The Drowsy Poisoned Patient - What Are the Indications for Intubation?

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Aspiration pneumonia following severe self-poisoning

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• Retrospective analysis of the respiratory complications in poisoned patients according to the time of intubation, the use of gastric lavage and activated charcoal…

• 28.4% of 257 patients had aspiration pneumonia, but no clear definition of altered consciousness (missing data for 20.6%)
  – 48.2% of unconscious patients outside the hospital, for an unknown period

• Mixed drugs overdose, no case of pure ethanol intoxication

| Table 1 |
|---------------------|---------------------|---------------------|
| **Consciousness at the first contact with health care providers in view of pneumonias** |
| Patients without aspiration pneumonia n (%) | Patients with aspiration pneumonia n (%) | Total n (%) |
| Conscious | 63 (78.5) | 17 (21.3) | 80 (39.2) |
| Unconscious | 77 (62.1) | 47 (37.9) | 124 (60.8) |

\(\chi^2 6.2, \ P = 0.012.\)
Several limitations:

- Delay from ingestion to discovery and hospital admission
- High incidence of aspiration pneumonia in comparison with literature data
- Most of the conscious and unconscious patients received both gastric lavage and activated charcoal, although indications and contraindications were not respected
Relationship between GCS and risk of aspiration pneumonia

- 224 consecutive drug-poisoned patients admitted to the ICU
- Suspected AP in 45% of patients with GCS < 8, but also in 14.7% of the patients with GCS > 8 < 15

<table>
<thead>
<tr>
<th>GCS</th>
<th>Number with aspiration suspected</th>
<th>Number without aspiration suspected</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 (n=34)</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>14 (n=17)</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>13 (n=10)</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>12 (n=11)</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>11 (n=8)</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>10 (n=13)</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>9 (n=9)</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>8 (n=9)</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7 (n=18)</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>6 (n=30)</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>5 (n=23)</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>4 (n=9)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>3 (n=33)</td>
<td>17</td>
<td>16</td>
</tr>
</tbody>
</table>

(Adnet et al., Lancet, 1996)
Objective: to describe the frequency of aspiration pneumonitis in poisoned patients, to identify predisposing factors

Material: retrospective cohort study on 4562 poisoned patients
- 71/4562 (1.6%) with AP

Factors associated with AP: older ages, GCS < 15, spontaneous emesis, seizures, delayed presentation to hospital, ingestion of TCA

Factors not associated with AP: ingestion of ethanol, benzodiazepines, antipsychotics, administration with activated charcoal

Logistic regression for the patients admitted to the ICU: age, emesis, time from ingestion to presentation

Patients with AP have a longer ICU stay and a higher mortality
• Incidence of AP among poisoned patients may be highly variable
  – Inclusion criteria, ED or ICU patients, type of poison
  – While lower GCS (<8) are clearly associated with a higher risk of AP and will indicate orotracheal intubation, the question remains as patients with GCS at 15/15 are at some risk
    • Adnet: 29% AP with 85% of pts with GCS < 15; 0/34 AP in patients with GCS = 15
    • Isbister: 27/3487 pts (0.8%) of AP when GCS = 15 (versus 4.1% when GCS < 15)
Inadequate assessment of the airway and ventilation in acute poisoning: a need for improved education?

Joseph F. Cosgrove, Alistair D. Gascoigne

• Retrospective analysis of 37 pts admitted to the ICU following episodes of acute poisoning with a documented GCS
• Potential or actual airway problems?
• Airway protected according to criteria for intubation and ventilation?
• Any clinical and radiological evidence suggestive for aspiration pneumonia? Relationship with clinical findings of coma, loss of laryngeal reflexes and abnormal respiratory pattern?
Inadequate assessment of the airway and ventilation in acute poisoning. a need for improved education?

