

Table S1 Search strategy

Search	Query	Items found
Recent queries in EMBASE on Oct 7, 2020		
#1	'dexmedetomidine'/exp OR 'dexmedetomidine'	11,978
#2	dexmedetomidine:ti,ab	8,382
#3	precedex:ti,ab	65
#4	#1 OR #2 OR #3	11,978
#5	'child'/exp	2,918,758
#6	'infant'/exp	1,144,601
#7	child*:ti,ab	1,842,172
#8	infant*:ti,ab	501,205
#9	pediatric*:ti,ab	456,042
#10	#5 OR #6 OR #7 OR #8 OR #9	3,626,221
#11	'emergence agitation'/exp	452
#12	delirium:ti,ab	23,997
#13	excitement:ti,ab	6,193
#14	agitation*:ti,ab	25,821
#15	agitated:ti,ab	7,212
#16	#11 OR #12 OR #13 OR #14 OR #15	58,327
#17	'randomized controlled trial'/exp OR 'controlled clinical trial'/exp OR randomized:ti,ab OR placebo:ti,ab OR 'drug therapy':lnk OR randomly:ti,ab OR trial:ti,ab OR groups:ti,ab	7,543,580
#18	#4 AND #10 AND #16 AND #17	283
Recent queries in Cochrane database on Oct 7, 2020		
#1	MeSH descriptor: [Dexmedetomidine] explode all trees	1709
#2	(Precedex):ti,ab,kw (Word variations have been searched)	64
#3	(dexmedetomidine):ti,ab,kw (Word variations have been searched)	4845
#4	#1 or #2 or #3	4850
#5	MeSH descriptor: [Child] explode all trees	55465
#6	MeSH descriptor: [Infant] explode all trees	31836
#7	(child* or infant* or pediatric*):ti,ab,kw (Word variations have been searched)	188511
#8	#5 or #6 or #7	188511
#9	MeSH descriptor: [Emergence Delirium] explode all trees	93
#10	(delirium or excitement or agitation* or agitated):ti,ab,kw (Word variations have been searched)	7998
#11	#9 or #10	7998
#12	#4 and #8 and #11	252

Table S1 (continued)

Table S1 (continued)

Search	Query	Items found
Recent queries in PubMed on Oct 7, 2020		
#1	Search: (((("Dexmedetomidine"[Mesh]) OR (dexmedetomidine[Title/Abstract]))) OR (precedex[Title/Abstract]))	6,373
#2	Search: (((("Emergence Delirium"[Mesh]) OR (emergence agitation[Title/Abstract])) OR (delirium[Title/Abstract])) OR (excitement[Title/Abstract])) OR (agitation*[Title/Abstract])) OR (agitated[Title/Abstract])	39,455
#3	Search: (((("Child"[Mesh]) OR ("Infant"[Mesh])) OR (child*[Title/Abstract])) OR (infant*[Title/Abstract])) OR (pediatric*[Title/Abstract])	3,073,267
#4	Search: "randomized controlled trial"[pt] OR "controlled clinical trial"[pt] OR randomized[tiab] OR placebo[tiab] OR "drug therapy"[sh] OR randomly[tiab] OR trial[tiab] OR groups[tiab]	5,001,523
#5	Search: ((((((("Child"[Mesh]) OR ("Infant"[Mesh])) OR (child*[Title/Abstract])) OR (infant*[Title/Abstract])) OR (pediatric*[Title/Abstract])) AND (((("Dexmedetomidine"[Mesh]) OR (dexmedetomidine[Title/Abstract]))) OR (precedex[Title/Abstract]))) AND (((("Emergence Delirium"[Mesh]) OR (emergence agitation[Title/Abstract])) OR (delirium[Title/Abstract])) OR (excitement[Title/Abstract])) OR (agitation*[Title/Abstract])) OR (agitated[Title/Abstract])) AND ("randomized controlled trial"[pt] OR "controlled clinical trial"[pt] OR randomized[tiab] OR placebo[tiab] OR "drug therapy"[sh] OR randomly[tiab] OR trial[tiab] OR groups[tiab])	158
Recent queries in Web of Sciences on Oct 7, 2020		
#1	TS=(dexmedetomidine) OR (precedex)	7,815
#2	TS= (child) OR (infant) OR (child*) OR (infant*) OR (pediatric*)	2,115,883
#3	TS= (emergence agitation) OR (delirium) OR (excitement) OR (agitation*) OR (agitated)	60,181
#4	#1 AND #2 AND #3	339

