A NEW CLASSIFICATION FOR PATIENTS WEANING FROM MECHANICAL VENTILATION

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BACKGROUND

Weaning from mechanical ventilation:

- covers the entire process of liberating the patient from mechanical support and from the endotracheal tube.

- the weaning period may represent up to 40-50% of the overall ventilation period

- contributes to major complications, length of ICU stay and cost of ICU care
BACKGROUND

Weaning from mechanical ventilation

J-M. Boles*, J. Bion††, A. Connors†, M. Herridge‡, B. Marsh³, C. Melot‡, R. Pearl***, H. Silverman†††, M. Stanchina‡‡, A. Vieillard-Baron††††, T. Welte⁶⁶

Statement of the Sixth International Consensus Conference on Intensive Care Medicine

Classification for weaning from mechanical ventilation (MV) in three groups (simple, difficult and prolonged weaning) based on number, timing and results of spontaneous breathing trials (SBTs) and extubation outcomes.

<table>
<thead>
<tr>
<th>TABLE 3</th>
<th>Classification of patients according to the weaning process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group/category</strong></td>
<td><strong>Definition</strong></td>
</tr>
<tr>
<td>Simple weaning</td>
<td>Patients who proceed from initiation of weaning to successful extubation on the first attempt without difficulty</td>
</tr>
<tr>
<td>Difficult weaning</td>
<td>Patients who fail initial weaning and require up to three SBTs or as long as 7 days from the first SBT to achieve successful weaning</td>
</tr>
<tr>
<td>Prolonged weaning</td>
<td>Patients who fail at least three weaning attempts or require &gt;7 days of weaning after the first SBT</td>
</tr>
</tbody>
</table>

SBT: spontaneous breathing trial.
Weaning from mechanical ventilation.
Three groups

• 1) Simple Weaning (first trial)
  – Early detection

• 2) Difficult Weaning (more than 1 attempt, up to one week)
  – Reasons for failure

• 3) Prolonged Weaning (more than 1 week or than three attempts)
  – Global management

Boles JM. ERJ 2007
Weaning classification

- Extubation without SBT?
- Successful SBT without extubation?
- Self extubation?
- Early tracheostomy?
- NIV post extubation?
- Etc.
WIND study : Methods

A prospective observational survey was run in 36 intensive care units in France, Spain and Switzerland, over a three month period.
All patients requiring intubation and MV were enrolled and followed until ICU discharge.
Modality of MV, results of SBTs*, extubations and outcome were collected daily allowing their classification according the three previously described weaning groups.

* SBT= all “tests” used to decide extubation
Flow chart according to 2007 Consensus Conference

2729 pts included
Flow chart according to 2007 Consensus Conference

- 2729 pts included
- 1375 pts classified
- 1354 (49.6%) not classified (no weaning, no SBT,...)

50% of screened patients could not be classified using the previous classification for numerous reasons: no SBT performed before planned extubation, successful self extubation without SBT, early tracheotomy for other reason than weaning, NIV...
Flow chart according to 2007 Consensus Conference

2729 pts included

1354 (49.6%) not classified
(no weaning, no SBT, ...)

1375 pts classified

Group I
961 pts (70%)

Group II
318 pts (23%)

Group III
96 pts (7%)

50% of screened patients could not be classified using the previous classification for numerous reasons: no SBT performed before planned extubation, successful self extubation without SBT, early tracheotomy for other reason than weaning, NIV...
We thus proposed a new classification with these definitions:

**Weaning attempt**: SBT or planned and/or self extubation without SBT

**Successful extubation**: Planned or self extubation without death or reintubation within the next 7 days, whatever the use of post extubation NIV or not

**Group 0 (no weaning process)** = No weaning attempt or need for tracheostomy for other reason than weaning (prolonged neurological disease and/or for superior airway managements)

**Group I (simple weaning)** = First weaning attempt resulting in a successful extubation, within 1 day when weaning attempt corresponds to a SBT

**Group II (difficult weaning)** = Successful extubation within 2 to 7 days after the 1st weaning attempt and no more than 3 weaning attempts

