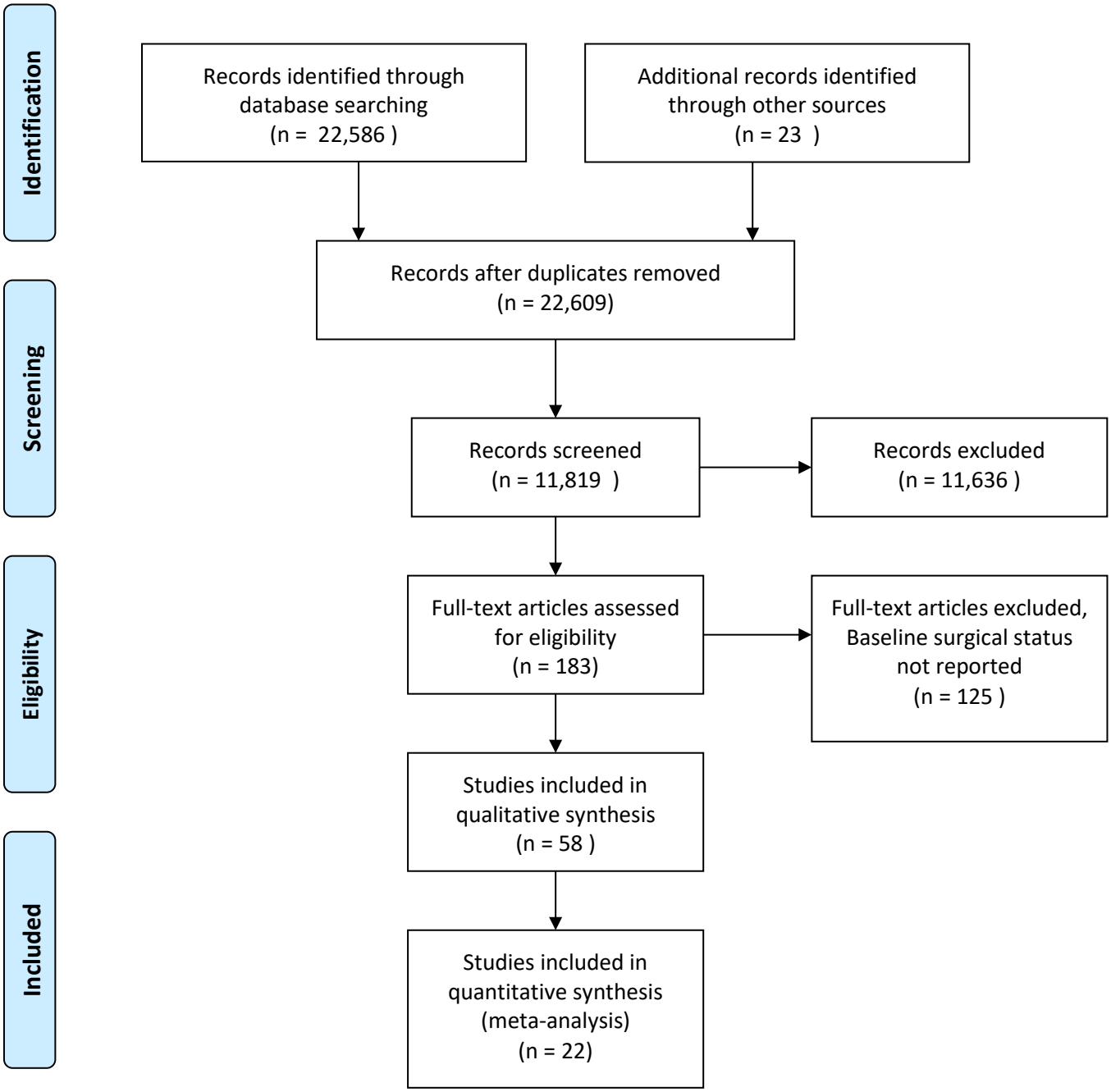
Baseline surgical status and short term mortality after ECMO for post-cardiotomy shock. Meta-analysis.

