Supplementary materials document

Appendix

PUBMED search equation

Search (((((((((emergence agitation) OR (Delirium and Emergence)) OR (Anesthesia and Emergence and Delirium)) OR (Emergence and Excitement)) OR (Postanesthetic and Excitement)) OR (Agitated and Emergence)) OR (Emergence and Agitation))) AND ((((((((MPV-1440) OR MPV 1440) OR MPV1440) OR Precedex) OR Hospira Brand of Dexmedetomidine Hydrochloride) OR Dexmedetomidine Hydrochloride) OR (Hydrochloride and Dexmedetomidine)) Sort by: [relevance]

Cochrane Library search equation

#4 emergence agitation or Delirium and Emergence or Anesthesia and Emergence and Delirium or Emergence and Excitement or Postanesthetic and Excitement (Word variations have been searched)

#5 Agitated and Emergence or Emergence and Agitation or emergence delirium (Word variations have been searched)

#6 #4 or #5

#7 MPV-1440 or MPV 1440 or MPV1440 or Precede or Hospira Brand of Dexmedetomidine Hydrochloride (Word variations have been searched)

#8 Dexmedetomidine Hydrochloride or Hydrochloride and Dexmedetomidine or Dexmedetomidine (Word variations have been searched)

#9 #7 or #8

#10 #6 and #9

Web of Science search equation

#1 TS= (Dexmedetomidine Hydrochloride) OR TS= (Hydrochloride and Dexmedetomidine) OR

TS= (Hospira Brand of Dexmedetomidine Hydrochloride) OR TS=(Precedex) OR TS=(MPV1440)

OR TS=(MPV1440) OR TS= (MPV 1440) OR TS=(MPV-1440)

#2 TS= (emergence agitation) OR TS= (Delirium and Emergence) OR TS= (Anesthesia and

Emergence and Delirium) OR TS= (Emergence and Excitement) OR TS= (Postanesthetic and

Excitement) OR TS= (Agitated and Emergence) OR TS= (Emergence and Agitation)

#3 #1 AND #2

Embase search equation

#1 emergence AND agitation OR (agitated AND emergence) OR (emergence AND delirium) OR

(emergence AND excitement) OR (postanaesthetic AND excitement) OR (postanesthetic AND
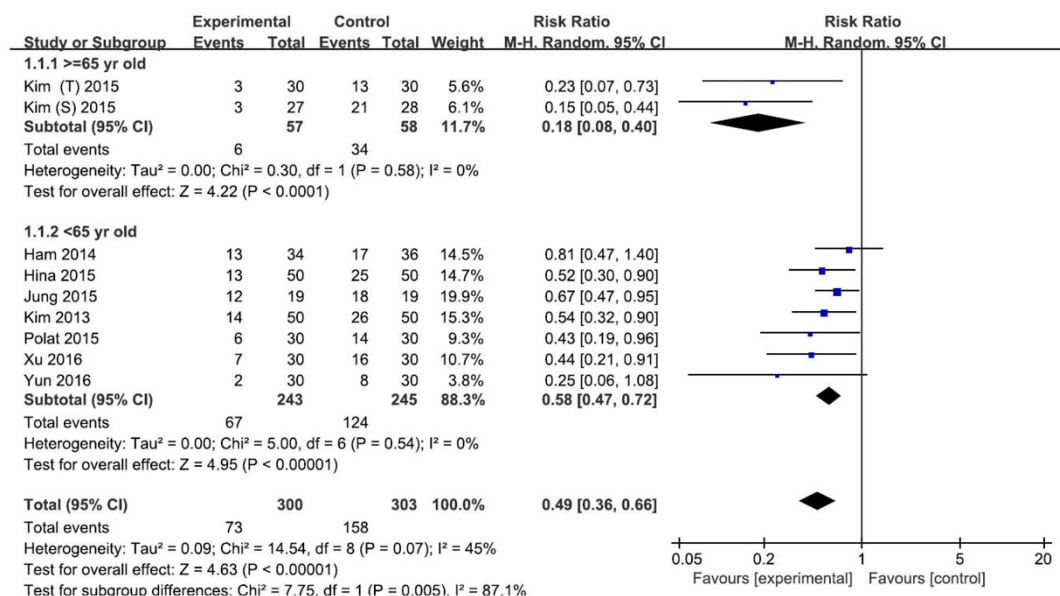
excitement)

#2 cepedex OR dexamedetomidine OR dexdomitor OR dexdor OR (dexmedetomidine AND

hydrochloride) OR (mpv AND 1440) OR mpv1440 OR precedex OR primadex OR sedadex OR

dexmedetomidine

#3 #1 AND #2

Supplementary Figure.1 Meta-analysis of risk ratios for the efficacy of dexmedetomidine vs placebo in difference age levels.

Supplementary Table 1. Meta-regression Analysis.

