

Long-term Cardiac and Neurocognitive Outcome After Off-pump Coronary Artery Bypass Grafting (OPCAB) *Versus* Percutaneous Coronary Intervention (PCI) *The Octopus Study*

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DISCLOSURES / CONFLICTS OF INTEREST

None reported by all authors.

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Funded by:

Netherlands National Health
insurance Council.

INTRODUCTION

Coronary revascularization effectively relieves angina but is associated with adverse effects:

- Brain: stroke, TIA, cognitive decline
- Myocardial damage
- End-organ damage: e.g. renal dysfunction

INTRODUCTION (2)

- CABG with CPB: neuro-cognitive complications.
 - Development of Off-Pump CABG (OPCAB)
 - OPCAB: comparable cardiac outcome¹
 - OPCAB: no benefit on cognitive decline¹
- PCI is equally safe as CABG and OPCAB², but
 - Repeat revascularization rate 29% in 5 years³
 - Procedural stroke 0.5%, TIA 6%⁴ and micro-emboli on transcranial doppler⁵
 - Cerebral ischemic injury on DWI-MRI⁴
 - Cognitive decline comparable to CABG with CPB, but no direct comparison PCI versus OPCAB

¹ Van Dijk D et al, *JAMA* 2007

³ Eefting F, Nathoe HM et al, *Circulation* 2003

⁵ Bladin CF, *Stroke* 2008

² Daemen J *Circulation* 2008

⁴ Lund C *Eur Heart J* 2005

OBJECTIVES

To compare the long-term effects of

PCI *versus* OPCAB on

[1] Cardiac outcome

[2] Cognitive outcome

DESIGN

- Randomization PCI–BMS *versus* OPCAB¹
- Long-term follow-up at 7.5 years
- Multi-center
- Patients referred for PCI
- Stable and unstable coronary disease
- Preserved or moderately impaired LV Function

¹ van Dijk D, *Controlled Clinical Trials*, 2000

DESIGN 7.5 YEAR CARDIAC OUTCOME:

Data collection:

- Physician-confirmed hospital records
- Independent, blinded event committee

Cardiac outcome measure: composite of

- Death
- Myocardial infarction
- Stroke
- Coronary re-intervention

DESIGN 7.5 YEAR NEUROCOGNITIVE OUTCOME

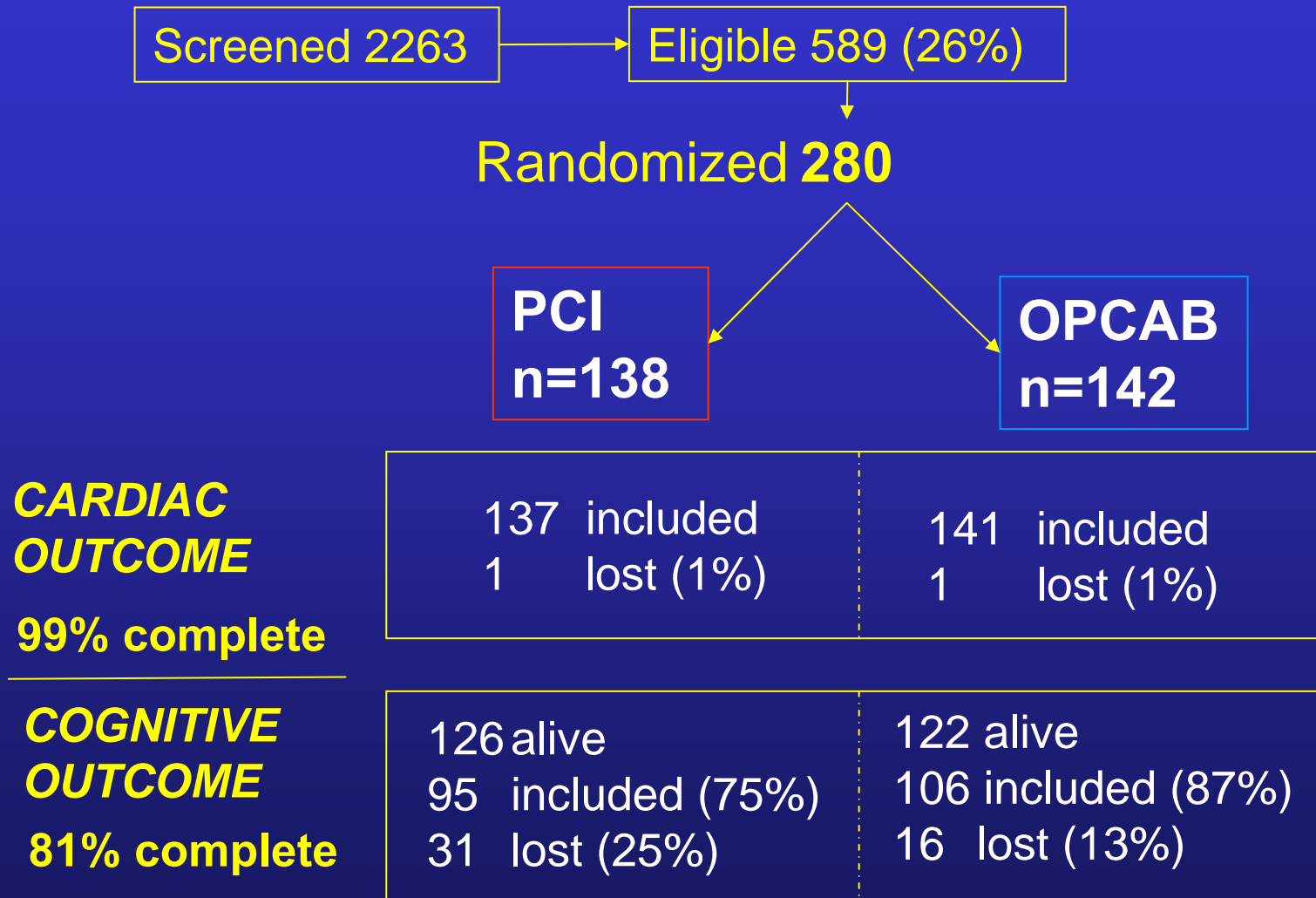
Data collection

- 9 validated neuropsychological tests
- 7 domains of cognition
- Psychologist blinded to randomization

Cognitive outcome measure:

- Overall mean of individual standardized test scores
 - Crude analysis
 - Multiple imputation (sensitivity for missing values)

FLOW of PATIENTS – 7.5 YEAR FOLLOW-UP



BASELINE CHARACTERISTICS: ORIGINAL SAMPLE

BASELINE	PCI (n=138)	OPCAB (n=142)
Age, years mean (SD)	60 (9)	59 (10)
Male, %	70	72
Stroke or TIA, %	6	7
Myocardial infarction, %	25	23
PCI, %	4	5
DM, %	9	14
Coronary disease 1VD, %	68	74
Normal LVF, %	91	79
PROCEDURAL		
Stents, n	1.44	0.03
Arterial grafts, n	0.03	1.1
Manipulation of aorta, %	100	15

RESULTS – 7.5 YEAR CARDIAC OUTCOME

	PCI (n=137)	OPCAB (n=141)	P- Value
Death n(%)	12 (8.7%)	19 (13.4%)	0.21
Stroke	1 (0.7%)	1 (0.7%)	1.00
MI	11 (8.0%)	8 (5.6%)	0.44
Composite Death / Stroke / MI	24 (17.4%)	28 (19.7%)	0.62
Repeat revascularization	30 (21.7%)	16 (11.3%)	0.02
CABG	4 (2.9%)	1 (0.7%)	0.17
PCI	26 (18.8%)	15 (10.6%)	0.23
CARDIAC OUTCOME	54 (39.9%)	44 (31.0%)	0.12

BASELINE CHARACTERISTICS : COGNITIVE OUTCOME SAMPLE

	PCI (n=95)	OPCAB (n=106)	P-value
Age, years mean (SD)	59 (8)	57 (9)	0.10
Education, score	4.1	4.3	0.26
Male, %	73	73	1.00
Stroke or TIA, %	5	5	0.86
Myocardial infarction, %	26	23	0.55
DM, %	9	13	0.41
Hypertension, %	34	32	0.81
Hypercholesterolemia, %	62	62	0.98
Coronary disease: 1 VD, %	71	73	0.35
Normal LVF, %	89	78	0.03