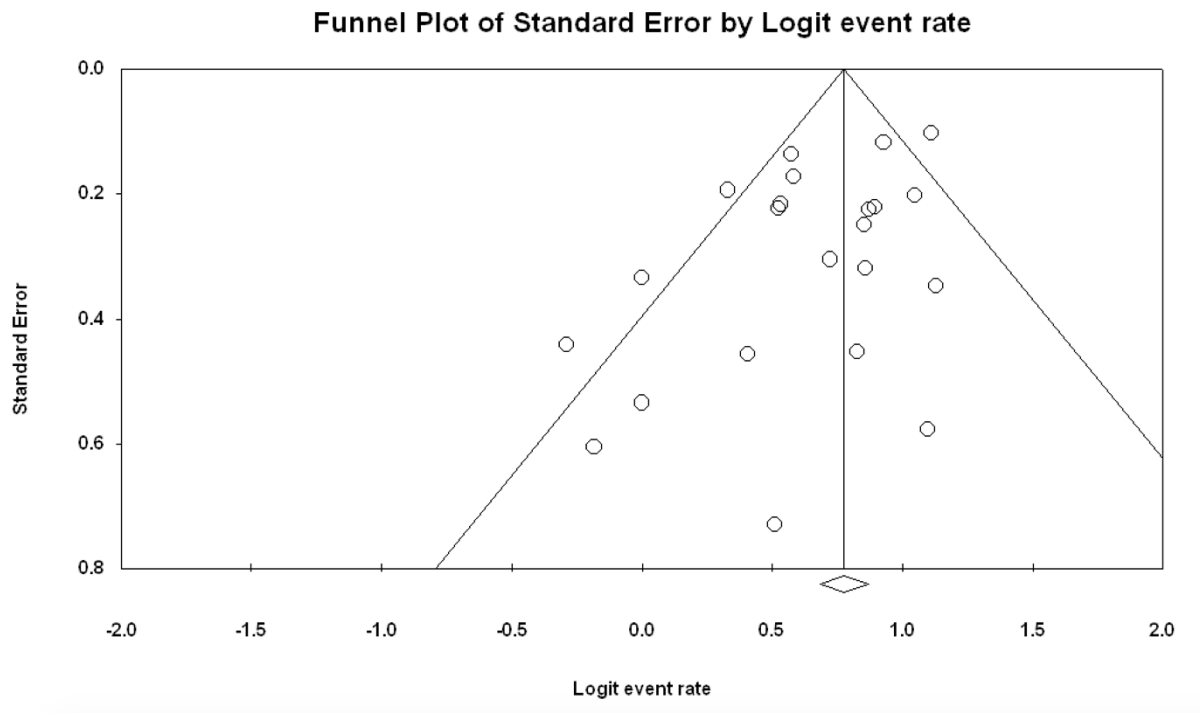
-ECMO for PCS depending on surgical status-

