

## Supplementary Materials

**Table S1:** Subgroup analyses of studies using dexmedetomidine to prevent postoperative delirium.

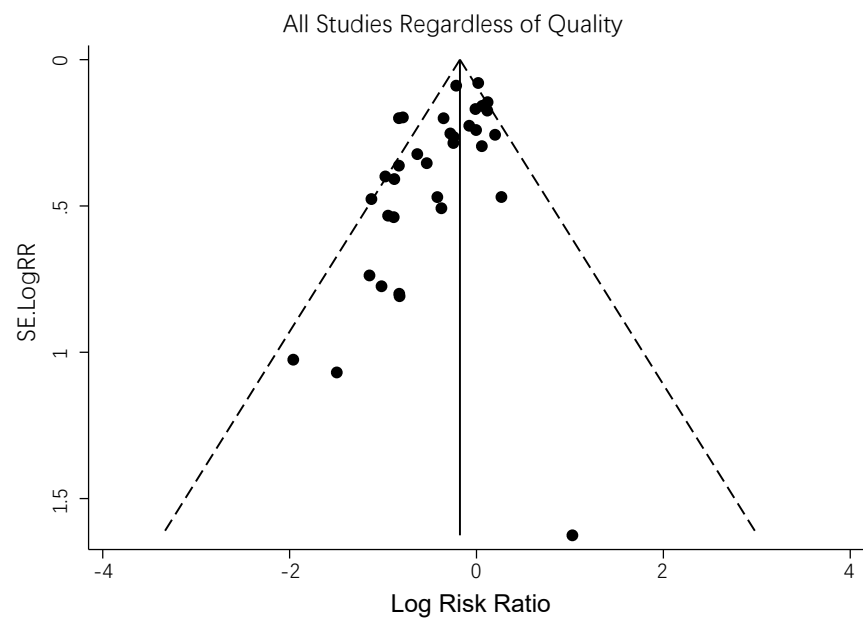
| Subgroup                 | RR (95%CI)         | No. of Datasets | I-squared (%) | P-Value | Weight (%) |
|--------------------------|--------------------|-----------------|---------------|---------|------------|
| Type of Surgery          |                    |                 |               |         |            |
| non-cardiac              | 0.58 (0.43 - 0.79) | 7               | 41.0          | 0.000   | 91.3       |
| cardiac                  | 0.55 (0.24 - 1.28) | 2               | 0.0           | 0.168   | 8.7        |
| Age                      |                    |                 |               |         |            |
| elderly                  | 0.59 (0.44 - 0.79) | 7               | 40.5          | 0.000   | 95.7       |
| non-elderly              | 0.34 (0.10 - 1.22) | 2               | 0.0           | 0.098   | 4.3        |
| Quality of Studies       |                    |                 |               |         |            |
| low risk                 | 0.64 (0.39 - 1.04) | 4               | 54.2          | 0.072   | 51.3       |
| high risk                | 0.54 (0.39 - 0.76) | 5               | 0.0           | 0.000   | 48.7       |
| Timing of Administration |                    |                 |               |         |            |
| before surgery           | 0.64 (0.48 - 0.86) | 7               | 21.1          | 0.003   | 75.6       |
| after surgery            | 0.44 (0.30 - 0.65) | 2               | 0.0           | 0.000   | 24.4       |
| Overall                  | 0.58 (0.44 - 0.76) | 9               | 27.6          | 0.000   | 100        |

