

Supplementary Table 2: Eligible studies selected for meta-analysis of early versus late invasive mechanical ventilation.

Author	Year	Study Type	Study Population	Definition of Early Group	Definition of Late Group	Outcome	Sample Size
Antonelli	1998	Experimental	ICU patients with acute hypoxemic respiratory failure	Initially intubated	Initially placed on NIV	ICU mortality	64
Esteban	2002	Observational (Unconditioned)	ICU patients who received positive pressure ventilation	Initially intubated or received mechanical ventilation through tracheostomy	Initially placed on NIV	ICU mortality	5183
Depuydt	2004	Observational (Unconditioned)	ICU patients with acute hypoxemic respiratory failure requiring positive pressure ventilation and hematologic malignancy or aplastic anemia	Initially intubated	Initially placed on NIV	In hospital mortality	128
Squadrone	2004	Observational (Unconditioned)	ICU patients with hypercapneic acute respiratory failure due to COPD or pneumonia who received positive pressure ventilation	Initially intubated	Initially placed on NIV	In hospital mortality	128
Carratu	2005	Observational (Unconditioned)	ICU patients with COPD and acute respiratory failure	Death or escalated to IMV within a few hours of initiating NIV	Remained on NIV for more than a few hours	Mortality	122
Honrubia	2005	Experimental	ICU patients with acute respiratory failure	Initially intubated	Initially placed on NIV	In hospital mortality	64
Merlani	2005	Observational (Unconditioned)	Emergency Department patients with acute respiratory failure who were initially treated with NIV	Intubated while in the emergency department	Not intubated in the emergency department	In hospital mortality	104
Demoule	2006	Observational (Unconditioned)	ICU patients who received positive pressure ventilation for acute respiratory failure	Initially intubated	Initially placed on NIV	ICU mortality	524
Gristina	2011	Observational (Unconditioned)	ICU patients with acute respiratory failure and hematologic malignancy (non-BMT) (GIVITI database)	Initially intubated	Initially placed on NIV	In hospital mortality	1302
Chandra	2012	Observational (Unconditioned)	Adults w acute COPD who received positive pressure ventilation	Initially intubated	Initially placed on NIV	In hospital mortality	611284
Molina	2012	Observational (Unconditioned)	ICU patients with hematologic malignancy who received positive pressure ventilation (EMEHU Cohort)	Initially intubated	Initially placed on NIV	ICU mortality	300
Price	2013	Observational (Conditioned)	ICU patients with acute leukemia who underwent intubation	Intubated within 24 hours of ICU admission	Intubated more than 24 hours after ICU admission	30 day mortality	167
Turkoglu	2013	Observational (Unconditioned)	ICU patients with ARDS and hematologic malignancy	Initially intubated	Initially placed on NIV	ICU mortality	67
Azevedo	2014	Observational (Unconditioned)	ICU patients with cancer who received positive pressure ventilation within 48 hours of ICU admission	Initially intubated	Initially placed on NIV	In hospital mortality	263
Azoulay	2014	Observational (Unconditioned)	ICU patients with malignancies who met ARDS criteria within 3 days of ICU admission	Initially intubated	Initially placed on NIV	In hospital mortality	1004
Schnell	2014	Observational (Conditioned)	ICU patients with acute respiratory failure who received positive pressure ventilation (Outcomerea database)	Initially intubated	Initially placed on NIV	In hospital mortality	2321
Chawla	2016	Observational (Unconditioned)	Adult ICU patients with ARDS	Initially intubated	Initially placed on NIV	ICU mortality	170
Crulli	2016	Observational (Conditioned)	Pediatric ICU patients who underwent intubation (NEAR4KIDS Cohort)	Not placed on NIV in the 24 hours prior to intubation	NIV use in the 24 hours prior to intubation	ICU mortality	100

