

Washington TCT 2005

**Filters versus Occlusion Balloons  
during CAS**

**Is there a clear preference?**

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# Presenter Disclosure Information

Name: Klaus Mathias

Within the past 12 months, the presenter or their spouse/partner have had the financial interest/arrangement or affiliation with the organization listed below.

Nothing to disclose

# **Why do we use CP?**

**Stroke is an embolic disease (>95%)**

**CAS is accompanied by embolization  
in 100% of the cases**

**Brain is more than moving arms and  
legs**

# Critical Particle Size

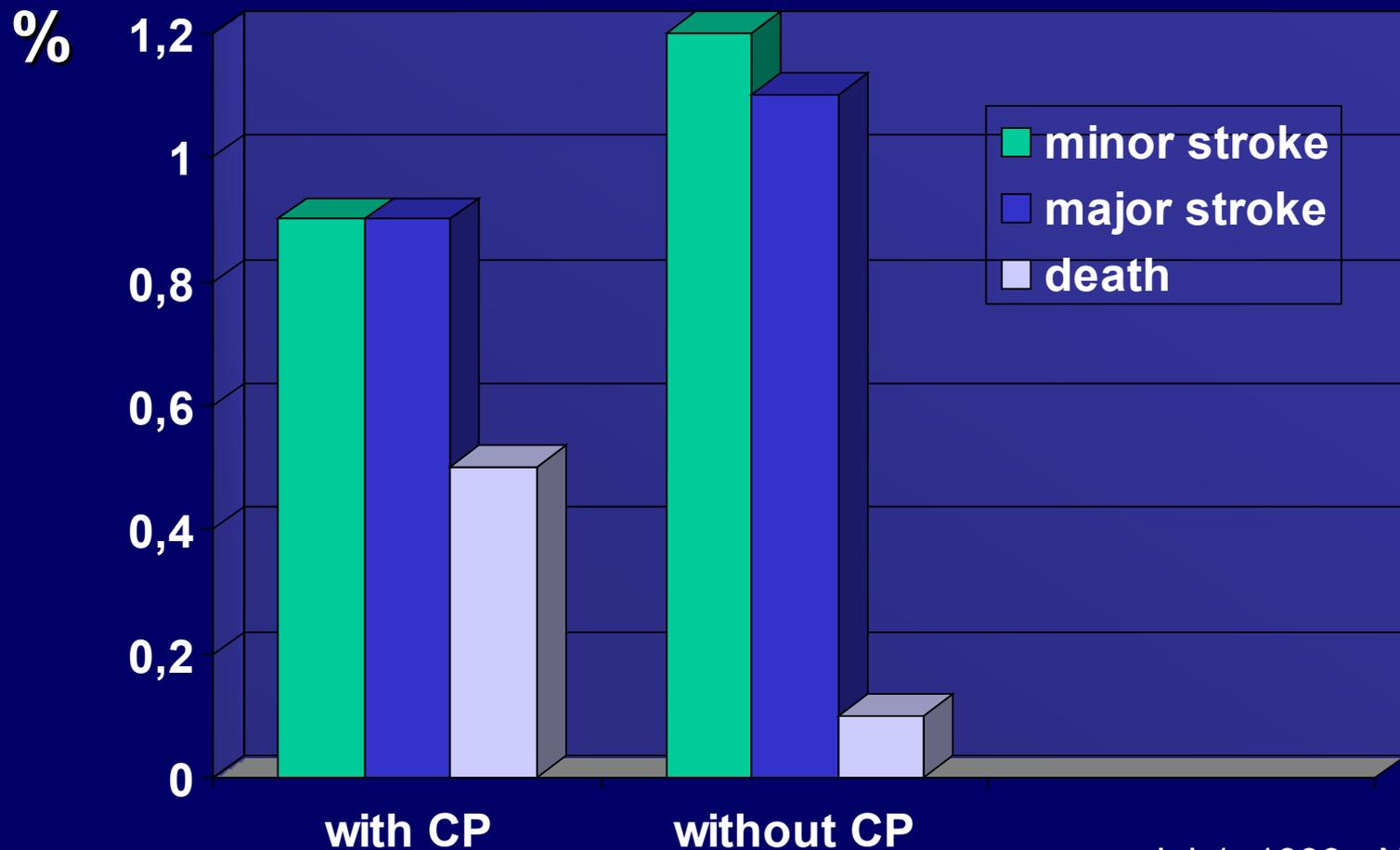
- particles  $< 20\mu$   pass cerebral circulation
- particles  $20 - 200\mu$   micro-infarction possible
- particles  $> 200\mu$   will cause a stroke