SUPPLEMENTARY APPENDIX

Appendix Figure 1. PRISMA Flow Chart

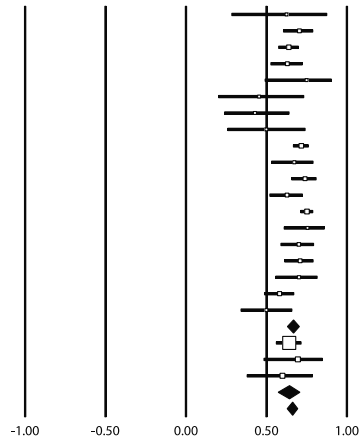


Appendix Figure 2. Publication bias

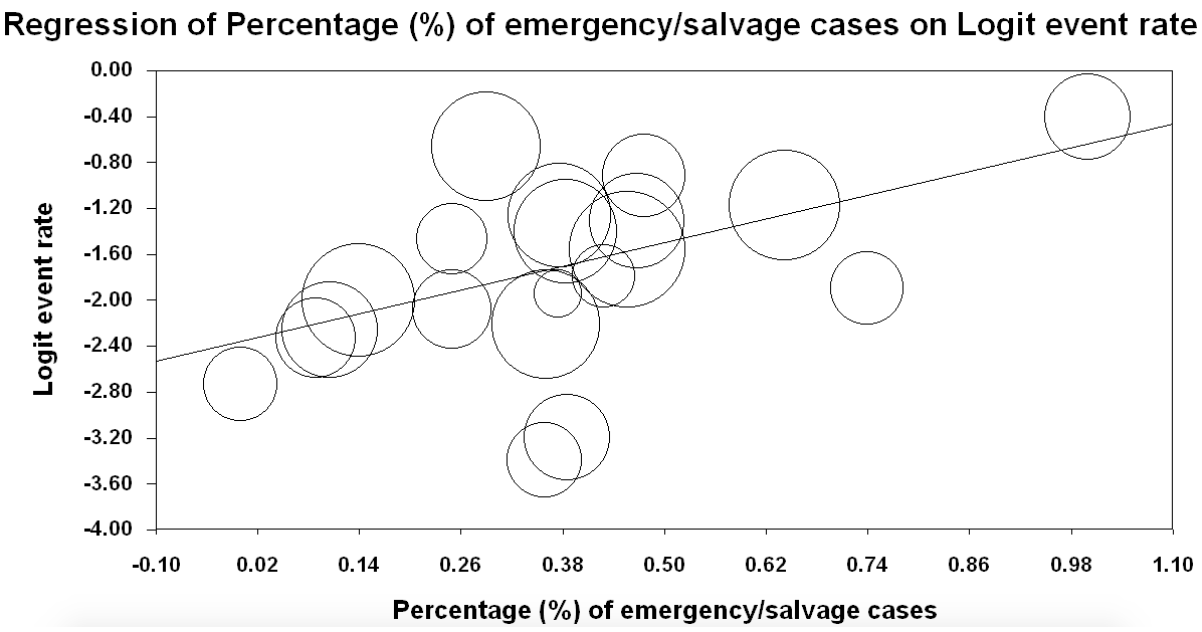


Appendix Figure 3. Sensitivity analysis <50% emergency vs >50% emergency cases

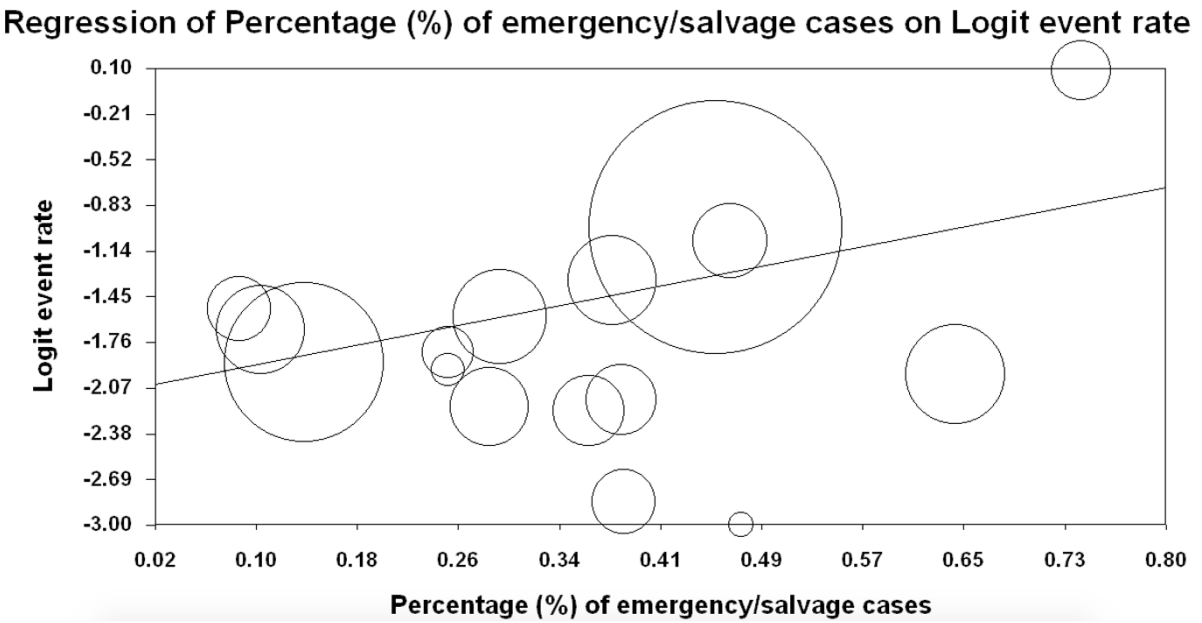
	Study name	Subgroup within study	Event rate	Lower limit	Upper limit	Z-Value	p-Value
	Beckmann 2017	Blank	0.625	0.285	0.875	0.699	0.484
	Doll N 2003	Blank	0.705	0.606	0.788	3.877	0.000
	Elsharkawy 2010	Blank	0.639	0.576	0.699	4.201	0.000
	Guihaire 2017	Blank	0.630	0.528	0.723	2.473	0.013
	Khorsandi 2016	Blank	0.750	0.492	0.903	1.903	0.057
	Iazzara 1993	Blank	0.455	0.203	0.732	-0.301	0.763
	Magovern 1994	Blank	0.429	0.240	0.640	-0.652	0.514
	Mikus 2013	Blank	0.500	0.260	0.740	0.000	1.000
	Papadopoulos 2015	Blank	0.717	0.668	0.761	7.934	0.000
	Pokersnik 2012	Blank	0.673	0.532	0.789	2.376	0.017
	Pontailler 2017	Blank	0.740	0.657	0.809	5.173	0.000
	Raffa 2017	Blank	0.628	0.521	0.723	2.345	0.019
<50%	Rastan 2010	Blank	0.752	0.713	0.788	10.908	0.000
Emergency	Saxena 2015	Blank	0.756	0.610	0.859	3.253	0.001
	Slottosch 2012	Blank	0.701	0.590	0.793	3.428	0.001
	Slottosch 2017	Blank	0.710	0.614	0.790	4.063	0.000
	Unosawa 2012	Blank	0.702	0.558	0.815	2.688	0.007
	Wu 2010	Blank	0.582	0.488	0.670	1.708	0.088
	Zhong 2017	Blank	0.500	0.342	0.658	0.000	1.000
Subtotal			0.669	0.631	0.704	8.231	0.000
	Biancari 2017	Blank	0.642	0.562	0.715	3.404	0.001
>50%	Muehrcke 1996	Blank	0.696	0.485	0.847	1.824	0.068
Emergency	Santarpino 2015	Blank	0.600	0.380	0.786	0.888	0.374
Subtotal			0.644	0.573	0.708	3.907	0.000
Overall			0.663	0.629	0.694	9.089	0.000