Kangelaris	2016	Observational (Unconditioned)	ICU patient with ARDS (VALID Cohort)	Intubated on the same day as meeting criteria for ARDS	Not intubated on the same day as meeting criteria for ARDS	In hospital mortality	457
Ye	2016	Observational (Unconditioned)	ICU patients with ARDS that required positive pressure ventilation	Initially intubated	Initially placed on NIV	90 day mortality	58
Azoulay	2017	Observational (Unconditioned)	ICU patients with non-AIDS immunodeficiency and acute hypoxemic respiratory failure (Efrain Cohort)	Initially intubated	Initially placed on NIV	In hospital mortality	828
Bauer	2017	Observational (Conditioned)	Adult ICU patients who underwent intubation (ICON database)	Intubated within 2 days of ICU admission	Intubated more than 2 days after ICU admission	In hospital mortality	655
Bellani	2017	Observational (Unconditioned)	ICU patients who met ARDS criteria within 2 days of onset of respiratory failure, and received positive pressure ventilation (LUNG-SAFE Cohort)	Intubated within 2 days of onset of respiratory failure	Initiated and maintained on NIV for >2 days after onset of respiratory failure	In hospital mortality	2148
Rathi	2017	Observational (Unconditioned)	ICU patients with cancer who received positive pressure ventilation for hypoxemic respiratory failure	Initially intubated	Initially placed on NIV	In hospital mortality	1614
Wiles	2018	Observational (Unconditioned)	Lung transplant patients admitted to the medical ICU for acute respiratory failure and received positive pressure ventilation	Initially intubated	Initially placed on NIV	In hospital mortality	156
Alraddadi	2019	Observational (Unconditioned)	Patients with MERS (Middle East Respiratory syndrome) and acute hypoxemic respiratory failure who received positive pressure ventilation	Initially intubated	Initially placed on NIV	90 day mortality	302
Khemani	2019	Observational (Unconditioned)	Pediatric ICU patients with new pediatric ARDS diagnosis (PARDIE Cohort)	Initially intubated	Initially placed on NIV	90 day mortality	678
Taha	2019	Observational (Unconditioned)	Patients with ARDS who received positive pressure ventilation (2016 National Inpatient Database database)	Initially intubated	Initially placed on NIV	In hospital mortality	4277
Darreau	2020	Observational (Conditioned)	ICU patients with septic shock (INTUBATIC Cohort)	Intubated within 8 hours of vasopressor initiation	Intubated more than 8 hours after vasopressor initiation	In hospital mortality	323
Grasselli	2020	Observational (Unconditioned)	ICU patients with confirmed COVID-19	Intubated within 24 hours of ICU admission	Initiated on NIV within 24 hours of ICU admission	In hospital mortality	3279
Matta	2020	Observational (Conditioned)	ICU patients with COVID-19 who underwent intubation	Intubated at admission or within 2 days of initiating NIV or requiring an FiO2 ≥0.50	Intubated more than 2 days after initiating NIV or after requiring an FiO2 ≥0.50	In hospital mortality	111
Siempos	2020	Observational (Unconditioned)	ICU patients with acute hypoxemic respiratory failure and COVID-19	Initially intubated	Not initially intubated	ICU mortality	42
Xie	2020	Observational (Unconditioned)	ICU patients with COVID-19 who received respiratory support	Received IMV at time of ICU admission	Received non-invasive respiratory support at time of ICU admission	28 day mortality	733
Bavishi	2021	Observational (Conditioned)	ICU patients intubated due to COVID-19	Intubated 4-24 hours after hospital admission	Intubated 5-10 days after hospital admission	In hospital mortality	54
COVID-ICU Group	2021	Observational (Unconditioned)	ICU patients with COVID-19 (COVID-ICU Cohort)	Intubated within 24 hours of ICU admission	Placed on NIV within first 24 hours of ICU admission	90 day mortality	4244
Daniel	2021	Observational (Unconditioned)	Adult COVID-19 patients with respiratory failure who received positive pressure ventilation	Initially intubated	Initially placed on NIV	30 day mortality	222
Fayed	2021	Observational (Conditioned)	Patients intubated with severe COVID-19 pneumonia	Intubated within 24 hours of onset of severe respiratory distress	Intubated more than 24 hours after the onset of severe respiratory distress	Mortality	110

Kopp	2021	Observational (Conditioned)	Pediatric ICU patients who underwent intubation for an acute airway and/or parenchymal lung disease (RESTORE Cohort)	Initially intubated	Placed on NIV prior to intubation	In hospital mortality	2427
Pandya	2021	Observational (Conditioned)	Adult patients intubated due to COVID-19	Intubated ≤ 1.27 days after presentation	Intubated > 1.27 days after presentation	All cause mortality, 20 days after study completion	75
Roedl	2021	Observational (Conditioned)	ICU patients with COVID-19	Initially intubated	Initially placed on NIV	ICU mortality	167
Zirpe	2021	Observational (Conditioned)	Adult ICU patients with COVID-19 who underwent intubation	Intubated within 48 hours of ICU admission	Intubated more than 48 hours after ICU admission	In hospital mortality	147
Zucon	2021	Observational (Unconditioned)	ICU patients with severe respiratory infection and ARDS due to COVID-19	Intubated within 24 hours of ICU admission	Not intubated within 24 hours of ICU admission (intubated after >24 hours or only received NIV)	ICU mortality	54
Ball	2022	Observational (Conditioned)	ICU patients with COVID-19 who failed helmet CPAP prior to intubation, and underwent 2 PEEP CT scans	Intubated ≤ 2 days after initiating helmet CPAP	Intubated >2 days after initiating helmet CPAP	ICU mortality	52
Karagiannidis	2022	Observational (Unconditioned)	Adult patients with COVID-19 who received positive pressure ventilation	Initially intubated or intubated after < 24 hours of NIV	Initially placed on NIV and did not require escalation to IMV within 24 hours of initiation	In hospital mortality	15176
Le Terrier	2022	Observational (Conditioned)	Adult ICU patients with COVID-19 and acute respiratory failure who underwent intubation	Patients admitted from March 9, 2020 to May 15, 2020. Time from hospital admission to intubation was shorter during this time frame.	Patients admitted from May 16, 2020 to January 9, 2021. Time from hospital admission to intubation was significantly longer during this time frame.	ICU mortality	223
Yamamoto	2022	Observational (Conditioned)	Adult patients with COVID-19 who underwent intubation (J-RECOVER cohort)	On ≤ 6 L of supplemental oxygen prior to intubation	On NIV or >6 L of supplemental oxygen prior to intubation	In hospital mortality	412
Manrique	2023	Observational (Unconditioned)	ICU patients with COVID-19 pneumonia and ARDS (SEMICYUC Cohort)	Intubated before or at time of ICU admission	Not intubated at the time of ICU admission	In hospital mortality	4198
Riera	2023	Observational (Conditioned)	ICU patients with COVID-19 who underwent intubation (CIBERESUCICOID database)	Intubated within 24 hours of ICU admission	Intubated more than 24 hours after ICU admission	In hospital mortality	2725
Chalkias	2024	Observational (Conditioned)	Adults with severe ARDS and COVID-19 who underwent intubation (ISIC Cohort)	Lower disease severity at time of intubation (SOFA <7 or P/F ratio >250)	Higher disease severity at time of intubation (SOFA ≥ 7 or P/F ratio ≤ 250)	30 day mortality	854
Mellado-Artigas	2024	Observational (Unconditioned, Target Trial Emulation)	ICU patients with acute hypoxemic respiratory failure (MIMIC-IV Database)	Intubated within 48 hours of ICU admission	Not intubated or delayed intubation	30 day mortality	2996