# **Do we have sufficient evidence for the benefit of CP?**

- **Single Center Data**
- **ProCAS**
- **Global Carotid Stent Survey**
- **Trials**

# ProCAS Registry

## Comparison CAS with/without CP



Jul-1, 1999 - Nov-30, 2004

# 5 CAS Trials in the US

**CAS with cerebral protection**

**Only different filters were used**

**More than 800 patients included**

**Virmani:**

**filters contained in 62 - 87%**

**various plaque material**

# Principles of Cerebral Protection

## **Distal balloon protection**

*1984 J. Theron (Caen), S. Bockenheimer (Frankfurt)*

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## **Proximal balloon protection**

*1989 R. Kachel (Erfurt), J. Parodi (St. Louis)*

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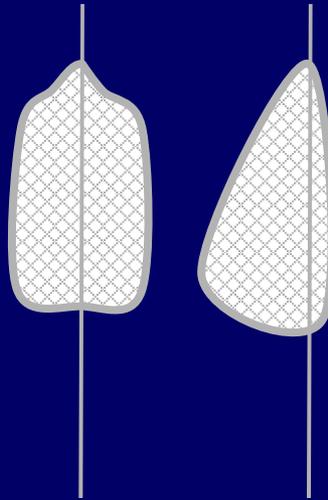
## **Filter protection**