Resuscitation 40 (1999) 161–164

Joseph F. Cosgrove a, Alistair D. Gascoigne b,*

Indications for intubation and ventilation of coma patients (trauma patients)

Immediately:
- Coma: not obeying commands, not speaking, not eye opening, i.e.: GCS < 8.
- Loss of protective laryngeal reflexes.
- Ventilatory insufficiency as judged by arterial blood gases:
  - Hypoxaemia (\(\text{PaO}_2 < 9\) kPa on air or < 13 kPa on oxygen)
  - Hypercarbia (\(\text{PaCO}_2 > 6\) kPa)
- Spontaneous hyperventilation causing \(\text{PaCO}_2 < 3.5\) kPa.
- Respiratory arrhythmia. Before transferring a patient (including within a hospital)
- Significantly deteriorating conscious level, even if not coma.
- Bilateral fractured mandible.
- Copious bleeding into mouth.
- Seizures.
Ethanol ingestion frequent in this subgroup of patients (25/37 pts)

27/37 managed according to the standards
- 11 with did not require any intervention
- 16 required tracheal intubation, 1 aspiration pneumonia (before hospital admission)

10/37 received sub-optimal care
- 6 developed respiratory complications

Lack of specific intubation guidelines for poisoned patients
- Not only the A/B/C approach, but more training on airway management in the setting of acute poisoning (influence of other factors: dynamics of poisoning, time from ingestion to discovery, nature of the substance, vomiting,...)
Prospective, observational study conducted on 73 patients admitted to the ED with altered consciousness following poisoning

No patient with GCS < 8 required intubation nor presented aspiration

1 intubation in patient with GCS 12

Intubation 1.4%, aspiration 0.3%

Alcohol-intoxicated patients have usually the lowest median GCS, but with a more rapid recovery without adverse events

Patients with GCS can be observed in the ED, but the initial assessment and follow-up should be made by an experienced emergency physician + fully adapted facility with cardiorespiratory monitoring, nurses, junior staff, physiotherapists…
Predictors of the need for rapid sequence intubation in the poisoned patient with reduced Glasgow coma score


C Donald, R Duncan, S Thakore

• Objective:
  – To define key physiological indicators of intubation in poisoned patients
  – Is the GCS a valuable indicator?

• Material & Methods
  – Prospective observational study
  – Patients allocated in two groups
    • Group I: all toxicological presentations with GCS < 8 who were not intubated and managed conservatively
    • Group II: all poisoned patients with a reduced GCS who were intubated
Predictors of the need for rapid sequence intubation in the poisoned patient with reduced Glasgow coma score

C Donald, R Duncan, S Thakore


Table 1: Comparative physiological variables of intubated group versus non-intubated group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intubated (n = 12, 11 M : 1 F)</th>
<th>Non-intubated (n = 14, 6 M : 8 F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>Age</td>
<td>34.6</td>
<td>38</td>
</tr>
<tr>
<td>Heart rate</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>Blood pressure (systolic)</td>
<td>119</td>
<td>128</td>
</tr>
<tr>
<td>GCS (range)</td>
<td>5.9 (3–11)</td>
<td>5.5</td>
</tr>
<tr>
<td>pH</td>
<td>7.29</td>
<td>7.3</td>
</tr>
<tr>
<td>Pao₂ on high-flow O₂ (IOM)</td>
<td>29.9 (20.1)</td>
<td>13.5</td>
</tr>
<tr>
<td>Paco₂ (IOM)</td>
<td>6.8 (6.5)</td>
<td>6.8</td>
</tr>
</tbody>
</table>

GCS, Glasgow coma scale; IOM, interquartile mean; O₂, oxygen; Pao₂, partial pressure carbon dioxide; Paco₂, partial pressure oxygen.

Table 2: Types of poisoning in intubated and non-intubated groups

<table>
<thead>
<tr>
<th>Cases</th>
<th>Intubated (n = 12)</th>
<th>Non-intubated (n = 14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Phenobarbitone, voltarol, stemetil, paracetamol, atenolol</td>
<td>Quetiapine</td>
</tr>
<tr>
<td>2</td>
<td>Ecstasy</td>
<td>TCA and diazepam</td>
</tr>
<tr>
<td>3</td>
<td>Unknown ?TCA</td>
<td>Amitriptyline, diazepam</td>
</tr>
<tr>
<td>4</td>
<td>?Antidepressant</td>
<td>Chloromethiazole</td>
</tr>
<tr>
<td>5</td>
<td>Cocaine, heroin, diazepam, ecstasy</td>
<td>Amitriptyline</td>
</tr>
<tr>
<td>6</td>
<td>Amitriptyline, propranolol</td>
<td>Tramadol, zopiclone and amitriptyline</td>
</tr>
<tr>
<td>7</td>
<td>Dothiepin</td>
<td>Alcohol</td>
</tr>
<tr>
<td>8</td>
<td>Amitriptyline, DHC, flucloxacinill, aspirin, simvastatin, quinine,</td>
<td>Alcohol</td>
</tr>
<tr>
<td></td>
<td>ranitidine, diazepam</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Propranolol, lisinopril</td>
<td>Alcohol</td>
</tr>
<tr>
<td>10</td>
<td>Unknown</td>
<td>Alcohol</td>
</tr>
<tr>
<td>11</td>
<td>Dothiepin</td>
<td>Alcohol</td>
</tr>
<tr>
<td>12</td>
<td>Mirtazapine, cocomadol, atenolol</td>
<td>Alcohol</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Diazepam, MAO, SSRI</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Quetiapine, tramadol, paracetamol</td>
</tr>
</tbody>
</table>

