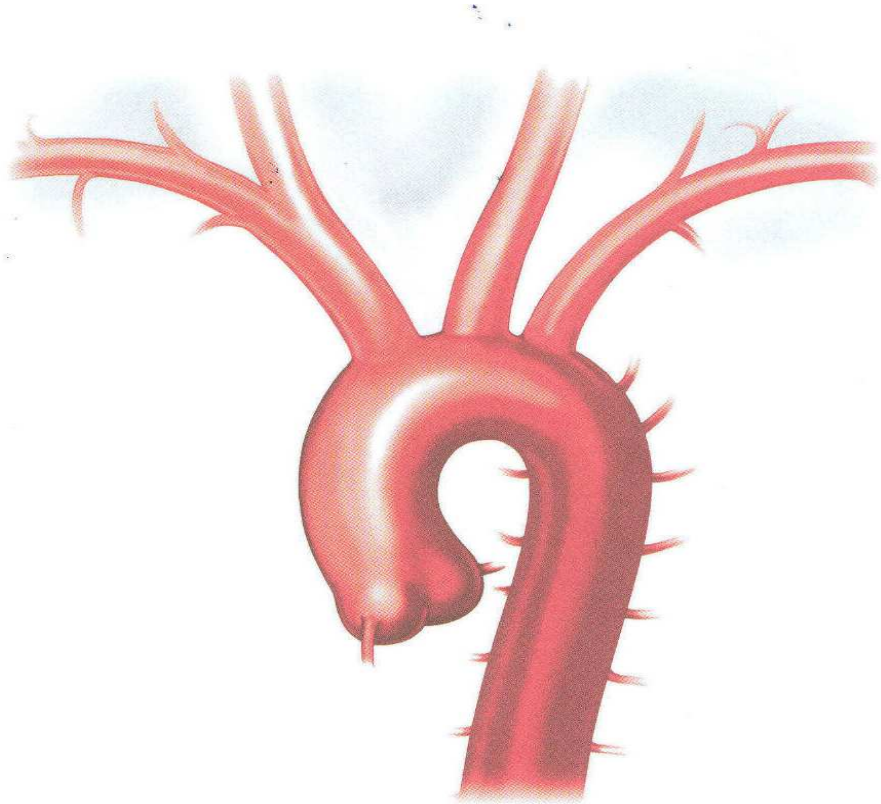
Resection of thoracic aortic aneurysm: Protection of spinal cord injuries – update.

George Silvay, M.D., Professor, Department of Anesthesiology,
Mount Sinai School of Medicine, New York, NY.

XVI. National Congress of Czech Society of Anesthesiology and Intensive Care Medicine, Ceske Budejovice, CZ. October 1 – 3, 2009.



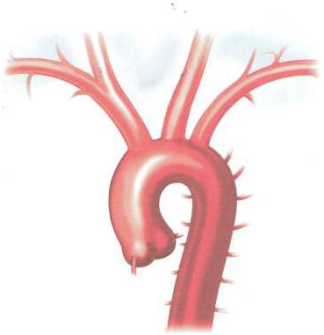

MOUNT SINAI
MSM
SCHOOL OF MEDICINE
OF THE CITY UNIVERSITY
OF NEW YORK

DISCLOSURE – nothing at present

..but waiting and I hope, it will arrive.

Five segments of my discussion:

TAA = SILENT KILLER!

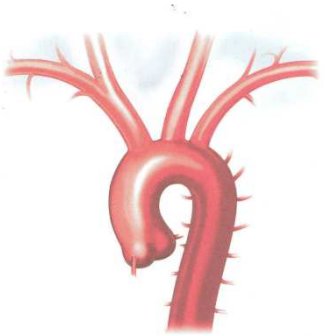


1. **General Comments & Early diagnosis !!!**
2. Aortic Clinic-Elective Operation-DAS.
3. Update the “Brain Protection”.
4. Prevention of Spinal Cord Injury.
5. Age is not a Contraindication for Repair of TAA..

Elefteriades JA: Thoracic Aortic Aneurysm:

Reading the Enemy's Playbook.

World J Surg 2008;32:366-374.



Aortic aneurysm dissection or rupture, is one of the most catastrophic acute natural event that can befall a human being.

The pain of this disorder is often described by those affected as the most severe pain imaginable. Because acute aortic event often masquerades as a heart attack, its true incidence is often underestimated. If a middle-aged or elderly person arrives in emergency room with acute onset of chest pain, clutches his chest as having experienced a "myocardial infarction". In actual fact, many such presentations represent undiagnosed acute aortic event – aortic dissection or aortic rupture.

For all these reasons, **early recognition and elective treatment of aortic aneurysm is of great importance** , not only to the surgeons, but also to the generalist and to other specialists in emergency medicine, radiology, cardiology, and others.

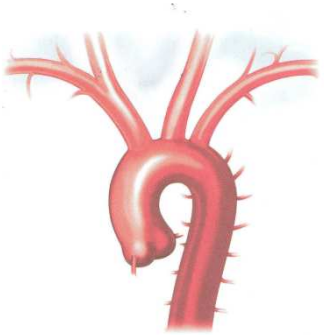
CASE NO.	SEX, AND AGE	DATE OPERATED	ANEURYSM		RESULT AND REMARKS
			NATURE	SITUATION	
1. R.M.	C.M. 46	12/22/48	Syph	Transverse arch	Apparently well for 2 months and then devoloped fatal hemorrhage
2. R.R.	W.M. 32	4/28/50	Spont	Rt. subclav.	Cured
3. J.M.	C.M. 45	7/12/51	Syph	Innominate and adjacent aorta	Cured
4. F.D.	**W.M. 57**	**10/4/51**	**Syph**	**Ascending and transverse arch**	**Died 14 hrs after operation, diffuse cerebral damage, anesthetic complication**
5. L.H.	C.M. 41	9/6/51	Syph	Terminal thoracic aorta	Died 18 days after operaiton, secondary hemorrhage
6. W.F.	W.M. 56	9/7/51	Syph	Transverse arch	Improved

Cooley D.A., De Bakey M.E.: Surgical consideratiosn of Intrathoracic Aneurysms of the Aorta and Great Vessels. Ann Surg 135: 660-680, 1952

.....the use of surface cooling, hypothermic cardiopulmonary bypass + DHCA in adults for repair of aortic arch aneurysms...

Griepp RB, Stinson EB, Hollingworth JF *et al*:
Prosthetic replacement of the aortic arch.
J. Thorac. Cardiovasc. Surg. 70:1051-1063, 1975

Litwak RS, Lev R, Baron M,
Silvay G, Gadboys HL:

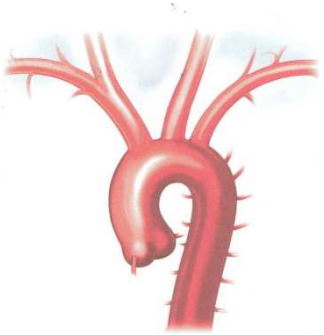


THE SURGICAL TREATMENT OF AORTIC ANEURYSMS

From Departments of Geriatric and Surgery, Division of Cardiothoracic Surgery, Mount Sinai Hospital, New York, NY

Geriatric 1967;6:105-121.

Aortic Aneurysms: Etiology



Atherosclerosis

Hypertension

Trauma*

Iatrogenic (Ao cannulation, Ao X clamp, PSI)

Degenerative diseases (Marfan's, Ehlers-Danlos)

Infection

Syphilis

Smoking

AORTIC SURGERY AND ANESTHESIA
"HOW TO DO IT"

Instituto Scientifico Universitario San Raffaele ,Milano-Italy. December 2008.

The evolution of surgical repair of two most challenging aortic segments – the aortic arch and the thoraco-abdominal aorta were, and will be the main topics..

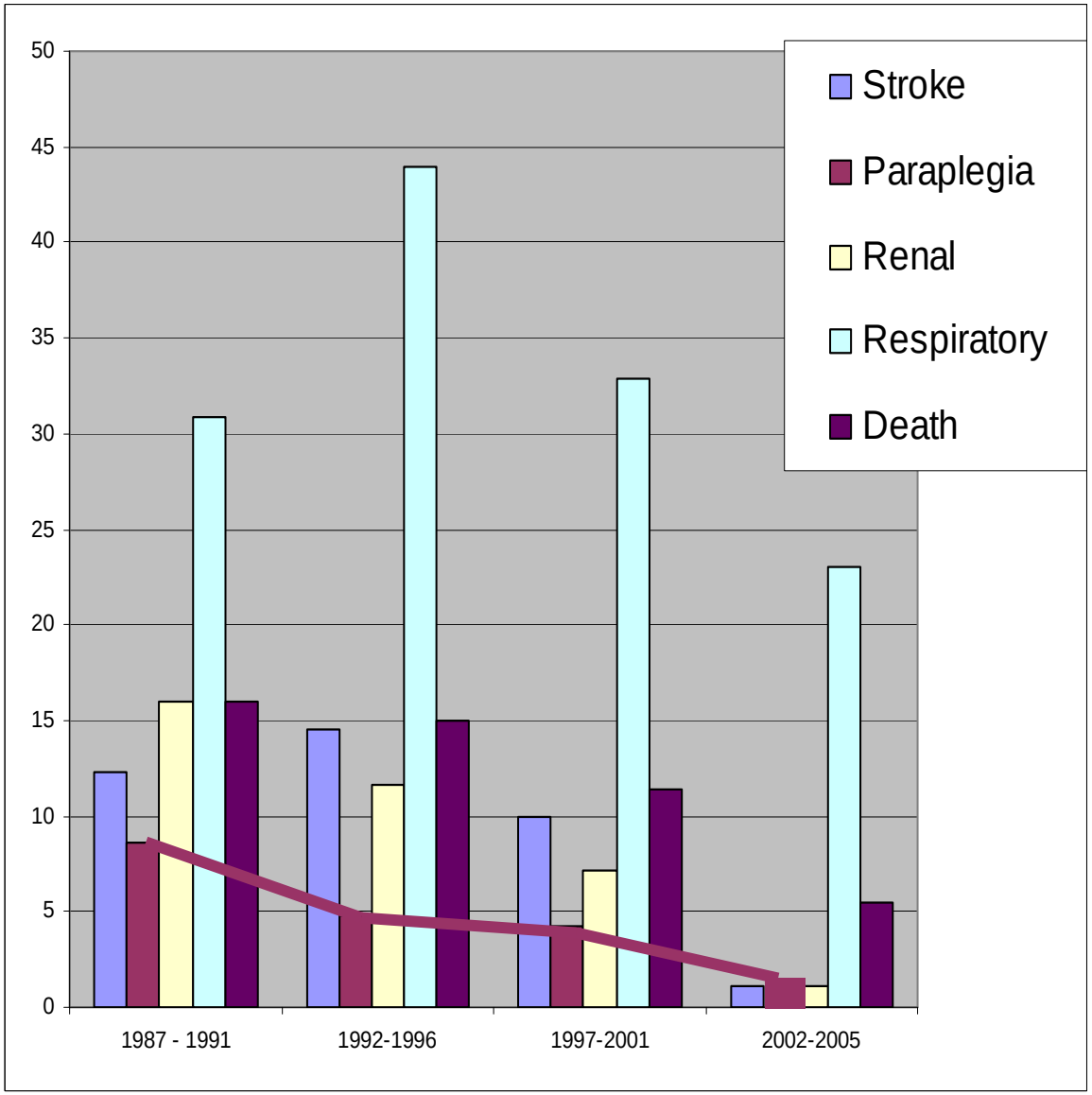
Aortic Symposium 2010 in New York (April 29-30, 2010).

Aortic Surgery and Anesthesia:"How to do it" Milano (December 17-18, 2010).

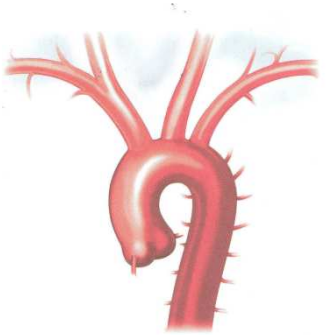
Advances Following Repair of TAA. Review of complications:

Etz CD et al: Ann Thor Surg 2007;83:S870-876

%



THORACIC AORTIC ANEURYSMS:



90-95% patients are asymptomatic, until dissection or rupture occur.

About 50,000 people die annually from unrecognized aortic event in USA.

Diagnosis: Majority during routine chest X-ray or scanning for other medical problem. There are 24.000 new TAA diagnosed in the US each year.

Definitive diagnosis: Computed tomography scans and magnetic resonance imaging.

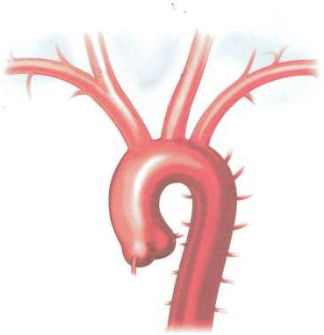
Aortic Clinic: Type of treatment. Timing. Education.

Surgical criteria: Size of aneurysm ; or nomogram for computing the body size and aneurysm size.

Non size criteria: Symptoms (usually late), mechanical properties, athero-embolism, biomarkers (D-dimer, CRP, RNA in leucocytes).

Location: 50% ascending/arch; 40% descending; 10% thoraco-abdominal aneurysms.

SURGICAL PRIORITY:



ELECTIVE SURGERY

URGENT SURGERY - up to 24 hours after diagnosis

EMERGENCY SURGERY - progressive acute dissection, leak or rupture of aneurysm

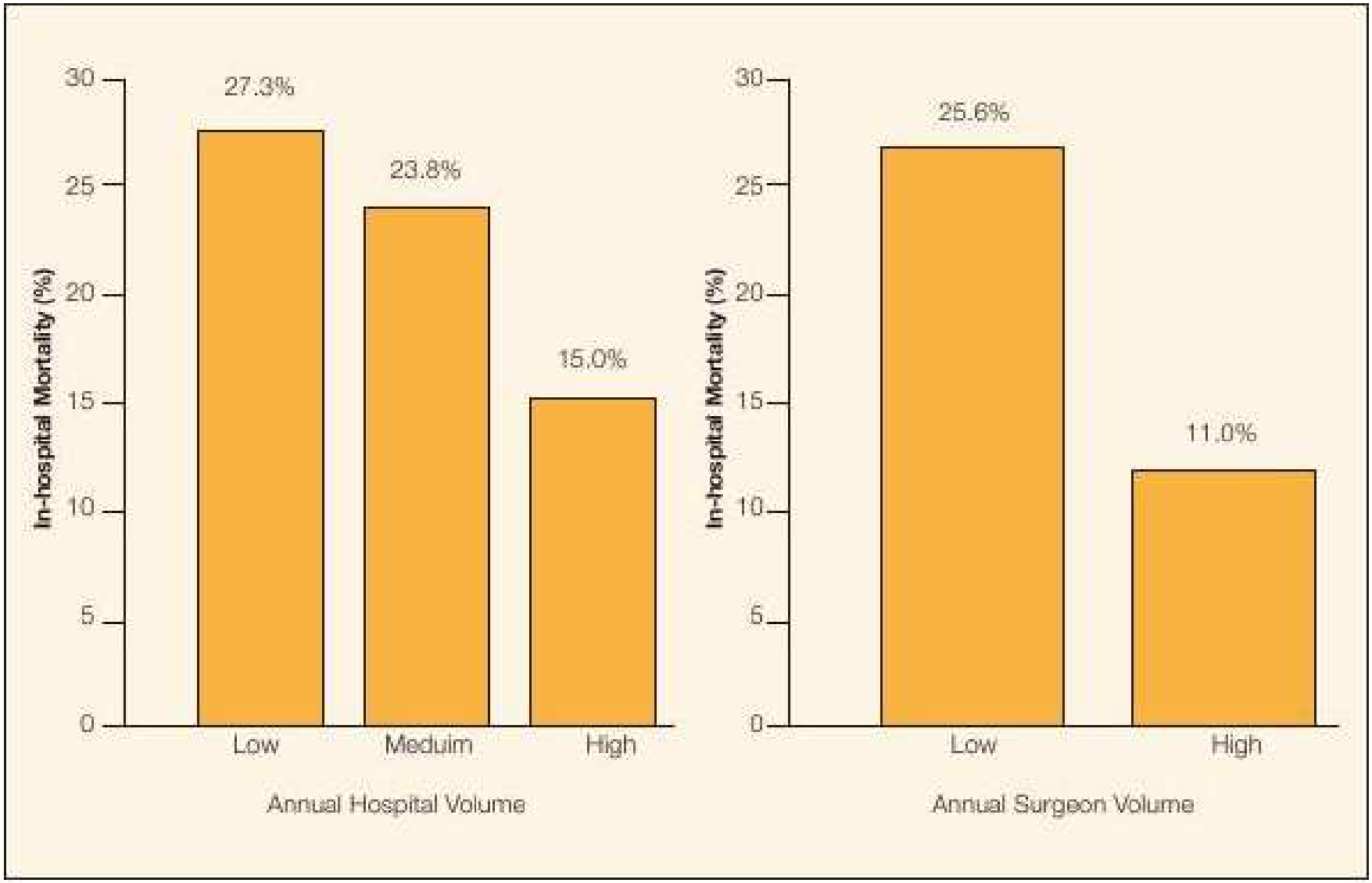


Figure 7 - *Graphs show in-hospital mortality rates in function of annual hospital volume (left) and annual surgeon volume (right).*

Chiesa R. et al:H.SanRaffaele Proceeding 2009;1: 47-55

The Department of Anesthesiology of the
Mount Sinai School of Medicine, New York, NY

presents the

28th Annual Symposium:
Clinical Update in Anesthesiology, Surgery and Perioperative Medicine

with International Faculty and Industrial Exhibits

Course Directors: George Silvay, MD, PhD & Marc Stone, MD

January 17-22, 2010
The Atlantis Resort
Paradise Island, Bahamas

Target Audience: Physicians, CRNAs, Nurses, Physician Assistants, Perfusionists
Abstracts will be accepted for poster-discussion presentation in the following areas:
new surgical, anesthetic, perfusion and perioperative techniques; monitoring; new pharmacologic agents; interesting case series; and basic science research related to anesthesia and surgery.