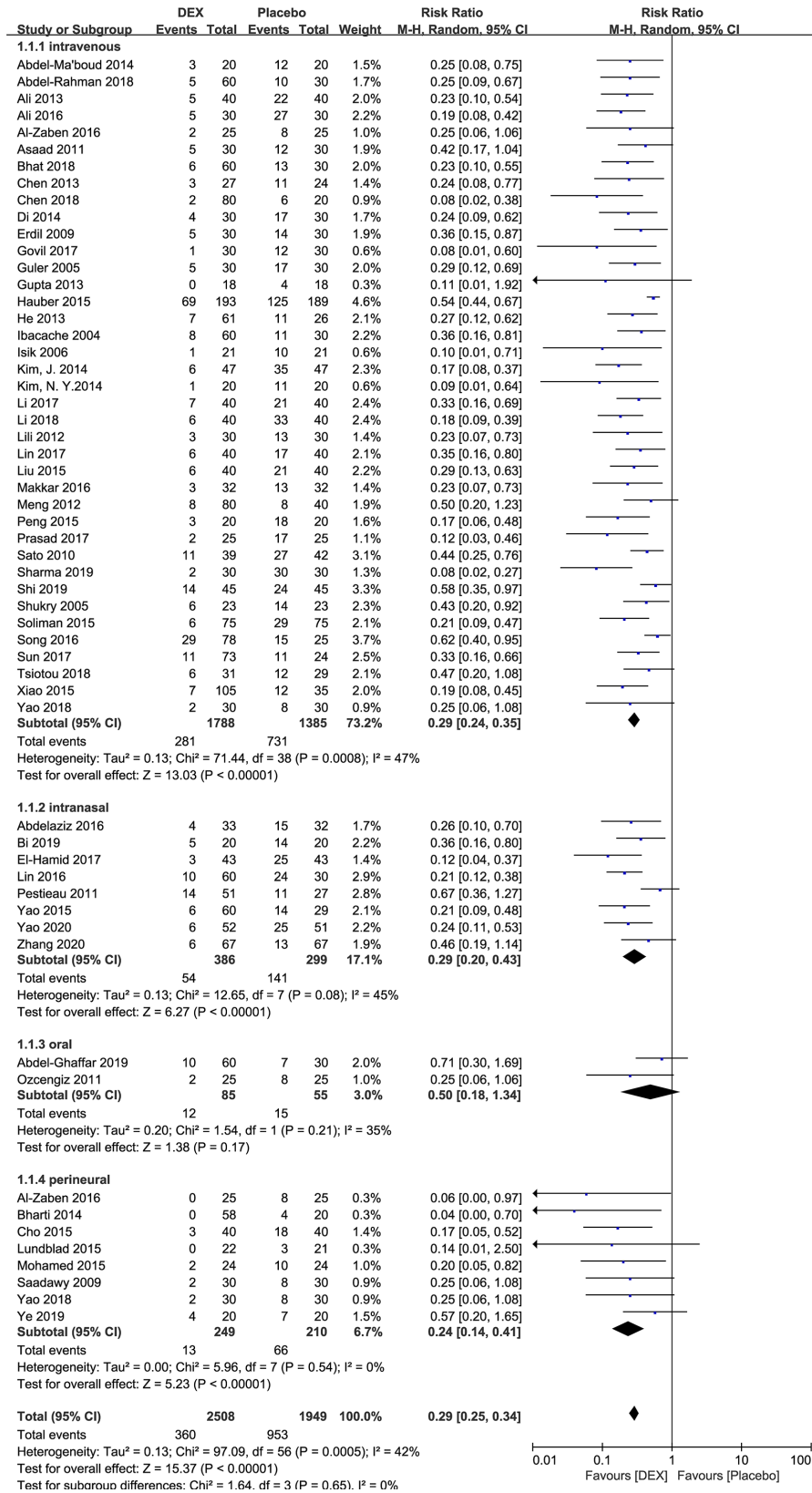


Figure S1 Subgroup analysis of EA incidence: different routs. EA, emergence agitation.