*1981 K. Mathias (Dortmund), G. Roubin (NY), N. Hopkins (Buffalo) etc.*

# Filter Protection

# Designs of Filters

**symmetrical**  
**asymmetrical**



- safer filtering
- better apposition to vessel wall in curved segments

**bare wire**  
**mounted on wire**

- crossing the lesion is easier
- wire of choice

# Angioguard

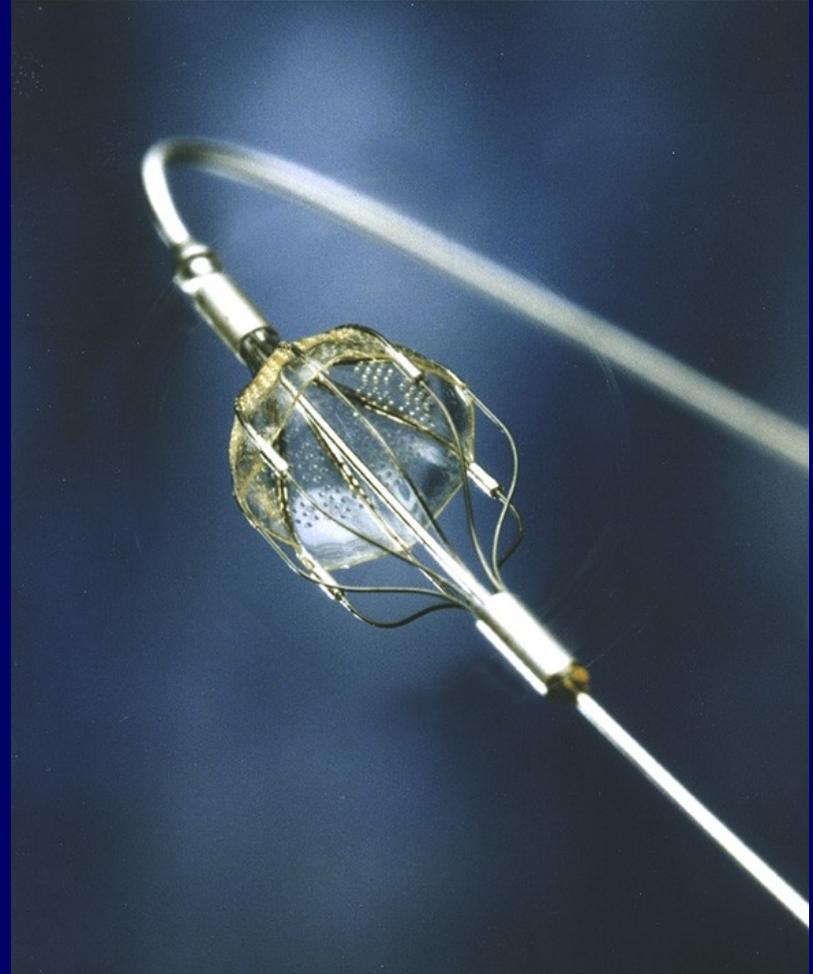


**first filter**

**3rd generation**

**good trackability**

**short filter basket**



# AccuNet



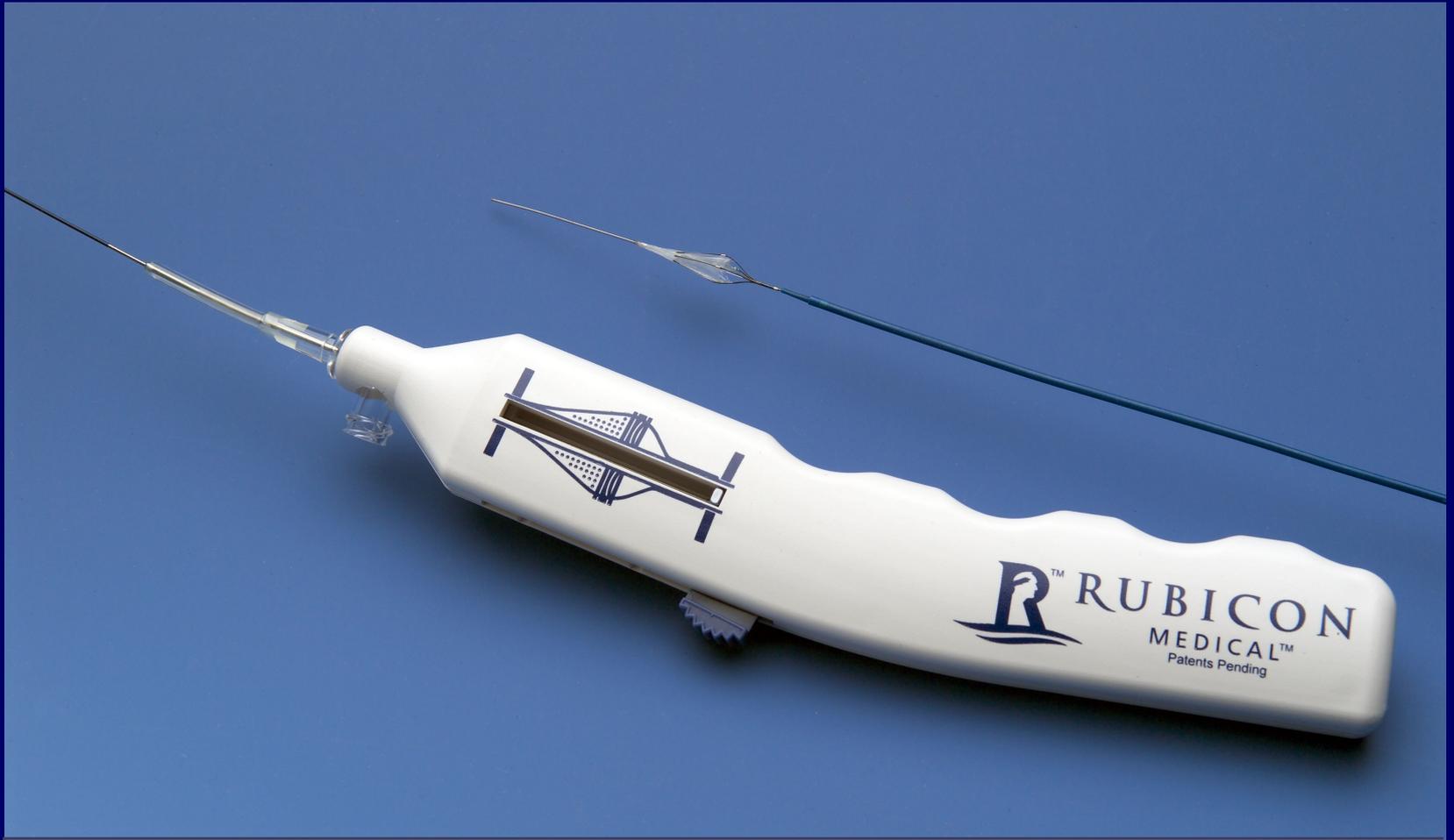
**good filter in curved artery segments  
retrieval catheter will be improved**