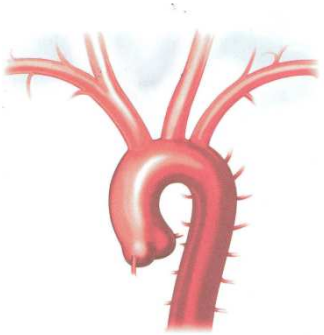
The deadline for abstract submission is Friday, October 16, 2009

For information and abstract forms contact:
Helen Phillips e-mail: helen.phillips@mountsinai.org Phone: 212-241-7630

www.clinicalupdateinanesthesiology.org

Five segments of my discussion:

TAA = SILENT KILLER!



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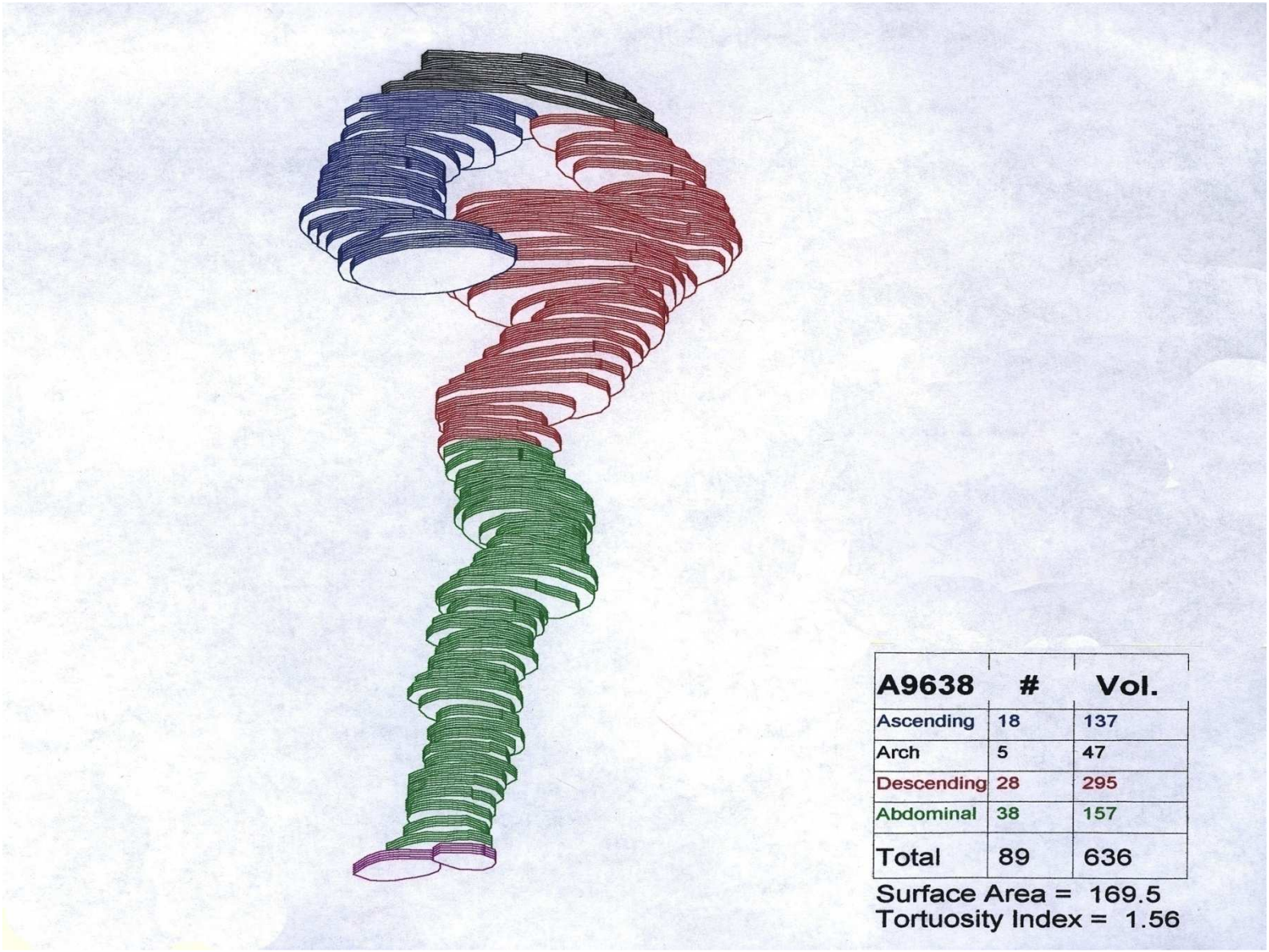
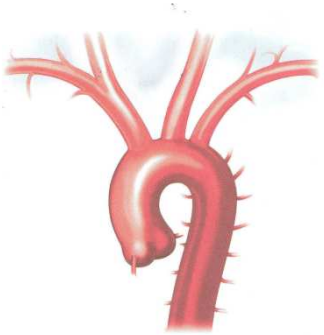
Aortic Clinic in Mount Sinai Med. Center, NY – is following over 3,000 patients.



A9638	#	Vol.
Ascending	18	137
Arch	5	47
Descending	28	295
Abdominal	38	157
Total	89	636

Surface Area = 169.5
Tortuosity Index = 1.56

Role of Aortic Clinic :



Follow all the patients with TAA in 3 – 6 month intervals.

Established and timely execute the type of treatment:

1.Medical – conservative

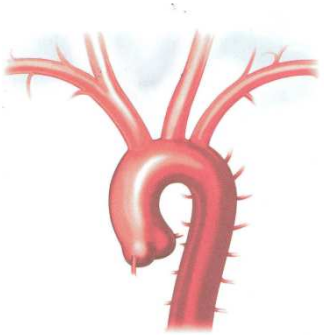
2.Surgical repair

3. Endovascular stent

Educate patient and family about disease.

PREANESTHETIC CLINIC for

Day Admission Cardiac and Major Vascular Surgery:



3-7 days before OR: Multi-disciplinary preoperative evaluation, updated history, physical and dental examinations.

Specific laboratory and clinical test:

Medication refinement: beta-blockers, recent PCI, antiplatelet therapy, glucose control, etc.

Patients and their families are offered a tour of the CICU with discussions on what to expect postoperatively.

PREANESTHETIC CLINIC for

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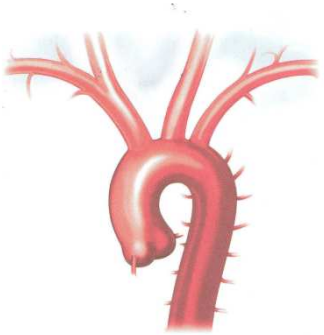

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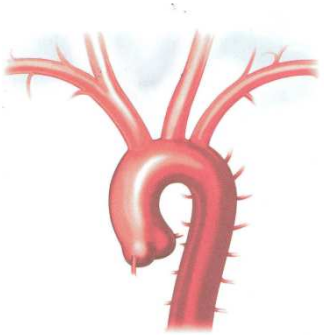
TAA: preoperative assessment and preparation.

- Preoperative assessment of all organ subsystems.
- Information about size, location, and extent of TAA.
- Patient medication (eg, discontinue plavix, wafarin).
- Laboratory studies .
- **Preoperative antibacterial prophylaxis.**
- Plan for brain protection during DHCA (jugular bulb oxygen saturation)
- Strategy for spinal cord protection (e.g., CSF drainage, mild hypothermia, SSEPs, MEPs, steroids).
- Blood conservation strategy (antifibrinolytics, cell saver).
- Optimal perioperative and postoperative care-monitoring.

Silvay G, Stone M: Sem Cardiothor Vasc Anesth.10:1015;2006 (March).

Preoperative Assessment of the Patients and Organization of the Operating Room is Critical !



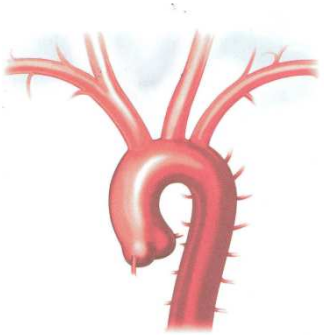
Close communication of anesthesiologist with surgeon, cardiologist, perfusionist and OR nurses is necessary to provide an optimal management and perioperative care of the patient.

It is important to prevent and avoid suprises in the OR .

Harmony in the OR provide optimal results and decreasing the morbidity and mortality.


25th Annual Meeting of the European Association of Cardiothoracic Anaesthesiologists
9th -11th June 2010
Edinburgh International Conference Centre
Further information at www.eacta.org
European Association
of Cardiothoracic
Anaesthesiologists

The value of ECHOCARDIOGRAPHIC monitoring during TAA repairs:



Visualization: Aorta, heart chambers-anatomy, thromus, emboli, air.

Location and size of the aneurysm.

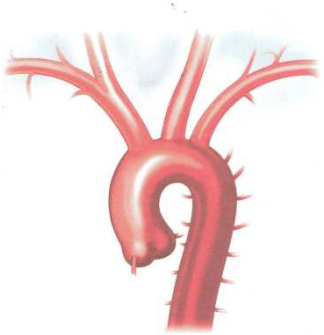
Recognition: Atherosclerotic changes in aorta

Demonstration: Aortic flap and flow in the true and false lumens.

Verification: Cannula positioning and flow during CPB.

Five segments of my discussion:

TAA = SILENT KILLER!



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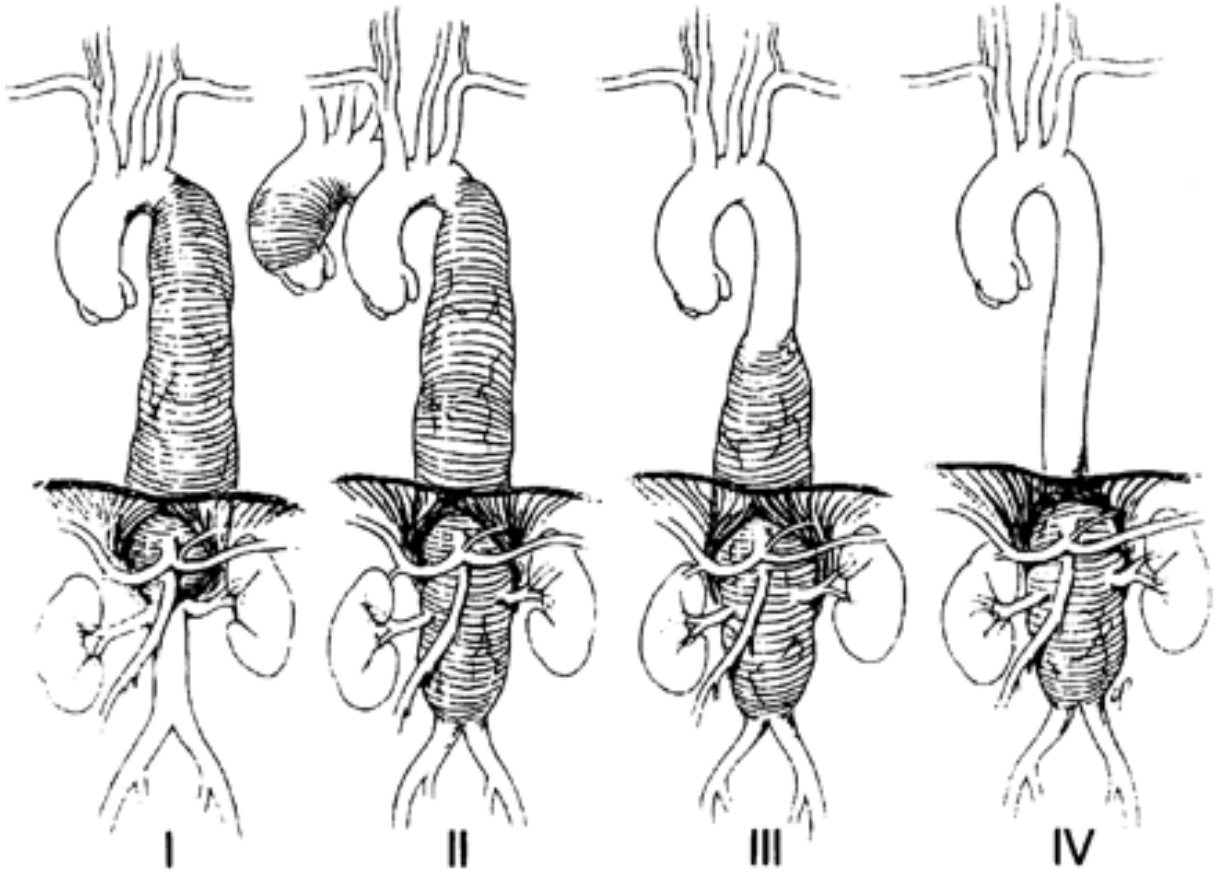
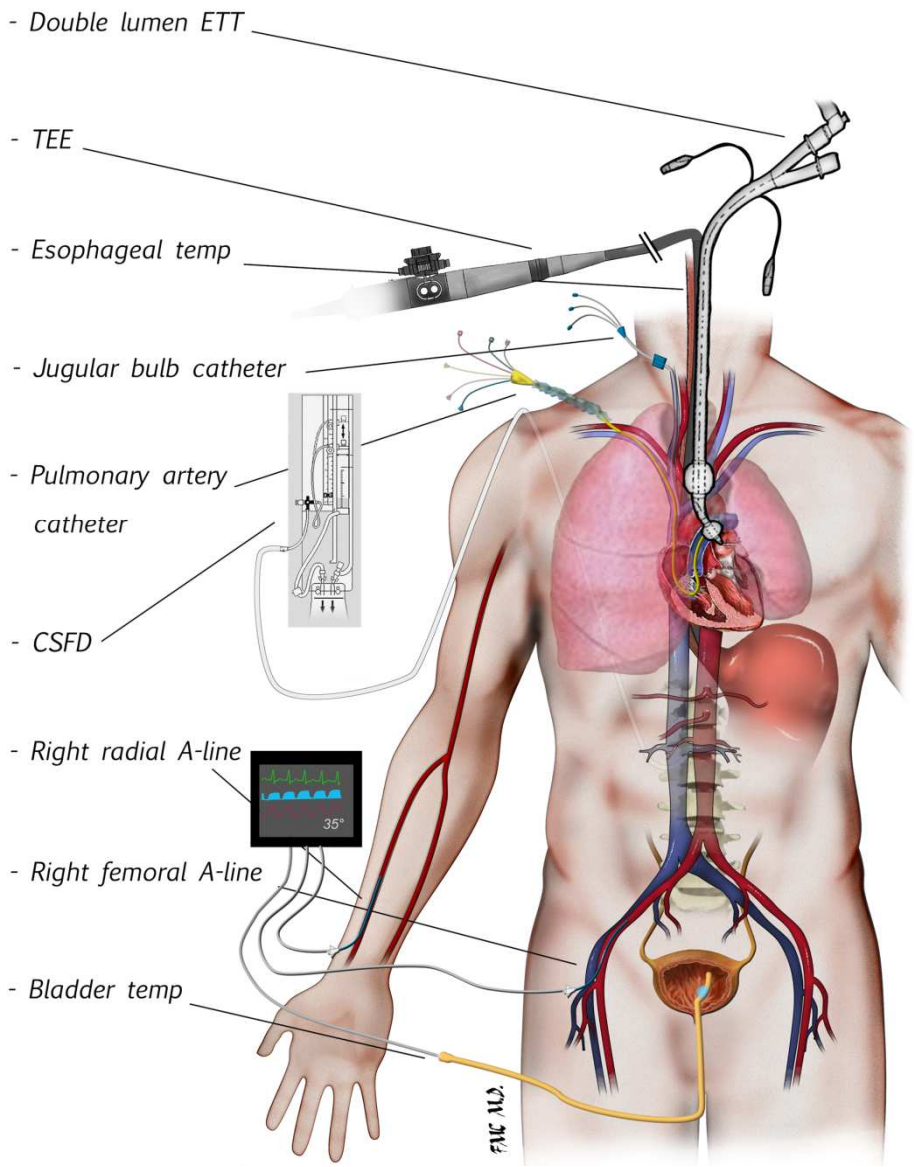
Crawford Classification of DTAA

