40 Years of Carotid Angioplasty
A Glance Back

Klaus Mathias
Director of WIST, Hamburg, Dortmund
I have nothing to disclose concerning this presentation.
Selective Angioplasty

Andreas Grüntzig 1974 non-compliant balloon
1977 coronary artery angioplasty

Felix Mahler 1978 renal artery angioplasty

Klaus Mathias 1979 renal graft artery angioplasty

Why not supra-aortic arteries?
1976/77 – Animal Experiments

- artificial carotid stenosis
- balloon dilatation
- blood filtration
- cerebral perfusion
1976/77 – Animal Experiments

- artificial carotid stenosis
- balloon dilatation
... first publication ...

Ein neuartiges Katheter-System zur perkutanen transluminalen Angioplastie von Karotisstenosen

Von K. Mathias

Aus der Abteilung für Röntgendiagnostik des Zentrums Radiologie (Direktor: Prof. Dr. med. W. Wenz) der Universität Freiburg/Br.

... no enthusiastic reaction!
1978 – A Controversy Begins

Don’t touch the carotid bifurcation – it is sacred surgical territory!

... but vascular surgery had no level 1 evidence at that time.

... needed another 13 years

NASCET 1991

ECST 1991

For vascular surgeons a nightmare!
Official Warning of the German Society of Vascular Surgery 1978

... this procedure includes an unacceptable risk of stroke and is no alternative to vascular surgery.
March 8 1979 - First Patient
Fibro-muscular Dyplasia

32 yo woman with TIAs
• severe stenosis of right distal ICA

The first patient was referred by the head of cardio-vascular surgery of the Freiburg University Hospital: Prof. Dr. Volker Schloesser
March 8 1979 - First Patient

Over the wire technique - Balloon diameter 4 mm
Discussing New Concepts of Angioplasty

40 years ago
first carotid angioplasty

42 years ago
first coronary angioplasty

PTA Symposium 1980 Nürnberg
Mathias, Dotter Zeitler, Olbert, Grüntzig, Roth
1980 – 1st Patient with Atherosclerotic Disease

68 yo man
- COPD
- CHD
- myocardial infarction 2x
- minor right mca stroke
- angioplasty with 4 mm balloon catheter shaft 9-F
technique: over-the-wire
- no sheath or guiding catheter with proper size available at that time
How to prevent embolization during balloon angioplasty?
The Stroke Problem

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Two reasons for cerebral protection
- most strokes are caused by embolism (>95%)
- micro- & macro-embolization occurs during CAS
1981 – Who will produce our filter?

0.035” movable core wire threads fixed at core and filter fixed at wire pores of filter membrane 70 µ

filter opened:
- core pulled back
- flow resistance

filter closed:
- core pushed forward

Companies not interested: No market!

K. Mathias
1989 - First Patient with Stent

65 yo man
- symptomatic ica stenosis > 90%
- balloon dilatation
  over-the-wire technique
What to do?
• leave it as it is?
• emergency surgery?

1989 - First Patient with Stent

intimal flap
1989 - First Patient with Stent

Options for stent placement
• Palmaz balloon-expandable stent
• Rolling-membrane Wallstent

Wallstent developed by a small Swiss company in early eighties
- bought by Schneider
- bought by Pfizer
- bought by Boston Scientific
1989 - First Patient with Stent

Intimal flap attached to vessel wall after placement of a Wallstent across the bifurcation
Fantastic - a stent
Today Routine Stent Placement

Self-expandable nitinol stents
A fascinating journey is going on

Thank you for your interest
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Klaus Mathias
Director of WIST, Hamburg, Dortmund