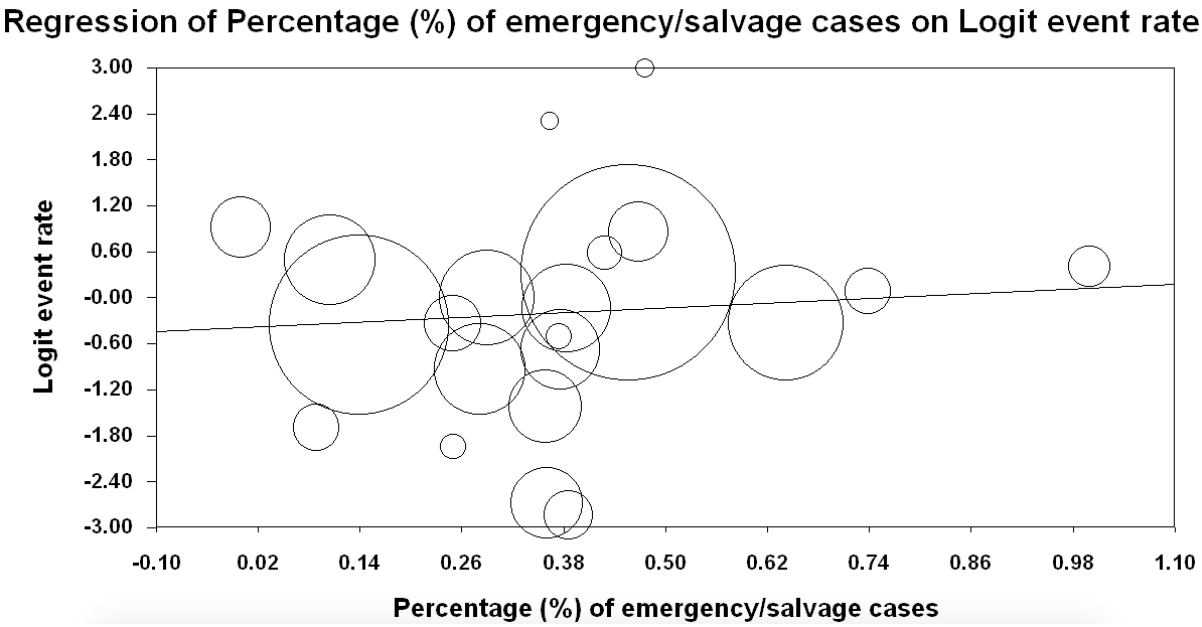
Appendix Figure 4. Neurologic complications