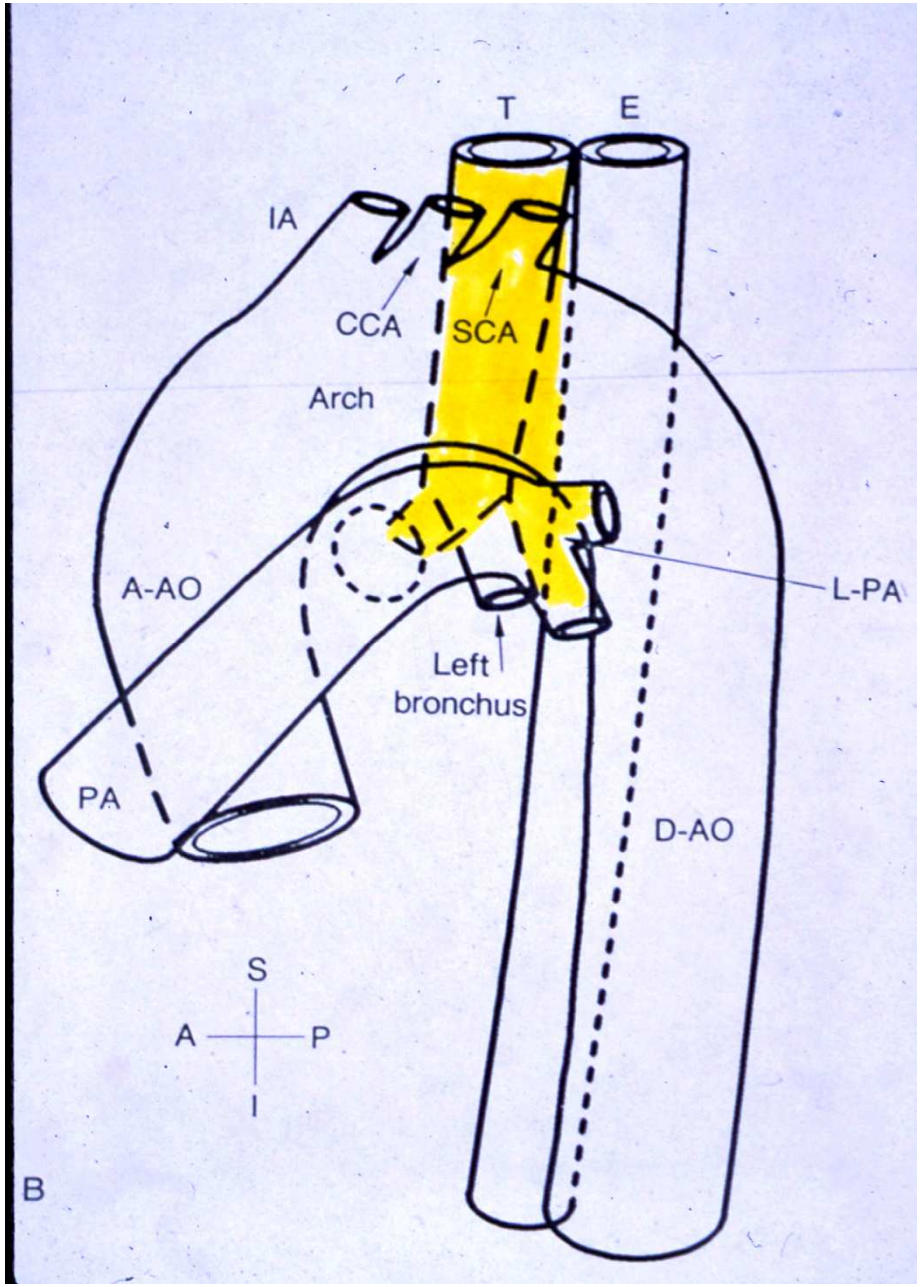


	I	II	III	IV
Neuro deficits	**15%**	**31%**	**7%**	**4%**

J Vasc Surg 1986;3(3):89-404

Airway management & monitoring:




T
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CCA
SCA
Arch
A-AO
L-PA
Left
bronchus
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D-AO
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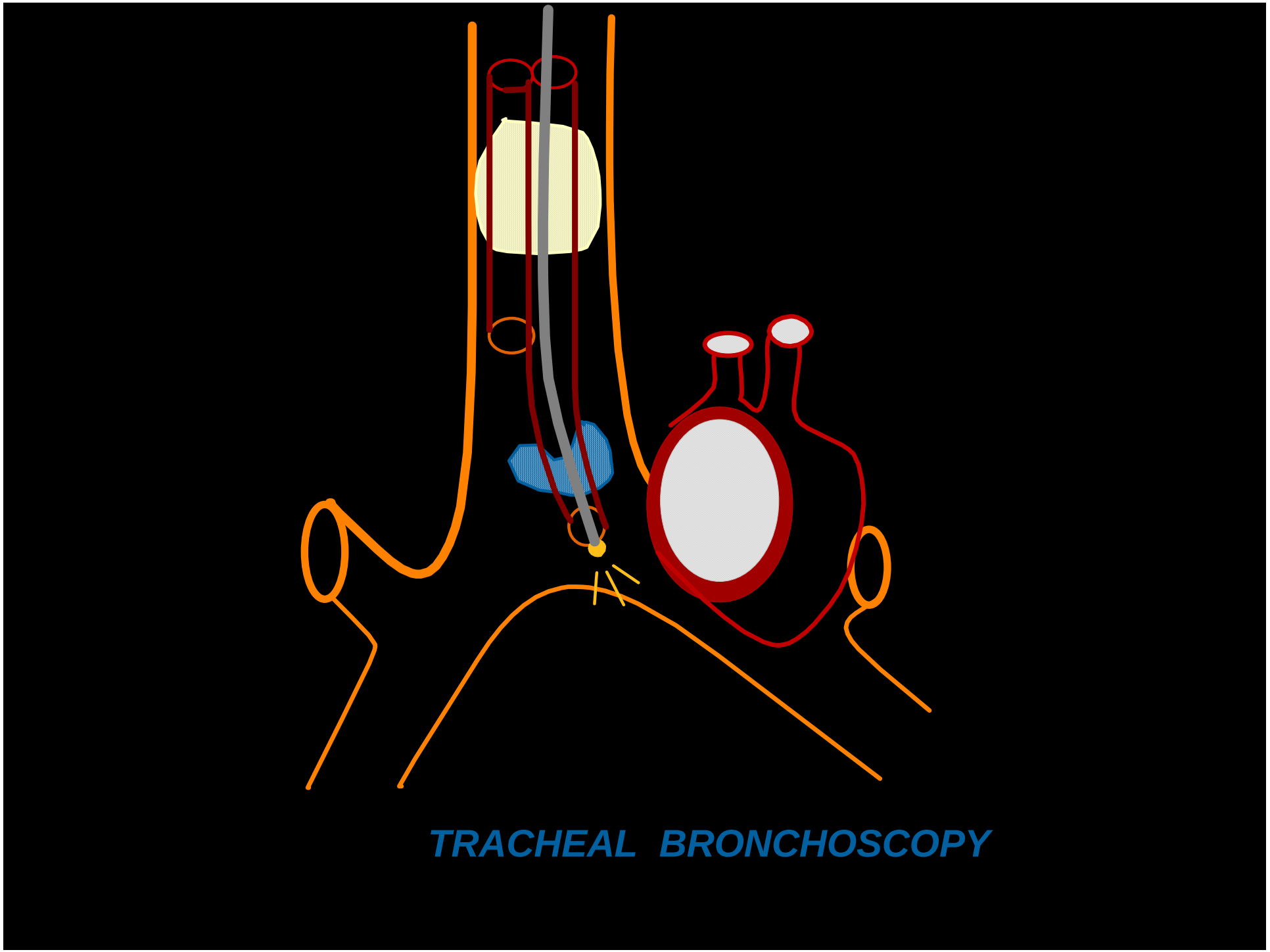
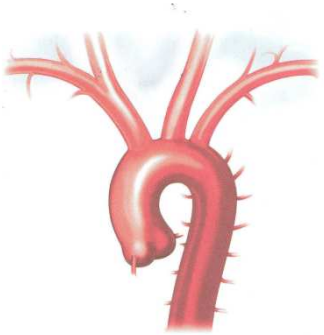

TRACHEAL BRONCHOSCOPY

RIGHT-sided DLT:

- Right main bronchus is shorter, wider and more vertically aligned
- Must assure ventilation of the right upper lobe (fibroptic bronchoscopy required).
- Most malpositions occur when patients are turned from the supine to the lateral position

CSF drainage:



Instituted in OR (assuming INR < 1.4)

Codman CSF drainage catheter set:

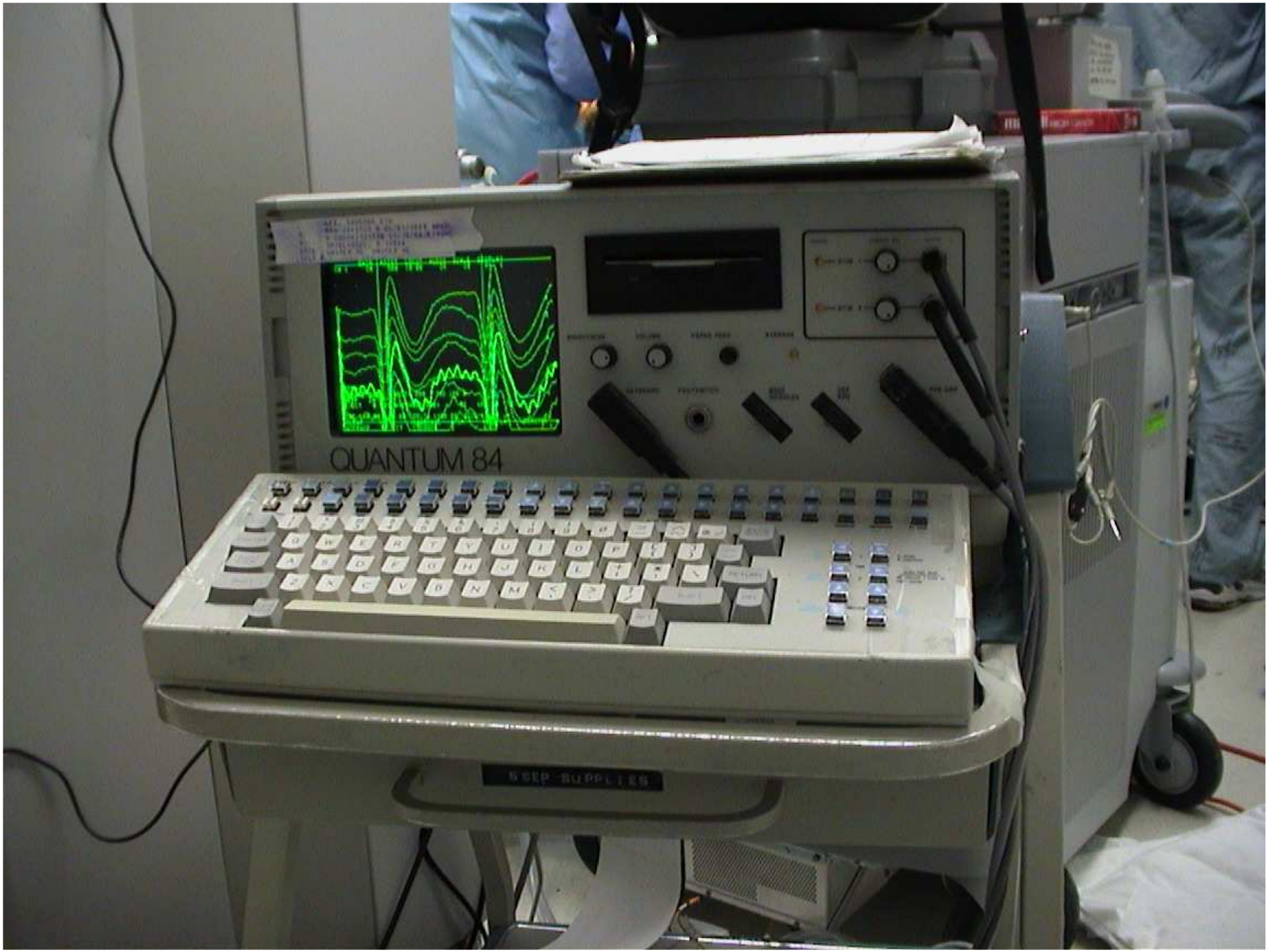
14 G Touhy needle

46 cm silicon catheter OD 1.65 mm

Collection kid open to gravity drainage and zeroed at 13 cm above the phlebostatic axis

CSF will automatically drain in CSF pressure exceeds 10 mmHg.

