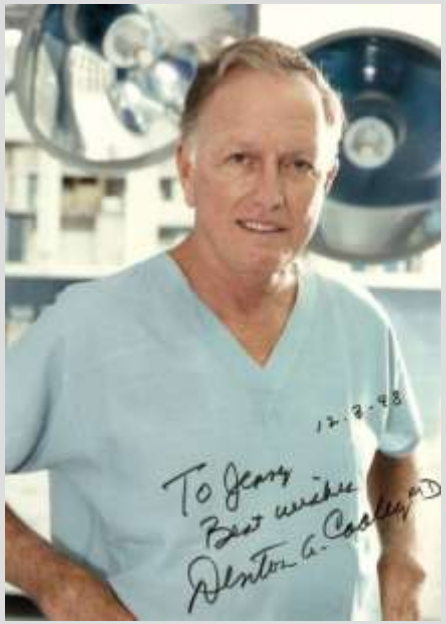
1951, C. Miller Fisher
Etiology: Occlusion of the carotid Artery
8 ICA occlusions hemiplegia,
Prophetic statement: “some day vascular surgery Neurosurgery will find a way to bypass the occluded portion of the internal carotid artery during the period of fleeting symptoms.”

History

1953, Michael DeBakey –
1st successful carotid endarterectomy

Published 22 years later

1953, Denton Cooley – 1st published report of carotid Endarterectomy



"I've always felt that I did well as a student because I lacked confidence."

Epidemiology

- Stroke – 3rd leading cause of death behind cardiovascular disease and cancer
-600,000 – 750,000 people / year

- Leading cause of adult disability
- Second leading cause of dementia
90% of CVA attributable to atherosclerosis
-Approx. 25% directly related to carotid stenosis
Presentation

- Asymptomatic – 37%
- Hemispheric TIAs – 29% includes dysphasia/aphasia, contralateral paresis/plegia, contralateral sensory changes,contralateral homonymous hemianopsia
- Transient Monocular Blindness – 9%
- Minor CVA – 24%

NASCET (asymptomatic carotidal stenosis)
ECST (symptomatic carotidal stenosis
- Recommend CEA for:
- All asymptomatic men and women with >70% stenosis, the earlier the better
- All symptomatic men with 50-69 % stenosis if within 2 weeks of last event

CEA vs Endovascular - Summary

ICSS (International Carotid Stenting Study) active trial
CREST (Carotid Revasc. Endart. Vs Stenting)
SPACE (Stent-protected Perc. Angiopl. Vs CEA)
EVA-3S (Endart. Vs angiopl. In pts with severe symptomatic stenosis)

Cerebral Angiography

1927 – Egas Moniz – Lisbon – The first reproducible technique for imaging the cerebral circulation using direct injection of iodides

1937-1951 – About 100 cases reported of cervical carotid artery occlusion diagnosed by arteriography

Most early cerebral angiograms did not include the carotid arteries. The diagnosis was thought to be "middle cerebral artery thrombosis"

The Advent of Carotid surgery

1951 – Carrea – Buenos Aires – ICA resection and ECAICA Anastamosis

1953 – Strully – Unsuccessful attempted endarterectomy of an occluded ICA

August 7, 1953 – DeBakey – First CEA

November , 1954 – Pickering and Rob – CCA-ICA anastamosis.

1959 – DeBakey organized the series of Cooperative Studies between 1968-1976

1976 – present – Explosive growth!

Carotid Endarterectomy

45-90 Minutes of General or Regional Anesthesia

Anterior neck Incision

Shunt

Carotid Sinus Blockade

Plaque removal and tacking

Patching

Post Operative Monitoring

CEA is clearly indicated and effective in good risk, symptomatic patients with stenosis greater than 70%
CEA is probably indicated in patients with complex deep plaque ulceration.
CEA is appropriate for asymptomatic patients with stenosis greater than 70%, but only with combined M&M <3% and expected patient survival >5 years.
There is probably a role for CAS in high risk, symptomatic patients , but treatment should be within an investigational protocol.

