Surgical outcomes and optimal approach to treatment of aortic valve endocarditis with aortic root abscess – systematic review and meta-analysis

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Abstract

Background Data on the postoperative outcomes for patients with infective endocarditis complicated by an aortic root abscess is sparse due to the condition's low incidence and high mortality rates. This systematic review and meta-analysis aims to evaluate existing data on the impact of aortic root abscesses (ARA) on the postoperative outcomes of surgically managed infective endocarditis (IE) and to inform optimal surgical approach. **Methods** The online databases MEDLINE, EMBASE and Cochrane library were searched from 1990 to 2022 for studies comparing ARA with NARA (no ARA) in infective endocarditis. Data was extracted by two independent investigators and aggregated in a random-effects model (Review Manager version 5.3). Risk of bias was assessed using an adapted version of the Newcastle-Ottawa scale. **Results** Six clinical studies were included in the meta-analysis (n = 1982). The ARA group was associated with an increased risk of in-hospital mortality (OR = 1.74 96% CI 1.18-2.56) and late mortality (HR = 1.27 95% CI 1.03-1.58). The reoperation meta-analysis was complicated by high rates of heterogeneity (I^2 = 59%) and found no significant differences in reoperation between group ARA and NARA (no ARA) (HR = 1.48; 95% CI 0.92-2.40). Post-hoc scatter graph showed a strong linear relationship (r=0.998), suggesting hospitals with higher rates of aortic root replacement (ARR) achieve lower rates of reoperation for ARA patients compared with PR. **Conclusions** The presence of an ARA in aortic valve endocarditis is associated with elevated early and late mortality despite modern standards of care. Additionally, ARR should be considered to have a favourable postoperative profile for use in this context.

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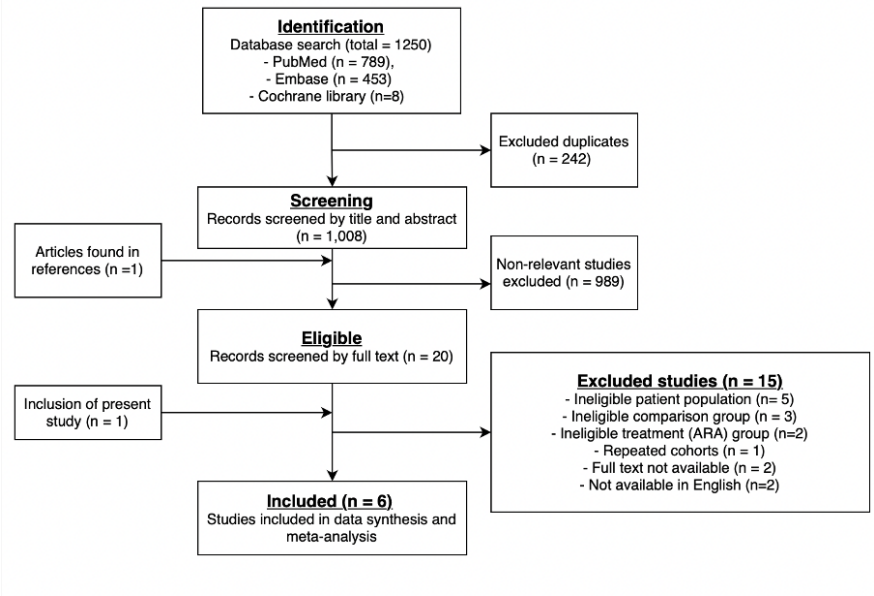
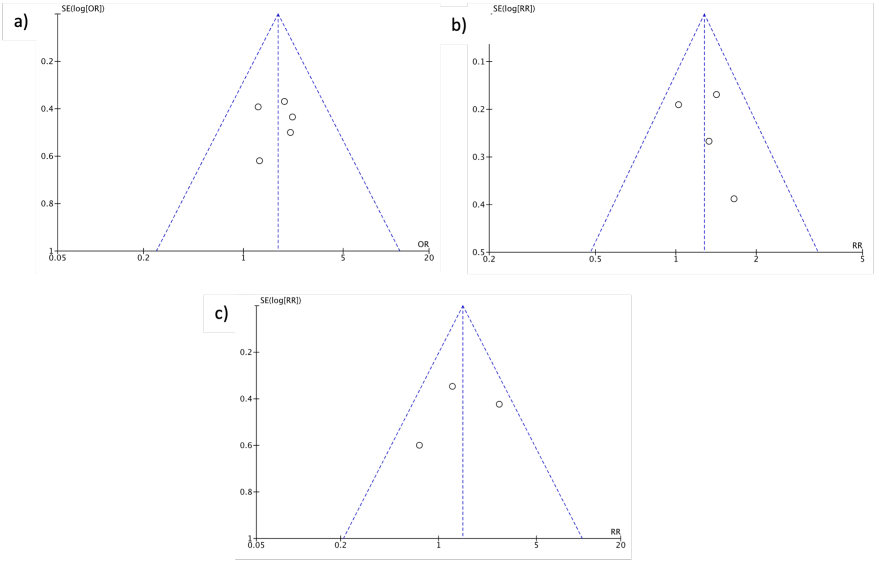
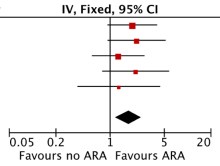