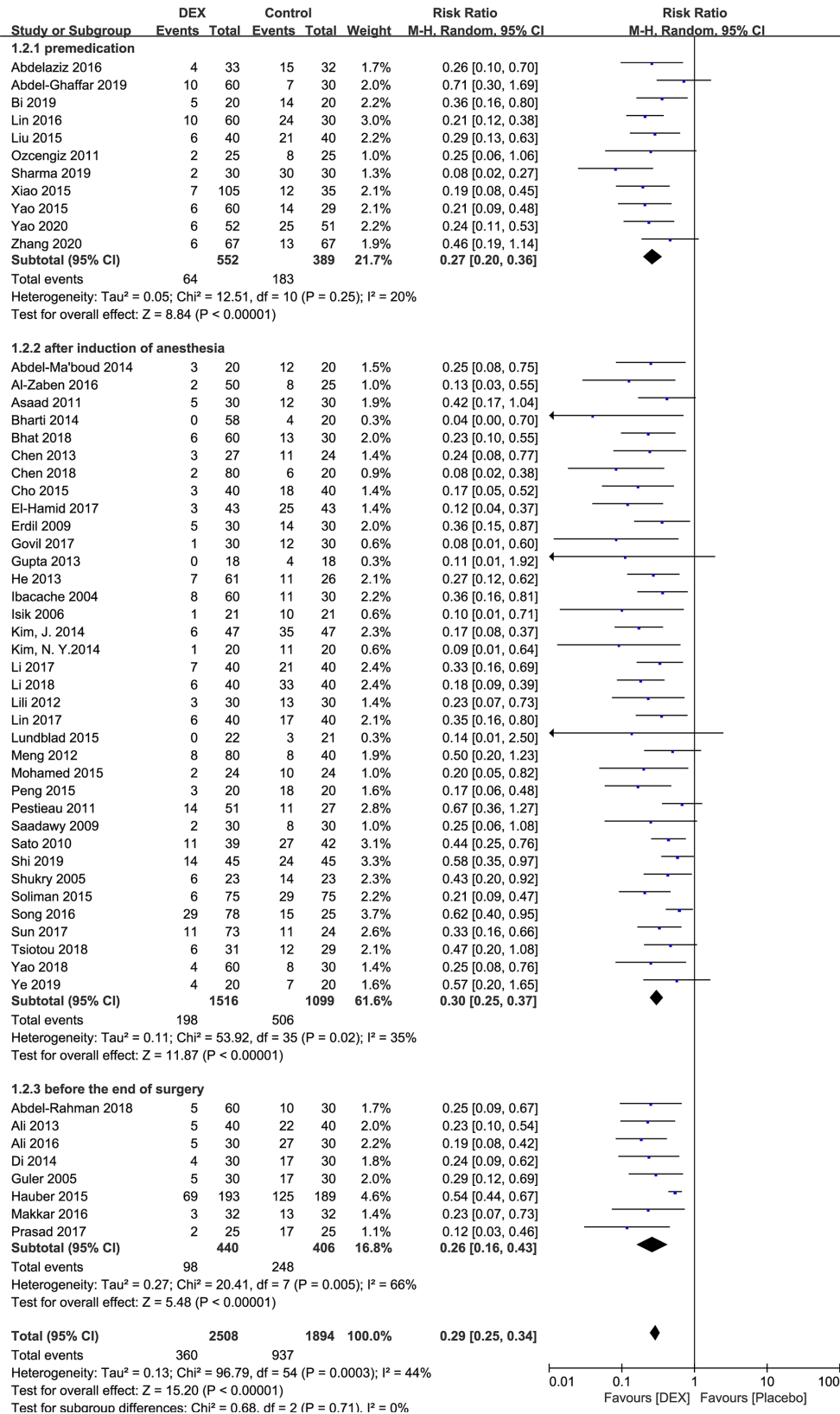


Figure S2 Subgroup analysis of EA incidence: different timing. EA, emergence agitation.

