

	Type of study	Total patients	Comparison	Main findings
Calafiore 2002 (25)	Single centre	4,823	On-pump single clamp On-pump double clamp OPCAB side-clamping Anaortic OPCAB	The presence of any aortic manipulation rather than the use of CPB itself was identified as an independent predictor of cerebrovascular accidents, especially in patients with extracoronary vasculopathy
Kapetanakis 2004 (24)	Single centre	7,272	Anaortic OPCAB OPCAB side-clamping On-pump double clamp	Patients operated on-pump with double clamp were 1.8 times more likely to have a stroke versus those without any aortic manipulation (95% confidence interval: 1.15 to 2.74, $p < 0.01$)
Kim 2002 (23)	Single centre	345	On-pump CABG OPCAB side-clamping Anaortic OPCAB	Anaortic OPCABG is associated with significant reduction in stroke risk compared to OPCAB with side-clamping and On-pump CABG (0% vs 0.8% vs 3.9%; $p=0.017$)
Patel 2002 (22)	Single centre	484	On-pump CABG Anaortic OPCAB	There was a significantly lower incidence of permanent focal neurological events in OPCAB patients compared to the ONCAB group (0.4% vs 3.9%; $p = 0.012$).
Valley 2008 (26)	Single centre	1,758	Anaortic OPCAB Off-pump side-biter Off-pump PAD	Anaortic technique showed a significant neurological protection compared to the use of a side-biter clamp or PAD (stroke rate 0.25% vs 1.1% respectively; $p=0.037$)
Lev-Ran 2005 (21)	Single centre	700	Anaortic OPCAB Off-pump side-biter	The use of partial aortic clamping was the only independent predictor of postoperative stroke (increasing the risk 28-fold; 0.2% vs 2.2%, $p=0.01$)
Moss 2015 (17)	Single centre	12,079	Anaortic OPCAB Off-pump side-biter Off-pump PAD On-pump single clamp On-pump double clamp	Aortic clamping was independently associated with an increase in postoperative stroke compared with no-touch technique (adjusted OR 2.50; $p<0.01$)
Albert 2018 (20)	Single centre	13,279	Anaortic OPCAB On-pump CABG	The anOPCAB technique reduced the overall & early postoperative stroke rate compared to on-pump CABG (overall: 0.49% vs 1.31%, $p < .0001$; early: 0.09% vs 0.83%; $p<0.0001$).
Arrigoni 2015 (78)	Single centre	400	Anaortic OPCAB On-pump (Syntax) PCI (Syntax)	Stroke rate was significantly lower after anaortic OPCAB vs CABG arm of the SYNTAX trial (1.3% vs 3.4%; $p=0.032$). No significant stroke rate difference when comparing anaortic OPCAB vs PCI arm of the trial (1.3 vs 2.0%; $p=0.347$)
Zhao 2018 (79)	Network meta-analysis	68,837	Anaortic OPCAB On-pump CABG PCI	There was no difference in 30-day stroke risk when comparing anOPCAB with PCI (OR 0.92, 95% CI 0.47–1.78). Compared with CABG, anOPCAB (OR 0.28, 95% CI 0.20–0.38) and PCI (OR 0.31, 95% CI 0.17–0.55) were associated with 72% and 69% reductions in 30-day stroke risk, respectively
Misfield 2011 (80)	Meta-analysis	11,398 (8 studies)	Anaortic OPCAB Off-pump side-biter/PAD	The rate of postoperative CVA was significantly lower in anaortic OPCAB (0.5% vs 1.4%; odds ratio, 0.46; 95% confidence interval, 0.29–0.72; $I^2=0.8\%$; $p=0.0008$)
Pawliszak 2016 (18)	Meta-analysis	25,136 (18 studies)	Clampless* OPCAB Off-pump side-biter	Aortic “no-touch” was associated with a statistically lower risk of CVA as compared to side-clamp OPCAB (0.36% vs 1.28%; risk ratio 95% CI: 0.41 (0.27-0.61); $p<0.01$; $I^2=0\%$).
Zhao 2017 (19)	Network meta-analysis	37,720 (13 studies)	Anaortic OPCAB Off-pump side-biter Off-pump PAD On-pump single clamp On-pump double clamp	AnOPCAB was the most effective treatment for decreasing the risk of post-operative stroke (-78% vs CABG, 95% confidence interval [CI]: 0.14 to 0.33; -66% vs side-clamp OPCAB, 95% CI: 0.22 to 0.52; -52% vs OPCAB-PAD, 95% CI: 0.27 to 0.86)

Table 1. Studies examining bypass grafting with different degrees of aortic manipulation.