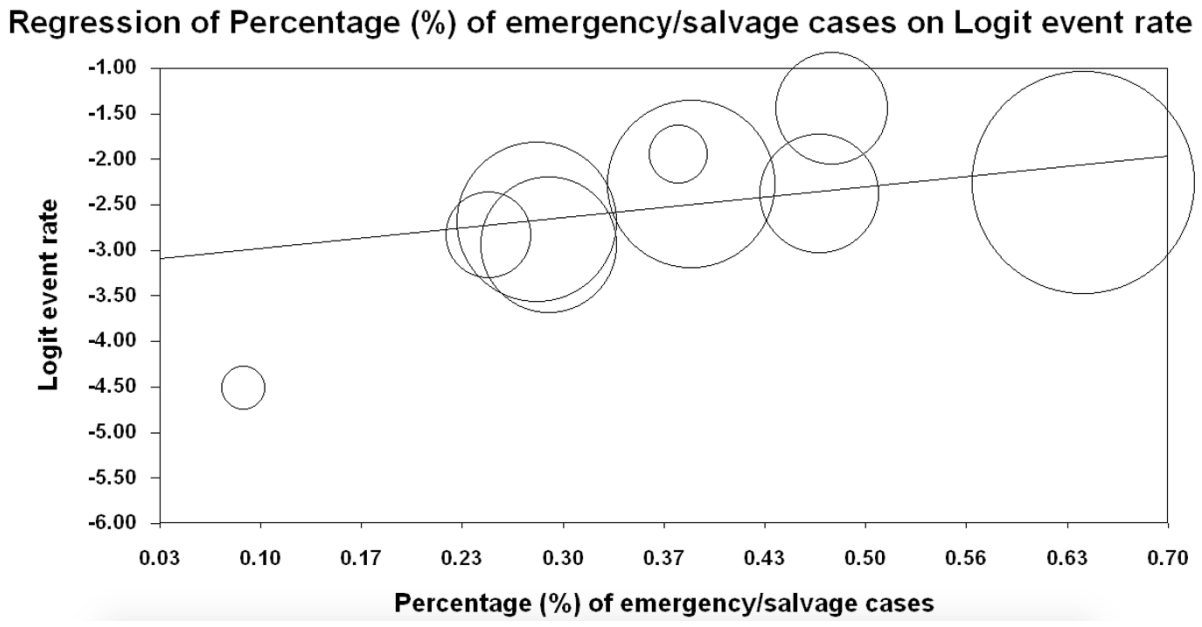
Appendix Figure 5. Limb complications



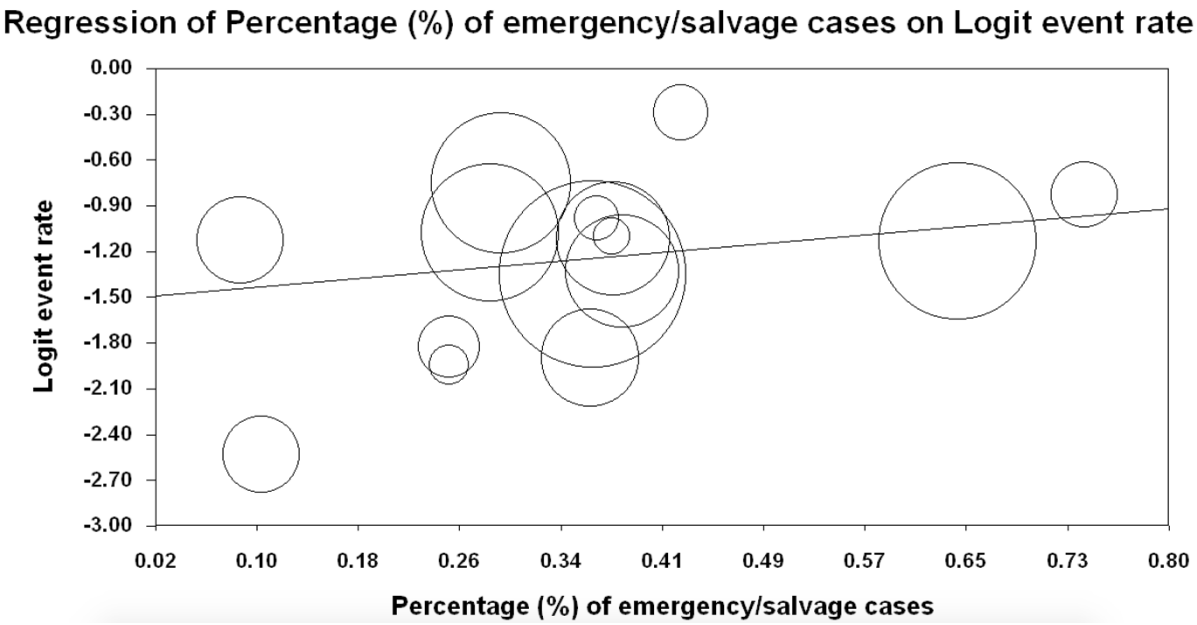
Appendix Figure 6. Bleeding



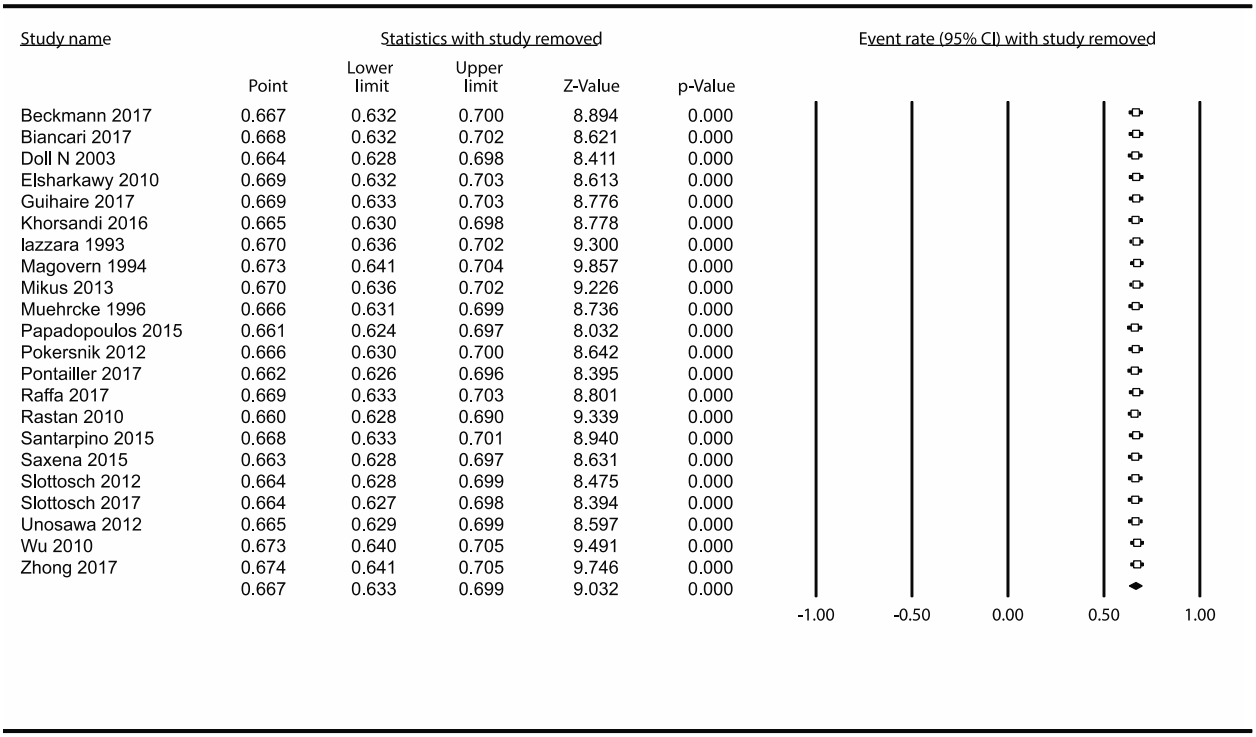
Appendix Figure 7. Brain death



Appendix Figure 8. Sepsis



Appendix Figure 9. Cumulative analysis.



Study name	Statistics with study removed				
	Point	Lower limit	Upper limit	Z-Value	p-Value
Beckmann 2017	0.667	0.632	0.700	8.894	0.000
Biancari 2017	0.668	0.632	0.702	8.621	0.000
Doll N 2003	0.664	0.628	0.698	8.411	0.000
Elsharkawy 2010	0.669	0.632	0.703	8.613	0.000
Guihaire 2017	0.669	0.633	0.703	8.776	0.000
Khorsandi 2016	0.665	0.630	0.698	8.778	0.000
Iazzara 1993	0.670	0.636	0.702	9.300	0.000
Magovern 1994	0.673	0.641	0.704	9.857	0.000
Mikus 2013	0.670	0.636	0.702	9.226	0.000
Muehrcke 1996	0.666	0.631	0.699	8.736	0.000
Papadopoulos 2015	0.661	0.624	0.697	8.032	0.000
Pokersnik 2012	0.666	0.630	0.700	8.642	0.000
Pontailler 2017	0.662	0.626	0.696	8.395	0.000
Raffa 2017	0.669	0.633	0.703	8.801	0.000
Rastan 2010	0.660	0.628	0.690	9.339	0.000
Santarpino 2015	0.668	0.633	0.701	8.940	0.000
Saxena 2015	0.663	0.628	0.697	8.631	0.000
Slottosch 2012	0.664	0.628	0.699	8.475	0.000
Slottosch 2017	0.664	0.627	0.698	8.394	0.000
Unosawa 2012	0.665	0.629	0.699	8.597	0.000
Wu 2010	0.673	0.640	0.705	9.491	0.000
Zhong 2017	0.674	0.641	0.705	9.746	0.000
	0.667	0.633	0.699	9.032	0.000

Appendix Table 1. PRISMA CheckList

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2-3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	5
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	NA
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	6
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	6
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	6
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	6-7

Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	7
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	7-8
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	7-8

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	8-9
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	7
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	8
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	8, Appendix
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Figures
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	8-10
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Appendix
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	10, Appendix
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	10-14

Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	14
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	15
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	1

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed10000

Appendix Table 2. ROBINS-I tool bias assessment.