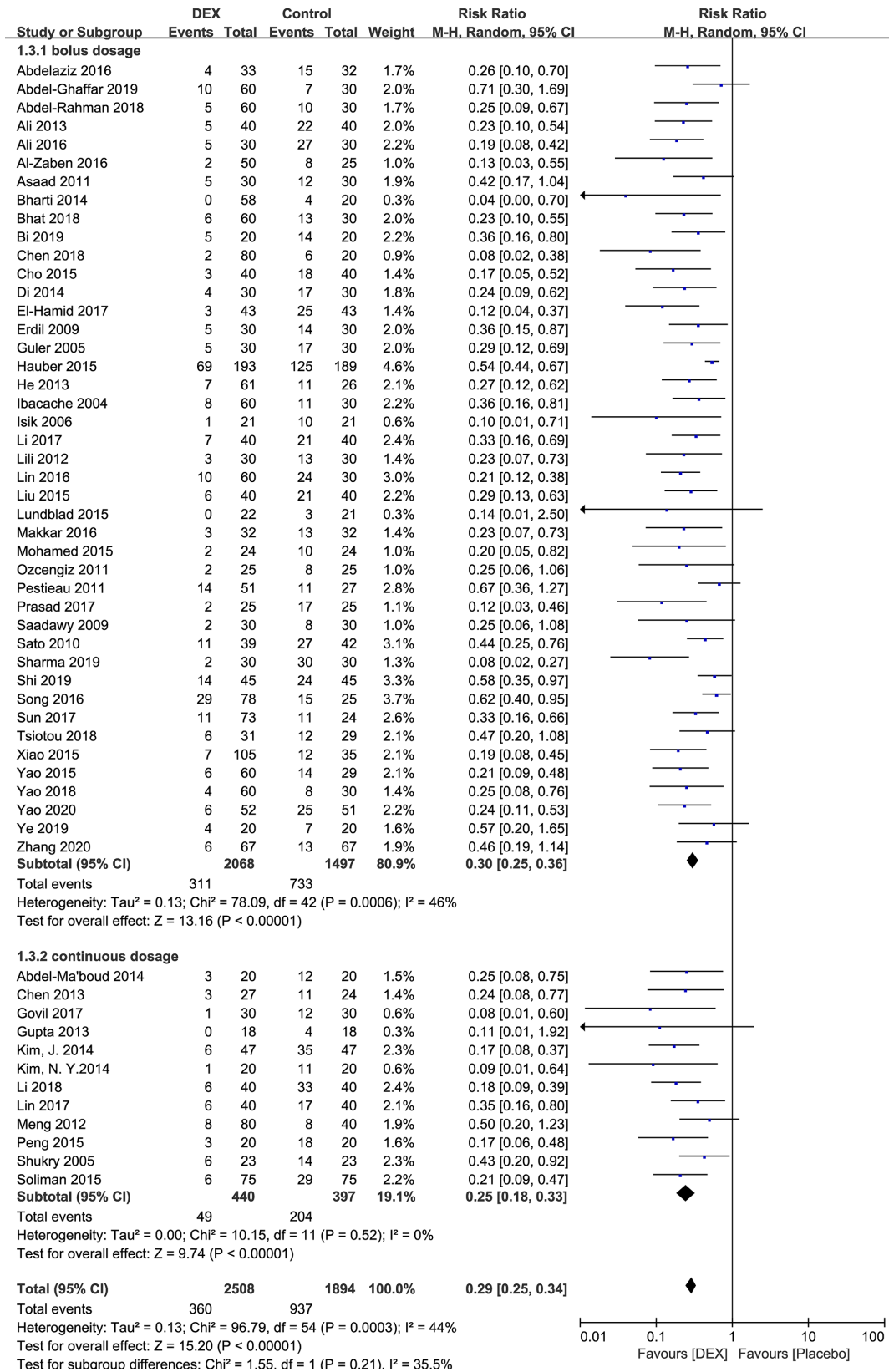


Figure S3 Subgroup analysis of EA incidence: different patterns. EA, emergence agitation.

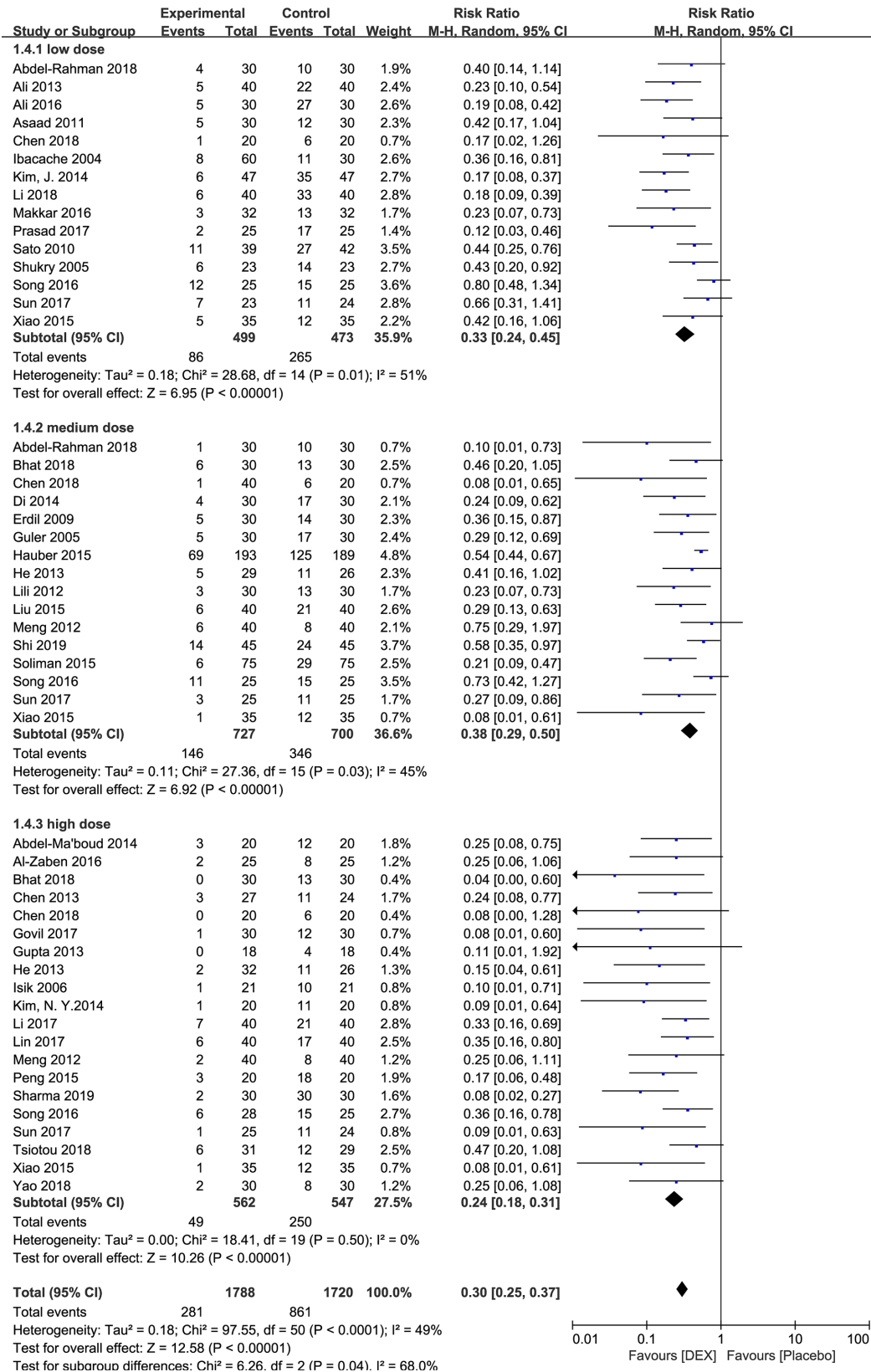


Figure S4 Subgroup analysis of EA incidence: different dose. EA, emergence agitation.