**Table S2:** The incidence of adverse events in intervention group and control group.

| Types of Drugs                  | Adverse Events      | RR (95%CI)         | P                  | No.  | Studies                                                        |
|---------------------------------|---------------------|--------------------|--------------------|------|----------------------------------------------------------------|
| Atypical Antipsychotics         | atrial fibrillation | 2.05 (0.52 - 8.08) | 0.31               | 1    | Larsen 2010 [29]                                               |
|                                 | arrhythmia          | 1.13 (0.42 - 3.03) | 0.81               | 2    | Larsen 2010 [29], Prakanrattana 2007 [41]                      |
|                                 | renal failure       | 0.68 (0.12 - 3.92) | 0.66               | 1    | Prakanrattana 2007 [41]                                        |
| Acetylcholinesterase Inhibitors | diarrhoea           | 1.15 (0.48 - 2.76) | 0.76               | 2    | Sampson 2007 [45], Gamberini 2009 [25]                         |
|                                 | dizziness           | 2.61 (0.32 - 21.2) | 0.37               | 1    | Sampson 2007 [45]                                              |
|                                 | Insomnia            | 1.07 (0.69 - 1.67) | 0.75               | 2    | Sampson 2007 [45], Gamberini 2009 [25]                         |
|                                 | nausea/vomiting     | 1.12 (0.81 - 1.57) | 0.49               | 2    | Sampson 2007 [45], Gamberini 2009 [25]                         |
|                                 | parasthesiae        | 0.75 (0.05 - 11.1) | 0.83               | 1    | Sampson 2007 [45]                                              |
|                                 | pyrexia             | 0.75 (0.05 - 11.1) | 0.83               | 1    | Sampson 2007 [45]                                              |
|                                 | atrial fibrillation | 0.9 (0.56 - 1.45)  | 0.67               | 1    | Gamberini 2009 [25]                                            |
|                                 | arrhythmia          | 1.02 (0.21 - 4.84) | 0.98               | 1    | Gamberini 2009 [25]                                            |
|                                 | stroke              | 0.52 (0.05 - 5.55) | 0.59               | 1    | Gamberini 2009 [25]                                            |
|                                 | Dexmedetomidine     | arrhythmia         | 0.89 (0.72 - 1.10) | 0.27 | 2                                                              |
| bradycardia                     |                     | 1.24 (1.01 - 1.52) | 0.04               | 4    | Li.X 2017 [32], Su 2016 [48], Yang 2015 [53], Deiner 2017 [19] |
| hypertension                    |                     | 0.67 (0.52 - 0.87) | 0.00               | 2    | Su 2016 [48], Deiner 2017 [19]                                 |
| hypotension                     |                     | 1.10 (0.94 - 1.29) | 0.23               | 4    | Li.X 2017 [32], Su 2016 [48], Yang 2015 [53], Deiner 2017 [19] |
| infection                       |                     | 3.00 (0.13 - 71.5) | 0.50               | 1    | Yang 2015 [53]                                                 |
| nausea/vomiting                 |                     | 0.87 (0.29 - 2.65) | 0.81               | 1    | Yang 2015 [53]                                                 |
| stroke                          |                     | 1.02 (0.26 - 4.03) | 0.98               | 2    | Li.X 2017 [32], Deiner 2017 [19]                               |
| tachycardia                     |                     | 0.51 (0.32 - 0.82) | 0.01               | 1    | Su 2016 [48]                                                   |
| Ketamine                        | atrial fibrillation | 0.94 (0.55 - 1.6)  | 0.82               | 1    | Avidan 2017 [16]                                               |
|                                 | hallucination       | 1.26 (0.90 - 1.75) | 0.18               | 1    | Avidan 2017 [16]                                               |
|                                 | hypotension         | 0.9 (0.44 - 1.85)  | 0.78               | 1    | Avidan 2017 [16]                                               |

|                 |                     |                    |      |   |                                                           |
|-----------------|---------------------|--------------------|------|---|-----------------------------------------------------------|
|                 | nausea/vomiting     | 0.95 (0.77 - 1.17) | 0.62 | 1 | Avidan 2017 [16]                                          |
|                 | tachycardia         | 0.99 (0.43 - 2.27) | 0.98 | 1 | Avidan 2017 [16]                                          |
| Glucocorticoids | atrial fibrillation | 0.96 (0.91 - 1.02) | 0.23 | 3 | Dieleman 2012 [20], Mardani 2013 [36], Whitlock 2015 [51] |
|                 | myocardial          |                    |      |   |                                                           |
|                 | infarction          | 0.93 (0.59 - 1.45) | 0.74 | 2 | Dieleman 2012 [20], Mardani 2013 [36]                     |
|                 | pneumonia           | 1.07 (0.15 - 7.53) | 0.95 | 2 | Dieleman 2012 [20], Mardani 2013 [36]                     |
|                 | renal failure       | 0.84 (0.69 - 1.03) | 0.09 | 2 | Dieleman 2012 [20], Whitlock 2015 [36]                    |
|                 | respiratory failure | 0.86 (0.71 - 1.03) | 0.10 | 3 | Dieleman 2012 [20], Mardani 2013 [36], Whitlock 2015 [51] |
|                 | stroke              | 0.89 (0.69 - 1.17) | 0.40 | 3 | Dieleman 2012 [20], Mardani 2013 [36], Whitlock 2015 [51] |
|                 | gastrointestinal    |                    |      |   |                                                           |
|                 | hemorrhage          | 1.19 (0.81 - 1.76) | 0.38 | 1 | Whitlock 2015 [51]                                        |
|                 | infection           | 0.95 (0.84 - 1.07) | 0.39 | 1 | Whitlock 2015 [51]                                        |

**Figure S1:** The funnel plots of the included studies regardless of the risk of bias.



**Figure S2:** The funnel plots of the included studies with low risk.