Study	Bias due to confounding	Bias in selection of participants into the study	Bias in measurement of interventions	Bias due to departures from	Bias due to missing data*	Bias in measurement of outcomes*	Bias in selection of reported result*	Overall bias	Cohen's Kappa
Beckmann 2017 [13]	Critical	Critical	Serious	NA	Low	Moderate	Moderate	Critical	71.4%
Biancari 2017 [14]	Critical	Low	Serious	NA	Low	Low	Low	Low	85.7%
Doll N 2003 [15]	Critical	Low	Low	NA	Moderate	Low	Low	Low	71.4%
Elsharkawy 2010 [16]	Critical	Low	Low	NA	Low	Moderate	Moderate	Low	85.7%
Guihaire 2017 [17]	Critical	Serious	Low	NA	Low	Moderate	Moderate	Moderate	85.7%
Khorsandi 2016 [18]	Critical	Low	Serious	NA	Low	Low	Low	Low	71.4%
Iazzara 1993 [19]	Critical	Low	Serious	NA	Moderate	Critical	Moderate	Moderate	71.4%
Magovern 1994 [20]	Critical	Low	Serious	NA	Moderate	Moderate	Critical	Moderate	71.4%
Mikus 2013 [21]	Critical	Low	Low	NA	Low	Moderate	Moderate	Low	85.7%
Muehrcke 1996 [22]	Critical	Moderate	Critical	NA	Serious	Low	Low	Moderate	85.7%
Papadopoulos 2015 [23]	Critical	Low	Low	NA	Low	Moderate	Moderate	Low	85.7%
Pokersnik 2012 [24]	Critical	Serious	Critical	NA	Low	Moderate	Moderate	Critical	71.4%
Pontailler 2017 [25]	Critical	Low	Serious	NA	Serious	Critical	Critical	Critical	71.4%
Raffa 2017 [26]	Critical	Low	Serious	NA	Low	Moderate	Low	Low	85.7%
Rastan 2010 [27]	Critical	Low	Low	NA	Low	Moderate	Moderate	Low	85.7%
Santarpino 2015 [28]	Critical	Low	Low	NA	Moderate	Low	Low	Low	71.4%
Saxena 2015 [29]	Critical	Low	Low	NA	Low	Moderate	Moderate	Low	71.4%
Slottosch 2012 [30]	Critical	Low	Low	NA	Low	Low	Moderate	Low	100%
Slottosch 2017 [31]	Critical	Low	Low	NA	Moderate	Moderate	Moderate	Moderate	71.4%
Unosawa 2012 [32]	Critical	Low	Low	NA	Low	Moderate	Moderate	Low	57.1%
Wu 2010 [33]	Critical	Low	Critical	NA	Low	Low	Low	Low	57.1%
Zhong 2017 [34]	Critical	Critical	Low	NA	Low	Serious	Moderate	Critical	71.4%

*When multiple outcomes were reported for a study, the highest level of bias at the outcome level is reported in the table. Bias reported for comparison of peripheral vs central extracorporeal circulation and not for a study in general.