GRADE results

DEX compared to placebo or comparator for EA in children

Bibliography: DEX for EA in children. Cochrane Database of Systematic Reviews [Year], Issue [Issue].

Certainty assessment							Summary of findings				
Participants (studies) Follow up	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	Study event rates (%)		Relative effect (95% CI)	Anticipated absolute effects	
							With placebo or comparator	With DEX		Risk with placebo or comparator	Risk difference with DEX
EA incidence: dexmedetomidine vs placebo											
4402 (55 RCTs)	not serious	not serious	not serious	not serious	publication bias strongly suspected ^a	⊕⊕⊕○ MODERATE	937/1894 (49.5%)	360/2508 (14.4%)	RR 0.29 (0.25 to 0.34)	495 per 1,000	351 fewer per 1,000 (from 371 fewer to 327 fewer)
EA incidence subgroup: different route - intravenous											
3173 (39 RCTs)	not serious	not serious ^b	not serious	not serious	publication bias strongly suspected ^c	⊕⊕⊕○ MODERATE	731/1385 (52.8%)	281/1788 (15.7%)	RR 0.29 (0.24 to 0.35)	528 per 1,000	375 fewer per 1,000 (from 401 fewer to 343 fewer)
EA incidence subgroup: different route - intranasal											
685 (8 RCTs)	not serious	serious	not serious	not serious	none	⊕⊕⊕○ MODERATE	141/299 (47.2%)	54/386 (14.0%)	RR 0.29 (0.20 to 0.43)	472 per 1,000	335 fewer per 1,000 (from 377 fewer to 269 fewer)
EA incidence subgroup: different route - oral											
140 (2 RCTs)	not serious	not serious	not serious	serious ^d	none	⊕⊕⊕○ MODERATE	15/55 (27.3%)	12/85 (14.1%)	RR 0.50 (0.18 to 1.34)	273 per 1,000	136 fewer per 1,000 (from 224 fewer to 93 more)
EA incidence subgroup: different route - caudal or nerve-blocking											
459 (8 RCTs)	not serious	not serious	not serious	not serious	none	⊕⊕⊕⊕ HIGH	66/210 (31.4%)	13/249 (5.2%)	RR 0.24 (0.14 to 0.41)	314 per 1,000	239 fewer per 1,000 (from 270 fewer to 185 fewer)
EA incidence subgroup: different time - premedication											
941 (11 RCTs)	not serious	not serious	not serious	not serious	none	⊕⊕⊕⊕ HIGH	183/389 (47.0%)	64/552 (11.6%)	RR 0.27 (0.20 to 0.36)	470 per 1,000	343 fewer per 1,000 (from 376 fewer to 301 fewer)
EA incidence subgroup: different time - after induction of anesthesia											
2615 (36 RCTs)	not serious	not serious	not serious	not serious	publication bias strongly suspected ^e	⊕⊕⊕○ MODERATE	506/1099 (46.0%)	198/1516 (13.1%)	RR 0.30 (0.25 to 0.37)	460 per 1,000	322 fewer per 1,000 (from 345 fewer to 290 fewer)
EA incidence subgroup: different time - before the end of surgery											
846 (8 RCTs)	not serious	serious ^f	not serious	not serious	publication bias strongly suspected ^g	⊕⊕○○ LOW	248/406 (61.1%)	98/440 (22.3%)	RR 0.26 (0.16 to 0.43)	611 per 1,000	452 fewer per 1,000 (from 513 fewer to 348 fewer)

EA incidence subgroup: bolus or continuous dosage - bolus dosage

3565 (43 RCTs)	not serious	serious ^h	not serious	not serious	publication bias strongly suspected ^{fi}	⊕⊕○○ LOW	733/1497 (49.0%)	311/2068 (15.0%)	RR 0.30 (0.25 to 0.36)	490 per 1,000	343 fewer per 1,000 (from 367 fewer to 313 fewer)
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EA incidence subgroup: bolus or continuous dosage - continuous dosage

837 (12 RCTs)	not serious	not serious	not serious	not serious	none	⊕⊕⊕⊕ HIGH	204/397 (51.4%)	49/440 (11.1%)	RR 0.25 (0.18 to 0.33)	514 per 1,000	385 fewer per 1,000 (from 421 fewer to 344 fewer)
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EA incidence: dexmedetomidine vs midazolam

779 (3 RCTs)	not serious	not serious	not serious	not serious	none	⊕⊕⊕⊕ HIGH	132/386 (34.2%)	45/393 (11.5%)	RR 0.34 (0.25 to 0.45)	342 per 1,000	226 fewer per 1,000 (from 256 fewer to 188 fewer)
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EA incidence: Dexmedetomidine vs fentanyl

