**Supplementary appendix 4 –** Tests evaluated or incorporated in clinical practice for prediction of extubation success

| **Author, year** | **Definitions of test success** |
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|  |  |
| **PHYSIOLOGICAL TESTS** | |
| **Respiratory Rate, RR (breaths per minute)** | |
| Davidson, 2008 | RR ≥ 63 |
|  |  |
| **Tidal volume, Vt (ml/kg)** | |
| Kavvadia, 2000 | Vt > 4 |
| Kavvadia, 2000 | Vt > 5.5 |
| Davidson, 2008 | Vt ≥ 4 |
|  |  |
| **Spontaneous minute ventilation, MVs (ml/kg/min)** | |
| Kamlin, 2006 | MVs > 220 |
| Fox, 1993 | % of baseline MVs after adding dead space > 140 |
| Vento, 2004 | % time spent with MVs<125 ≤ 8.1% |
|  |  |
| **Ratio of spontaneous to mechanical minute ventilation, MVs/MVm** | |
| Wilson, 1998 | Absence of apnea/brady/desat and MVs/MVm ≥ 0.5 |
| Gillespie, 2003 | Same as Wilson 1998 |
| Kamlin, 2006 | MVs/MVm ≥ 0.8 |
| Gupta, 2009 | MVs/MVm ≥ 0.5 |
|  |  |
| **Rapid Shallow Breathing Index, RR/Vt (breaths/min/ml/kg)** | |
| Davidson, 2008 | RR/Vt ≥ 22 |
|  |  |
| **Breathing patterns** | |
| Kaczmarek, 2013 | Variability index of Vt |
| Kaczmarek, 2013 | Variability index of inspiratory time, Ti |
| Kaczmarek, 2013 | Variability index of expiratory time, Te |
| Kaczmarek, 2013 | Variability index of Ti/total respiratory cycle time |
| Kaczmarek, 2013 | Variability index of Vt/Ti |
|  |  |
| **Compliance of Respiratory System, CRS (ml/cmH2O/kg)** | |
| Kavvadia, 2000 | CRS ≥ 0.8 |
|  |  |
| **Maximum inspiratory pressure, MIP (cm H2O)** | |
| Chen, 1992 | MIP ≥ 35 |
| Sillos, 1992 | MIP > 25 |
|  |  |
| **CLINICAL TESTS** | |
| **Prolonged Endotracheal Continuous Positive Airway Pressure (CPAP) Trials** **( 4-24 hours)** | |
| Kim, 1987/1989 | FAILURE: 1) ≥ 2 apneas/bradycardias needing stimulation within 30min; 2) any apnea/bradycardia requiring bag mask ventilation; 3) pH < 7.3 |
| Tapia, 1995 | FAILURE: 1) ≥ 3 apneas/h > 20s with bradycardias/desaturations; 2) ≥ 1 apnea/bradycardia needing bag mask ventilation; 3) pH ≤ 7.25, PaCO2 > 60, FiO2 > 0.6 |
| Mas Munoz 1996 | FAILURE: 1) >3 apnea/h or less if bradycardia or bag mask ventilation; 2) pH < 7.2, pCO2 > 60, FiO2 > 0.6; 3) Signs of respiratory distress |
|  |  |
| **1-hour Endotracheal CPAP Trials** | |
| Greenough, 1989 | pH ≥ 7.25 |
| Chen, 1992 | PaO2 50-80, PaCO2 < 50, pH > 7.25 |
| Chan, 1993a | pH ≥ 7.25 and pCO2 ≤ 50 |
| Chan, 1993b | pH ≥ 7.25 |
| Dimitriou, 1996 | pH ≥ 7.25 |
| Dimitriou, 2000a | pH ≥ 7.25 |
| Dimitriou, 2000b | Regular respiratory efforts and pH ≥ 7.25 |
| Kavvadia, 2000 | pH ≥ 7.25 with normal PaCO2 and BE ≥ -5 |
| Dimitriou, 2002 | pH ≥ 7.25 with normal PaCO2 and BE > -5 |
|  |  |
| **Spontaneous Breathing Trials, SBT (≤ 30-min endotracheal CPAP trials)** | |
| Kamlin, 2006/2008 | FAILURE: (1) Bradycardia >15s; (2) oxygen saturation < 85% despite 15% increase in FiO2 |
| Andrade, 2010 | FAILURE: Heart rate < 100, oxygen saturation < 85% and Silverman Anderson Score > 5 |
| Von Merkel, 2012 | Same as Kamlin 2006 |
| Chawla, 2013 | FAILURE: (1) Heart rate <100 for > 10s; (2) Oxygen saturation < 85% for > 15s; (3) Significant bradycardias requiring intervention |
| Zhang, 2014 | FAILURE: Frequent apneas, bradycardias > 10s or desaturations > 15s |
|  |  |
| **COMPOSITE TESTS** | |
| **SBT + breathing patterns** | |
| Kaczmarek, 2013 | SBT + Variability index of Vt |
| Kaczmarek, 2013 | SBT + Variability index of Ti |
| Kaczmarek, 2013 | SBT + Variability index of Te |
| Kaczmarek, 2013 | SBT + Variability index of Ti/Ttot |
| Kaczmarek, 2013 | SBT + Variability index of Vt/Ti |
|  |  |
| **Tension time index of diaphragm, TTdi** | |
| Currie, 2011 | TTdi ≤ 0.15 |
| Dimitriou, 2011 | TTdi ≤ 0.12 |
| Bhat, 2016 | TTdi < 0.08 |
|  |  |
| **Tension time index of respiratory muscles, TTmus** | |
| Currie, 2011 | TTmus ≤ 0.18 |
| Dimitriou, 2011 | TTmus ≤ 0.1 |
| Bhat, 2016 | TTmus < 0.19 |
|  |  |
| **Cardiorespiratory signal analysis** | |
| Precup, 2012 | Classification based on machine learning |
| Robles-Rubio, 2015 | Combined variability of respiratory-related metrics |