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Question: Remimazolam compared to dexemedetomidine for sedation and anesthesia in adult patients[a]
Setting: Hospital/clinical setting for patients requiring sedation or anesthesia
Bibliography:

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	remimazolam	dexemedetomidine	Relative (95% CI)	Absolute (95% CI)		
***Time to achieve sedation (min, P<0.00001) (assessed with: MOAA/S score /RASS; Scale from: 0 to 6)**												
6	randomised trials	not serious	serious[b]	not serious	not serious	none	439	438	-	MD **3.45 lower** (4.72 lower to 2.19 lower)	⨁⨁⨁◯ Moderate[b]	IMPORTANT
Postoperative nausea and vomiting, P=0.35 (assessed with: Nausea and vomiting)												
7	randomised trials	not serious	not serious	not serious	not serious	none	67/445 (15.1%)	75/444 (16.9%)	**RR 0.89** (0.71 to 1.13)	**19 fewer per 1,000** (from 49 fewer to 22 more)	⨁⨁⨁⨁ High	CRITICAL
Hypotension (High dose), P=0.05 (assessed with: Blood pressure decrease in high dose group (50-100mg/50kg remimazolam in 10 minutes))												
3	randomised trials	not serious	not serious	not serious	not serious	none	27/168 (16.1%)	15/168 (8.9%)	**RR 1.80** (0.99 to 3.26)	**71 more per 1,000** (from 1 fewer to 202 more)	⨁⨁⨁⨁ High	CRITICAL
***Hypotension (Low dose), P=0.03 (assessed with: Blood pressure decrease in low dose group (5-10mg/50kg remimazolam in 3-10min))**												
3	randomised trials	not serious	not serious	not serious	not serious	none	66/258 (25.6%)	156/258 (60.5%)	**RR 0.48** (0.25 to 0.91)	**314 fewer per 1,000** (from 453 fewer to 54 fewer)	⨁⨁⨁⨁ High	IMPORTANT
Respiratory depression, P=0.21 (assessed with: Respiratory rate/SpO2 decrease)												
6	randomised trials	not serious	serious[c]	not serious	serious[d]	none	48/391 (12.3%)	106/391 (27.1%)	**RR 0.65** (0.34 to 1.27)	**95 fewer per 1,000** (from 179 fewer to 73 more)	⨁⨁◯◯ Low[c,d]	CRITICAL
Respiratory depression-sensitivity analysis, P=0.54 (assessed with: Respiratory rate/SpO2 decrease (excluding Zhou study))												
5	randomised trials	not serious	not serious	not serious	not serious	none	22/209 (10.5%)	26/210 (12.4%)	**RR 0.85** (0.50 to 1.43)	**19 fewer per 1,000** (from 62 fewer to 53 more)	⨁⨁⨁⨁ High	CRITICAL
***Fully alert time (min), P=0.0006 (assessed with: from discontinuation of sedative medication to a MOAA/S score of 5)**												
4	randomised trials	not serious	serious[e]	not serious	not serious	none	311	311	-	MD **2.54 lower** (3.99 lower to 1.09 lower)	⨁⨁⨁◯ Moderate[e]	IMPORTANT

CI: confidence interval; **MD:** mean difference; **RR:** risk ratio

Explanations

a. "*" denotes statistical significance.
b. Substantial heterogeneity was initially observed (I^2 = 95%, P < 0.00001). The main sources of inconsistency can be attributed to: 1. Different surgical settings: Some studies involved non-intubated bronchoscopy (Xingfang Chen, Huiying Xu, Laiying Zhou), while Yang Deng et al. focused on post-diagnostic sedation using RASS scoring. 2. Large variance in one study: Yang Deng et al. showed notably different standard deviations (15.93 vs 94.44) compared to other studies, though RevMan automatically assigned it a very low weight (0.2%) to minimize its impact. After sensitivity analysis excluding studies with extreme values (Seung-Wan Hong et al.), heterogeneity decreased to I^2 = 60%, while maintaining the significant effect direction and similar effect size (MD = -2.21 [-2.69, -1.73]). Indicating the heterogeneity primarily comes from the difference of age between studies.
c. Moderate heterogeneity was observed in the initial analysis (I^2 = 61%, P = 0.04). This heterogeneity was mainly attributed to one study (Laiying Zhou et al.) where rescue medication usage differed significantly between groups (70 vs 8 times in dex and remi groups). After sensitivity analysis excluding this study, heterogeneity decreased substantially (I^2 = 0%, P = 0.45), while the overall effect remained non-significant (RR = 0.85 [0.50, 1.43], P = 0.54). The heterogeneity was considered explainable by clinical factors rather than methodological issues.
d. Moderate heterogeneity was observed in the initial analysis (I^2 = 61%, P = 0.04). After sensitivity analysis excluding the Laiying Zhou study (which had imbalanced rescue medication usage between groups(dex vs remi): 70 vs 8 times), heterogeneity decreased to I^2 = 0%. The confidence interval (0.50, 1.43) is wide and crosses the line of no effect (RR = 1). The total sample size (419 patients after sensitivity analysis) and number of events are relatively small. These factors indicate serious imprecision in the effect estimate.
e. High heterogeneity was observed (I^2 = 88%, P < 0.0001). This substantial inconsistency can be attributed to the different types of surgical populations included in these studies, which may affect recovery times differently. The mean differences varied considerably across studies, ranging from -1.00 min (Zhou et al.) to -5.00 min (Hong et al.). This variation likely reflects the clinical diversity of the included studies rather than methodological heterogeneity, as they involved different surgical procedures with varying complexity and anesthetic requirements.