Management of asymptomatic stenosis: Medical therapy is usually sufficient for asymptomatic carotid stenosis.

What are the exceptions?

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Disclosure

Speaker name: Johann Pelz

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I have the following potential conflicts of interest to report:

- ☐ Consulting
- ☐ Employment in industry
- ☐ Stockholder of a healthcare company
- ☐ Owner of a healthcare company
- ☐ Other(s)

- ☒ I do not have any potential conflict of interest

Management of contemporary BMT

Treatment of hypertension

- **RR < 140 / 90 mm Hg** (Class I- LoE: A)
- type of therapy less important than response (Class I- LoE: A)

Control of Hyperlipidemia

- statin therapy
  - **LDL cholesterol < 100 mg/dl** (Class I, LoE: B)
  - diabetes: LDL cholesterol < 70 mg/dl (Class IIa, LoE: B)

Management of Diabetes mellitus

- usefulness of diet, exercise and glucose-lowering drugs (Class IIa, LoE: A) with **HbA1c values < 7.0%**

Brott et al., *JACC*, 2011

Management of contemporary BMT

Antithrombotic Therapy

- aspirin 75 – 325 mg /d is recommended (Class I, LoE: A) for prevention of MI / cardiovascular events; benefit for primary stroke prevention not established
- if aspirin is contraindicated: clopidogrel 75 mg / d

Management of contemporary BMT

APA/dpa

Lifestyle changes

- smoking cessation (Class I, LoE: B)

- physical activity at least 40 min/d at 3-4 d/week (Class I, LoE: B)
- weight reduction for lowering blood pressure
- mediterranean diet rich in fruits and vegetables, consumption of wholegrain cereal products and low-fat milk and meat products, limiting of sucrose intake to less than 50 g/day, use of vegetable margarine and rapeseed oil instead of butter, and fish consumption at least two portions per week