a)

Study or Subgroup	log[Odds Ratio]	SE	Weight	Odds Ratio IV, Fixed, 95% CI	Year
Anguera 2005	0.66	0.3703	28.4%	1.93 [0.94, 4.00]	2005
Yoshioka 2017	0.7858	0.4335	20.7%	2.19 [0.94, 5.13]	2017
Mahmood 2020	0.2406	0.3918	25.3%	1.27 [0.59, 2.74]	2020
Yang 2020	0.7586	0.5008	15.5%	2.14 [0.80, 5.70]	2020
Harris 2022	0.2577	0.6198	10.1%	1.29 [0.38, 4.36]	2021
Total (95% CI)			**100.0%**	**1.74 [1.18, 2.56]**	

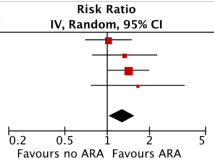
Heterogeneity: Chi² = 1.40, df = 4 (P = 0.84); I² = 0%
Test for overall effect: Z = 2.81 (P = 0.005)

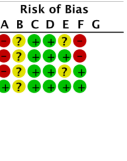


b)

Study or Subgroup	log[Risk Ratio]	SE	Weight	Risk Ratio IV, Random, 95% CI	Year
Said 2017	0.0208	0.1904	33.1%	1.02 [0.70, 1.48]	2017
Yoshioka 2017	0.2851	0.2676	16.8%	1.33 [0.79, 2.25]	2017
Yang 2020	0.3507	0.1688	42.1%	1.42 [1.02, 1.98]	2020
Harris 2022	0.502	0.3875	8.0%	1.65 [0.77, 3.53]	2021
Total (95% CI)			**100.0%**	**1.27 [1.03, 1.58]**	

Heterogeneity: Tau² = 0.00; Chi² = 2.24, df = 3 (P = 0.52); I² = 0%
Test for overall effect: Z = 2.21 (P = 0.03)

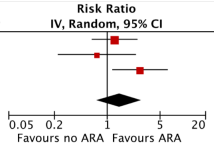




c)

Study or Subgroup	log[Risk Ratio]	SE	Weight	Risk Ratio IV, Random, 95% CI	Year
Said 2017	0.2263	0.348	42.2%	1.25 [0.63, 2.48]	2017
Yang 2020	−0.3134	0.5994	22.9%	0.73 [0.23, 2.37]	2020
Harris 2022	0.9984	0.4245	34.9%	2.71 [1.18, 6.24]	2021
Total (95% CI)			**100.0%**	**1.45 [0.74, 2.86]**	

Heterogeneity: Tau² = 0.16; Chi² = 3.65, df = 2 (P = 0.16); I² = 45%
Test for overall effect: Z = 1.08 (P = 0.28)



Risk of bias legend
(**A**) Random sequence generation (selection bias)
(**B**) Allocation concealment (selection bias)
(**C**) Blinding of participants and personnel (performance bias)
(**D**) Blinding of outcome assessment (detection bias)
(**E**) Incomplete outcome data (attrition bias)
(**F**) Selective reporting (reporting bias)
(**G**) Other bias