# Emboshield



**bare wire 0.014" – 0.018"**  
**high capture capacity**

# Rubicon



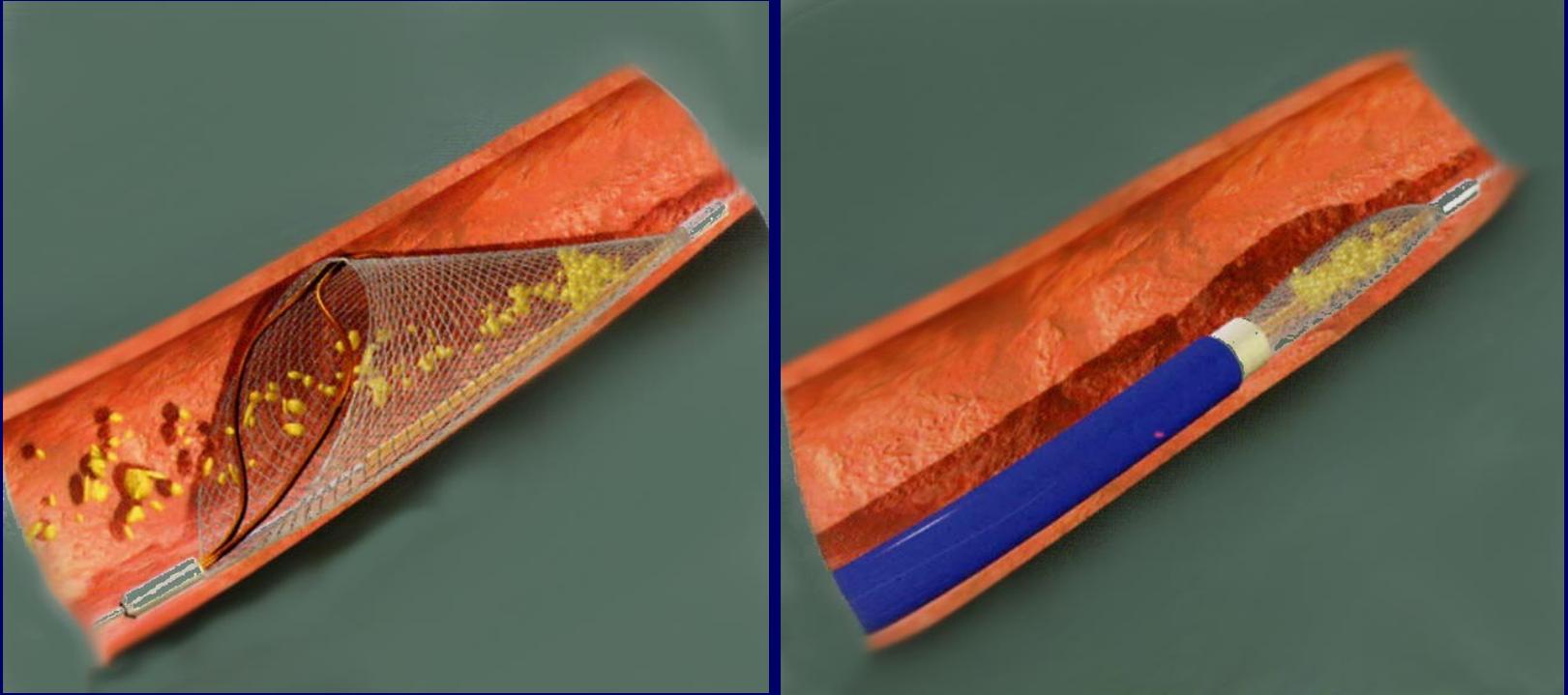
filter with lowest profile 2.2-F

# FilterWire EZ



**asymmetric filter: one size fits all up to 6 mm**

# Spider



**bare wire – heparin coated – asymmetrical  
different size of meshes**

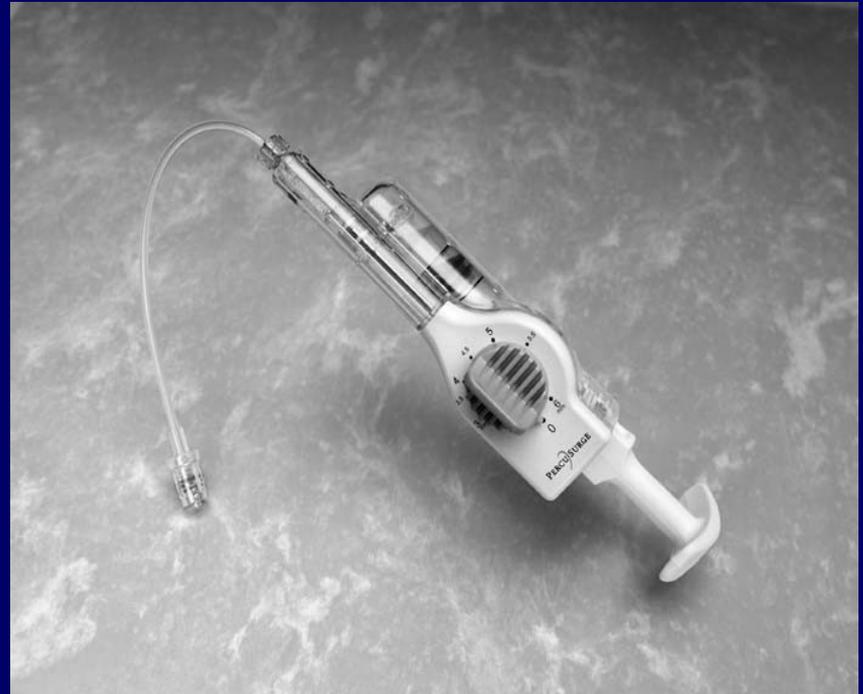
# Balloon Protection

# PercuSurge

The PercuSurge GuardWire™ System is not approved for use in the U.S. in the coronary, cerebral or carotid vasculature.