CSF was continued for 72 hours


QUANTUM 84

Anesthetic Technique

Induction

- **Midazolam (1-2 mg IV)**
- **Fentanyl (4-5 μg/kg IV)**
- **Etomidate (0.2 mg/kg IV)**

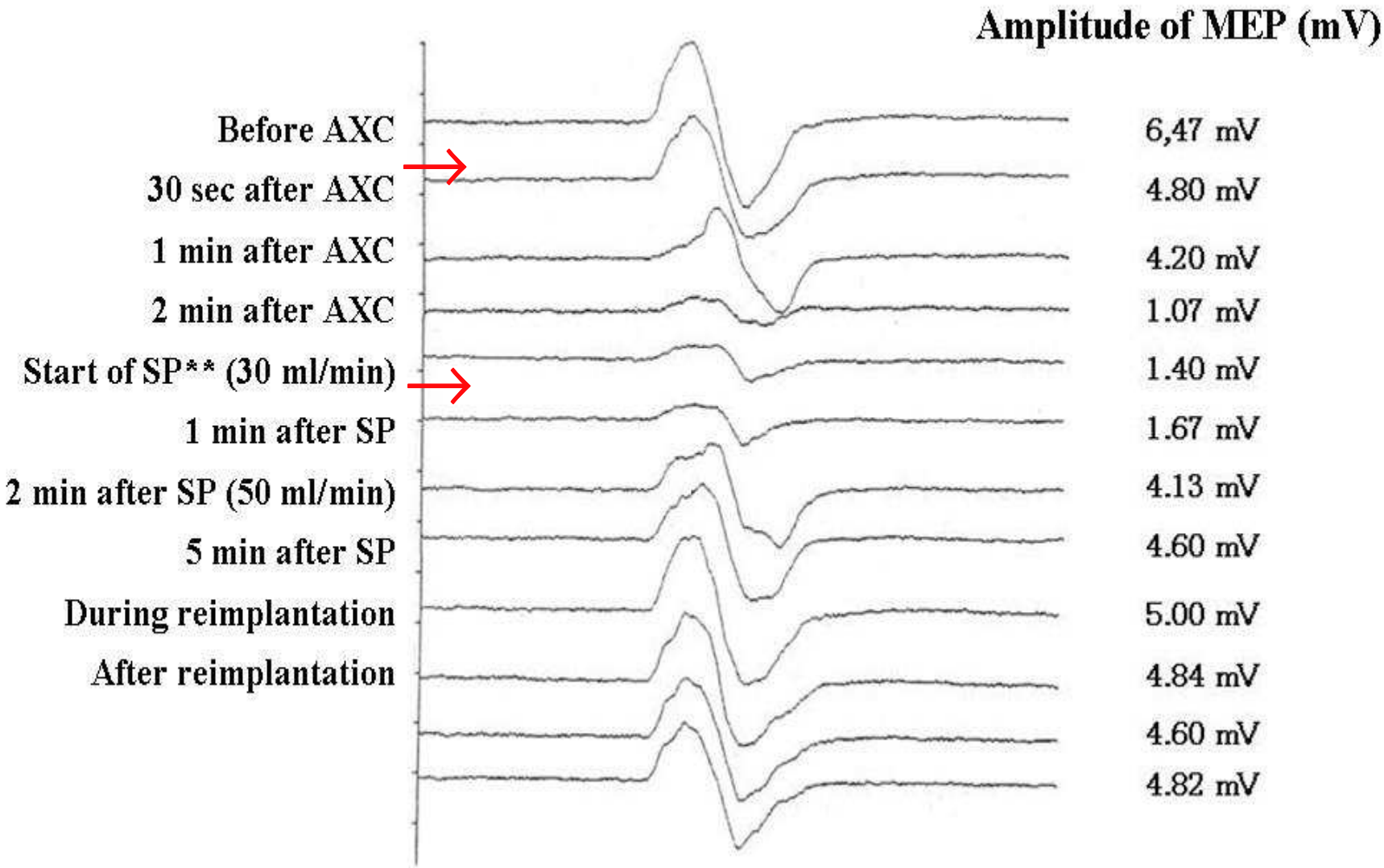
Maintenance

- **Midazolam (up to 0.3 mg/kg IV, mostly up front)**
- **Fentanyl (50 - 75 μg/kg IV, mostly up front)**
- **Propofol infusion (50 – 100 μg/kg/min IV, titrate to keep MAP 80 – 100 mmHg)**

No inhaled agents or paralytics used!

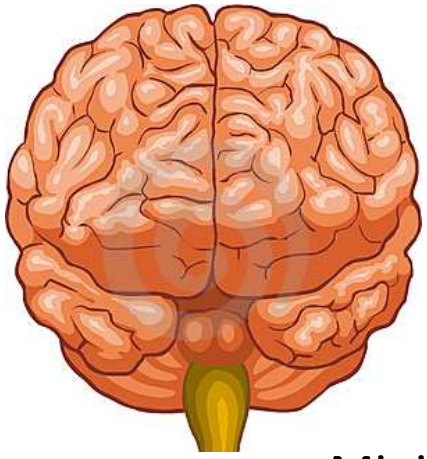
Stone ME, Silvay G, Griepp RB et al: Aortic Symposium 10:324;2006.

< Changes of MEP during AXC in case of TAAA >



Courtesy of Kakinohana et al

*SP : Selective perfusion of intercostal arteries



SPINAL CORD PROTECTION:

The collateral network protection.

Griepp RA et al: Ann Thor Surg 2007;83:S865-869
Etz CD et al: Ann Thor Surg 2009 (in press).

Minimize the time and effect of unavoidable intraoperative spinal cord ischemia.

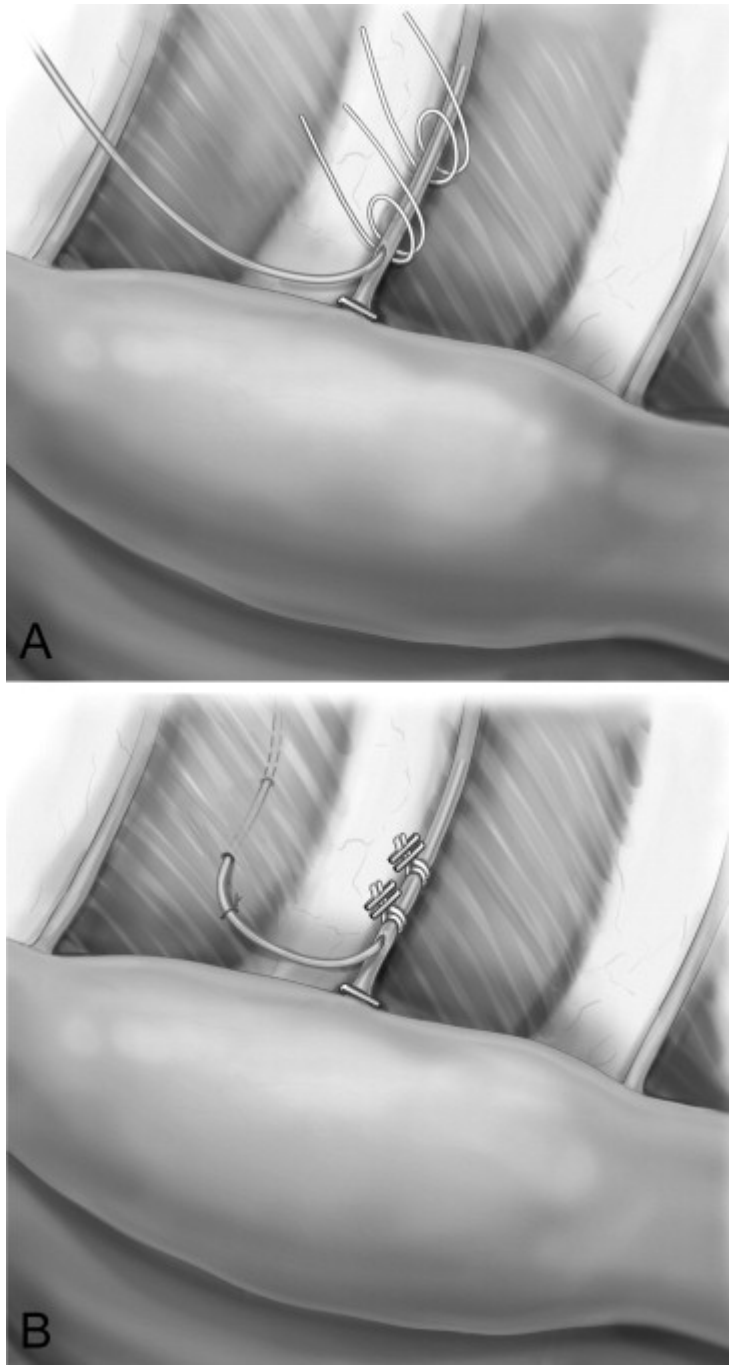
Recognize the collateral circulation and benefit of hypothermia, distal bypass (with oxygenator) and MEP.

Maintain the higher arterial blood pressures, avoid increase in CVP and provide appropriate CSF drainage.

Monitore the direct spinal cord perfusion pressure (catheter inserted in segmental artery).

Control hemodilution and oxygenation.

In the CICU, the same care as in OR!!!



A catheter was inserted into the distal end of ligated segmental artery (T6-L1).

Etz CD, et al.: Direct Spinal Cord Perfusion Pressure Monitoring in Extensive Distal Aortic Aneurysm Repair.
Ann Thorac Surg 2009 (June);87: 1764-1774.

Direct Spinal Cord Perfusion Pressure SCPP:

Number of patients: 13

Male: 5; Mean age: 60 y; Age range: 33-83 y

Previous cardiac op: 8 p; emergent op: 2 p.

Distal perfusion: 6 p; DHCA: 7 p.

SSEP and MEP monitoring and CSF drainage: 13 p.

SCPP in mmHg: fell from 62 mmHg (76% of pre MAP) to 53 after SA clamping

during distal perfusion fell to 24 during CPB for preparation for DHCA fell to 29 mmHg.

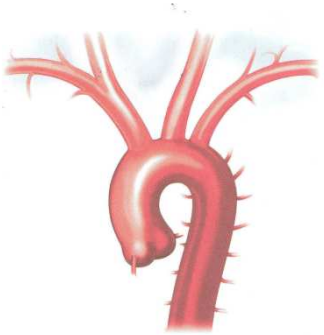
SCPP recovered gradually during several hours, after extensive SA sacrifice!

Direct monitoring may prevent a fall of SCPP below levels (?) critical for spinal cord recovery after insult due to repair of TAA.

Relationship between MAP, CVP, CSFP, SCPP and spinal cord ischemia!!

How important is to manipulate MAP, CVP, CSFP for optimization SCPP??

D-TAA-Spinal cord protection:



Expeditious and efficient surgical repair

Use of moderate hypothermia / DHCA.

Use of CSF drainage

Monitor MEP, SSEP

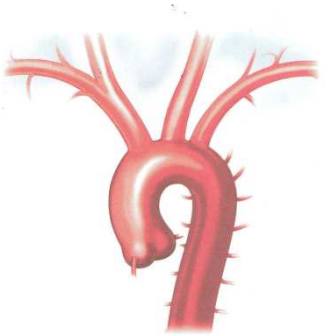
Use of distal perfusion (direct spinal cord art. pressure)

Maintenance of “normal” blood pressures and avoid elevation of CVP

CICU-Prevention of respiratory and hemodynamic instabilities; anemia and hypoxia.

Management of thoracoabdominal aortic aneurysm

Chiesa R, et al: HSR Proceeding 2009;1:47-55 (modified)



Author	Patients (n)	30-day mortality (%)	Paraplegia/ Praparesis (%)	Dialysis (%)
Coselli	2755	4.7	3.6	5.1
Svensson	1509	10	16	9
Rigberg	1010	19	no data	no data
Sandmann	673	12.5	7.5	10
Griepp	614	10.7	3.7	2.9
Crawford	605	8.9	6	17
Schepens	500	11.4	no data	no data
Conrad	445	6.8	9.5	4.6

Abstracts wil be accepted for oral and/or poster presentations in the following areas:

- Perioperative outcomes in the geriatric population
- Postopperative analgesia for the aged
- Optimization of the treatment of comorbidities
- Prevention of infection and sepsis
- Optimizing perioperative patient management
- Early mobilization, ambulation and rehabilitation
- Regional anesthesia in the geriatric population
- ICU management for the elderly
- Day admission surgery for major operations in the elderly
- Issue of futility: when to withold or withdraw treatment
- Cognitive dysfunction and postoperative delirium economic considerations of geriatric care

The abstract submission deadline is Sunday, March 01, 2009. Instructions are on website: www.geriatric09.cz.
Abstract presenters must be registered for the meeting!

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Professor, Department of Anesthesiology,
New York, The Mount Sinai School of Medicine New York
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Prof. Dr. Karel Cvachovec, CSc., MBA
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Central Intelligence Agency
THE WORLD FACTS BOOK (2008 est.)

Country	Life expectancy	$ per capita
Andorra	83.5 years	2,054
Macau	82.3	
Japan	82.0	
Canada	82.0.	2,585
France	80.7	2,833
Italy	80.1	2,020
Austria	80.0	2,729
Greece	80.0	1,317
Germany	79.1	2,548
USA	78.89	3,074
Czech Rep.	77.0	1,309
Mexico	**75.8**	**1,120**
Slovak Rep.	74.0	913
Turkey	73.1	461
Russia	65.1	404

There is no exact definition of “geriatric”, “aged”, “elderly” and “advance age” .

Chronological and biological age may differ considerably.

Chronological age is most commonly measured and is widely used in clinical practice.

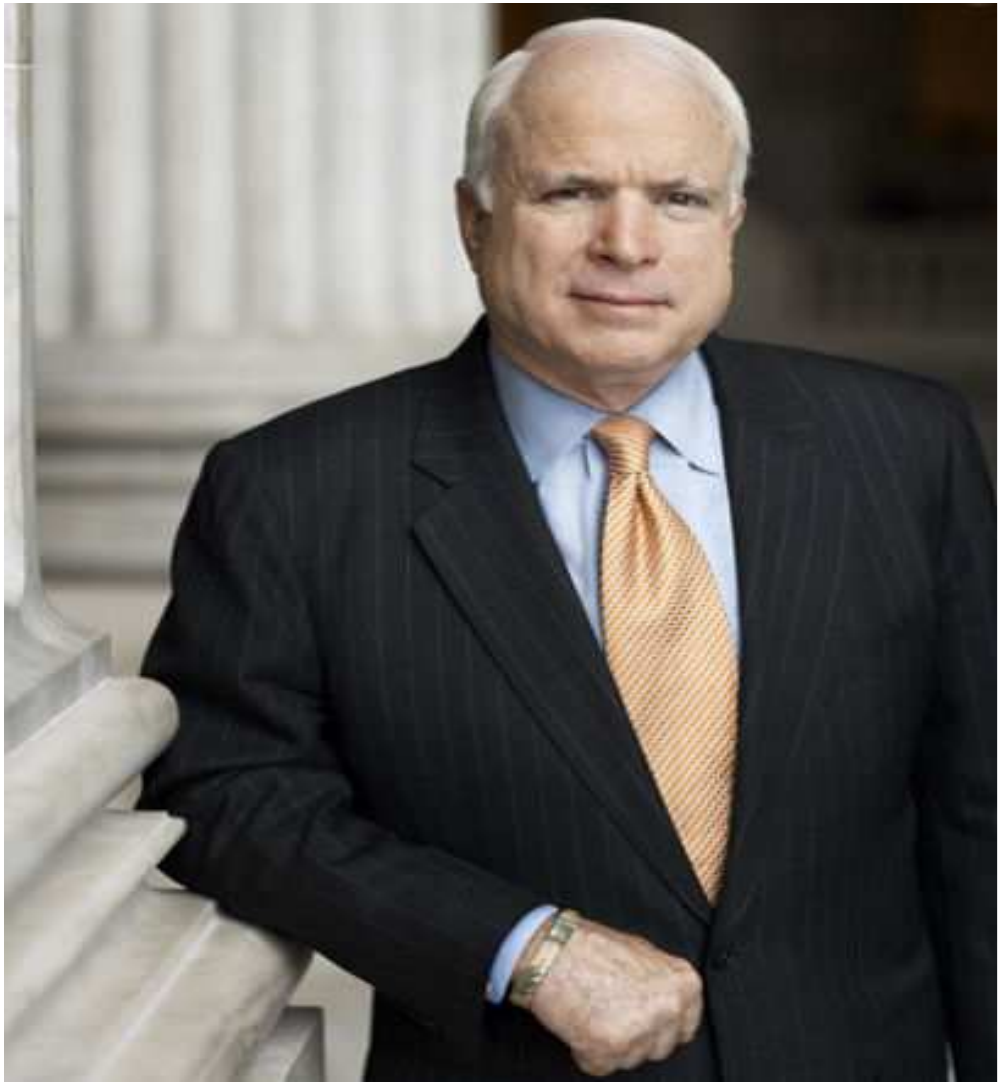
Medicare proposed to categorize geriatric patients:

- young old (aged 65 to 74 years)
- mid-old (aged 75 to 84 years)
- oldest-old (aged 85 years and above).

