

#### Additional file 4: Excluded studies with reasons

Study	Reason for exclusion
Ved 2020 <sup>1</sup>	Prospective observational cohort study
Martucci 2019 <sup>2</sup>	Secondary analysis of the VITdAL-ICU study
Langlois 2019 <sup>3</sup>	Review article, individual studies were reviewed for eligibility
Otero 2019 <sup>4</sup>	Retrospective cohort study
Viglianti 2019 <sup>5</sup>	Secondary analysis of the VITdAL-ICU study
Amrein 2019 <sup>6</sup>	Study protocol
Friedberg 2019 <sup>7</sup>	Patients not considered to be adult critically ill patients
Zheng 2018 <sup>8</sup>	No concerned outcomes
Slow 2018 <sup>9</sup>	Patients not considered to be adult critically ill patients
Langlois 2018 <sup>10</sup>	Meta-analysis, individual studies were reviewed for eligibility
Lee <sup>11</sup> 2018	Patients not considered to be adult critically ill patients
Bi 2018 <sup>12</sup>	Meta-analysis, individual studies were reviewed for eligibility
Smith 2018 <sup>13</sup>	No concerned outcomes
Han 2018 <sup>14</sup>	Used the same patient cohort with previous study
Schwetz 2017 <sup>15</sup>	Secondary analysis of the VITdAL-ICU study
Otero 2017 <sup>16</sup>	Retrospective study
Han 2017 <sup>17</sup>	Used the same patient cohort with previous study
Weng 2017 <sup>18</sup>	Meta-analysis, individual studies were reviewed for eligibility
Putzu 2017 <sup>19</sup>	Meta-analysis, individual studies were reviewed for eligibility
Amrein 2016 <sup>20</sup>	Secondary analysis of the VITdAL-ICU study
Alizadeh 2016 <sup>21</sup>	No concerned outcomes
Quraishi 2016 <sup>22</sup>	Secondary analysis of an observational cohort study
Nair 2015 <sup>23</sup>	No placebo group
Quraishi 2014 <sup>24</sup>	Inappropriate Intervention
Via 2012 <sup>25</sup>	Inappropriate Intervention
Grossmann 2012 <sup>26</sup>	Patients not considered to be adult critically ill patients
Venkatram 2011 <sup>27</sup>	Retrospective study
Van 2003 <sup>28</sup>	No placebo group

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