Moderator	Coeffcient (95% CI)	P	Adjusted R^2 %
Sample size	1.608 (0.870 to 2.973)	0.116	31.36
Type of anesthesia	2.358 (0.670 to 8.300)	0.16	79.57
Timing of administration of dexmedetomidine	**1.389 (1.052 to 1.859)**	**0.026**	**100**

Note: Meta-regression of sample size, type of anesthesia, administration of Dex.
The adjusted R2 shows the relative change in heterogeneity. Only bold indicates significant results (P<0.05).
Abbreviations: Dex., Dexmedetomidine; CI, confidence intervals.

Supplemental Table 2. Meta-analysis of Secondary Outcomes.

Outcome	Studies	Participants	Statistical Method	Effect Estimate	P1	I^2(%)	P2
2.1 Time to extubation	4	280	SMD (IV, Random, 95% CI)	0.26 (0.03 to 0.50)	0.03	0	0.9
2.2 Length of PACU stay	7	473	SMD (IV, Random, 95% CI)	-0.12 (-0.36 to 0.13)	0.35	43	0.10
2.3 Analgesics in PACU	7	528	RR (M-H, Random, 95% CI)	0.66 (0.51 to 0.84)	0.0009	0	0.45
2.4 Residual sedation	4	330	RR (M-H, Random, 95% CI)	1.98 (0.64 to 6.16)	0.24	0	0.24
2.5 PONV	12	842	RR (M-H, Random, 95% CI)	0.72 (0.45 to 1.15)	0.17	16	0.30
2.6 Bradycardia	7	559	RR (M-H, Random, 95% CI)	4.48 (0.99 to 20.25)	0.05	0	0.97
2.7 Hypotension	9	689	RR (M-H, Random, 95% CI)	2.37 (1.08 to 5.21)	0.03	34	0.18

Abbreviations: SMD, standard mean difference; IV, Inverse Variance; CI, confidence interval; RR, Risk Ratio; M-H, Mantel Haenszel; PONV, postoperative nausea and vomiting; PACU, post anesthesia care unit; P1, P value for statistical significance of effect estimate; I^2, test for heterogeneity; P2, P value for statistical significance of heterogeneity.

Supplementary Table 3. Results of sensitivity analysis.

Outcome	Description of Analysis	Number of Studies	Number of Patients	Effect Estimate (95% CI)	P	I²
Time to extubation	All included	5	380	0.97 (-0.17 to 2.11)	0.09	96
	Lee et al removed	4	280	0.26 (0.03 to 0.50)	0.03	0
	Xu et al removed	3	220	0.25 (-0.02 to 0.51)	0.07	0
	Yun et al removed	3	220	0.31 (0.04 to 0.57)	0.02	0
	Polat et al removed	3	220	0.25 (-0.01 to 0.52)	0.06	0
	Kim et al removed	3	180	0.23 (-0.07 to 0.52)	0.13	0
Length of PACU stay	All included	7	473	-0.12 (-0.36 to 0.13)	0.35	43
	Jung et al removed	6	435	-0.16 (-0.42 to 0.09)	0.22	44
	Kim(S) et al removed	6	418	-0.12 (-0.41 to 0.17)	0.42	53
	Kim(T) et al removed	6	413	-0.16 (-0.43 to 0.11)	0.24	45
	Polat et al removed	6	413	-0.05 (-0.25 to 0.15)	0.63	5
	Kim et al removed	6	373	-0.13 (-0.43 to 0.17)	0.39	52
	Kwon et al removed	6	413	-0.16 (-0.43 to 0.12)	0.26	47
	Lee et al removed	6	373	-0.06 (-0.32 to 0.21)	0.68	39
Number of patients requiring rescue analgesia	All included	8	607	0.71 (0.58 to 0.88)	0.001	0
	Yang et al removed	7	528	0.66 (0.51 to 0.84)	0.0009	0
	Hina et al removed	7	507	0.72 (0.56 to 0.92)	0.008	9
	Jung et al removed	7	569	0.72 (0.59 to 0.89)	0.002	0
	Xu et al removed	7	547	0.73 (0.59 to 0.90)	0.003	0
	Polat et al	7	547	0.71	0.001	0