371 (5 RCTs)	not serious	serious ^j	not serious	serious ^k	none	⊕⊕○○ LOW	49/171 (28.7%)	40/200 (20.0%)	RR 0.78 (0.42 to 1.44)	287 per 1,000	63 fewer per 1,000 (from 166 fewer to 126 more)
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EA incidence: Dexmedetomidine vs propofol

188 (3 RCTs)	not serious	not serious	not serious	very serious ^l	none	⊕⊕○○ LOW	22/96 (22.9%)	11/92 (12.0%)	RR 0.51 (0.27 to 1.00)	229 per 1,000	112 fewer per 1,000 (from 167 fewer to 0 fewer)
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EA incidence: Dexmedetomidine vs ketamine

114 (2 RCTs)	not serious	not serious	not serious	very serious ^m	none	⊕⊕○○ LOW	12/57 (21.1%)	5/57 (8.8%)	RR 0.42 (0.16 to 1.11)	211 per 1,000	122 fewer per 1,000 (from 177 fewer to 23 more)
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EA incidence: Dexmedetomidine vs ketofol

110 (2 RCTs)	not serious	not serious	not serious	very serious ⁿ	none	⊕⊕○○ LOW	13/55 (23.6%)	7/55 (12.7%)	RR 0.54 (0.23 to 1.24)	236 per 1,000	109 fewer per 1,000 (from 182 fewer to 57 more)
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different Dose

3508 (39 RCTs)	not serious	serious ^o	not serious	not serious	publication bias strongly suspected ^p	⊕⊕○○ LOW	861/1720 (50.1%)	281/1788 (15.7%)	RR 0.30 (0.25 to 0.37)	501 per 1,000	350 fewer per 1,000 (from 375 fewer to 315 fewer)
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different Dose - low dose

972 (15 RCTs)	not serious	serious ^q	not serious	not serious	publication bias strongly suspected ^r	⊕⊕○○ LOW	265/473 (56.0%)	86/499 (17.2%)	RR 0.33 (0.24 to 0.45)	560 per 1,000	375 fewer per 1,000 (from 426 fewer to 308 fewer)
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different Dose - medium dose

1427 (16 RCTs)	not serious	serious ^s	not serious	not serious	publication bias strongly suspected ^t	⊕⊕○○ LOW	346/700 (49.4%)	146/727 (20.1%)	RR 0.38 (0.29 to 0.50)	494 per 1,000	306 fewer per 1,000 (from 351 fewer to 247 fewer)
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different Dose - high dose

1109 (20 RCTs)	not serious	not serious	not serious	not serious	publication bias strongly suspected ^u	⊕⊕⊕○ MODERATE	250/547 (45.7%)	49/562 (8.7%)	RR 0.24 (0.18 to 0.31)	457 per 1,000	347 fewer per 1,000 (from 375 fewer to 315 fewer)
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CI: Confidence interval; **RR:** Risk ratio

Explanations

- a. Egger's tests P=0.000
- b. Heterogeneity: Tau² = 0.13; Chi² = 71.44, df = 38 (P = 0.0008); I² = 47%
- c. Egger's tests P=0.000
- d. Heterogeneity: Tau² = 0.27; Chi² = 20.41, df = 7 (P = 0.005); I² = 66%
- e. Egger's tests P=0.000
- f. Heterogeneity: Tau² = 0.27; Chi² = 20.41, df = 7 (P = 0.005); I² = 66%
- g. Egger's tests P=0.000
- h. Heterogeneity: Tau² = 0.13; Chi² = 78.09, df = 42 (P = 0.0006); I² = 46%
- i. Egger's tests P=0.000
- j. Heterogeneity: Tau² = 0.24; Chi² = 8.00, df = 4 (P = 0.09); I² = 50%
- k. cumulative Z-curve did not enter the futility area or crossed TSMB
- l. cumulative Z-curve did not enter the futility area or crossed TSMB
- m. cumulative Z-curve did not enter the futility area or crossed TSMB
- n. cumulative Z-curve did not enter the futility area or crossed TSMB
- o. Heterogeneity: Tau² = 0.18; Chi² = 97.55, df = 50 (P < 0.0001); I² = 49%
- p. Egger's tests P=0.000
- q. Heterogeneity: Tau² = 0.18; Chi² = 28.68, df = 14 (P = 0.01); I² = 51%
- r. Egger's tests P=0.027
- s. Heterogeneity: Tau² = 0.11; Chi² = 27.36, df = 15 (P = 0.03); I² = 45%
- t. Egger's tests P=0.001
- u. Egger's tests P=0.000

DEX compared to placebo for severe EA in children

Bibliography: . DEX for EA in children. Cochrane Database of Systematic Reviews [Year], Issue [Issue].