DHC, dihydrocodeine; MAO, monoamine oxidase; SSRI, selective serotonin reuptake inhibitor; TCA, tricyclic antidepressant.
There is a difference among the toxins represented in both groups (ethanol and benzo in the non-intubated group with GCS < 8, more TCA and cardiotoxic drugs in the intubated group)

No aspiration pneumonia in the non-intubated group (but airway protection was regularly assessed, with a close monitoring in the ED)

Reasons for intubation (n=12)
- Loss of airway protection = 9
- Failure of oxygenation/ventilation = 6
- Predicted clinical course = 8

Length of stay: 26 h in the non-intubated group; 5.4 days in the intubated group

Physiological variables seem less helpful than clinical experience (the most likely clinical course according to the nature of the toxin ingested) when deciding to intubate a poisoned patient
The gag reflex may be attenuated or absent at all levels of the GCS.
In patients with GCS < 8, gag reflex unlikely to be normal.
In patients with GCS > 8, gag reflex depressed in 64% of patients exposed to drugs, but only 8% after head injury.
A GCS of 15 does not allow to distinguish between the alert, lively patient and the drowsy, lethargic one.

Most of the patients with a GCS of 15 and impaired gag reflex had been exposed to a narcotic analgesic.

Many of the patients with a GCS 14-15 and impaired gag reflex had been exposed to tranquilisers.

Consciousness level and airway protection reflexes should be assessed independently.
Gag and cough reflexes

• Can we safely explore gag and cough reflexes?
Is the gag reflex a good discriminator for intubation in the poisoned patient?

- Gag reflex may be absent in healthy volunteers
- In the poisoned group, gag reflex may be depressed in the presence of GCS > 8

<table>
<thead>
<tr>
<th>Author, date and country</th>
<th>Patient group</th>
<th>Study type (level of evidence)</th>
<th>Outcomes</th>
<th>Key results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kulig K et al 1982 USA</td>
<td>38 emergency room patients Gag reflex assessed</td>
<td>Observational</td>
<td>Presence of gag reflex matched to conscious level</td>
<td>12 patients with a gag reflex were significantly obtunded</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 patient without a gag reflex was fully awake</td>
</tr>
<tr>
<td>Moulton C et al 1991 UK</td>
<td>111 emergency department patients requiring neurological observation Gag reflex and GCS assessed</td>
<td>Observational</td>
<td>Presence of gag reflex matched to conscious level</td>
<td>Gag reflex may be significantly attenuated or absent at all levels of GCS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In more conscious patients (GCS &gt; 8) 64% of those exposed to drugs had depressed gag compared with 8% of those with head injury.</td>
</tr>
<tr>
<td>Chan B et al 1993 Australia</td>
<td>414 patients with poisoning attending an emergency department Prediction of need for intubation</td>
<td>Diagnostic</td>
<td>GCS &lt; 8</td>
<td>sensitivity 90%, specificity 95%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Absence of gag on admission</td>
<td>sensitivity 70%, specificity 100%</td>
</tr>
<tr>
<td>Davies E et al 1995 UK</td>
<td>140 healthy volunteers Gag reflex assessed</td>
<td>Observational</td>
<td>Presence of gag reflex</td>
<td>Gag reflex was absent in 37% of subjects</td>
</tr>
<tr>
<td>Leder SB 1996 USA</td>
<td>63 healthy volunteers Gag reflex assessed</td>
<td>Observational</td>
<td>Presence of gag reflex</td>
<td>Gag reflex was absent in 13% of subjects</td>
</tr>
</tbody>
</table>