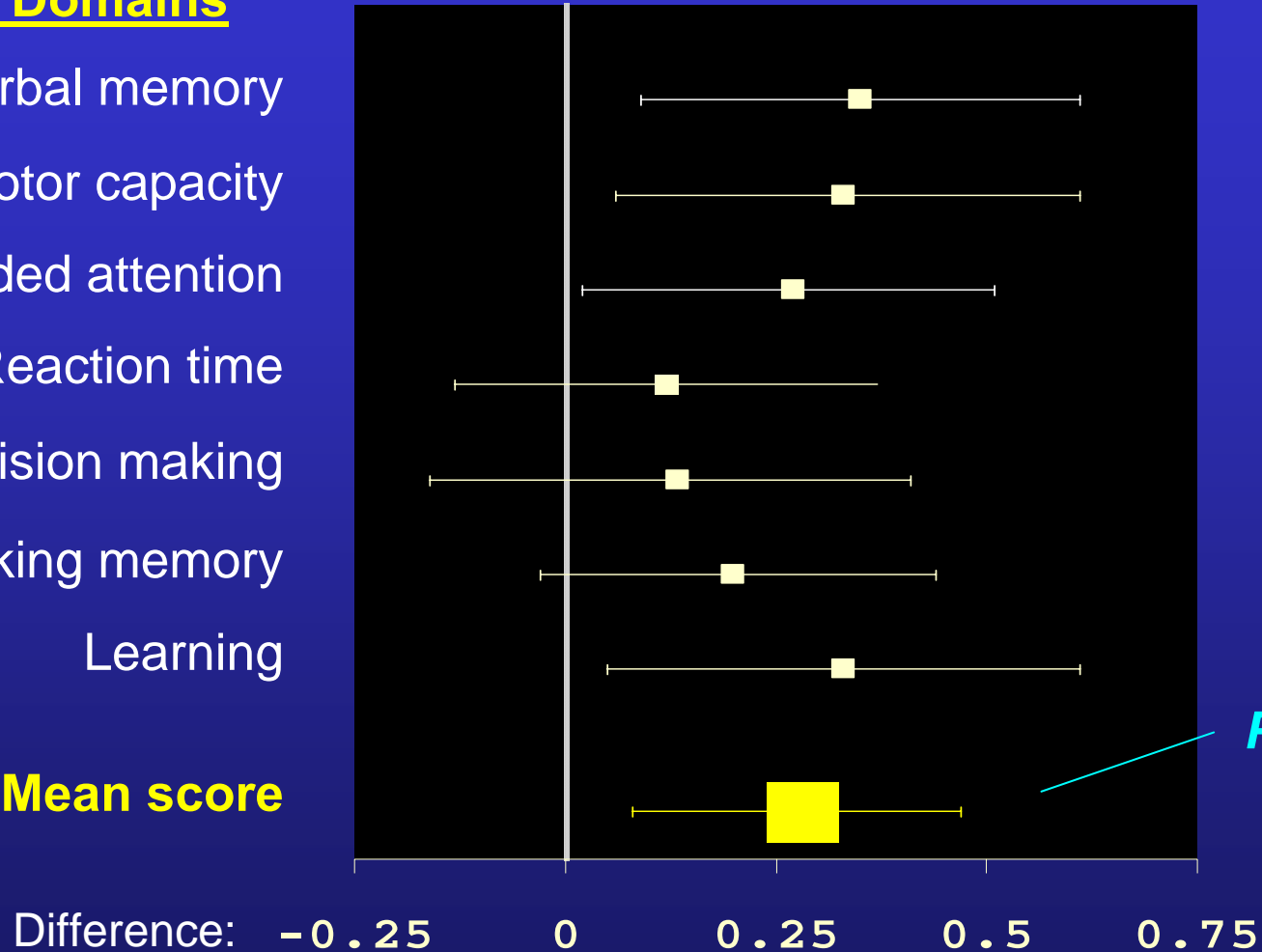
RESULTS – 7.5 YEARS NEUROCOGNITIVE OUTCOME

Cognitive Domains

- Verbal memory
- Motor capacity
- Divided attention
- Reaction time
- Decision making
- Working memory
- Learning

Mean score

n=201



P < 0.01

PCI BETTER ← ⇒ OPCAB BETTER

RESULTS – ROBUSTNESS 7.5 YEARS NEUROCOGNITIVE OUTCOME

OPCAB vs PCI	Crude	Multiple Imputation
Effect (β)	0.28	0.25
95% CI	(0.09-0.47)	(0.08-0.42)
P-Value	<0.01	<0.01

SUMMARY

After 7.5 years, OPCAB was associated with:

- ✓ a comparable safety profile as PCI
- ✓ a lower risk of coronary re-interventions
- ✓ a better cognitive performance.

DISCUSSION

- Cognitive assessment at baseline unavailable. Cognitive outcome is valid only on treatment-group level.
- Mechanism difference in cognitive outcome is unknown. Subclinical cerebral injury may have occurred due to micro-embolization after thoracic aorta manipulation with catheters during (repeated) PCI.
- BMS were used. In DES era, less re-interventions may be expected.

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