Evaluation of Methadone Poisoning in Hospitalized Children: A Short Review

Gholamali Maamouri¹, Anahita Alizadeh Ghamsari², *Edriss Teimouri³

¹Professor of Neonatology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.
²Pediatric Toxicologist, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.
³Students Research Committee, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

Abstract
Upload poisoning is one of the most dangerous and common poisoning in iranian children. Depression of the respiratory and central nervous systems may lead to significant toxicity. Even low doses of upload are dangerous in pediatrics under 6 years old. Methadone is the most toxic of the uploads; small doses as low as a single tablet can lead to death. According to this information we decided to evaluate methadone poisoning in hospitalized children.

Key words: Methadone, Naloxone, Poisoning, QTC.

Introduction
Poisoning and deaths linked to methadone have risen since the recent trend toward the outpatient management of opioid addiction and chronic pain with methadone has led to greater availability of these drugs to children in their homes (1).
Methadone poisoning is one of the most dangerous and common poisoning and causes of presentation to emergency departments in iranian children (2).
Although naloxone, a pure opioid antagonist, has been available for many years, there is steal high mortality rate in these children (3). Even low doses of methadone are dangerous in the pediatric population under 6 years old (4).

Discussion
Various studies demonstrated data about different features of accidental methadone poisoning in childhood.
According to Alotaibi ingestion of small amounts of methadone can lead to death. There are overlaps between toxic and fatal concentrations; careless storage is a common cause of accidental poisoning of children (6).
In Watson studies, patients who had taken long acting opioids such as methadone developed renarcosis up to 2 hours after their arrival to emergency room. Since the half life of naloxone is 60 to 90 minutes, it seems logical to observe patients for signs of recurrent toxicity for at least 2 hours (7).
According to Clarke study it is difficult to decrease confounding factors, such as the
probable range of different opioids, co-ingestants, and adulterants that can be taken, the variety of ways by which they can be taken (orally, intravenously, subcutaneously, nasally, or by smoking), and the complex treatment regimes that are given. It is mostly difficult to determine what individual patients have taken because usually they do not know (3).

In Shania studies, higher doses of methadone in the syrup form appear to exert a similar severity of poisoning and results compared to lesser doses of that in the form of tablet (8).

There have been multiple case reports of methadone ingestions in children reporting significant toxicity from doses as low as 5 milligrams (Table 1).

<table>
<thead>
<tr>
<th>First author</th>
<th>Publication year</th>
<th>No. cases</th>
<th>Age (s)</th>
<th>Amount(s)</th>
<th>No. significant CNS/respiratory Depression</th>
<th>No. deaths</th>
<th>Reports of prolonged symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aronow(9)</td>
<td>1972</td>
<td>18</td>
<td>&lt;7 years</td>
<td>5–40 mg</td>
<td>9</td>
<td>1</td>
<td>Up to 13 h</td>
</tr>
<tr>
<td>Bunchy(10)</td>
<td>1994</td>
<td>44</td>
<td>1mon–7 years</td>
<td>Up to 200 mg</td>
<td>20</td>
<td>2</td>
<td>24–48 h</td>
</tr>
<tr>
<td>Sesso(11)</td>
<td>1975</td>
<td>1</td>
<td>7 mon</td>
<td>10–13 mg</td>
<td>1</td>
<td>0</td>
<td>5.5 h</td>
</tr>
<tr>
<td>Lee(12)</td>
<td>1974</td>
<td>15</td>
<td>1–6 years</td>
<td>30–1120 mg</td>
<td>10</td>
<td>2</td>
<td>Seven required multiple doses of opioid antagonists</td>
</tr>
<tr>
<td>Robinson(13)</td>
<td>1971</td>
<td>3</td>
<td>2–10 years</td>
<td>Up to 50 mg</td>
<td>3</td>
<td>0</td>
<td>8 h</td>
</tr>
<tr>
<td>Daimio(14)</td>
<td>1973</td>
<td>4</td>
<td>15mon–5.5years</td>
<td>20–80 mg</td>
<td>4</td>
<td>4</td>
<td>&gt;20 h</td>
</tr>
<tr>
<td>McCauley(15)</td>
<td>1969</td>
<td>1</td>
<td>21 mon</td>
<td>20 mg</td>
<td>1</td>
<td>0</td>
<td>18 h</td>
</tr>
<tr>
<td>Brooks(16)</td>
<td>1999</td>
<td>1</td>
<td>30 mon</td>
<td>Unknown</td>
<td>1</td>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td>Schwab(17)</td>
<td>2001</td>
<td>2</td>
<td>8 mon–3 years</td>
<td>Unknown</td>
<td>2</td>
<td>0</td>
<td>Unknown</td>
</tr>
<tr>
<td>Farnaghi(2)</td>
<td>2009</td>
<td>31</td>
<td>4mon–12 years</td>
<td>21–33 mg</td>
<td>30</td>
<td>0</td>
<td>51 hr</td>
</tr>
<tr>
<td>Say(18)</td>
<td>1971</td>
<td>1</td>
<td>2 years</td>
<td>80 mg</td>
<td>1</td>
<td>0</td>
<td>48–72 h</td>
</tr>
<tr>
<td>Taheri(19)</td>
<td>2013</td>
<td>385</td>
<td>1–90 unknown</td>
<td>224/137 unknown</td>
<td>12</td>
<td>unknown</td>
<td>4·240 h</td>
</tr>
<tr>
<td>Jabehdari(20)</td>
<td>2012</td>
<td>31</td>
<td>&lt;12 years</td>
<td>2-125mg</td>
<td>12</td>
<td>unknown</td>
<td>51 hr</td>
</tr>
</tbody>
</table>

In one study in England by Eastwood and co-workers 13 cases of methadone poisoning were reported, all the children were below the age of 4 years. 5 cases (38%) were found to be dead on arrival with mean methadone concentration of (0.38 mg/L). Methadone concentrations in the survivors on arrival were (0.06) to (0.40 mg/L) (mean=0.16) (5). Sabzi and co-workers did a study on taleghani hospital emergency record of referred children during (2009) in Iran. From (6053) children entered the department (164) cases recorded as accident and poisoning. 65 cases (63.39%) were opium toxicity and 7 Cases (26.4%) were methadone toxicity (21).

**Conclusion**

Methadone poisoning is one of the most dangerous and common poisoning due to low education of patients and careless storage of methadone. In order to reduce the rate of poisoning child-resistant containers for dispensing syrup and reduction in methadone concentration should be used, however there is greater chances of survival if the child presents early to emergency department and quickly diagnosed and treated with an opioid antagonist is started.
References