Certainty assessment							Summary of findings				
Participants (studies) Follow up	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	Study event rates (%)		Relative effect (95% CI)	Anticipated absolute effects	
							With placebo	With DEX		Risk with placebo	Risk difference with DEX

Severe EA incidence: DEX vs Placebo

927 (11 RCTs)	not serious	not serious	not serious	not serious	none	⊕⊕⊕⊕ HIGH	137/420 (32.6%)	40/507 (7.9%)	RR 0.23 (0.16 to 0.32)	326 per 1,000	251 fewer per 1,000 (from 274 fewer to 222 fewer)
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CI: Confidence interval; RR: Risk ratio

DEX compared to placebo or compatater for emergence time in children

Bibliography: . DEX for EA in children. Cochrane Database of Systematic Reviews [Year], Issue [Issue].

Certainty assessment							Summary of findings				
Participants (studies) Follow up	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	Study event rates (%)		Relative effect (95% CI)	Anticipated absolute effects	
							With placebo or compatater	With DEX		Risk with placebo or compatater	Risk difference with DEX

Emergence time: DEX vs Placebo

3451 (45 RCTs)	not serious	very serious ^a	not serious	not serious	publication bias strongly suspected ^b	⊕○○○ ○ VERY LOW	1462	1989	-	The mean emergence time: DEX vs Placebo was 0	MD 2.28 higher (1.49 higher to 3.08 higher)
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Emergence time: DEX vs Midazolam

456 (6 RCTs)	not serious	very serious ^c	not serious	serious ^d	none	⊕○○○ ○ VERY LOW	226	230	-	The mean emergence time: DEX vs Midazolam was 0	MD 0.45 higher (1.45 lower to 2.35 higher)
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Emergence time: DEX vs Fentanyl

371 (5 RCTs)	not serious	very serious ^e	not serious	serious ^f	none	⊕○○○ ○ VERY LOW	171	200	-	The mean emergence time: DEX vs Fentanyl was 0	MD 0.46 lower (1.94 lower to 1.02 higher)
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CI: Confidence interval; MD: Mean difference

Explanations

a. Heterogeneity: Tau² = 0.83; Chi² = 622.02, df = 44 (P < 0.00001); I² = 93%

b. Egger's tests P=0.000

c. Heterogeneity: Tau² = 5.33; Chi² = 125.26, df = 5 (P < 0.00001); I² = 96%

d. the cumulative Z-curve did not enter the futility area or crossed TSMB

e. Heterogeneity: Tau² = 2.12; Chi² = 19.55, df = 4 (P = 0.0006); I² = 80%

f. the cumulative Z-curve did not enter the futility area or crossed TSMB

DEX compared to placebo or comparater for discharge time from recovery room in children

Bibliography: . DEX for EA in children. Cochrane Database of Systematic Reviews [Year], Issue [Issue].

Certainty assessment							Summary of findings				
Participants (studies) Follow up	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	Study event rates (%)		Relative effect (95% CI)	Anticipated absolute effects	
							With placebo or comparater	With DEX		Risk with placebo or comparater	Risk difference with DEX

Discharge time: DEX vs placebo

2725 (31 RCTs)	not serious	very serious ^a	not serious	serious ^b	none	⊕○○○ VERY LOW	1186	1539	-	The mean discharge time: DEX vs placebo was 0	MD 1.27 higher (2.43 lower to 4.96 higher)
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Discharge time: DEX vs Midazolam

307 (4 RCTs)	not serious	not serious	not serious	serious ^c	none	⊕⊕⊕○ MODERATE	152	155	-	The mean discharge time: DEX vs Midazolam was 0	MD 0.94 lower (1.82 lower to 0.06 lower)
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Discharge time: DEX vs Fentanyl

189 (3 RCTs)	not serious	serious ^d	not serious	serious ^e	none	⊕⊕○○ LOW	80	109	-	The mean discharge time: DEX vs Fentanyl was 0	MD 3.68 higher (3 lower to 10.37 higher)
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CI: Confidence interval; MD: Mean difference

Explanations

a. Heterogeneity: $\text{Tau}^2 = 100.60$; $\text{Chi}^2 = 2343.93$, $\text{df} = 30$ ($P < 0.00001$); $I^2 = 99\%$

b. the cumulative Z-curve did not enter the futility area or crossed TSMB

c. the cumulative Z-curve did not enter the futility area or crossed TSMB

d. Heterogeneity: $\text{Tau}^2 = 21.16$; $\text{Chi}^2 = 5.46$, $\text{df} = 2$ ($P = 0.07$); $I^2 = 63\%$

e. the cumulative Z-curve did not enter the futility area or crossed TSMB

DEX compared to placebo or comparater for Patients requiring rescue analgesia in children

Bibliography: . DEX for EA in children. Cochrane Database of Systematic Reviews [Year], Issue [Issue].