CEA vs stenting

- Several studies have been carried out or are in progress to compare CEA and repair of carotid artery disease using interventional radiology
- Because of the potentially significant and lasting damage from a stroke and the relative success of CEA, studies comparing the two treatment options have been somewhat slow to be carried out
- Most of the early studies compare the two techniques in specific patient groups (i.e. elderly patients or poor surgical candidates)

WALLSTENT trial

- 219 patients with symptomatic stenosis
- Carotid arteries were 60-90% occluded
- Patients were randomly assigned to receive CEA or angioplasty and stenting (*without* protective filter device)
- 1-yr follow-up showed significantly higher rate of post-procedure stroke with angioplasty and stenting group compared to CEA group (12.2 vs 3.6%)

SAPPHIRE study

- **CEA vs carotid stenting *with* protective filter device**
- **334 patients with concurrent conditions that made them poor surgical candidates**
- **Symptomatic carotid stenosis of ≥50% or asymptomatic stenosis of ≥80%**
- **Primary end-point: major cardiovascular event within one year (death, stroke, MI)**

Results of SAPPHIRE study

- **Major cardiovascular events within one year were more common in CEA group than in angioplasty and stenting group (20.1% compared to 12.2%)**
- **Carotid revascularization was repeated within one year in fewer patients with stents than in patients who underwent CEA (0.6% and 4.3%, p=.04)**

Stenting vs CEA in elderly patients

- **Retrospective study of pts ≥75 years old who had been treated for carotid stenosis**
- **53 pts who had undergone stenting between June 2001 and April 2004 were compared to 110 pts who had undergone CEA between January 1997 and December 2001**
- **Primary outcome was MI or major, minor, or fatal stroke within one month of treatment**

Results of CEA vs stenting in elderly patients

- **Incidence of major *or* minor stroke within 30 days of treatment was significantly higher in stenting than in CEA group (11.3% to 1.8%, P<0.05)**
- **Incidence of major stroke within 30 days was similar in the two groups, but incidence of minor strokes was higher in stenting group (7.5% vs 0%, P<0.05)**
- **Protective embolic filter devices were used in this trial**

CAVATAS trial

- **504 pts with carotid stenosis were randomly assigned to CEA or angioplasty and stenting**
- **Results showed similar major risks and effectiveness of the two treatment options**
- **Outcomes following surgery were worse than outcomes reported in major trials evaluating carotid surgery, supporting the fact that there is a great deal of variability in outcome depending on surgeon expertise**

- **ICSS Safety results – *1713pts– 3 pts excluded; 853 pts CAS, 857 pts CAE***
- **Summary and conclusions**
- **• Strong evidence that CEA is safer than CAS in the primary ITT**
- **analysis (any stroke, death or perio-op MI, 8.5% v 5.1%, p=004)**
- **• Twice as many strokes after CAS than after CEA in the perprotocol**
- **analysis (7.0% v 3.3%, p=0.001)**
- **• Difference largely driven by non-disabling stroke**
- **Safety results**
- **• Higher 30 day risk of any cranial nerve palsy and haematoma**
- **in CEA arm compared to CAS arm.**
- **• Blinded MRI substudy supports the results of the main study**
- **and makes it unlikely that the difference is the result of bias**
- **• Carotid endarterectomy is the treatment of choice for suitable**
- **patients with recently symptomatic carotid stenosis**

