

**Table S1** Newcastle-Ottawa scale of included studies

Study	Representative of exposed cohort	Selection of non-exposed cohort	Ascertainment of exposure	Outcome not present at start of study	Comparability	Assessment of outcomes	Length of follow up	Adequacy of follow up	Total
Hiraoka	*	*	*	*	**	*	*	*	*****
Iba	*	*	*	*	**	*		*	*****
Joo	*	*	*	*	**	*	*	*	*****
Preventza	*	*	*	*	**	*		*	*****
Tokuda	*	*	*	*	**	*		*	*****

\*, indicates a point awarded in each category of the Newcastle-Ottawa scale.

**Table S2** Patient characteristics and outcomes

Characteristic	Hiraoka 2017		Iba 2014		Joo 2019		Preventza 2015		Tokuda 2016	
	Open	Hybrid	Open	Hybrid	Open	Hybrid	Open	Hybrid	Open	Hybrid
Population (n)	43	43	35	35	48	48	25	25	38	38
Age (mean, SD)	73.9±8.8	73.2±10.1	76.3±8.5	75.7±9.3	67.6±12.8	67.8±12.7	67.0±11.1	68.0±10.4	74.0±6.0	75.0±6.0
Male (n)	32	30	25	29	38	38	12	11	30	32
Hypertension (n)	38	36	33	33	37	39	24	22		
Diabetes (n)	6	7	5	5	11	10	1	3		
CAD (n)			8	10	15	17	11	12		
Stroke (n)	4	4	12	9	8	7	1	5	2	5
COPD (n)	6	6	5	7	5	7	15	14	2	4
CKD (n)			4	6	17	15				
Renal malperfusion (n)							6	7	3	3
Prior sternotomy (n)	2	1			9	7	6	5		
prior cardiac surgery (n)									8	6
Emergent surgery (n)	13	10	2	1	5	4	7	7	2	1
Aortic dissection	11	14								
Acute			0	0			18/274*	3/45*		
Chronic			0	0	18	20			3	2
Outcomes										
In hospital mortality (n)	4	6	1	1	2	2	2	4		
30-day mortality (n)	2	3			1	1	1	4		
Operative mortality (n)	5	7					2	4	0	1
New dialysis (n)			1	0	7	3	1	0	1	1
TIA (n)	4	5					0	5		
Permanent stroke (n)	0	5	0	3	1	7	0	3	3	9
Paraplegia (n)	2	2			0	0	1	1	1	2
Reop for bleeding (n)			2	3	4	1	3	0	5	4
ICU time (mean, SD)	21.0±16.7	12.9±17.3	4.8±5.1	1.8±2.5	6.7±9.8	2.4±3.8	4.0±5.2	8±13.1	4.5±1.3	8.5±10.4
Hospital LOS (mean, SD)	29.5±17.2	27.2±27.1	32.8±21.3	27.7±31.4	21.0±16.7	12.9±17.3	12.0±5.2	15.0±12.6	33.0±22.0	38.0±18.0

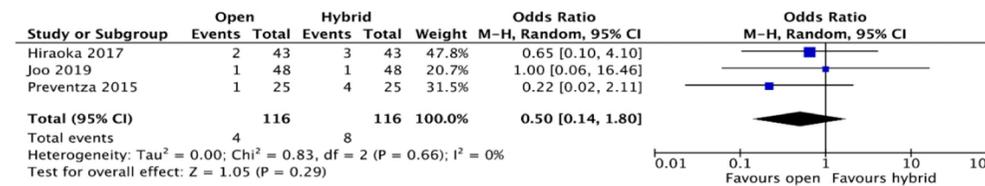
\*Percentages in entire patient cohorts instead of propensity-matched groups. CAD, coronary artery disease; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; ICU, intensive care unit; LOS, length of stay; LVEF, left ventricular ejection fraction; PVD, peripheral vascular disease; TIA, transient ischemic attack.

**Table S3** Summary of operative techniques used in the included studies

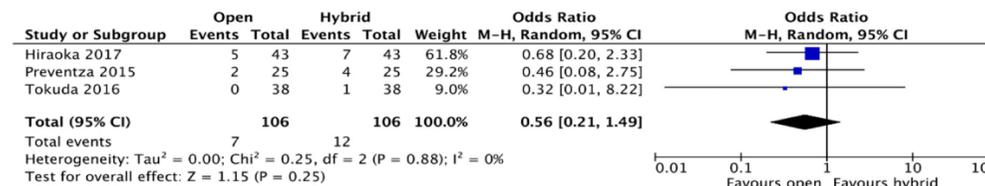
	Concomitant cardiac surgeries	Frozen elephant trunk	CPB use in hybrid procedures	Total debranching via sternotomy + TEVAR (zone 0)	Double debranching + TEVAR (zone 1)	Left Ca-left Sc/Ax bypass or left-right Ax bypass + TEVAR (zone 2)	Chimney technique for zone 0 repair	Other
Hiraoka 2017				14/58 (24%)	17/58 (29%)	23/58 (40%)	4/58 (7%)	
Iba 2014				8/50 (16%)	30/50 (60%)	6/50 (12%)	5/50 (10%)	Bypass to abdominal aorta in 1 case
Joo 2019				64/64 (100%)				
Preventza 2015	Root, AVR, CABG, tricuspid, MVR, TVR, PFO repair, Ascending in their open cohort	26/274 (9%) in their entire open cohort	2/25 (8%) in the matched hybrid cohort had ascending and root replacement	45/45 (100%)				
Tokuda 2016	3/38 (8%) in their matched open, 6/38 (16%) in their matched hybrid cohort (CABG)		25/38 (66%) in their matched hybrid cohort used CPB	46/58 (79%)				12/58 (21%) in the hybrid cohort underwent type 3 repair without arch replacement

