

# **Outcomes following eversion vs. conventional CEA in RCTs and observational studies – a systematic review**

**Kosmas I. Paraskevas, MD**

*London, UK*

# Disclosure

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Speaker name:

**Kosmas I. Paraskevas**

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

[Intervention Review]

## Eversion versus conventional carotid endarterectomy for preventing stroke

Piergiorgio Cao<sup>1</sup>, Paola De Rango<sup>1</sup>, Simona Zannetti<sup>2</sup>, Giuseppe Giordano<sup>1</sup>, Stefano Ricci<sup>3</sup>, Maria Grazia Celani<sup>3</sup>

<sup>1</sup>Unita' Operativa di Chirurgia Vascolare, Perugia, Italy. <sup>2</sup>Peripheral Vascular Division, Medtronic-Europe, Perugia, Italy. <sup>3</sup>Servizio di Neurologia e Ictus, USL 2, Perugia, Italy

**Citation:** Cao P, De Rango P, Zannetti S, Giordano G, Ricci S, Celani MG. Eversion versus conventional carotid endarterectomy for preventing stroke. *Cochrane Database of Systematic Reviews* 2000, Issue 4. Art. No.: CD001921. DOI: 10.1002/14651858.CD001921.

Five trials were included for a total of 2465 patients and 2589 arteries.

There were no significant differences in the rate of perioperative stroke and/or death and stroke during follow up between eversion and conventional CEA

Eversion CEA was associated with a significantly lower rate of restenosis > 50% during follow up (2.5% versus 5.2%, OR 0.48, 95% CI 0.32 to 0.72).



REVIEW

## Eversion versus Conventional Carotid Endarterectomy: A Meta-analysis of Randomised and Non-randomised Studies **CME**

C.N. Antonopoulos <sup>a,b,\*</sup>, J.D. Kakisis <sup>a</sup>, T.N. Sergeantanis <sup>b</sup>, C.D. Liapis <sup>a</sup>

**Results:** A total of 21 studies were deemed eligible (8530 ECEA and 7721 CCEA procedures), seven of which were randomised and 14 non-randomised. ECEA was associated with significant reduction in perioperative stroke (OR = 0.46, 95%CI: 0.35–0.62, NNT = 68, 95%CI: 56–96), death (OR = 0.49, 95%CI: 0.34–0.69, NNT = 100, 95%CI: 85–185) and stroke-related death (OR = 0.40, 95%CI: 0.23–0.67, NNT = 147, 95%CI: 115–270); the results were replicated at the sub-analysis on PCEA. Concerning long-term outcomes, ECEA presented with a significant reduction in late carotid artery occlusion (OR = 0.48, 95%CI: 0.25–0.90, NNT = 143, 95%CI: 100–769) and late mortality



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*Conclusions:* ECEA compared to CCEA may be associated with a lower incidence in both short-term and long-term outcomes, which does not seem to be hampered by potentially meaningful modifiers.

Eur J Vasc Endovasc Surg (2018) 55, 465–473

## REVIEW

# Editor's Choice — An Updated Systematic Review and Meta-analysis of Outcomes Following Eversion vs. Conventional Carotid Endarterectomy in Randomised Controlled Trials and Observational Studies

Kosmas I. Paraskevas <sup>a,\*</sup>, Vaux Robertson <sup>b</sup>, Athanasios N. Saratzis <sup>b</sup>, A. Ross Naylor <sup>b</sup>

<sup>a</sup>Department of Vascular and Endovascular Surgery, Royal Free Hospital, Royal Free London NHS Foundation Trust, London, UK

<sup>b</sup>The Department of Vascular Surgery, Leicester Royal Infirmary, Leicester, UK

**Results:** There were 25 eligible studies (5 RCTs, 20 OSs) involving 49,500 CEAs (16,249 eCEAs; 33,251 cCEAs).

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<sup>b</sup>The Department of Vascular Surgery, Leicester Royal Infirmary, Leicester, UK

**Table 4.** Comparison of 30 day outcomes between eversion carotid endarterectomy (eCEA) vs. conventional carotid endarterectomy (cCEA)<sup>a</sup> using randomised controlled trial (RCT) data only.