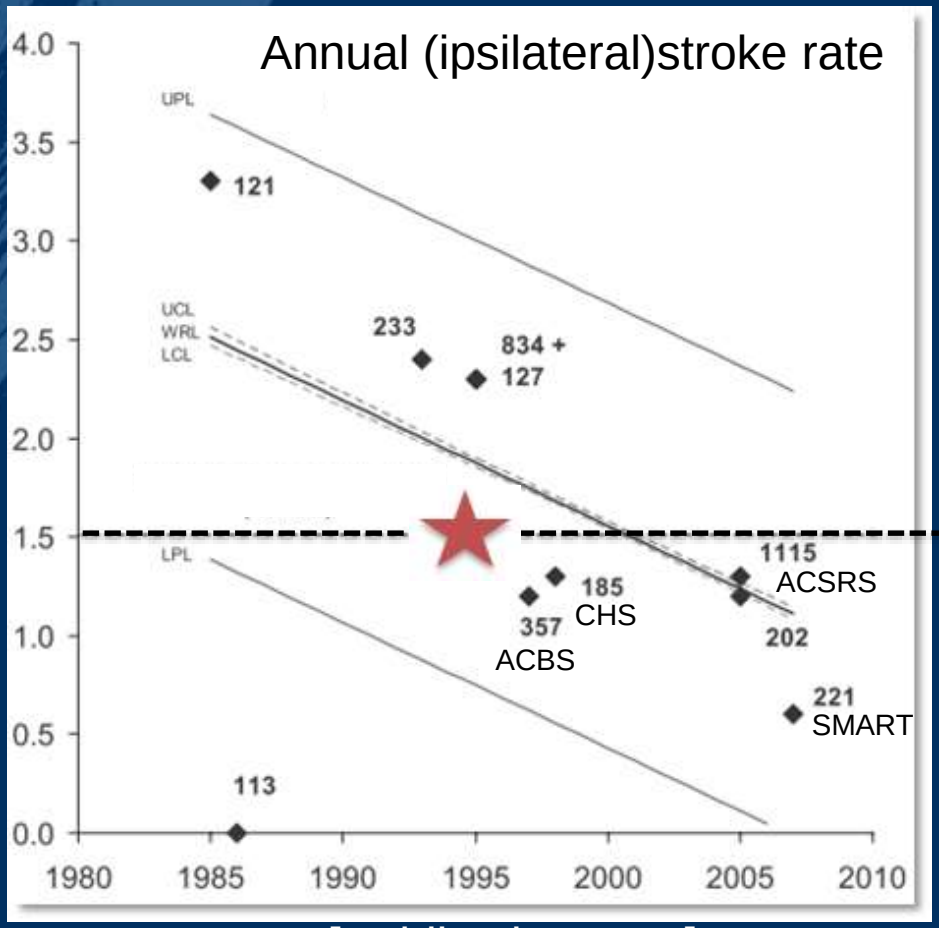
Ngandu et al., *Lancet,* 2015

Efficacy of current BMT for stroke prevention

Evidence from prospective (cohort) studies

Johnson, 1985
Toronto, 1986
VACS, 1993
ACAS, 1995
ECST, 1995
ACBS, 1997
CHS, 1998
ACSRS, 2005
ASED, 2005
SMART, 2007

n = 3292



1,5% for CEA
in ACAS/ACST

[Publication Year]

Σ annual stroke rate associated with BMT has fallen („25-year fall“)

Abbott et al., *Stroke,* 2009

But what are the exceptions?

1. Non-Adherence to BMT
2. Progression of stenosis despite BMT
3. Special characteristics of the stenosis

Non-Adherence to BMT

- Medical arm of the SAMMPRIS (Stenting versus Aggressive Medical Management for Prevention of Recurrent Stroke in Intracranial Stenosis) Trial (n = 227)

Table 1 Stenting and Aggressive Medical Management for Prevention of Recurrent Stroke in Intracranial Stenosis (SAMMPRIS) risk factor targets and control during follow-up

Risk factor measure	Target	No. patients with available data	Percentage of patients in target overall[a]
Primary risk factors			
Systolic blood pressure	<140 mm Hg (<130 if diabetic)	227	53
LDL-C	<70 mg/dL	225	47
Secondary risk factors			
Non-HDL-C	<100 mg/dL	225	60
HbA1c[b]	<7.0%	113	42
Smoking	Cessation	227	65
Weight management	For initial BMI[c] of 25-27 kg/m^2: target BMI <25 kg/m^2; for initial BMI >27 kg/m^2: target 10% weight loss	227	19
Physical activity	PACE score of 4-8[d]	227	44

Table 2 Risk factors associated with stroke, myocardial infarction, or vascular death at 3 years

Risk factor	Odds ratio (95% CI) Univariate	Multivariable[e]
Physical activity[b]		
Out of target	5.4 (2.4-12.1)[f]	
Continuous (mean PACE score)	0.5 (0.4-0.7)[c]	0.6 (0.4-0.8)[c]
LDL		
Out of target	1.8 (1.0-3.6)	
Continuous (mean, increase 10 mg/dL)	1.2 (1.1-1.4)[c]	1.1 (0.8-1.4)
SBP		
Out of target	2.1 (1.2-4.0)[c]	
Continuous (mean, increase 10 mm Hg)	1.3 (1.1-1.7)[c]	1.2 (0.9-1.5)
Smoking		
Out of target (smoked during study period)	1.6 (0.8-3.2)	
Non-HDL[d]		
Out of target	1.7 (0.9-3.2)	
Continuous (mean, increase 10 mg/dL)	1.2 (1.1-1.3)[c]	1.1 (0.8-1.4)
BMI[e]		
Out of target	0.9 (0.4-2.0)	
HbA1c[f]		
Out of target	2.0 (0.99-4.1)	