Study Weaknesses
- Gold standard is clinical judgement
• Retrospective analysis of 155 poisoned patients admitted with a GCS < 12, most receiving gastrointestinal decontamination, large variety of toxins. Overall incidence of AP was 15.5%
• The incidence of AP was clearly different in the patients who had absent or reduced gag reflex, and GCS < 8; significant relationship between AP, GCS and gag reflex
In the patients with reduced gag reflex, GCS was the most important predictor for AP

Limitations:

- The high incidence of AP may be due to pre-hospital events, to in-hospital events, to the large use of gastric evacuation
- Intubation should not be seen as the only effective measure to protect airways
Is tracheal intubation as safe as it appears?

- 266 poisoned patients (multidrug) (benzo 61%, ethanol 22%)
- Intubation based on altered mental status (GCS < 8 in 89%), or acute respiratory distress, circulatory failure
- Median intubation time 24 h
- Abnormal postextubation fiberoptic evaluation in 80% (mucosal edema for most of the patients, no follow-up available)
- Independent factors of early laryngeal injury: female gender and intubation duration > 72 h
- Ethanol and opioids are « protective »: but shorter intubation time
- Should we avoid in some cases intubation to prevent laryngeal injury? Role of early or late administration of antidotes?
The lateral decubitus position is thought to be optimal to prevent aspiration pneumonia.

Proper drainage and prevention of gastric regurgitation.

Body position: not the only risk factor — depth of coma.

Prospective study to analyze the influence of the position at the time of discovery on the occurrence of aspiration pneumonia in patients with GCS < 12.
205 patients, 88% intubated and mechanically ventilated in the field.

33.7% with suspected aspiration pneumonia.

Psychotropic agents or mixed overdoses.

Lower incidence of AP in patients with PP or SR position.

Not only gravitational drainage, probably better cough, gag and swallowing reflexes in some subgroups.

In healthy volunteers, no evidence that body position could influence swallowing reflex.

<table>
<thead>
<tr>
<th>Body Position</th>
<th>SAP (n [%])</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP (n = 25)</td>
<td>2 (8.0)</td>
</tr>
<tr>
<td>SP (n = 112)</td>
<td>44 (39.3)</td>
</tr>
<tr>
<td>LLD (n = 30)</td>
<td>11 (36.7)</td>
</tr>
<tr>
<td>RLD (n = 20)</td>
<td>9 (45)</td>
</tr>
<tr>
<td>SR (n = 18)</td>
<td>2 (11.1)</td>
</tr>
</tbody>
</table>

PP, prone position; SP, supine position; LLD, left lateral decubitus position; RLD, right lateral decubitus position; SR, semi-recumbent position.

*Chi-square test.
Influence of antidotes on endotracheal intubation and aspiration pneumonia

• Impossible to demonstrate the effect of naloxone or flumazenil on the incidence or severity of aspiration
  – Aspiration occurs prior to hospital admission or at the time of endotracheal intubation
  – Case series suggesting that patients who had a partial response to flumazenil had more complications
  – No evidence that flumazenil could reduce the number of complex procedures or the duration of hospital stay

(Mathieu-Nolf et al., Clin Tox, 2001)
Conclusions (1)

- Criteria for intubation of the « drowsy » poisoned patient cannot be easily drawn from the literature data
  - Intubation is not the only measure to prevent aspiration pneumonitis
- How to combine the evaluation of the neurological status of the « drowsy » poisoned patient and the absence of airway protection?
  - GCS as well as AVPU scale are probably not fully appropriate, particularly for patients with the highest scores
  - Gag reflex may offer some insights, but may be absent in healthy volunteers
  - The clinical findings may vary over a short period of time with some common toxins (ethanol, GHB)
Conclusions (2)

• The presence of an experienced emergency physician with a toxicological expertise in the ED or ICU is helpful to avoid unnecessary intubations but also to identify the patients at risk for aspiration and to propose measures to improve airway protection
  – Can the clinical course be predicted according to the time from ingestion to admission, the nature of the toxin, the presence of organ failure…?

• When the decision is made « not intubate », the patient has to be admitted in a fully adapted ward for cardiorespiratory monitoring and therapy

• Clinical experience is often more valuable than guidelines…