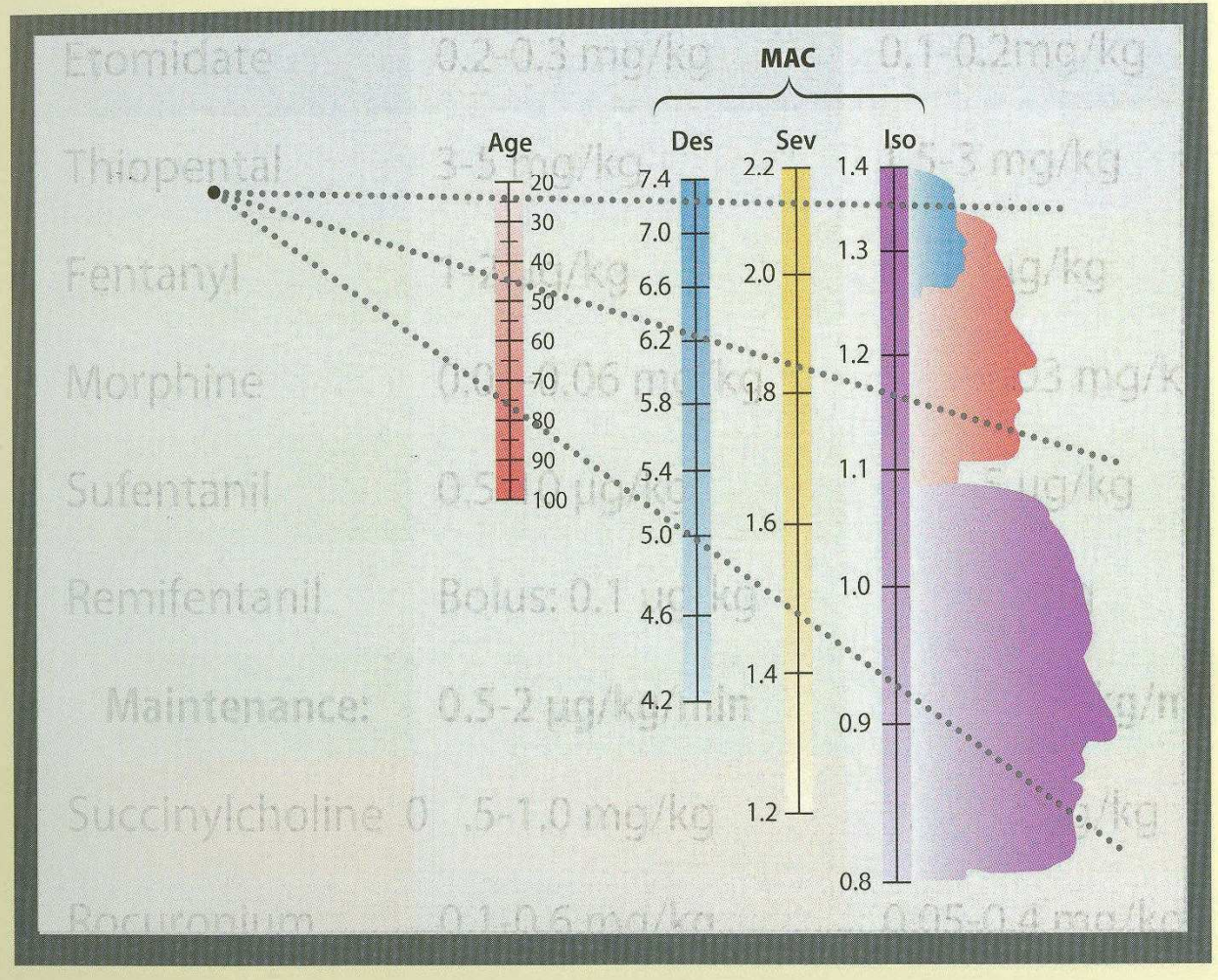
Sieber EF. Geriatric Anesthesia. NY McGraw-Hill Med. Publ. Div. 2007.

WHO IS OLD?

What is more important? Physiological age or chronological age? How do you feel ?



Perioperative Drug Therapy in Elderly Patients

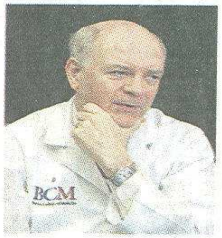


Normogram for minimum alveolar concentration (MAC) as a function of age.

Rivera, R. et al: Anesthesiology May 2009;110:1176-1184.

The New York Times, December 25, 2006

THE PHYSICIAN Dr. James L. Pool's chart noted that Dr. DeBakey had said he did not want surgery for his heart ailment.



THE WIFE As the hospital ethics committee debated, Katrin DeBakey barged in to demand an immediate operation.

THE FRIEND When other anesthesiologists at the hospital balked, Dr. Salwa A. Shenaq agreed to step in and do the procedure.

Michael Stravato for The New York Times

THE PATIENT
Dr. Michael E. DeBakey, seated, became the oldest patient to benefit from heart surgery he devised. From left are Carlos Hinojosa Salcedo, an aide; Kenneth Miller, a physical therapist; and Dr. George P. Noon, Dr. DeBakey's surgical partner.

The Doctor's World

The Man on the Table Was 97, but He Devised the Surgery

President Bush, Congressional leaders award DeBakey nation's highest civilian honor May 2008.

Died on natural causes – July 2008.

Geriatric cardiac patients 1999 - 2006

Procedures	N	Mortality
AVR: total elective	1.308	4.50%
Octogenarians	231	5.20%
CABGs	2.986	2.20%
Octogenarians	282	4.60%

J.Cardiothor Vasc Anesth 21:2007:784-792 JAGS 56:2008;255-261 Semin Cardiothor Vasc Anesth 12:2008;18-29

TAA	1.135	6.40%
Age > 76 y	350	6.60%

J Cardiothor Vasc Anesth 2008;22:Suppl.3,19.

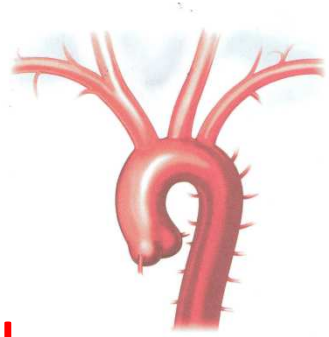
Predictors of Hospital Mortality:

Variables	95% CI (Confidence interval)
Renal failure	(3.0-35.9)
Ejection fraction < 30%	(2.3-12.4)
COPD	(1.9-14.8)
Peripheral vascular disease	(1.3-8.5)
Previous cardiac operation	(0.8-4.6)
Stroke	(0.8-4.5)
History of myocardial infarct	(0.5-3.4)
Atrial fibrillation	(0.5-3.4)
Body mass index <25	(0.4-2.6)
Age > 75	(0.3-2.2)

Conclusions - October2009-TAA.

- Early diagnosis - elective operation.
- TEE in every patient!
- Detailed preoperative evaluation and strategy for OR.
- Prevention of bleeding.
- Optimize prevention of CNS and spinal cord injury (DHCA, distal controlled perfusion, CSF drainage, steroids).
- Utilize advance monitoring, continue in CICU.
- **Antibiotic prophylaxis ! ! !**
- Participate in designing organ-preservation strategy.
- Maximize perfusion parameters intra and postoperatively in CICU.
- Maintained normal blood pressure and avoidance of elevated CVP as well as anemia and hypoxemia.

Conclusion:



Early diagnosis and decision about type of the treatment is very important. Age is not an absolute contraindication to surgical intervention. Patient selection and preoperative preparation remains the ultimate predictor of clinical outcome!

An aggressive approach offers symptomatic benefit in geriatric group of patients. Optimal anesthetic, surgical and critical care is mandatory for good result. Intervention in symptomatic geriatric patients is better done electively, rather than emergently.

GRACIAS

ありがとう

ΕΥΧΑΡΙΣΤΩ

MAHALO

谢谢

СПАСИБО

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اِمْتِنان

CÁM Ơ'N ANH

ASANTE

MULTUMIRI

FALEMNDERIT

KIA ORA

TEŞEKKÜR

THANK YOU

ขอบคุณ

DANK U

MERCI

TERIMA KASIH

KÖSZÖNÖM

D'AKUJEM

GRAZIE

DANKE

サンキュー

DEKUJEME

HO'OMAIKA'I

OBRIGADO

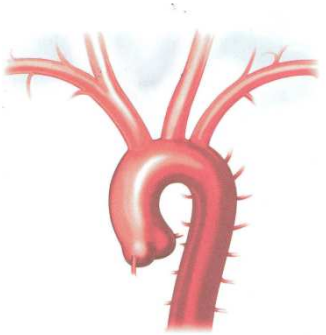
TRADUKU

TAK

OUTCOME SERIES OF RESECTIONS OF THE AORTIC ARCH

Authors	Era	N	Mortality	Stroke	TND
Spielvogel et al	1999-2004	109	4.60%	4.60%	5.50%
Numata et al	1998-2002	120	5.80%	0.80%	5.80%
Sundt et al	1997-2001	19	11%	11%	16%
Okita et al	1997-1999	30	6.60%	6.60%	13.30%
Di Eusanio et al	1995-2002	352	6.80%	3.50%	5.40%
Kazui et al	1990-1999	220	12.70%	3.30%	6.00%
Wozniak et al	1990-1995	21	19%	9.50%	4.80%
Kazui et al	1986-2001	330	11.20%	2.40%	4.20%
Bachet et al	1984-1998	171	16.90%	12.80%	N/A
Etz et al	1995-2005	869	4.60%	2.40%	6.00%

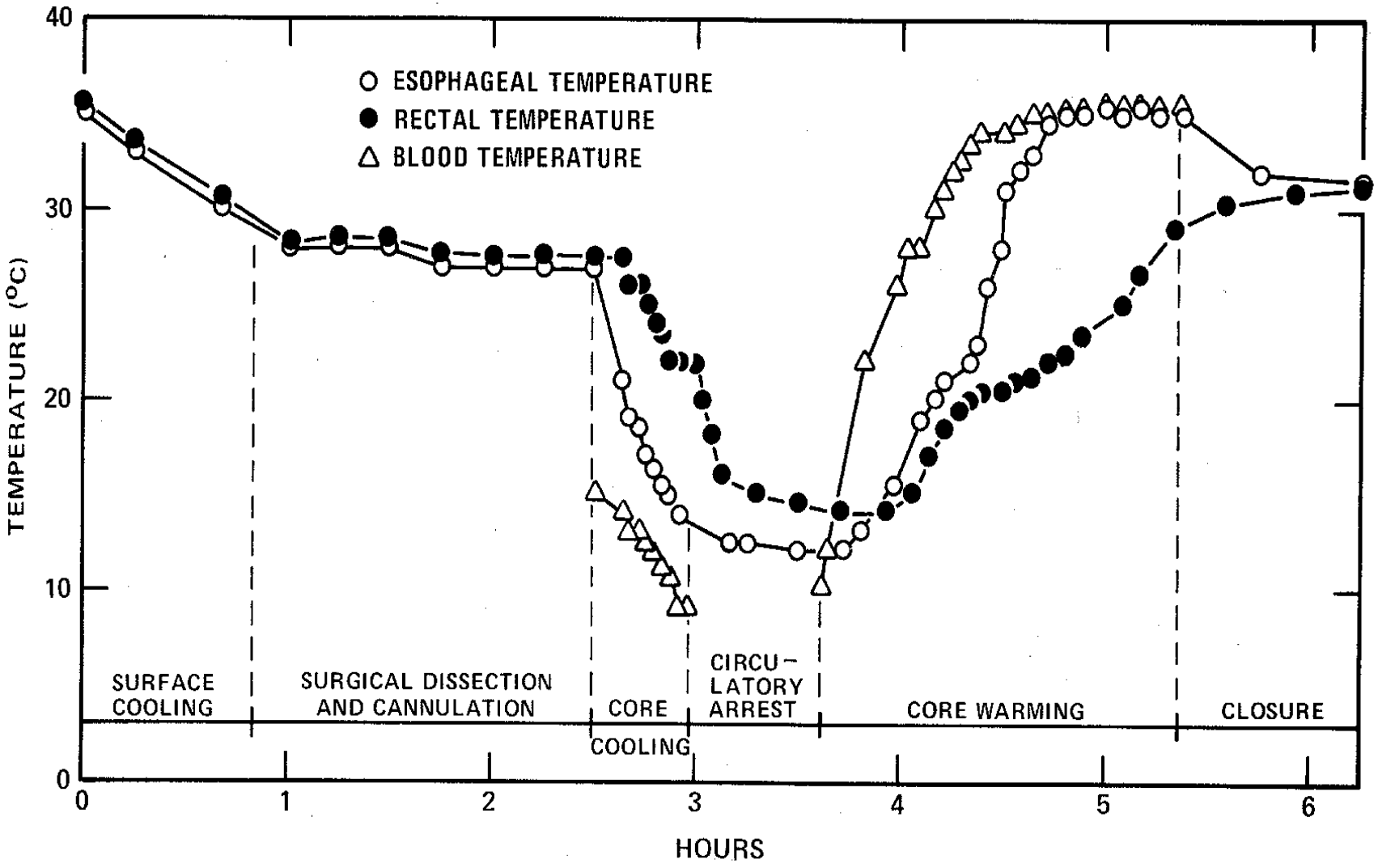
Axillary cannulation improves survival and neurological outcome after atherosclerotic ascending aortic repair .



Etz CD et al. Ann Thorac Surg 2008;86:441-447

Cannulation	**Aorta**	**Femoral**	**Axillary**
Patients No.	157	261	451
Age > 60 years	73	125	251
Elective	131	196	387
Previous aortic op.	33	63	88
Clot or atheroma	8	16	19
Stroke %	3.8	2.7	0.9
Death %	5.1	6.5	3.3

Aortic Arch Replacement



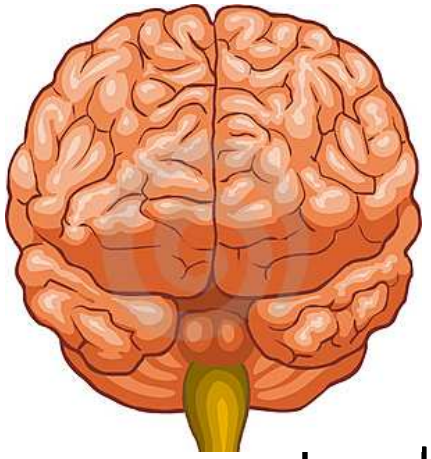
Griepp, et. al. JTCVS, 1975

Staged Repair Reduces Paraplegia after Extensive Thoracoabdominal Ao An Repair

Etz CD et al: Ann.Mtg.AATS May 11, 2009

90 patients underwent extensive segmental artery range 9-15 (med.13)

	Single Stage	Two Stage
N	55	35
Older than 60y	42 (76%)	21 (60%)
MEP	21 (38%)	14 (40%)
CSF drainage	47 (86%)	29 (83%)
Spinal cord injury	8 (15%)	0
Stroke	3 (5%)	1 (3%)
Hospital mortality	6 (11%)	2 (6%)



Deep Hypothermic Circulatory Arrest (DHCA):

Neuroprotective Strategies

Level of hypothermia :

- Brain Temperatures ?
- Jugular Bulb O2Hb Saturation
- Cerebral Oximetry (EEG)

Blood Filters in Perfusion System

TEE – Aortic Manipulation, De-airing Heart

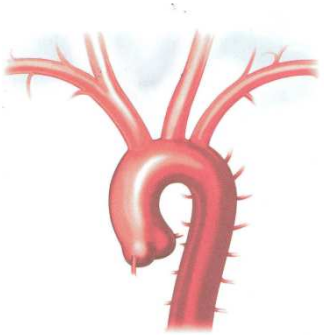
Alpha Stat pH Management

Maintain Serum Glucose Level

Gradual Re-warming

Five segments of my discussion:

TAA = SILENT KILLER!