Our experience

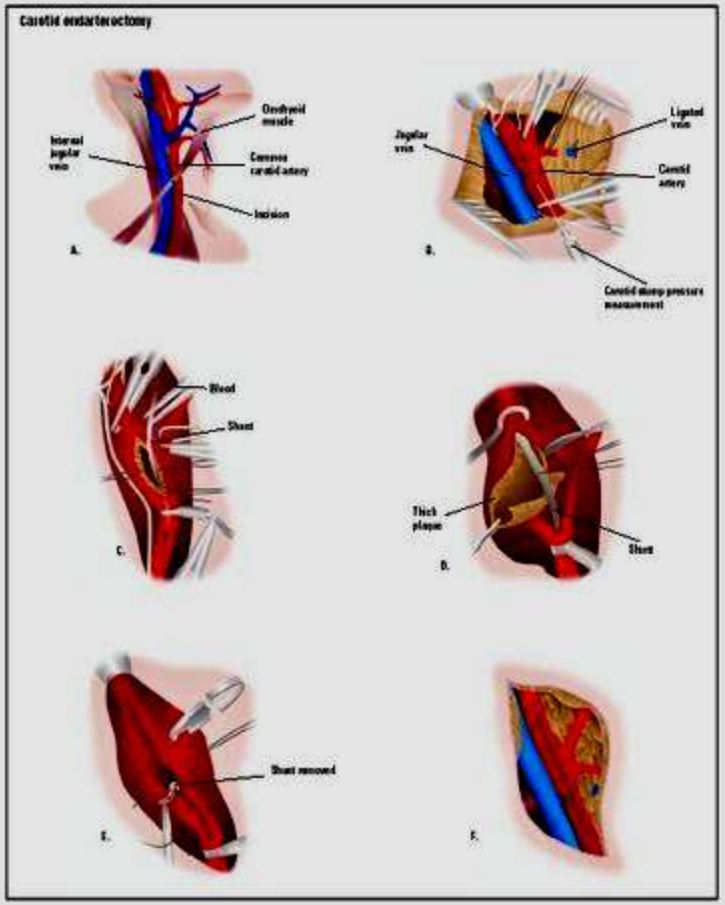
Standard

Thombendatherectomy
- **invert technique**
- **patch technique**

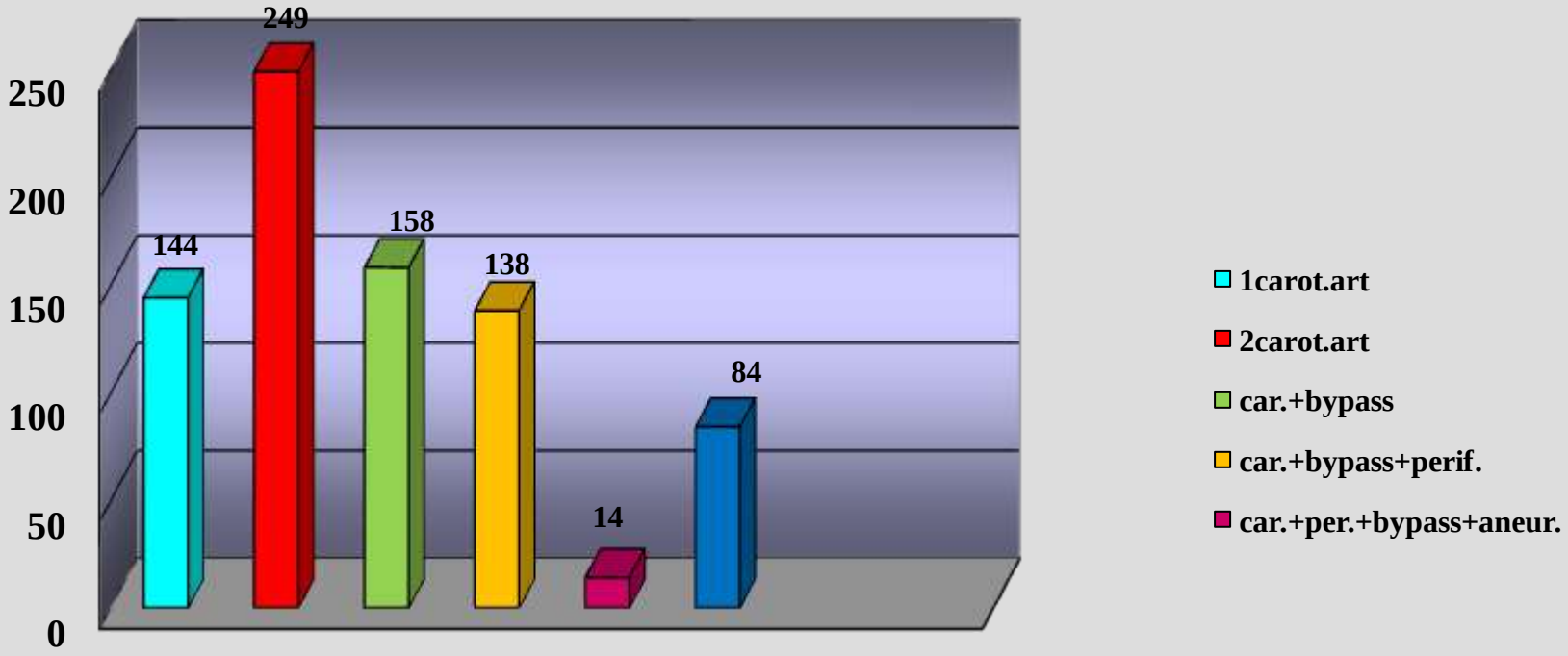
General deep anesthesy

Longitudinal lateral neck incission

Shunt



Vascular surgery N= 703 pts.

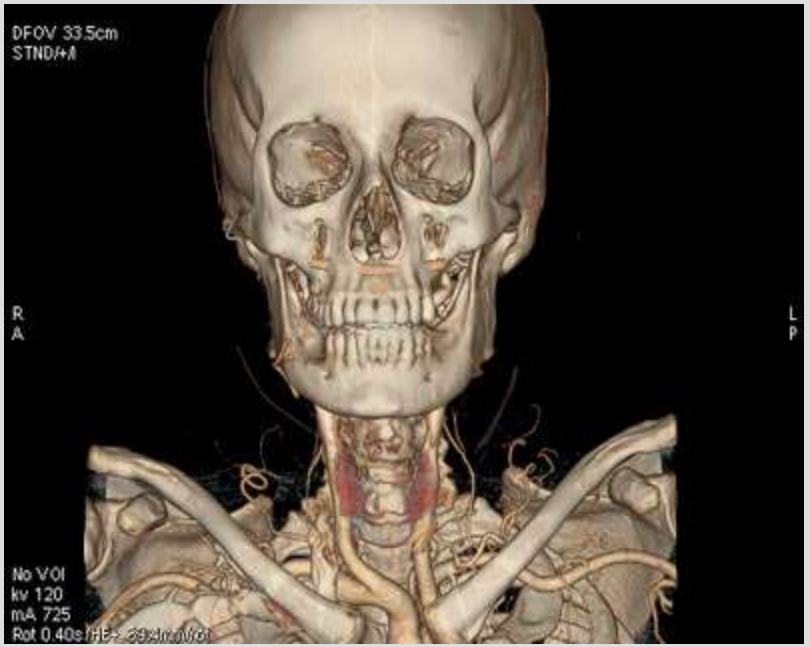


Cardiosurgery - Skopje

Minimal invasive carotidal surgery-our technique

Goals:

- Minimal incision (2cm)
-Without shunt
-Fast and safe surgery
(minimal invasive)
-Ideal monitoring of
the cerebral function
-Minimal invasive anesthesia
-Early mobilization
-Best long term results



Minimal invasive carotidal surgery
N = 84pts; period 12/09-05/10

Age (years)	**62.2 ± 7.8**
Sex (f/m)	**21/63**

Comorbidities:

Hyperlipidemia- 53,5% (45pts)
Diabetes disease- 50%(42pts)
Hypertension – 55,9%(47pts)
COPD – 17,8%(15pts)
Adiposity – 15,5%(13pts)
Smokers – 58,3%(49pts)

Coronary artery disease 51,2%(43pts)
Abdominal aneurysm 5,9% (5pts)
Peripheral vascular disease 10,7%(9pts)
Both carotid 34,5%(29pts)