The PercuSurge GuardWire™ System

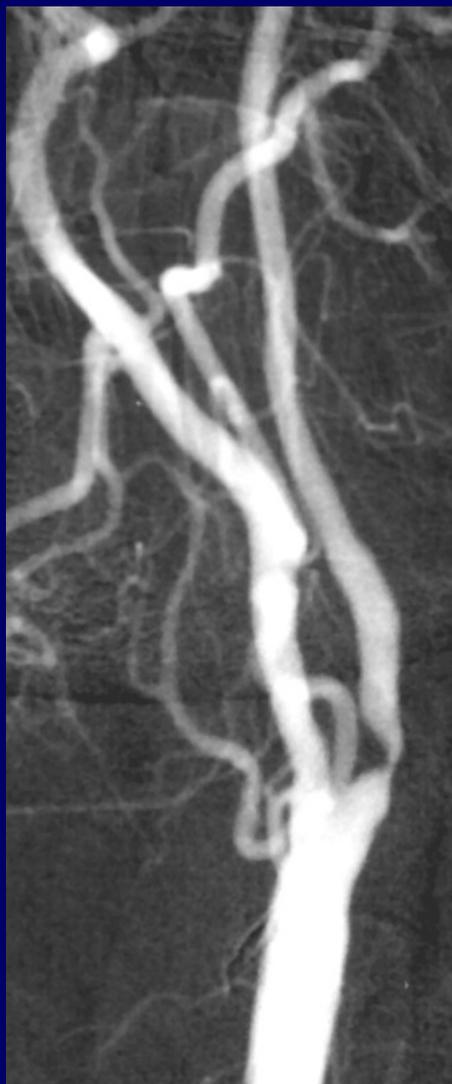


# PercuSurge

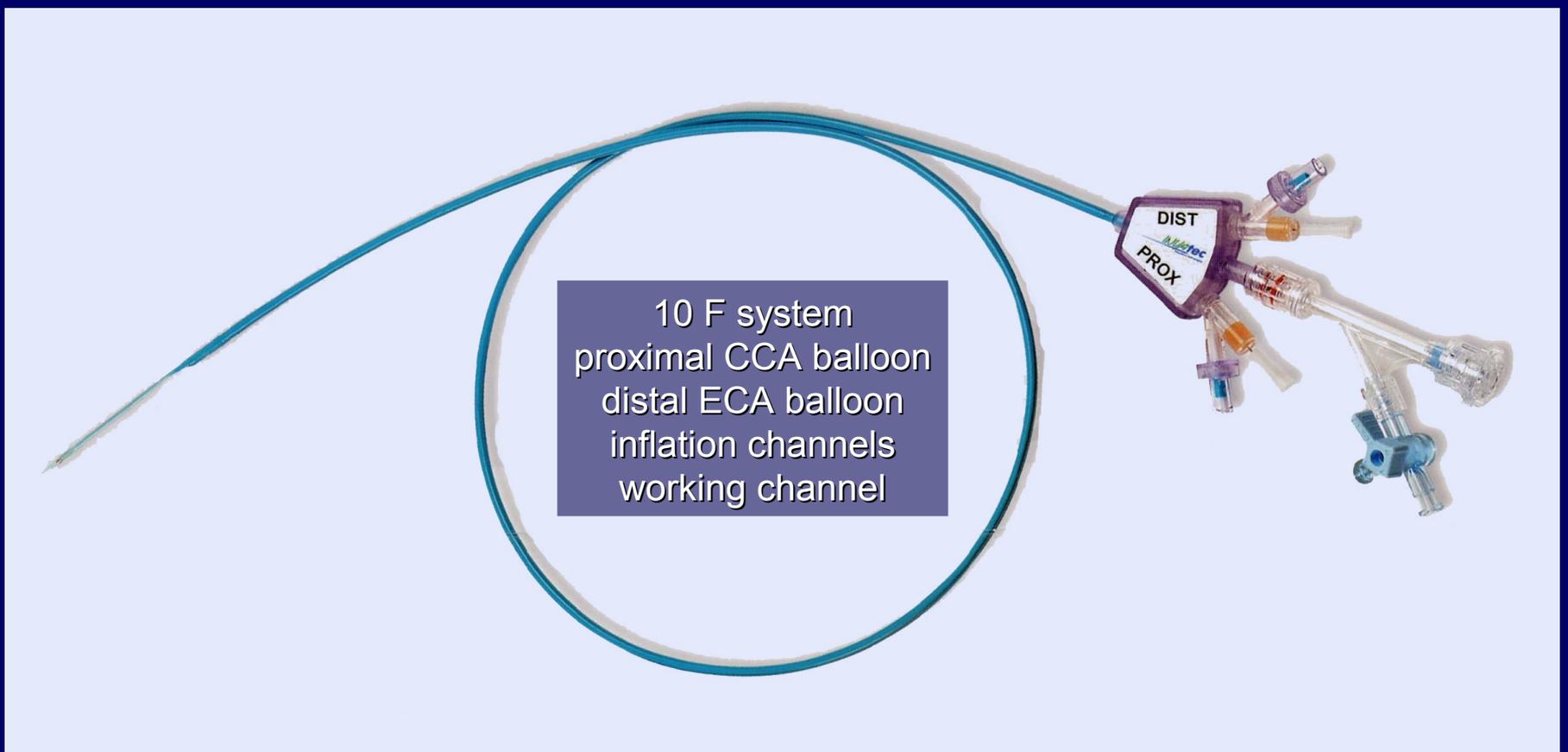


can be placed in tortuous ICAs  
no retrieval problems  
aspiration of 60 -80 cc

# PercuSurge

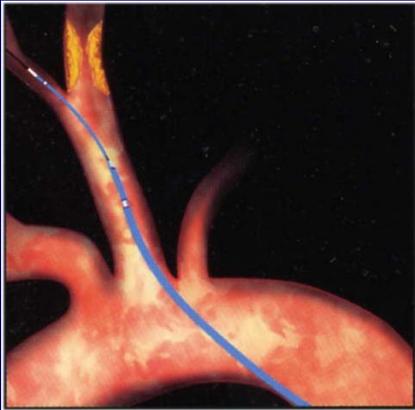


# MO.MA Proximal Balloon Protection

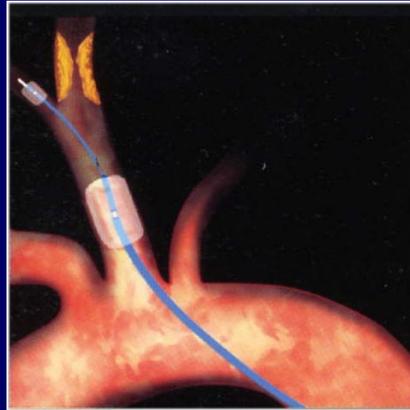


10 F system  
proximal CCA balloon  
distal ECA balloon  
inflation channels  
working channel

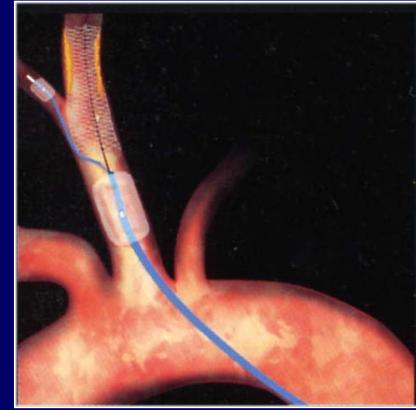
# MO.MA Proximal Balloon Protection



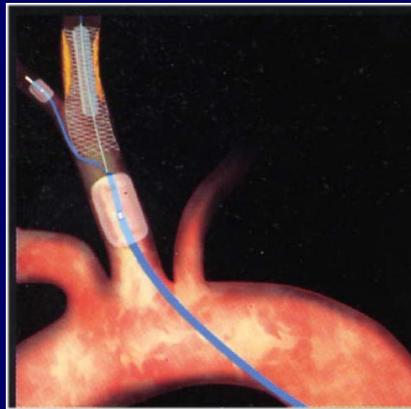
placing the balloon  
in the ECA



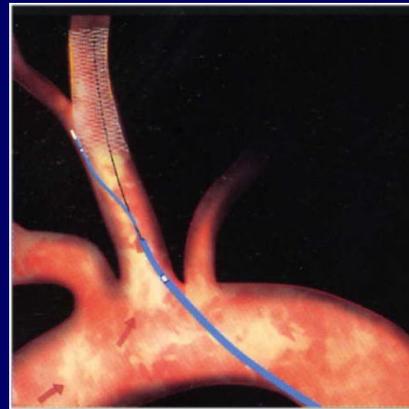
balloons inflated  
in CCA & ECA



stent placement in  
ICA



balloon dilatation of  
ICA



recovery of EPD

# MO.MA Trial

- Stent implantation successful 100 %
- MO.MA system successfully positioned 100 %
- Transient neurological symptoms 7.6 %
  - procedure continued successfully in all patients
    - intermittent balloon deflation 1.8%
- Diameter stenosis (NASCET)  $85 \pm 8$  %  $\rightarrow$   $6 \pm 8$  %
- Duration of flow blockage  $7.6 \pm 5.9$  min
- Amount of aspirated blood  $62 \pm 17$  cc
- Debris collected **79,2%**

**Make your selection**

# What do Filters Catch?

- **filters have a pore size of  $\sim 110\mu\text{m}$**
- **smaller particles will pass the filter**
- **filters may not be well apposed to the arterial wall**
- **filter retrieval may wash out particles**

