Methods

Introduction

LITHIUM (Li)
A mood stabilizer used in clinical psychiatry, primarily to treat bipolar disorder.

NARROW THERAPEUTIC WINDOW (0.6 - 1.2 mmol/L)
The disadvantage of lithium therapy (4), with toxic effects as low as 1.5 mmol/L. (5) The etiology of the toxicity may vary (5) and there is no antidote for the toxic effects of lithium. (3)

HEMODIALYSIS (HD)
An effective intervention: enhances clearance and decreases half-life.

USE OF HEMODIALYSIS FOR TOXICITY MANAGEMENT
The decision to perform hemodialysis is clinical and variable as an intervention in the treatment of lithium poisoning. (6) Lithium levels ≥ 4 mmol/l in any category and lithium levels ≥ 2.5 mmol/l in chronic exposure have been described as indications for HD.

Objectives

To analyze cases of lithium intoxication received by the Arizona Poison and Drug Information Center (APDIC) between 2002 and 2014; and assess patients' laboratory data (i.e. lithium and serum creatinine levels), clinical symptomatology and the use of hemodialysis to improve lithium clearance.

Methods

In this study, "lithium level" represents the highest reported level. The mean highest lithium level was calculated for each category.

Total of lithium cases in Toxicall® n = 561
Excluded cases (no laboratory data) n = 213

<table>
<thead>
<tr>
<th>Category of Toxicity</th>
<th>Number</th>
<th>Cases qualified for this study</th>
<th>Cases excluded</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Overdose</td>
<td>149</td>
<td>n = 38</td>
<td>n = 20</td>
<td>n = 310</td>
</tr>
<tr>
<td>Chronic Overdose</td>
<td>69</td>
<td>n = 22</td>
<td>n = 9</td>
<td>n = 110</td>
</tr>
<tr>
<td>Chronic Poisoning</td>
<td>110</td>
<td>n = 18</td>
<td>n = 12</td>
<td>n = 98</td>
</tr>
</tbody>
</table>

Of 91 cases, treatment was indicated when the patient meets one or more of the following criteria: (6)
- [Li] ≥ 4.0 mmol/l in any category and [Li] ≥ 2.5 or 4.0 mmol/l in chronic toxicity
- Presence of at least one severe clinical effects (neurological symptoms)
- Contraindications for volume expansion

In general, when comparing HD to that of conservative therapy, HD was utilized when patients had higher values of lithium level.

ACUTE ON CHRONIC OVERDOSE

No HD group:
One case in which the [Li] = 4.1 mmol/l but only a gastrointestinal clinical effect was manifest (i.e. vomiting).

HD group:

<table>
<thead>
<tr>
<th>n</th>
<th>%</th>
<th>[Li] lower than 10.0mmol/l</th>
<th>[Li] greater than 10.0mmol/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>50</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>1.5</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

In the other cases of this subgroup, the [Li] was ≤ 3.9 mmol/l. The predominant symptoms were agitation, drowsiness/lathargy and confusion.

CHRONIC POISONING

No HD group:

<table>
<thead>
<tr>
<th>n</th>
<th>%</th>
<th>[Li] lower than 10.0mmol/l</th>
<th>[Li] greater than 10.0mmol/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Some “no HD” cases had high [Li] (4.2 - 4.5 and 10.0mmol/l) associated with severe clinical effects (i.e. fasciculations, drowsiness/lathargy, coma).

Conclusions

Literature recommendations for HD are inconsistent. Overall, HD is indicated when the patient meets one or more of the following criteria: (6)
- [Li] ≥ 4.0 mmol/l in any category and [Li] ≥ 2.5 or 4.0 mmol/l in chronic toxicity
- Presence of at least one severe clinical effects (neurological symptoms)
- Contraindications for volume expansion

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References