1. General Comments & early diagnosis !!!
2. Aortic Clinic-Elective Operation-DAS.
3. Update the “Brain Protection”.
4. Prevention of Spinal Cord Injury.
5. **Age is not a Contraindication for Repair of TAA.**

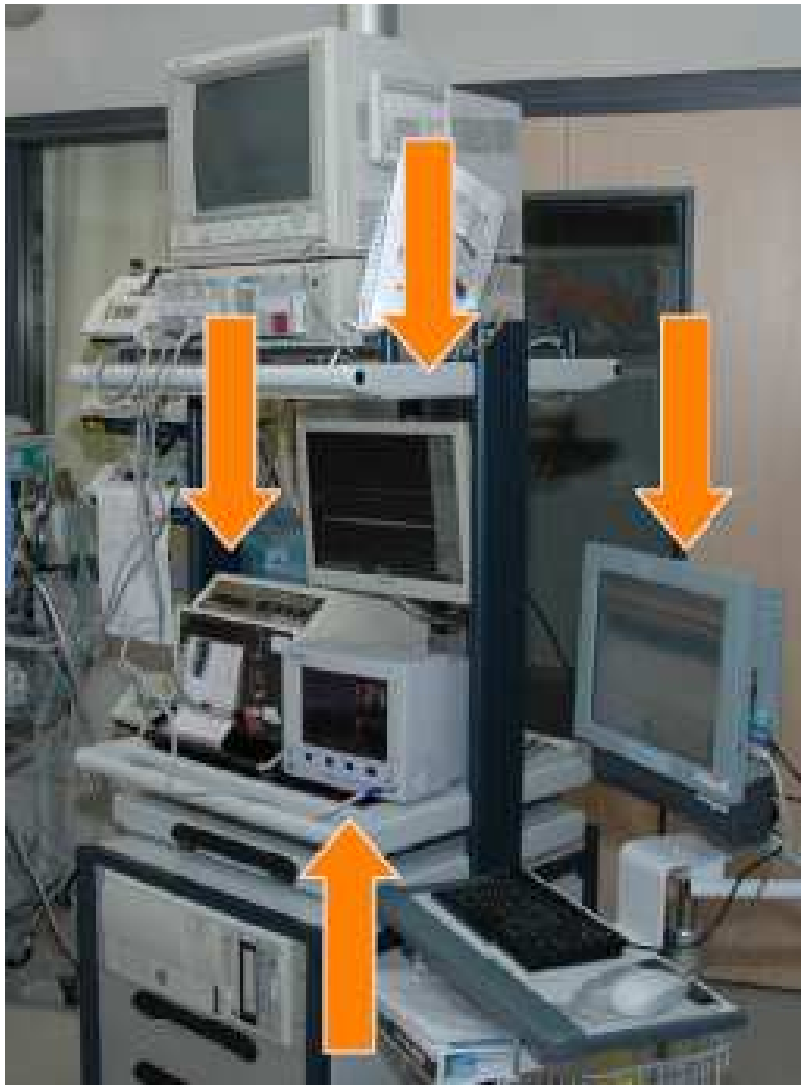
DHCA Jugular bulb SO_2

KA 70 y F

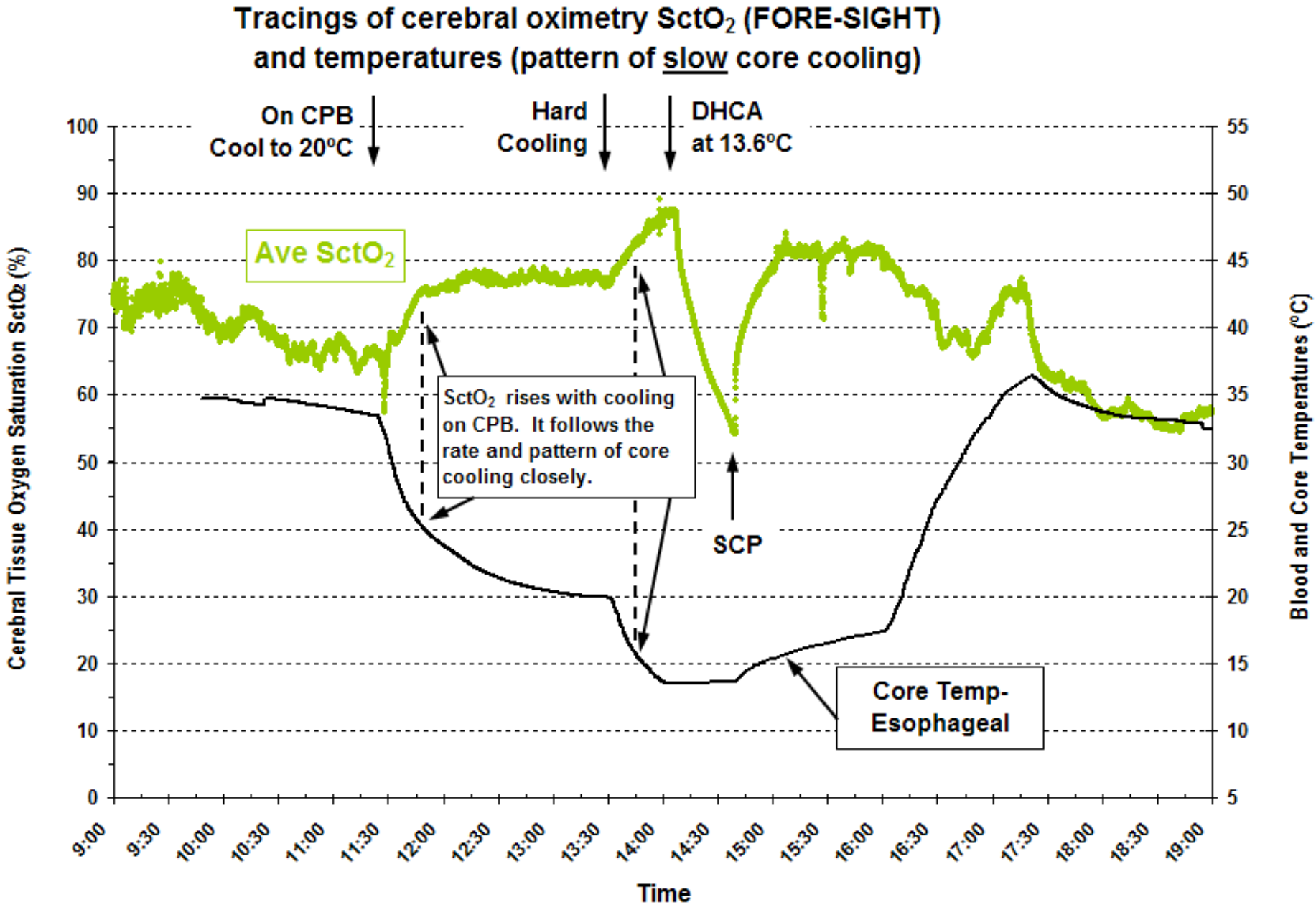
Diagnosis: TAA

14:00	70%	
16:00	76%	
16:50	80%	CPB
16:57	83%	Cooling
17:12	86%	
17:28	89%	
18:07	96%	
18:09	97%	DHCA – 22min
18:31	90%	CPB
18:36	86%	Warming
19:30	80%	
20:00	74%	
20:30	71%	
21:00	72%	

Several Manufacturers of NIRSs



- **FORE-SIGHT, CAS Medical Systems, Inc. (Branford, CT USA)**
- **NIRO-100 and -300, Hamamatsu Photonics (Hamamatsu City, Japan)**
- **INVOS 4100 and 5100, Somanetics Corp. (Troy, MI USA)**


Tracings of cerebral oximetry SctO2 (FORE-SIGHT)
and temperatures (pattern of slow core cooling)
On CPB
Cool to 20°C
Hard
Cooling
DHCA
at 13.6°C
Ave SctO2
SctO2 rises with cooling on CPB. It follows the rate and pattern of core cooling closely.
SCP
Core Temp-
Esophageal
Cerebral Tissue Oxygen Saturation SctO2 (%)
Blood and Core Temperatures (°C)
Time
100
90
80
70
60
50
40
30
20
10
0
55
50
45
40
35
30
25
20
15
10
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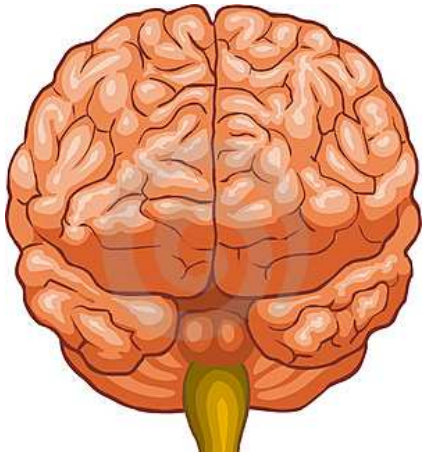


Aortic Arch Replacement with DHCA:

R. Axillary art. cannulation

Core cooling

Jugular bulb 02 saturation > 95% prior CA

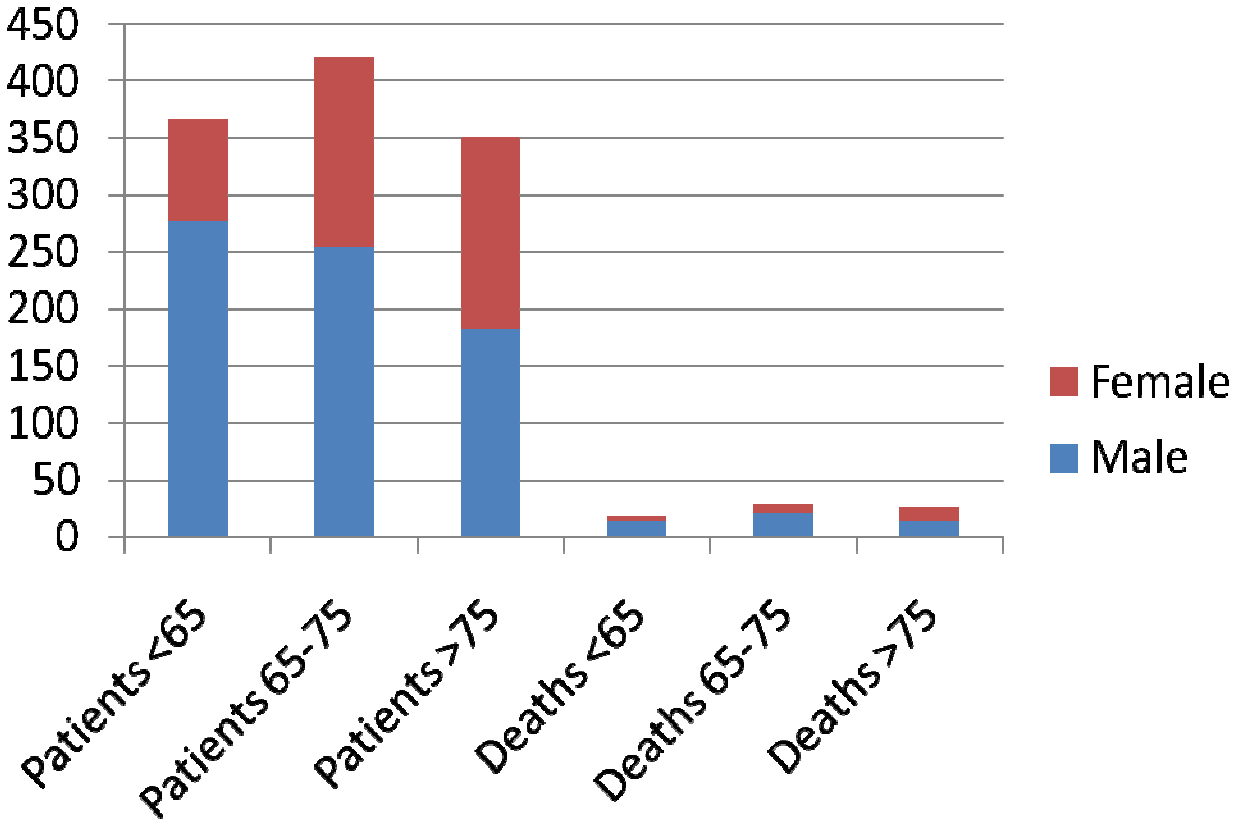
? Surface cooling (head packed with ice)

Gradual rewarming !

For Perfusion: Minimum blood temperature 10 C, perfusion gradient never over 10 C.

1999-2006 Mortality in Open TAA by Age and Gender (n=1,135).

Silvay G, et al: J Cardiothor Vasc Anesth 2008:22:Suppl.3,p19.



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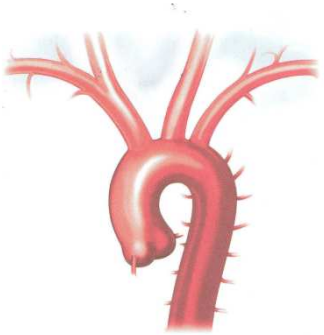
Body mass index <25	(0.4-2.6)
Age > 75	(0.3-2.2)

CNS monitoring:



Electroencephalogram: Monitoring electrical activity from the cerebral cortex (BIS, Entropy, PSI) confirming electrical silence.

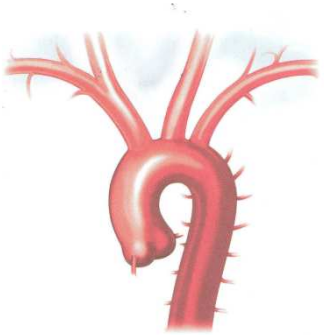
Jugular bulb oxygen saturation (SjVO2): Measuring the global balance of cerebral oxygen supply and demand. Save >95%.

Trans-cranial doppler ultrasound : Measuring the cerebral blood flow – adequacy of retrograde cerebral perfusion.

Near-infrared spectroscopy (cerebral oximetry): Provides data on local oxygenation and perfusion. Normal range 47 – 83%.

Five segments of my discussion:

TAA = SILENT KILLER!



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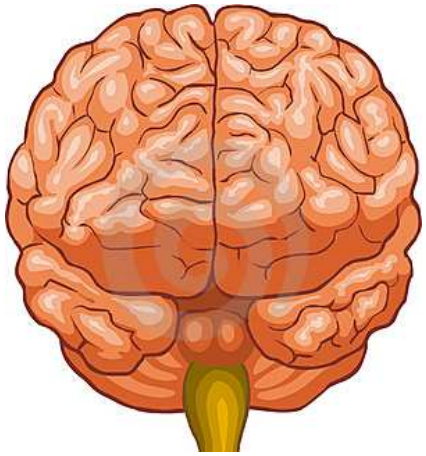


NEUROLOGICAL INJURIES FOLLOWING OPEN HEART SURGERY:

CNS: Type I: death due to stroke or hypoxia, encephalopathy, ischemic attack, stupor or coma. Type II: deterioration of intellectual function, cognitive and memory deficit, agitation or seizure.

SPINAL CORD ISCHEMIC INJURIES: Paraparesis or paraplegia.