**Group III (prolonged weaning)**:

*Group IIIa*: Weaning success = Successful extubation >7d after 1st weaning attempt and/or after >3 weaning attempts

*Group IIIb*: Never weaned = At least 1 weaning attempt but successful extubation never obtained
Flow chart new classification

Invasive MV & no tracheotomy before admission
N=2729

Included in the weaning cohort
N=2627

 Patients reintubated for intercurrent reason, i.e. other than weaning failure, in whom extubation success can not be assessed n=102 (3%)

G0 No weaning process
n=704 (26%)

G1 Simple weaning
n=1255 (46%)

G2 Difficult weaning
n=325 (12%)

G3 Prolonged weaning
n=343 (13%)

G3a Weaning success,
n=124 (34%)

G3b Never weaned,
n=219 (64%)

Successful extubation never obtained,
n=172 (79%)

Trach for weaning
N=47 (21%)

Need for Tracheotomy for other reason than weaning
n=69 (10%)
New Weaning Classification
all patients

Chart Title
New Weaning Classification
Patients weaning

Chart Title

Weaning category

G1  G2  G3a  G3b
Kaplan-Meier curves of weaning success
# Characteristics and ICU outcome according to the WIND weaning group

<table>
<thead>
<tr>
<th></th>
<th>No weaning process N=704</th>
<th>Simple weaning N=1255</th>
<th>Difficult weaning N=325</th>
<th>Prolonged weaning N=343</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAPS II Mean±SD</td>
<td>66±23</td>
<td>44±17</td>
<td>49±17</td>
<td>56±18</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Surgical admission, n (%)</td>
<td>123 (17.5)</td>
<td>412 (32.8)</td>
<td>60 (18.5)</td>
<td>54 (15.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ICU LOS (d) Median (25^{th}-75^{th})</td>
<td>3 [2;8]</td>
<td>5 [3;8]</td>
<td>10 [7;18]</td>
<td>20 [9;37]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ICU deaths, n (%)</td>
<td>560 (79.7%)</td>
<td>4 (0.3%)</td>
<td>1 (0.3%)</td>
<td>179 (52.2%)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
### Characteristics of weaning process according to the WIND weaning group

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<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of SBT: T-tube/ZEEP/Other %</td>
<td>44.5/51.7/4</td>
<td>55.5/43.2/1</td>
<td>50.5 /45.2/4</td>
<td>&lt;0.001 (each)</td>
</tr>
<tr>
<td>Delay from inclusion to 1&lt;sup&gt;st&lt;/sup&gt; weaning attempt, d median (25&lt;sup&gt;th&lt;/sup&gt;-75&lt;sup&gt;th&lt;/sup&gt;)</td>
<td>2 [1;5]</td>
<td>5 [3;9]</td>
<td>6 [3;9]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Delay from inclusion to 1&lt;sup&gt;st&lt;/sup&gt; successful extubation, d median (25&lt;sup&gt;th&lt;/sup&gt;-75&lt;sup&gt;th&lt;/sup&gt;)</td>
<td>2 [1;5]</td>
<td>7 [4;11]</td>
<td>14 [10;19]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Patients with reintubation for weaning failure, n (%)</td>
<td>0</td>
<td>29 (8.9)</td>
<td>97 (28.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Patients receiving post extubation NIV, n (%)</td>
<td>164 (13)</td>
<td>54 (16.6)</td>
<td>58 (17)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
CONCLUSION

• The previous classification did not permit to classify almost 50% of the cohort. This modified weaning classification allows describing and classifying real weaning practices.

• Among MV patients starting weaning, 65% of them fall in the simple weaning category
• This modified weaning definition strongly discriminates 3 groups with different weaning process and prognosis
• The other 35 % have either difficult (48%) or prolonged weaning (52%). Two thirds of patients entering the “prolonged” category will never be weaned.
• Amiens (respiratory ICU) : Dr C Andrejak
• Amiens (chirurgical ICU) : Dr E Zogheib
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• Lille : Dr E Jaillette
• Lille : Dr E Parmentier
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• Mayotte : Dr F Lion
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• Reus : Dr H Aguirre
• Roanne : Dr P Beuret
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