Outcome	Total number of patients		Weighted proportions		OR (95% CI)	p	I <sup>2</sup>
	eCEA	cCEA	eCEA	cCEA			
30 day stroke	1157	1249	1.72%	2.67%	0.57 (0.31–1.04)	.07	45.3%
30 day death	1157	1249	1.11%	1.70%	0.75 (0.34–1.70)	.50	38.1%
MI	1089	1181	0.79%	0.69%	1.13 (0.39–3.25)	.81	0%
30 day stroke/death	1157	1249	2.66%	4.32%	0.37 (0.11–1.28)	.12	65.9%
30 day stroke/death/MI	1089	1181	3.32%	5.62%	0.51 (0.18–1.46)	.21	68.5%
Recurrent stenosis	951	939	1.98%	4.54%	0.40 (0.23–0.69)	.001	0%
Cranial nerve injury	1157	1249	3.89%	6.66%	0.68 (0.45–1.01)	.06	49.5%
Neck haematoma	952	1053	3.88%	6.19%	0.69 (0.27–1.77)	.44	66.7%

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<sup>a</sup>Department of Vascular and Endovascular Surgery, Royal Free Hospital, Royal Free London NHS Foundation Trust, London, UK

<sup>b</sup>The Department of Vascular Surgery, Leicester Royal Infirmary, Leicester, UK

**Table 5.** Comparison of outcomes between eversion CEA (eCEA) vs. conventional CEA (cCEA)<sup>a</sup> using data derived from observational studies only.

Outcome	Total meta-analysis						Sensitivity analysis (involving only those observational studies with NOS>5) <sup>b</sup>					
	Weighted proportions eCEA	Weighted proportions cCEA	Total number of patients eCEA	Total number of patients cCEA	OR (95% CI)	p	I <sup>2</sup>	Weighted proportions eCEA	Weighted proportions cCEA	OR (95% CI) <sup>b</sup>	p	I <sup>2</sup>
30 day stroke	1.18%	2.14%	11,067	9203	0.58 (0.49–0.71)	<.0001	1.5%	1.56%	3.03%	0.62 (0.51–0.75)	<.0001	38.6%
30 day death	0.83%	1.49%	11,067	9203	0.46 (0.32–0.67)	<.0001	0%	0.83%	1.30%	0.57 (0.42–0.76)	.0002	0%
MI	0.91%	0.89%	5273	2445	1.01 (0.71–1.44)	.94	0%	0.90%	0.89%	1.09 (0.61–1.94)	.78	0%
30 day stroke/death	2.26%	4.32%	11,067	9203	0.52 (0.44–0.61)	<.0001	0%	2.36%	4.21%	0.59 (0.50–0.70)	<.0001	39.6%
30 day stroke/death/MI	2.62%	4.78%	5273	2445	0.50 (0.38–0.67)	<.0001	0%	3.17%	4.69%	0.69 (0.53–0.90)	.007	46.7%
Recurrent stenosis	2.34%	4.68%	5439	2569	0.49 (0.25–0.94)	.032	77.9%	2.77%	4.31%	0.63 (0.30–1.33)	.22	78%
Cranial nerve injury	2.52%	4.08%	10,513	8598	0.76 (0.37–1.56)	.46	93%	1.97%	3.22%	0.71 (0.29–1.78)	.47	88.6%
Neck haematoma	2.70%	2.04%	5116	2282	1.25 (0.82–1.90)	.31	49.2%	3.80%	2.56%	1.34 (0.95–1.90)	.10	27.6%



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<sup>a</sup>Department of Vascular and Endovascular Surgery, Royal Free Hospital, Royal Free London NHS Foundation Trust, London, UK

<sup>b</sup>The Department of Vascular Surgery, Leicester Royal Infirmary, Leicester, UK

**Table 6.** Comparison of outcomes between eversion CEA (eCEA) vs. conventional CEA (cCEA)<sup>a</sup> using combined data from randomised controlled trials and observational studies.

