Stroke After PCI vs. CABG (All Pts. and Left Main Disease)

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Disclosure Statement of Financial Interest

I, Tullio Palmerini DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.





Risk of stroke: CABG vs PCI















Tarakji et al. JAMA 2011;305:381-90

PE in RCT of PCI vs CABG







Percutaneous Coronary Intervention versus Coronary-Artery Bypass Grafting for Severe Coronary Artery Disease

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N Engl J Med 2009;360:961-72.

Variable	PCI	CABG	P Value	Relative Risk with PCI (95% CI)	
	no./total no. (%)				
Major adverse cardiac or cerebrovascular event					
In hospital	39/896 (4.4)	47/870 (5.4)	0.31	0.81 (0.53–1.22)	
30 Days after procedure	54/895 (6.0)	45/866 (5.2)	0.45	1.16 (0.79–1.71)	
6 Mo after randomization	111/893 (12.4)	85/860 (9.9)	0.09	1.26 (0.96–1.64)	
12 Mo after randomization	159/891 (17.8)	105/849 (12.4)	0.002	1.44 (1.15–1.81)	
Death, stroke, or MI	68/891 (7.6)	65/849 (7.7)	0.98	1.00 (0.72–1.38)	
Death	39/891 (4.4)	30/849 (3.5)	0.37	1.24 (0.78–1.98)	
From cardiac causes	33/891 (3.7)	18/849 (2.1)	0.05	1.75 (0.99–3.08)	
From cardiovascular causes	1/891 (0.1)	3/849 (0.4)	0.36†	0.32 (0.03-3.05)	
From noncardiovascular causes	5/891 (0.6)	9/849 (1.1)	0.24	0.53 (0.18–1.57)	
Stroke	5/891 (0.6)	19/849 (2.2)	0.003	0.25 (0.09-0.67)	
MI	43/891 (4.8)	28/849 (3.3)	0.11	1.46 (0.92–2.33)	





Risk of stroke: CABG vs PCI







Risk of Stroke With Coronary Artery Bypass Graft Surgery Compared With Percutaneous Coronary Intervention

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Palmerini et al; JACC 2012





30-day follow up

N. pts with stroke/total n. pts





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Study

Palmerini et al; JACC 2012



1-year follow up

N. pts with stroke/total n. pts







Palmerini et al; JACC 2012



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30-day follow up





Palmerini et al; JACC 2012

N. pts with stroke/total n. pts

30-day follow up

3305 Al		50-0	uay			OR (95% CI)	Treatment	Control
Awesome (2002)						6.72 (2.32, 19.44)	24/787	4/858
Ben Gal (2006)		_				3.04 (0.12, 75.55)	1/86	0/86
Ben Gal (2010)						4.02 (1.70, 9.49)	11/1215	10/4412
Biryukova (2009)						- 16.37 (0.94, 284.87)	8/333	0/313
Briguori (2007)			_	*		6.30 (0.35, 113.36)	6/149	0/69
Chieffo (2006)						3.83 (0.18, 80.52)	2/142	0/107
Dacey (2007)						4.70 (1.63, 13.53)	26/991	4/702
Gwon (2005)				T	*	- 41.77 (5.56, 313.53)	18/661	1/1493
Hsu (2008)				* 1	-	1.60 (0.06, 41.00)	1/39	0/20
Kimura (2008)						7.36 (3.48, 15.53)	30/1708	9/3712
King (1997)		-		* 1		3.14 (0.15, 65.76)	2/270	0/168
Kohsaka (2008)				+ + -		12.14 (5.81, 25.33)	65/2634	8/3845
Lee (2006)			·			7.43 (0.42, 131.26)	8/123	0/50
Lee (2007)						7.21 (0.37, 141.40)	3/102	0/102
Li (2009)						4.41 (1.49, 13.05)	18/1886	4/1834
O'Keele (1993)			0			- 16.12 (0.91, 286.22)	7/100	0/100
Park DES (2010)			-	2		4.93 (0.59, 41.33)	6/219	1/176
Parke BMS (2010)				*	_	1.95 (0.09, 41.00)	2/259	0/100
Reynolds (2003)				*		1.51 (0.06, 37.43)	1/200	0/100
Rodes-Cabau (2008)			-	*		6.01 (0.74, 48.85)	8/145	1/104
Sanmartin (2007)		_		* 1		1.98 (0.09, 41.65)	2/245	0/96
Tarantini (2009)				* !	_	2.22 (0.09, 55.04)	1/127	0/93
Varani (2007)		-		*		3.54 (0.14, 87.91)	1/95	0/111
Yamagata (2010)				*	_	5.70 (0.29, 111.85)	3/116	0/92
Yan (2009)			_	*		5.96 (0.31, 115.58)	3/708	0/600
Yang JH (2008)			1			5.68 (0.27, 118.72)	2/390	0/441
Yang ZK (2007)			-	*		6.24 (0.75, 52.24)	6/231	1/235
Fixed effects (I-square	d=0.0%	1		0		6.38 (4.68, 8.70)	265/13961	43/20019
Random effects				\$		6.38 (4.68, 8.70)		
	-		1		1			
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	PCI	wo me		CARG NO	rse			