	removed			(0.58 to 0.88)		
	Ham et al removed	7	537	0.70 (0.55 to 0.88)	0.003	7
	Kim et al removed	7	507	0.72 (0.56 to 0.92)	0.008	9
	Lee et al removed	7	507	0.63 (0.40 to 1.00)	0.05	19
Residual sedation	All included	4	330	1.98 (0.64 to 6.16)	0.24	0
	Hina et al removed	3	230	1.80 (0.46 to 7.03)	0.40	16
	Polat et al removed	3	270	4.60 (1.02 to 20.83)	0.05	0
	Ham et al removed	3	260	1.55 (0.38 to 6.35)	0.55	7
	Kim et al removed	3	230	1.80 (0.46 to 7.03)	0.40	16
Hypotension	All included	9	689	2.37 (1.08 to 5.21)	0.03	34
	Hina et al removed	8	589	2.37 (1.08 to 5.21)	0.03	34
	Kai et al removed	8	629	2.37 (1.08 to 5.21)	0.03	34
	Palot et al removed	8	629	2.37 (1.08 to 5.21)	0.03	34
	Yun et al removed	8	629	2.68 (1.07 to 6.69)	0.04	37
	Ham et al removed	8	619	1.53 (0.73 to 3.24)	0.26	0
	Kim et al removed	8	589	2.47 (0.90 to 6.79)	0.08	41
	Kwon et alremoved	8	629	2.50 (0.99 to 6.32)	0.05	43
	Lee et al removed	8	589	2.18 (0.90 to 5.26)	0.08	46
	Yang et al removed	8	610	2.69 (1.24 to 5.81)	0.01	32
Bradycardia	All included	7	559	4.48 (0.99 to 20.25)	0.05	0
	Hina et al removed	6	459	4.48 (0.99 to 20.25)	0.05	0
	Xu et al removed	6	499	4.48 (0.99 to 20.25)	0.05	0

	Palot et al removed	6	499	4.48 (0.99 to 20.25)	0.05	0
	Kim et al removed	6	459	4.48 (0.99 to 20.25)	0.05	0
	Kwon et al removed	6	499	3.97 (0.45 to 35.25)	0.22	0
	Lee et al removed	6	459	4.32 (0.76 to 24.67)	0.10	0
	Yang et al removed	6	480	5.00 (0.90 to 27.79)	0.07	0
PONV	All included	12	842	0.72 (0.45 to 1.15)	0.17	16
	Hina et al removed	11	742	0.72 (0.42 to 1.20)	0.21	26
	Jung et al removed	11	804	0.72 (0.45 to 1.15)	0.17	16
	Xu et al removed	11	782	0.71 (0.40 to 1.24)	0.23	26
	Kim(S) et al removed	11	787	0.67 (0.37 to 1.21)	0.18	23
	Kim(T) et al removed	11	782	0.72 (0.42 to 1.21)	0.21	26
	Yun et al removed	11	782	0.72 (0.45 to 1.15)	0.17	16
	Palot et al removed	11	782	0.77 (0.51 to 1.16)	0.22	0
	Ham et al removed	11	772	0.67 (0.42 to 1.07)	0.09	12
	Kim et al removed	11	742	0.80 (0.50 to 1.29)	0.36	11
	Kwon et al removed	11	782	0.67 (0.42 to 1.07)	0.10	14
	Lee et al removed	11	742	0.77 (0.51 to 1.17)	0.22	0
	Yang et al removed	11	763	0.69 (0.40 to 1.19)	0.18	25

Abbreviations: SMD, standard mean difference; IV, Inverse Variance; CI, confidence interval; RR, Risk Ratio; M-H, Mantel Haenszel; PONV, postoperative nausea and vomiting; PACU, post anesthesia care unit; P1, P value for statistical significance of effect estimate; I2, test for heterogeneity. The red font indicates that the result was not robust.

Supplementary Table 4. Pain Score and Analgesics in PACU.

Study	Assessment of pain	Pain score in PACU		P	Analgesics in PACU	Number of patients need for analgesias in PACU Dex / Con
		Dex	Con			
Polat et al[29] (2015)	VAS	20 (20–30)	30 (20–30)	0.002	Fentanyl 1 µg kg^{-1}	0/0
Kim et al[28] (2013)	NRS	2 (0–6)	2 (0–8)	0.061	Fentanyl 1 µg kg^{-1}	4/8
Kim et al[2] (S) (2015)	VAS	5.3 (±1.9)	6.6 (±1.9)	0.011	?	?
Kim et al[2] (T) (2015)	VAS	5.1 (±1.6)	5.7 (±2.1)	0.246	?	?
Xu et al[47] (2016)	VAS	2.2(±1.4)	3.1(±1.7)	0.039	Fentanyl 0.5-1 µg kg^{-1}	2/8
Lee et al[30] (2016)	NRS	4 (2–10)	7 (2–10)	0.001	Fentanyl	29/41
Ham et al[17] (2014)	NRS	0 (0-2)	2 (0-4.5)	0.046	Fentanyl 1 µg kg^{-1}	2/1
Hina et al[48] (2015)	NRS	?	?	?	25 µg fentanyl	4/8
Jung et al[26] (2015)	NRS	6	13	0.050	Fentanyl 0.5 µg kg^{-1}	2/6

Note: Data of pain score are presented as median (range) in the studies of Polat et al and Kim et al, as median (Interquartile Range) in the studies of Lee et al and Ham et al; Jung et al just recorded the number of patients whose NRS >/=4; and others are presented as mean (± SD).

Abbreviations: PACU, post anesthesia care unit; Dex, Dexmedetomidine; Con, Control; VAS, visual analogue score; NRS, numeric rating scale; ?, unknown.