Outcome	Total meta-analysis				OR (95% CI)	p	I <sup>2</sup>	Sensitivity analysis (involving only those observational studies with NOS>5) <sup>b</sup>				
	Total number of patients		Weighted proportions					Weighted proportions		OR (95% CI) <sup>b</sup>		p
	eCEA	cCEA	eCEA	cCEA				eCEA	cCEA			
30 day stroke	15,817	28,632	1.38%	2.33%	0.63 (0.46–0.86)	.004	40.7%	1.49%	2.99%	0.61 (0.51–0.86)	<.0001	36.1%
30 day death	13,672	11,817	0.86%	1.52%	0.55 (0.43–0.72)	<.0001	0%	0.86%	1.36%	0.60 (0.45–0.79)	<.0001	0.0%
MI	8690	20,638	0.95%	0.91%	1.04 (0.75–1.45)	.82	0%	0.89%	0.84%	1.09 (0.66–1.82)	.72	0%
30 day stroke/death	13,452	11,477	2.35%	4.3%	0.58 (0.50–0.67)	<.0001	48.3%	2.37%	4.22%	0.59 (0.42–0.82)	<.0001	48.3%
30 day stroke/death/MI	6325	3483	3.19%	4.74%	0.68 (0.45–1.02)	.065	50.9%	2.27%	5.01%	0.33 (0.13–0.86)	.17	32.5%
Recurrent stenosis	7246	4219	2.02%	4.71%	0.45 (0.26–0.78)	.004	72.5%	2.01%	4.15%	0.53 (0.29–0.95)	.033	72.5%
Cranial nerve injury	14,473	27,247	2.77%	4.82%	0.69 (0.40–1.22)	.205	90.4%	2.31%	4.29%	0.63 (0.32–1.24)	.178	86.3%
Neck haematoma	9091	21,075	3.04%	2.49%	1.27 (1.01–1.58)	.037	43.2%	3.30%	2.97%	1.13 (0.86–1.49)	.037	44.3%

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<sup>a</sup>Department of Vascular and Endovascular Surgery, Royal Free Hospital, Royal Free London NHS Foundation Trust, London, UK

<sup>b</sup>The Department of Vascular Surgery, Leicester Royal Infirmary, Leicester, UK

**Table 7.** Comparison of 30 day outcomes between eversion CEA (eCEA) vs. patched CEA (pCEA) using data from randomised controlled trials and observational studies.

Outcome	Total meta-analysis						Sensitivity analysis (involving only those observational studies with NOS>5) <sup>a</sup>					
	Total number of patients		Weighted proportions		OR (95% CI)	p	I <sup>2</sup>	Weighted proportions		OR (95% CI) <sup>a</sup>	p	I <sup>2</sup>
eCEA	pCEA	eCEA	pCEA	eCEA				pCEA				
30 day stroke	7565	8584	1.38%	1.93%	0.71 (0.37–1.36)	.30	58.7%	1.41%	1.85%	0.81 (0.39–1.68)	.57	48.3%
30 day death	7785	8924	0.86%	1.12%	0.64 (0.35–1.18)	.15	68.7%	0.73%	0.77%	0.95 (0.64–1.42)	.90	0%
MI	371	365	0.77%	0.89%	0.98 (0.17–5.69)	.98	0%	0.77%	0.89%	0.98 (0.17–5.69)	.98	0%
30 day stroke/death	7565	8584	2.35%	3.31%	0.64 (0.35–1.18)	.15	71.3%	2.14%	3.44%	0.57 (0.28–1.18)	.13	71.8%
30 day stroke/death/MI	371	365	3.19%	5.42%	— <sup>b</sup>	— <sup>b</sup>	— <sup>b</sup>	3.19%	5.42%	— <sup>b</sup>	— <sup>b</sup>	— <sup>b</sup>
Recurrent stenosis	1220	1268	2.02%	6.21%	0.68 (0.24–1.95)	.47	84.6%	5.15%	5.46%	0.84 (0.27–2.66)	.77	79.9%
Cranial nerve injury	6227	7072	4.82%	7.18%	0.50 (0.20–1.28)	.15	89.9%	2.32%	6.19%	0.37 (0.19–0.74)	.005	91%
Neck haematoma	932	963	3.04%	3.62%	0.53 (0.30–0.95)	.03	0%	4.78%	10.25%	0.43 (0.20–0.90)	.02	0.0%

# Systematic Review of Randomized Controlled Trials of Patch Angioplasty Versus Primary Closure and Different Types of Patch Materials During Carotid Endarterectomy

Kittipan Rerkasem<sup>1</sup> and Peter M. Rothwell,<sup>2</sup> <sup>1</sup>Department of Surgery, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand, <sup>2</sup>Stroke Prevention Research Unit, University of Oxford, Oxford, UK.

[*Asian J Surg* 2011;34(1):32–40]

Ten RCTs that involved 2,157 operations compared primary closure with routine patch closure

**CONCLUSION:** Meta-analysis of relatively small RCTs suggests that carotid patch angioplasty reduces the combined perioperative and long-term risk of stroke and the risk of restenosis. More data are needed.

# **Outcomes following eversion vs. conventional CEA in RCTs and observational studies – a systematic review**

*- Thank you for your attention -*