Mortality Rate due to Anesthesia:

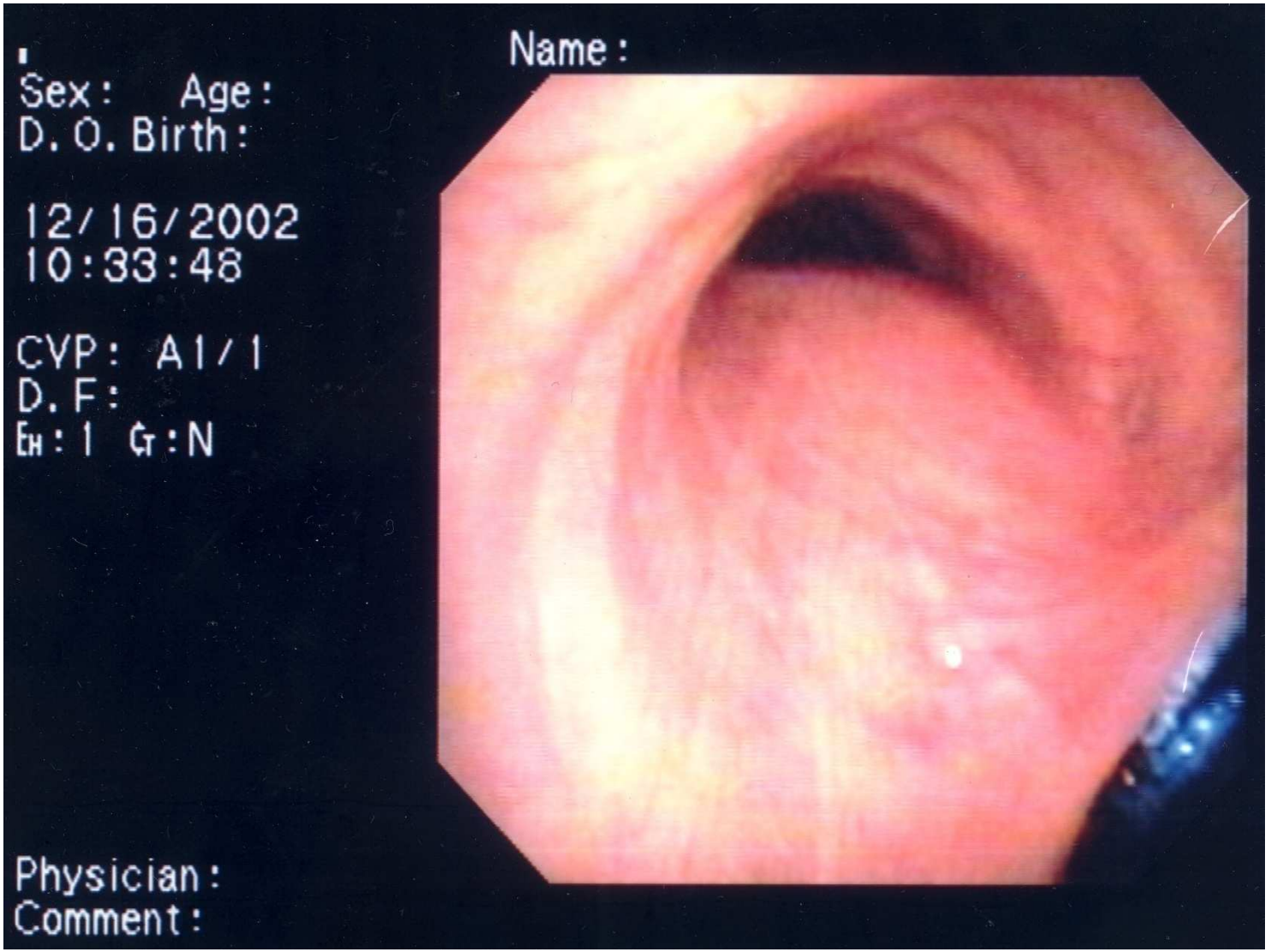
Haynes AB, et al: NEJM 2009;360:491-499.

1950 - 1 death in 1,000 patients

1980 - 1 death in 10,000 patients

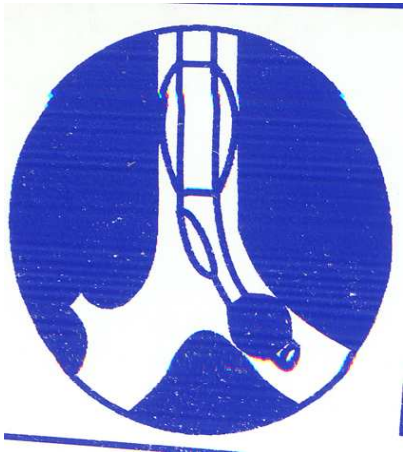
2005 – 1 death in 100,000 patients

The anesthesia has become safer is clear as our malpractice premiums have dropped ($56,000-12,000 per year). The overwhelming majority of cases were attributed to overdoses, or misused anesthetic agents ! But ……..

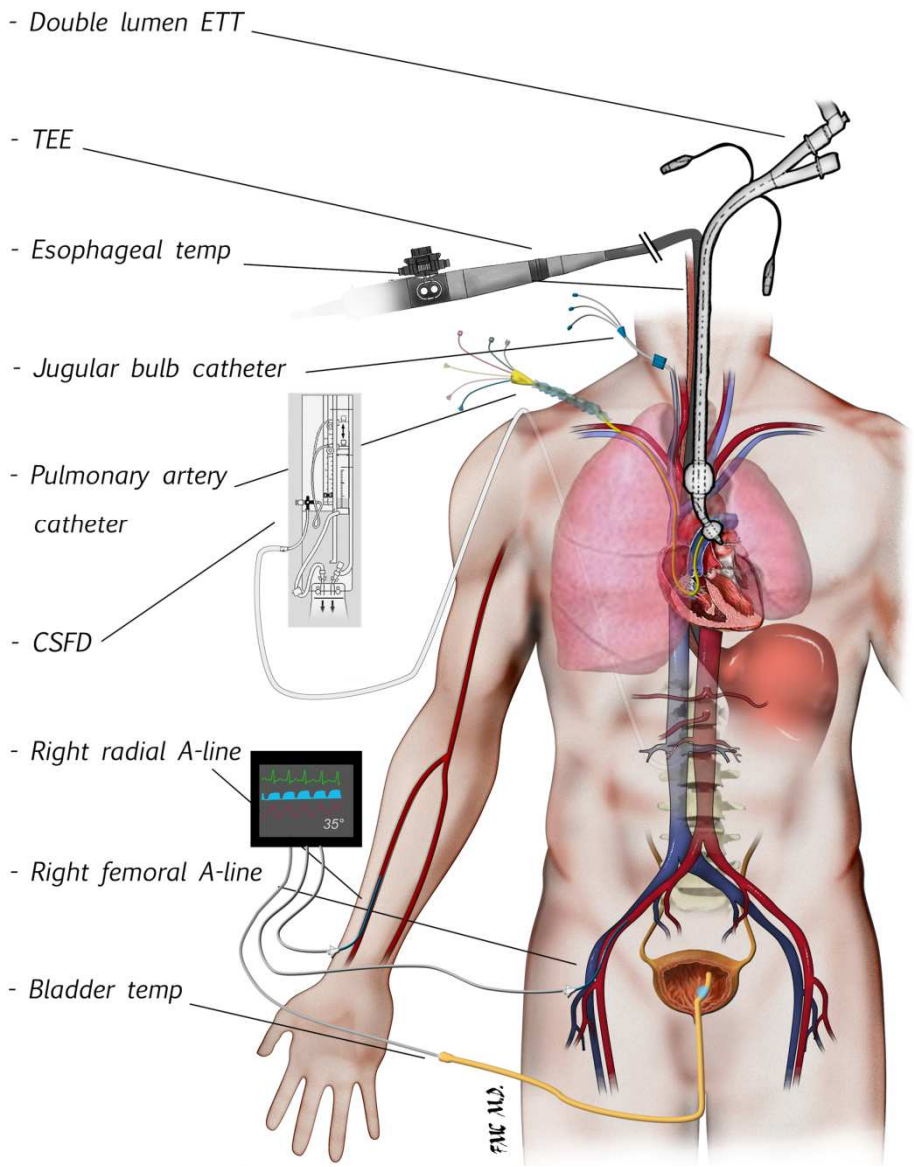

Name :
Sex : Age :
D. O. Birth :
12/16/2002
10:33:48
CVP : A1/1
D. F :
EH : 1 G : N
Physician :
Comment :

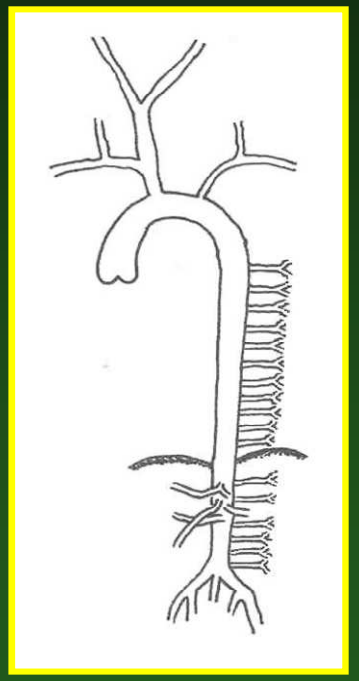
For One Lung Ventilation (OLV) Use:

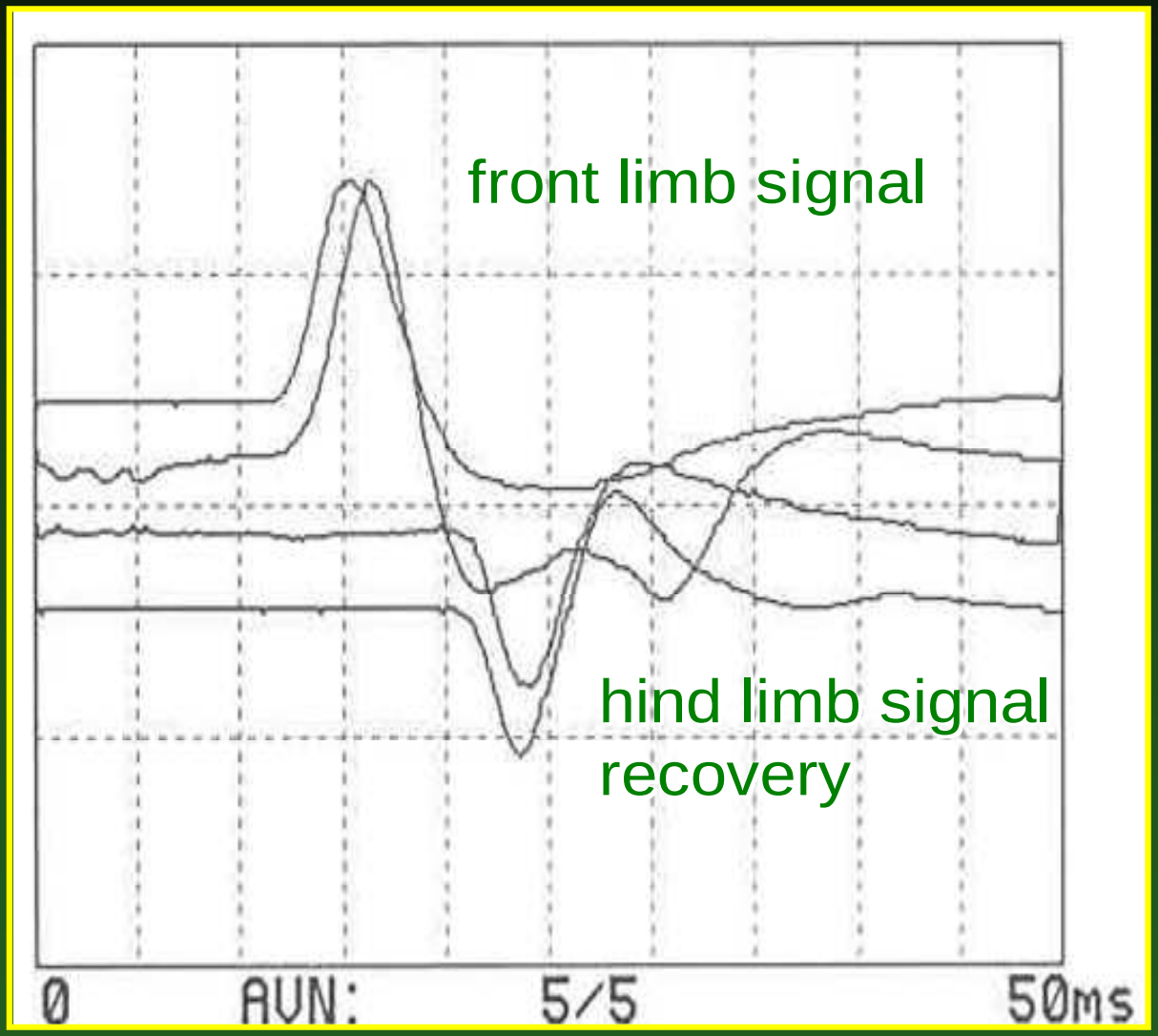
- **Double Lumen Tube(DLT)- R or L**
- **UNIVENT® Tube**
- **Bronchial Blockers**



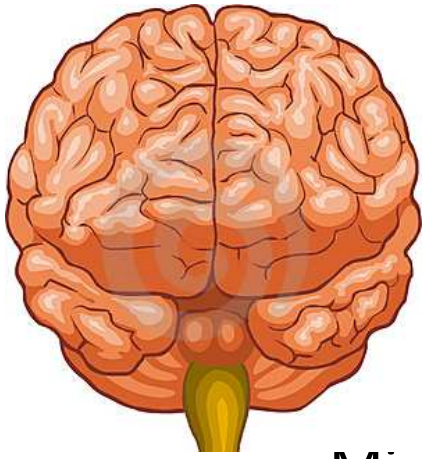
Airway management & monitoring:







MEP recovery after clamp release of previously interrupted ve



SPINAL CORD PROTECTION:

The collateral network protection.

Griepp RA et al: Ann Thor Surg 2007;83:S865-869
Etz CD et al: Ann Thor Surg 2009 (in press).

Minimizing the effect of unavoidable intraoperative spinal cord ischemia. Recognition collateral circulation and benefit of hypothermia, distal bypass (with oxygenator) and MEP.

Maintain higher arterial blood pressures, avoid increase in CVP and provide appropriate CSF drainage.

Monitoring of direct spinal cord perfusion pressure (catheter inserted in segmental artery).

Controle hemodilution and oxygenation.

CICU !!!

Changes in Age Population:

Material: 110 patients for elective MV replacement

Mean age: 44.5 y. Mortality: 12.7%

Litwak RS, Silvay G, Gadboy HL, et al: Factor associated with operative rosk in mitral valve replacement. Amer J Cardiolog 1969;23:335-343.

Material: 1,308 patients for variety of thoracic aortic surgery

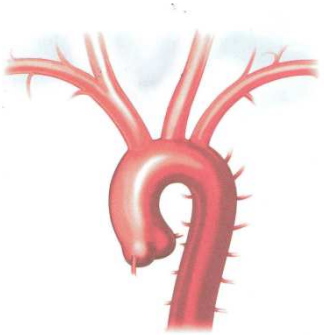
Mean age: 61.4 y. Mortality: 4.5% (N=1,077)

Mean age: 83.3 y. Mortality: 5.2% (N= 231)

Silvay G, Castillo JG, Chikwe J, et al: Cardiac anesthesia and surgery in geriatric patients.

Semin Cardiothor Vasc Anesthesia 2008;12:18-29.