# Filters

- **preserve blood flow during CAS**
- **contrast material injection always possible**
- **higher precision in stent placement**
- **correct size selection important**
- **ACT > 250 s**
- **crossing of lesion sometimes difficult**
- **placement of filter in tortuous ICA difficult**
- **spasm may occur**
- **recovery of filter difficult: retrieval catheter will not easily cross stents with open cell design**

# **Distal Balloon Protection**

- **crossing of lesion easy**
- **tortuosity of ICA does not matter**
- **incomplete angiogram**
- **retrieval easy**
- **efficacy of aspiration questionable**
- **5-10% of patients do not tolerate the interruption of blood supply**

# Proximal Balloon Protection

- ICA lesion not touched
- ICA tortuosity does not matter
- thrombus can be dissolved and aspirated
- incomplete angiogram
- retrieval easy
- efficacy of aspiration high
- large device profile
- 5-10% of patients do not tolerate the interruption of blood supply

# ProCAS Registry

## Cerebral Protection

<b>yes</b>	<b>3,370</b>	<b>72.8%</b>
<b>no</b>	<b>1,259</b>	<b>27.2%</b>

registered since Oct-1, 2000

## Type of CP

<b>filter</b>	<b>2,825</b>	<b>83.8%</b>
<b>distal balloon</b>	<b>244</b>	<b>7.2%</b>
<b>proximal balloon</b>	<b>238</b>	<b>7.1%</b>
<b>unknown</b>	<b>63</b>	<b>1.9%</b>

registered since Oct-1, 2000



***Safety first!  
For your patient  
and yourself!***