Turan et al., *Neurology,* 2017

Progression of stenosis despite BMT

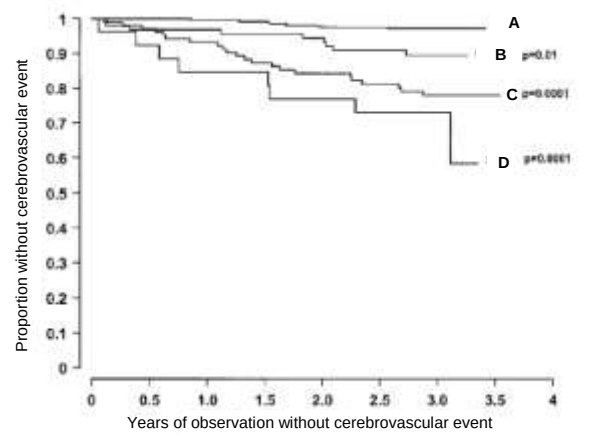
Reference	Patients	Age	M:F	Prevalence: initial stenosis	Follow-up	Rate of progression	Progression vs. Non-Progression: ipsilateral neurological deficit	Progression vs. Non-Progression: Stroke
Roederer 1984[443]	162	64	110 M 52 W	< 50%: 64% 50-79%: 29% 80-99%: 3% Verschluss: 4%	15	Gesamt: 20%/Jahr ≥ 50%: 8%/Jahr	≥ 80 vs. < 80%: 33% vs. 0,4%	≥ 80 vs. < 80%: 12,5% vs. 0%
Hatsukami 1990[444]	200	65	138 M 62 W	< 50%: 63% 50-79%: 33% 80-99%: 4%	54	≥ 50%: 3,9% ≥ 80%: 1,2%	Kein Unterschied	Kein Unterschied
Bock 1993[435]	242	68	191 M 51 W	< 50%: 61% 50-79%: 25% 80-99%: 5%	27	Gesamt: 14,8%	11% vs. 1,7%	n.v.
Johnson 1995[445]	232	63	136 M 96 W	< 50%: 59,5% 50-79%: 43,5%	84	Bis 80-99% < 50%: 4% in 7a 50-79%: 26% in 7a	n.v.	14,8% vs. 2,3% nach 7 Jahren
Mackey 1997[439]	715	65	283 M 432 W	< 50%: 50% 50-79%: 29% 80-99%: 15,8% Verschluss: 5,2%	42	8,3% 16,4% 12,2%	≥ 80 vs. < 80%: 19,2% vs. 2,9% ≥ 50% vs. < 50%: 13% vs. 2,9%	
Rockman 1997[446]	425	75	219 M 206 W	50-79%	38	4,9%: 1 Jahr 16,7%: 3 Jahre 26,5%: 5 Jahre	37,5% vs. 7,3%	10,4% vs. 2,1%
Olin 1998[447]	465	69	255 M 210 W	60-79%	24	5%: 1 Jahr 11%: 2 Jahre 20%: 3 Jahre		5,6% vs. 0,8%
Mansour 1999[117]	344	71	344 M	50-79%	25	Gesamt: 15,5%	26% vs. 12%	10,2% vs. 2,5%
Muluk 1999[448]	1004	66	984 M 20 W	< 50%: 75% 50-79%: 14% ≥ 80%: 11%	28	Gesamt: 9,3%/Jahr	11,9% - 21,1%	
Liapis 2000[449]	442	69	320 M 122 W	< 50%: 69% ≥ 50%: 31%	44	Gesamt: 15%/Jahr	20,7% vs. 6,1% (TIA)	11,2% vs. 1,9%
Cina 2002[115]	417	73	259 M 158 W	< 50%: 72,4% 50-99%: 23,3%	6-9	Gesamt: 16%		No difference (short follow-up)

- In case of a clear progression over time (e.g. 50% > 60% > 80%) consider intervention

German S3-Guideline Diagnosis, Therapy and Follow up of extracranial carotid stenosis 2012

Special characteristics of the stenosis

- Ulcerated plaques vs. non-ulcerated plaques („The northern Manhattan Study“): 5-years stroke risk **8.5%** *vs*. **3.0%**
- Plaque echogenicity (Tromsø Study):



A: Subjects without stenosis

B: subjects with echogenic and predominantly echogenic plaques

C: subjects with predominantly echolucent plaques

D: subjects with echolucent plaques

- Ultrasonic plaque echolucency and emboli signals (ACES Study): 2-years follow up; Hazard ratio 10.61 for ipsilateral stroke

Prabhakaran et al., *Stroke,* 2006
Mathiesen et al., *Circulation,* 2001
Topakian et al., *Neurology,* 2011

Summary

- Best medical treatment is the method of choice for the treatment of asymptomatic carotid stenosis
- Consider intervention when:
  - Patient is non-adherent to BMT
  - In case of a fast progression of stenosis
  - In case it is a high risk stenosis

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