Minimal invasive carotidal surgery

Minimal invasive carotidal surgery
Results –intraoperative data N=84pts

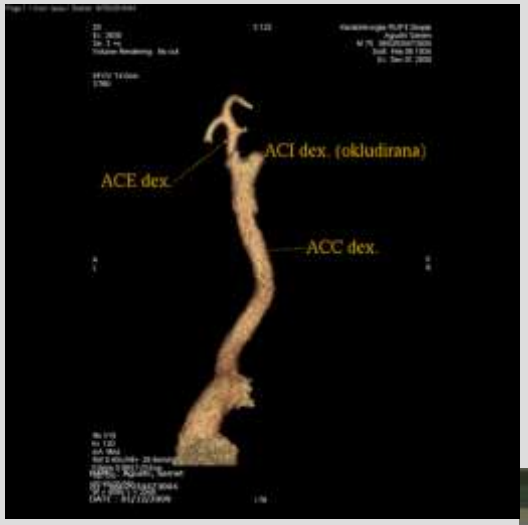
• TEA	69,0%(58pts)
• Carotidal kinking	27,4%(23pts)
• Extranatomy bypass	1,2%(1pts)
• Venous graft	1,2%(1pts)
• Carotidal aneurysm	1,2%(1pts)
• Mean time of carotidal clamping	13±0.8min
• Mean time skin to skin	30,7 ± 22.1min
• Intubation due to agitation	5,9%(5pts)

Minimal invasive carotidal surgery
Results N=84pts

- **Redon drainage pull out** **4-6 h after**
- **In hospital stay 1,5days** **84 pts**
- **Complications –**
  early postoperative carotidal occlusion **1pat.**
- **Transient events**
  - glosopharyngeal paresis **3 pts**
  -facialis paresis **9 pts**

- **Follow up – 1 – 6months**

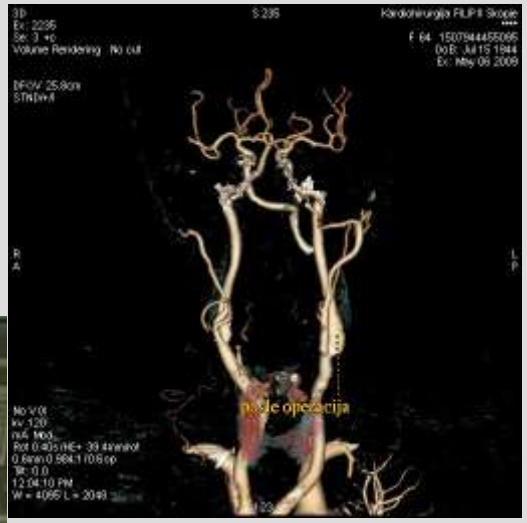
Minimal invasive carotidal surgery - acute carotidal oclussion

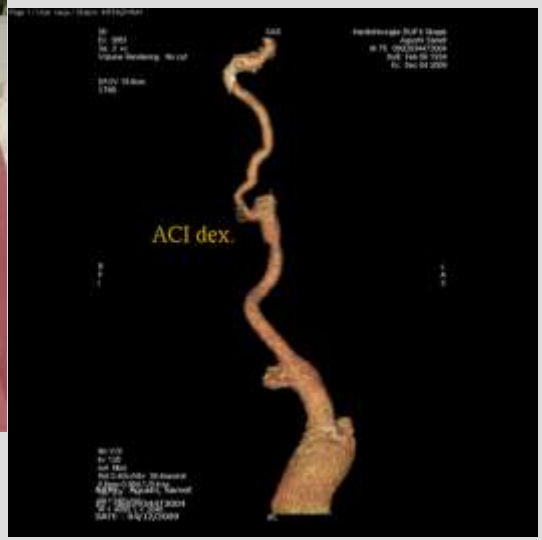


Pre-op MSCT

First operation in awake settings- after thrombectomy left sided plegy,speech disorders, and swallowing disorders