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Study

PCI vs off-pump CABG









Risk of stroke with on-pump vs off- pump CABG

Study ID	RR (95% CI)	Events, treatment	Events, control	% Weight
Diegeler, 2000	0.33 (0.01, 7.72)	0/20	1/20	1.29
BHACAS 1, 2002	0.67 (0.11, 3.90)	2/100	3/100	4.08
BHACAS 2, 2002	0.34 (0.04, 3.18)	1/100	3/101	2.52
Carrier, 2003	0.44 (0.02, 10.34)	0/28	1/37	1.27
Lee, 2003	0.33 (0.01, 7.87)	0/30	1/30	1.27
Lingaas, 2003	0.20 (0.01, 4.08)	0/60	2/60	1.40
Munretto, 2003	0.20 (0.01, 4.11)	0/88	2/88	1.39
Octopus, 2003	0.49 (0.04, 5.34)	1/142	2/139	2.23
SMART, 2003	1.01 (0.15, 7.03)	2/98	2/99	3.38
Sahlman, 2003	1.08 (0.07, 16.38)	1/24	1/26	1.73
Legare, 2004	- 5.00 (0.24, 103.28)	2/150	0/150	1.39
Motallebzadeh, 2004	0.44 (0.02, 10.05)	0/15	1/20	1.30
PRAGUE-4, 2004	0.18 (0.01, 3.74)	0/204	2/184	1.39
Selvanayagam, 2004	0.33 (0.01, 7.87)	0/30	1/30	1.27
JOCRI, 2005	0.35 (0.01, 8.56)	0/81	1/86	1.25
Al-Ruzzeh, 2006	1.00 (0.14, 6.93)	2/84	2/84	3.40
Nesher, 2006	0.67 (0.12, 3.85)	2/60	3/60	4.15
Niranjan, 2006	1.00 (0.06, 15.44)	1/40	1/40	1.70
Hernandez, 2007	0.15 (0.01, 2.81)	0/99	3/102	1.46
Motallebzadeh, 2007	0.32 (0.03, 3.04)	1/108	3/104	2.52
Sajja, 2007	0.36 (0.01, 8.58)	0/56	1/60	1.26
Medved, 2008	0.50 (0.05, 5.22)	1/30	2/30	2.31
ROOBY, 2009	1.74 (0.73, 4.14)	14/1104	8/1099	17.04
BBS, 2010	1.08 (0.37, 3.15)	7/176	6/163	11.14
DOORS, 2010	0.56 (0.26, 1.19)	10/450	18/450	21.94
MASS III, 2010	0.49 (0.09, 2.66)	2/155	4/153	4.50
Sousa Uva, 2010	0.20 (0.01, 4.15)	0/73	2/74	1.40
Overall (I-squared = 0.0%, p = 0.979)	0.70 (0.49, 0.99)	49/3605	76/3589	100.00
NOTE: Weights are from random effects analysis				
.1 1 10				
Favours off-pump Favours on-pump				



Afilalo et al. EHJ 2012;33:1257-67



Risk of stroke with on-pump vs off- pump CABG

	Off-pump	CABG	On-pump	CABG	Risk Ratio			Risk Ratio	
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	Year	M-H, Random, 95% Cl	
1.3.1 Trials with low ris	k of bias								
OCTOPUS 2001	2	142	5	139	4.2%	0.39 [0.08, 1.98]	2001		
BHACAS I +II 2002	3	200	6	201	5.9%	0.50 [0.13, 1.98]	2002		
SMART 2003	2	100	2	100	2.9%	1.00 [0.14, 6.96]	2003		
Al-Ruzzeh 2006	2	84	1	84	1.9%	2.00 [0.18, 21.64]	2006		
MASS III 2009	3	156	5	155	5.5%	0.60 [0.14, 2.45]	2009		
ROOBY 2009	14	1104	8	1099	14.8%	1.74 [0.73, 4.14]	2009	+	
DOORS 2009	10	450	18	450	19.0%	0.56 [0.26, 1.19]	2009		
PROMISS 2010	0	73	0	74		Not estimable	2010		
BBS 2011	16	176	11	163	20.3%	1.35 [0.64, 2.82]	2011		
Subtotal (95% CI)		2485		2465	74.6%	0.91 [0.61, 1.36]		•	
Total events	52		56						
Heterogeneity: Tau ² = 0.02; Chi ² = 7.40, df = 7 (P = 0.39); I ² = 5%									
Test for overall effect: Z = 0.45 (P = 0.65)									

Moller et al. Cochrane Database Rev 2012;3





Risk of Stroke with Percutaneous Coronary Intervention Compared to On-pump and Off-pump Coronary Artery Bypass Graft Surgery: Evidence from a Comprehensive Network Meta-analysis

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Submitted



Mixed treatment comparison





Song et al, BMJ 2011





Indirect comparison







Glenn et al. Health Techn Assess 2005















Sensitivity analyses





Conclusions

- Pooled data from meta-analyses suggest that PCI may be associated with lower risk of stroke than both on-pump CABG and offpump CABG
- Although off-pump CABG seems to be associated with lower risk of stroke than onpump CABG, this results is mainly driven by studies at high risk of bias