DTAA resection in MSSM NY: 432 patients (2000-2007)



The hospital (30 days) mortality 5.5%

Rate of paraplegia 1.6%

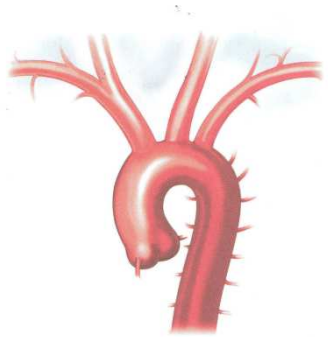
New onset of dialysis 3.1%

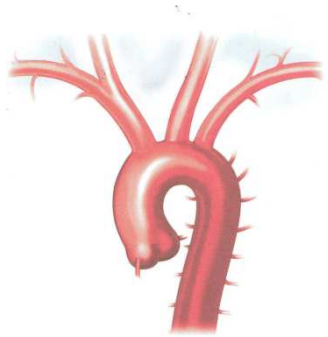
Reoperation for bleeding 3.1%

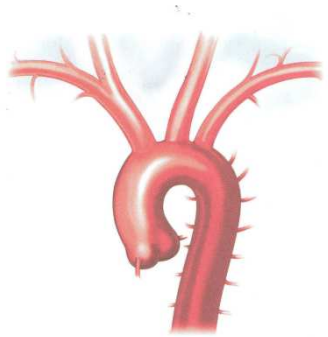
Temporary tracheostomy 11%

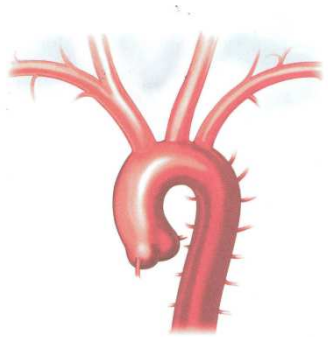
Median stay in CICU 3.5 days

Plestis KA, Griepp RG. Aortic Symposium 2008;11:20

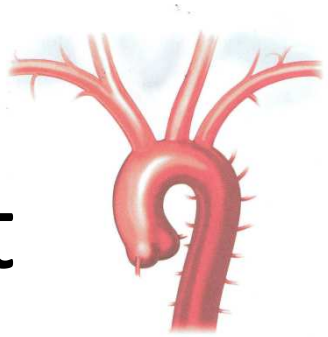








Surgical repair versus Stent Graft



No prospective randomized study exists compairing open surgical repair and stent grafting….
Expert Consensus Document.

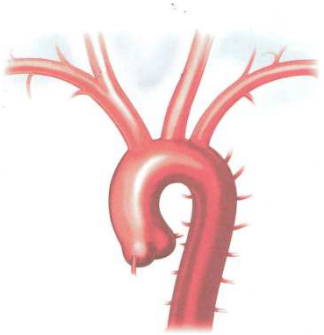
Svensson LG, Kouchoukos NT, Miller DC. Ann Thorac Surg 2008;85:S1-41

Repair of Thoracoabdominal Aortic Aneurysm…… “the expanding popularity of endovascular thoracic aortic aneurysm repair had produced a group of patients with stent-graft failure who require open reoperation”

Coselli JS : Aortic Symposium 2008;11:194

PREANESTHETIC CLINIC for

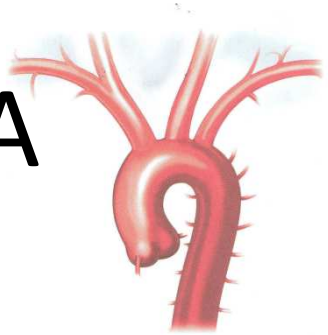
Day Admission Cardiac and Major Vascular Surgery:



Day before the operation: Staff of PAC confirms all the arrangements for the OR and ICCU: blood bank order, blood conservation strategies, antibacterial prophylaxis, medication refinement. PAC are preparing all records, tests and other documentation.

On the day of surgery, patient is admitted to the hospital in the PAC, after basic assessment of the patient to prevent interval changes, patient is escorted to the OR.

100 consecutive repair of DTAA with intra-operative monitoring of MEP.



On average 7 segmental art. Pairs were sacrificied

Hospital (30 days) mortality 6%

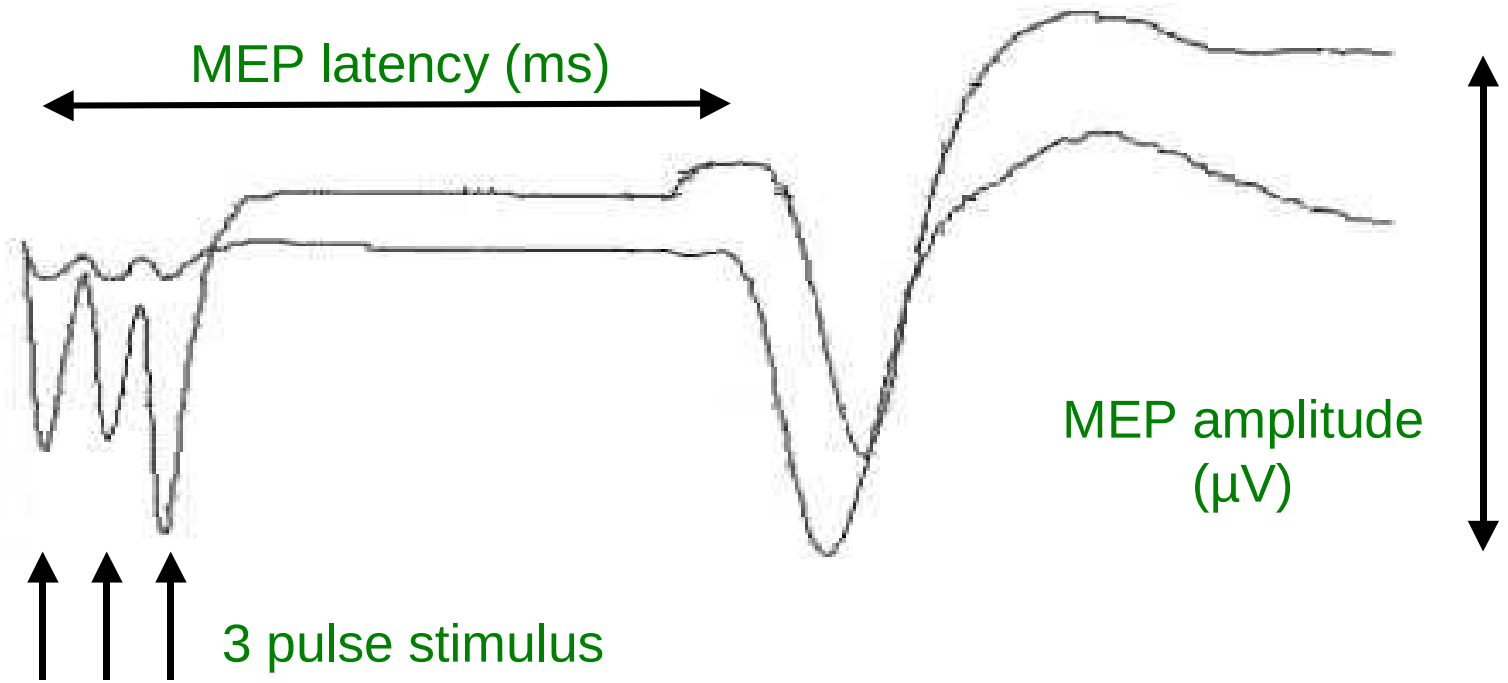
Paraplegia 2%

In 99 patients MEP's were normal, or returned to baseline levels by manipulation with MAP

Median stay in CICU: 2.5; in hospital 10 days

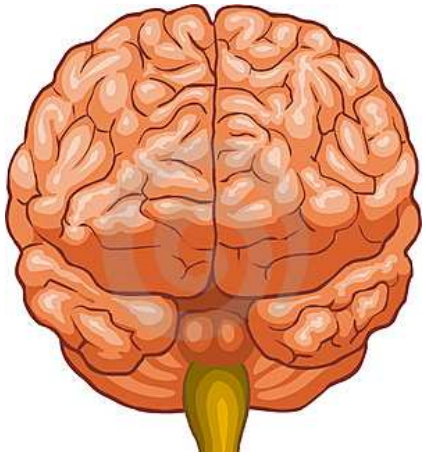
Etz CD et al: Ann Thor Surg 2006;82:1670

Typical Motor Evoked Potential (MEP) recording for lower limb function



MEP latency – duration from stimulation to first detection

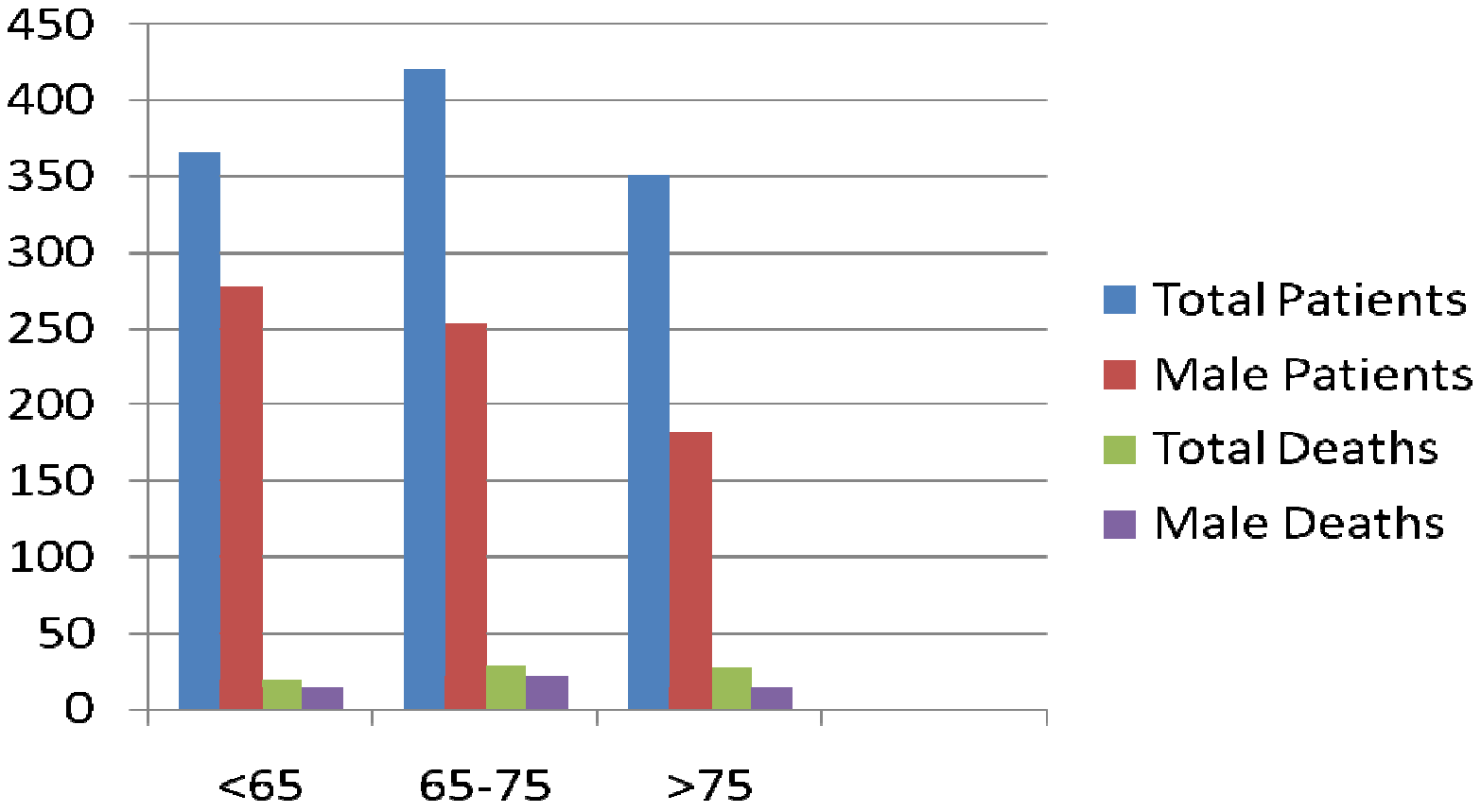
MEP amplitude – peak-to-peak amplitude response



Neuroprotective strategies

- Hypothermia (32° C or DHCA)
- CSF drainage
- Distal perfusion
- Steroids
- Neurophysiologic monitoring

TAA resectionFromtic Cases Mortality by Age and Gender (1.135 pts).



GERIATRIC PATIENTS - TAA

Conclusion:

Early diagnosis !!

Select treatment: conservative

surgical repair

stent graft

Long term survival and quality of life is largely determined by concurrent medical condition.

Repair of TAA can be performed safely in geriatric population.

DHCA
Metabolic Management

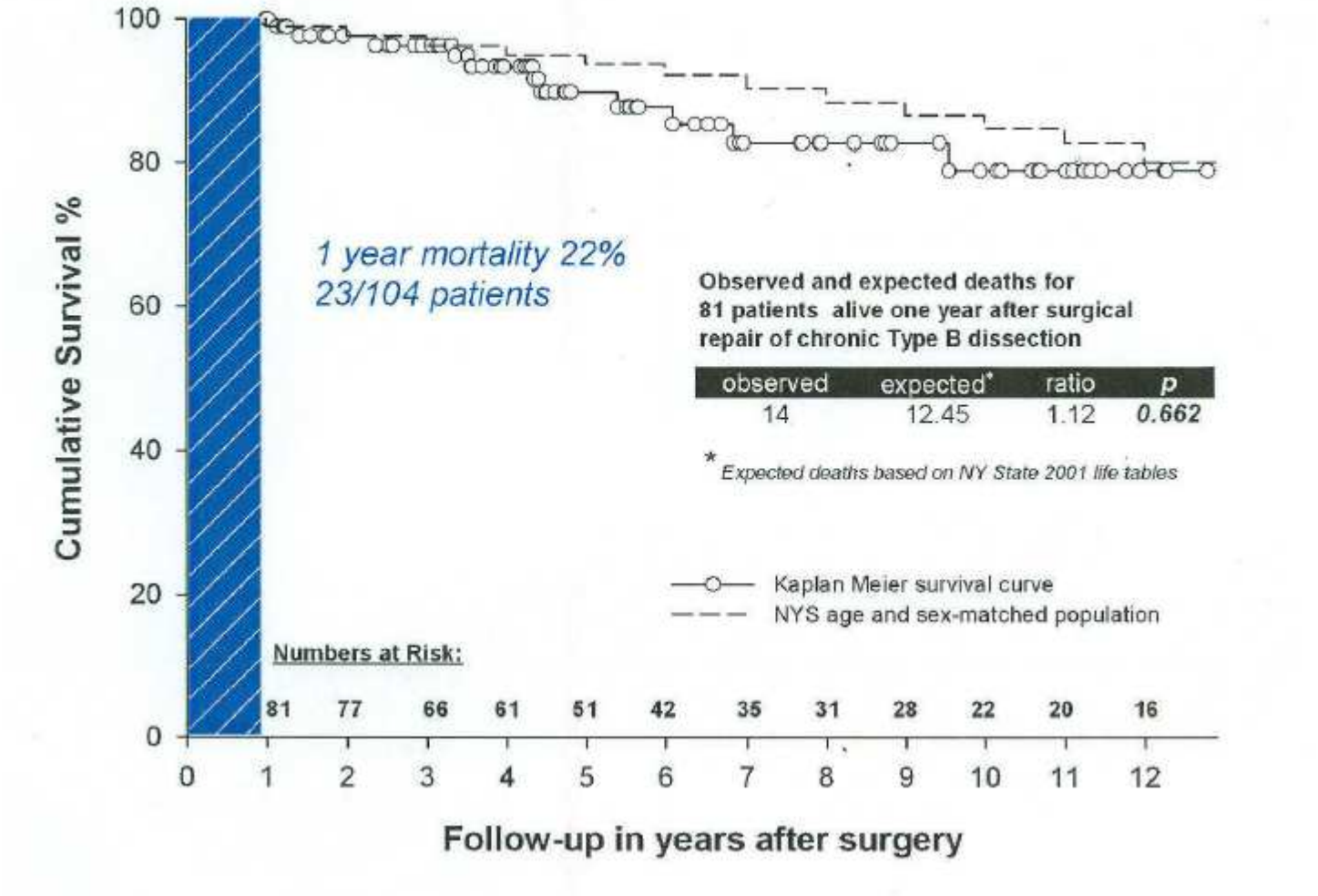
Alpha-Stat management

Hemodilution – Hct 18-20%

Avoid hyperglycemia

Steroids

OPEN REPAIR DTAA DISSECTION: (1/1994-4/2007) 104 patients (82 males, median age 60.5y. (26-83y). 23 p. emergency op. SSEP+MEP; 73p. CSF drainage. Hosp. mortality 10p. Overall survival 78% at 1y. 68% at 5y. 59% at 10 y.



DISCLOSURE – nothing at present...

..but waiting and I hope, it will arrive.