Urgent surgery- by-pass with venous graft within first 6 hours





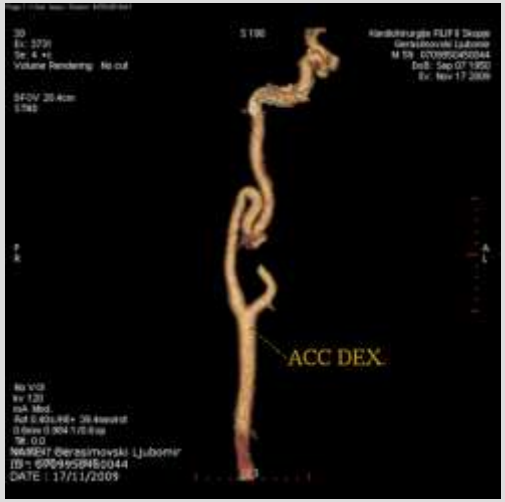
24 hours after second surgery

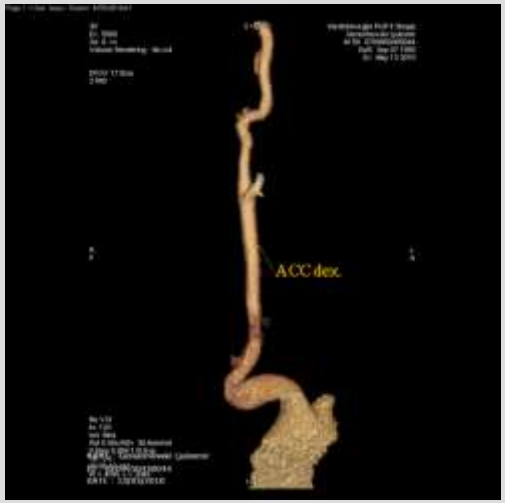
Cardiosurgery - Skopje

Postop MSCT

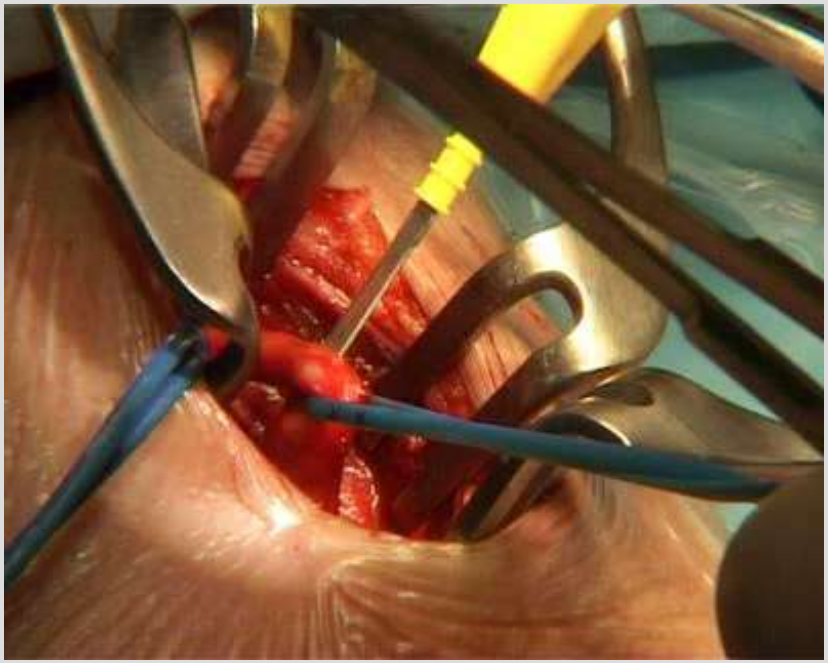
Minimal invasive carotidal surgery - carotidal kinking