AVR, aortic valve replacement; Ax, axillary artery; Ca, carotid artery; CABG, coronary artery bypass graft; CPB, cardiopulmonary bypass; MVR, mitral valve repair/replacement; PFO, patent foramen ovale; Sc, subclavian artery; TEVAR, thoracic endovascular aortic repair; TVR, tricuspid valve repair/replacement.

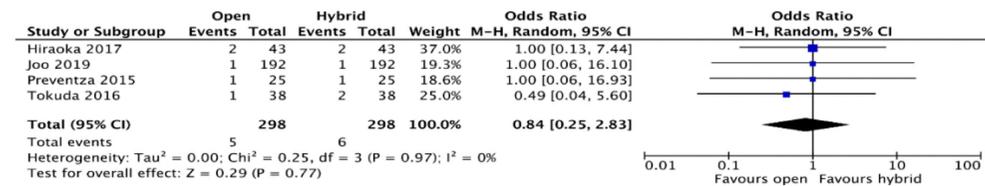
### 30-day Mortality



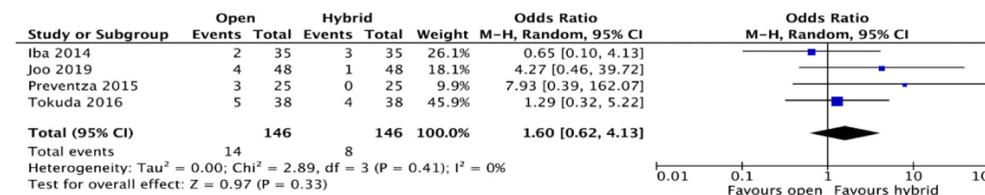
### Operative Mortality



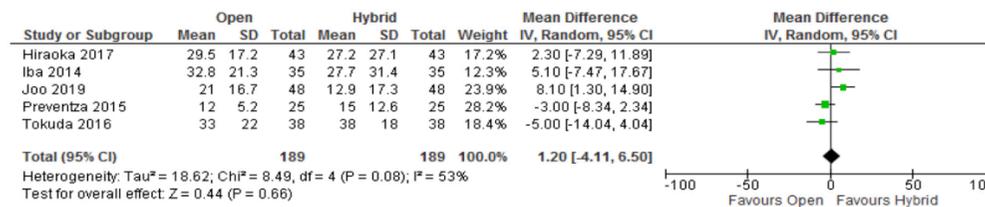
### Paraplegia



### Reoperation for bleeding



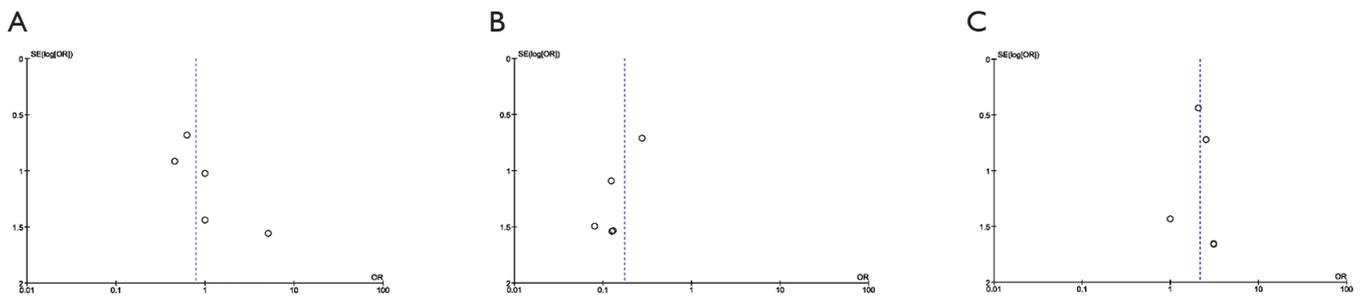
### Length of Stay



**Figure S1** Forest plots for the comparison of outcomes of patients undergoing open versus hybrid aortic arch repair.

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Hiraoka 2017	⊖	⊖	?	+	+	+	+
Iba 2014	⊖	⊖	?	+	+	+	+
Joo 2019	⊖	⊖	?	+	+	+	+
Preventza 2015	⊖	⊖	?	+	+	+	+
Tokuda 2016	⊖	⊖	?	+	+	+	+

**Figure S2** Risk of bias assessment is based on review author's judgement on each included study. Green and red indicate low and high risk of bias, respectively. Yellow indicates unclear risk bias.



**Figure S3** Funnel plots of (A) in-hospital mortality, (B) permanent stroke, and (C) dialysis. OR, odd ratio; SE, standard error.