Certainty assessment							Summary of findings				
Participants (studies) Follow up	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	Study event rates (%)		Relative effect (95% CI)	Anticipated absolute effects	
							With placebo or comparater	With DEX		Risk with placebo or comparater	Risk difference with DEX

DEX vs Placebo

2031 (23 RCTs)	not serious	serious ^a	not serious	not serious	publication bias strongly suspected ^b	⊕⊕○○ LOW	334/893 (37.4%)	212/1138 (18.6%)	RR 0.43 (0.31 to 0.59)	374 per 1,000	213 fewer per 1,000 (from 258 fewer to 153 fewer)
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DEX vs Midazolam

396 (5 RCTs)	not serious	not serious	not serious	serious ^c	none	⊕⊕⊕○ MODERATE	31/196 (15.8%)	18/200 (9.0%)	RR 0.58 (0.36 to 0.94)	158 per 1,000	66 fewer per 1,000 (from 101 fewer to 9 fewer)
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DEX vs fentanyl

253 (3 RCTs)	not serious	not serious	not serious	serious ^d	none	⊕⊕⊕○ MODERATE	35/113 (31.0%)	16/140 (11.4%)	RR 0.39 (0.22 to 0.66)	310 per 1,000	189 fewer per 1,000 (from 242 fewer to 105 fewer)
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CI: Confidence interval; RR: Risk ratio

Explanations

a. Heterogeneity: Tau² = 0.27; Chi² = 86.75, df = 20 (P < 0.00001); I² = 77%

b. Egger's tests P=0.002

c. the cumulative Z-curve did not enter the futility area or crossed TSMB

d. the cumulative Z-curve did not enter the futility area or crossed TSMB

DEX compared to placebo or compater for PONV in children

Bibliography: . DEX for EA in children. Cochrane Database of Systematic Reviews [Year], Issue [Issue].

Certainty assessment							Summary of findings				
Participants (studies) Follow up	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	Study event rates (%)		Relative effect (95% CI)	Anticipated absolute effects	
							With placebo or compater	With DEX		Risk with placebo or compater	Risk difference with DEX

PONV incidence between DEX and Placebo

2616 (32 RCTs)	not serious	not serious	not serious	not serious	none	⊕⊕⊕⊕ HIGH	149/1204 (12.4%)	64/1412 (4.5%)	RR 0.43 (0.33 to 0.55)	124 per 1,000	71 fewer per 1,000 (from 83 fewer to 56 fewer)
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DEX vs Midazolam

366 (5 RCTs)	not serious	not serious	not serious	serious ^a	none	⊕⊕⊕○ MODERATE	31/181 (17.1%)	15/185 (8.1%)	RR 0.48 (0.27 to 0.85)	171 per 1,000	89 fewer per 1,000 (from 125 fewer to 26 fewer)
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DEX vs Ketamine

204 (3 RCTs)	not serious	serious ^b	not serious	serious ^c	none	⊕⊕○○ LOW	29/87 (33.3%)	38/117 (32.5%)	RR 0.58 (0.19 to 1.82)	333 per 1,000	140 fewer per 1,000 (from 270 fewer to 273 more)
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CI: Confidence interval; RR: Risk ratio

Explanations

- the cumulative Z-curve did not enter the futility area or crossed TSMB
- Heterogeneity: Tau² = 0.62; Chi² = 6.53, df = 2 (P = 0.04); I² = 69%
- the cumulative Z-curve did not enter the futility area or crossed TSMB

DEX compared to placebo for Hypotension incidence in children

Bibliography: . DEX for EA in children. Cochrane Database of Systematic Reviews [Year], Issue [Issue].

Certainty assessment							Summary of findings				
Participants (studies) Follow up	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	Study event rates (%)		Relative effect (95% CI)	Anticipated absolute effects	
							With placebo	With DEX		Risk with placebo	Risk difference with DEX

hypotension incidence between DEX and Placebo

1868 (20 RCTs)	not serious	not serious	not serious	very serious ^a	none	⊕⊕○○ LOW	19/837 (2.3%)	30/1031 (2.9%)	RR 1.5 (0.9 to 2.5)	23 per 1,000	11 more per 1,000 (from 2 fewer to 34 more)
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CI: Confidence interval; RR: Risk ratio

Explanations

a. the cumulative Z-curve did not enter the futility area or crossed TSMB

DEX compared to placebo for bradycardia incidence in children

Bibliography: . DEX for EA in children. Cochrane Database of Systematic Reviews [Year], Issue [Issue].

Certainty assessment							Summary of findings				
Participants (studies) Follow up	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	Study event rates (%)		Relative effect (95% CI)	Anticipated absolute effects	
							With placebo	With DEX		Risk with placebo	Risk difference with DEX

Bradycardia incidence between DEX and Placebo

2333 (26 RCTs)	not serious	not serious	not serious	very serious ^a	publication bias strongly suspected ^b	⊕○○○ VERY LOW	9/1027 (0.9%)	51/1306 (3.9%)	RR 3.47 (1.86 to 6.44)	9 per 1,000	22 more per 1,000 (from 8 more to 48 more)
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CI: Confidence interval; RR: Risk ratio

Explanations

a. the cumulative Z-curve did not enter the futility area or crossed TSMB

b. Egger's tests P=0.015