Pre – op. 64 MSCT





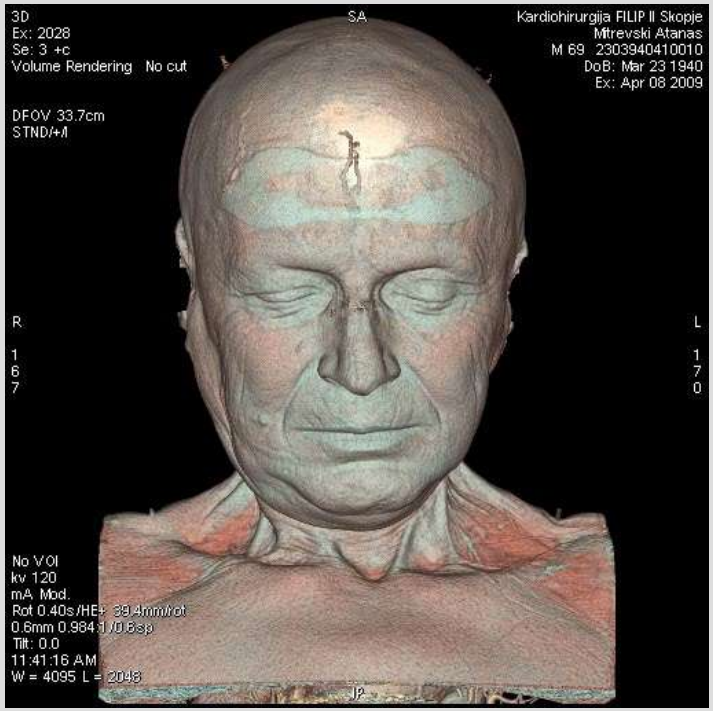
surgery

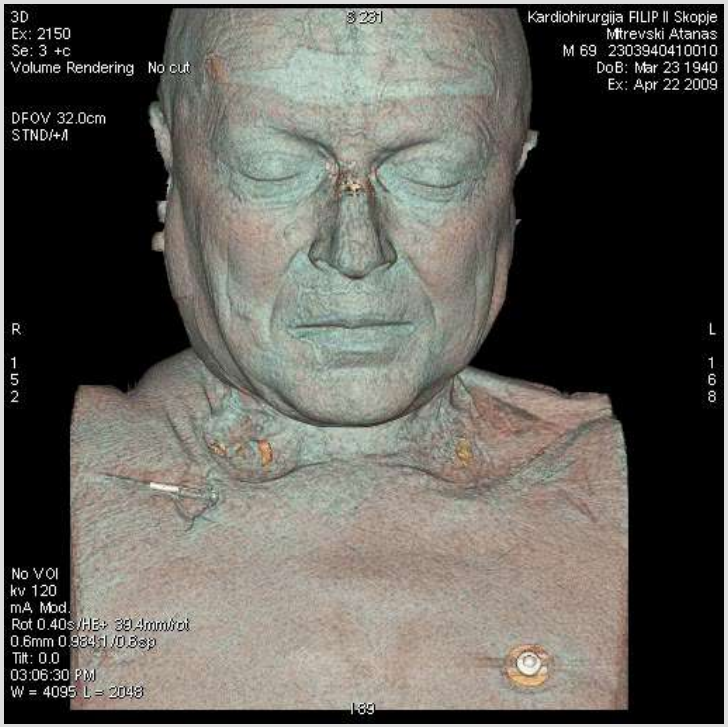


Post-op.

Pre – op. 64 MSCT

Minimal invasive carotidal surgery extranatomy by-pass grafting





Pre-op.

Post op.

Minimal invasive carotidal surgery
Surgery for carotid aneurysm

T.B. 63y. Old female
15 years treated from
enlarged thyroidal gland

Pre-op.

Post op.

Minimal invasive carotidal surgery

- ✓ **Consciousness of the patient during surgery provides both the anesthesiology and surgical team with one of the best neurologic monitoring devices, immediately showing the effect of cross-clamping and eventual need for changes in anesthetic or surgical steps.**
- ✓ **Better cost-benefit**

Minimal invasive carotidal surgery
Future

Stent

Surgery

- **Fast tracking procedure**
- **Awake patient**
- **↑ risk for embolisation**
- **Carotidal aneurysm**
- **Carotidal kinking**
- **↑ costs for medical treatment (costs for clopidogrel)**
- **Long term results ???**

- **Fast tracking procedure**
- **Awake patient**
- **↓ risk for embolisation**
- **Carotidal aneurysm**
- **Carotidal kinking**
- **↓ costs for medical treatment (aspirin)**
- **Long term results -proven**

Conclusion

- **Carotid vascular disease is prevalent in the US and results in significant mortality and morbidity when untreated**
- **Results of trials comparing the invasive treatment options are ongoing and have shown somewhat conflicting results**
- **Studies support the use of angioplasty and stenting in certain patient populations**

Conclusion

- **Patients with carotid stenosis who are likely to benefit more from carotid angioplasty and stenting than from CEA include pts with significant comorbidities that make them poor surgical candidates**
- **Elderly pts may be at higher risk of having a minor stroke within 30 days following stenting than CEA**
- **The use of protective embolic filters is important in the outcome following angioplasty and stenting**