Appendix Table 3. Complications

Study (year) [reference]	Baseline status (elective/urgent/ emergency/salvage)	Neurological complications. N (%)	Brain death. N (%)	Limb complications. N (%)	AKI. N (%)	Sepsis. N (%)	Bleeding. N (%)	MOF. N (%)	Transfusions		
									RBC	FFP	PLT
Beckmann 2017 [e1]	NR/NR/3/NR	1 (12.5)	1 (12.5)	NR	4 (50.0)	2 (25.0)	3 (37.5)	1 (12.5)		NR	
Biancari 2017 [e2]	19/34/80/15	35 (23.6)	14 (9.5)	18 (12.2)	67 (45.3)	36 (24.3)	62 (41.9)	54 (36.5)	17±17	14±21	28±72
Doll N 2003 [e3]	21/64/10/0	9 (9.5)	NR	15 (15.8)	64 (67.4)	7 (7.4)	59 (62.1)	12 (12.6)	30±20	NR	
Elsharkawy 2010 [e4]	NR/NR/84/NR	23 (9.9)	NR	NR	101 (43.3)	48 (20.6)	15 (6.4)	75 (32.2)		NR	
Guihaire 2017 [e5]	NR/NR/33/NR	3 (3.3)	NR	9 (9.8)	NR	12 (12.6)	18 (19.6)	41 (70.7)	12±1	NR	
Khorsandi 2016 [e6]*	9/3/4/0	3 (18.8)	NR	2 (12.5)	3 (18.8)	2 (12.5)	2 (12.5)	1 (6.3)		NR	
lazzara 1993 [e7]	1/6/4/0	NR	NR	NR	1 (9.1)	3 (27.3)	10 (90.9)	5 (45.5)	25±9	21±7	41±10
Magovern 1994 [e8]	0/11/10/0	6 (28.6)	4 (19.0)	1 (4.8)	1 (4.8)	NR	20 (95.2)	NR	28±5	21±7	40±15
Mikus 2013 [e9]	6/2/6/0	2 (14.3)	NR	NR	7 (50.0)	6 (42.9)	9 (64.3)	6 (42.9)	54±36	NR	18±9
Muehrcke 1996 [e10]	6/0/17/0	3 (13.0)	NR	12 (52.2)	12 (52.2)	7 (30.4)	12 (52.2)	5 (21.7)	43±22	10±12	59±40
Papadopoulos 2015 [e11]	NR/NR/NR/50	43 (11.9)	NR	47 (13.1)	220 (61.1)	NR	148 (41.1)	248 (69.0)		NR	
Pokersnik 2012 [e12]	NR/NR/0/0	3 (6.1)	NR	NR	16 (32.7)	NR	35 (71.4)	NR		NR	
Pontailler 2017 [e13]*	NR/NR/49/NR	5 (3.9)	NR	7 (5.5)	NR	NR	7 (5.5)	NR	4±5	1±1	3±4
Raffa 2017 [e14]	NR/NR/33/NR	17 (19.8)	8 (9.3)	9 (10.5)	26 (30.2)	18 (20.9)	40 (46.5)	NR		NR	
Rastan 2010 [e15]	159/122/205/31	90 (17.4)	NR	141 (27.3)	336 (65.0)	NR	300 (58.0)	NR	14±12	14±13	2±NR
Santarpino 2015 [e16]	0/0/0/20	8 (40.0)	NR	NR	7 (35.0)	NR	12 (60.0)	NR	80%	54%	43%
Saxena 2015 [e17]	35/6/4/0	4 (8.9)	0	8 (17.8)	20 (44.4)	11 (24.4)	7 (15.6)	13 (38.2)		NR	
Slottosch 2012 [e18]	NR/NR/29/NR	17 (22.1)	NR	16 (20.8)	53 (68.8)	19 (24.7)	26 (33.8)	NR	29±16	18±13	4±3
Slottosch 2017 [e19]*	NR/NR/37/0	34 (24.5)	5 (3.6)	17 (12.2)	92 (66.2)	32 (23.0)	50 (36.0)	NR	38±12	21±22	5±6
Unosawa 2012 [e20]	NR/NR/22/NR	10 (21.3)	4 (8.5)	12 (25.5)	15 (31.9)	NR	33 (70.2)	18 (38.3)		NR	
Wu 2010 [e21]	NR/NR/31/NR	NR	7 (6.4)	11 (10.0)	46 (41.8)	28 (25.5)	31 (28.2)	28 (25.5)		NR	
Zhong 2017 [e22]	NR/NR/9/NR	4 (11.1)	2 (5.6)	5 (13.9)	NR	5 (13.9)	15 (41.7)	7 (19.4)	13±10	10±4	2±1
Regression complication rate (%) vs emergency/non-emergency ratio: coefficient and p-value		**$ß_{coef}$= 1.721 P_{slope} < 0.001**	$ß_{coef}$= 1.958 P_{slope}= 0.099	**$ß_{coef}$= 1.711 P_{slope}< 0.001**	$ß_{coef}$= -0.428 P_{slope}= 0.526	$ß_{coef}$= -0.732 P_{slope}= 0.134	**$ß_{coef}$= -0.507 P_{slope}= 0.051**	$ß_{coef}$= -0.201 P_{slope}= 0.886	NA		

* Reported for entire study population including non-PCS patients

AKI, acute kidney injury; RBC, redo blood cells; FFP, fresh frozen plasma; PLT, platelets; MOF, multi-organ failure; NR, not reported

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