Paralytic Shellfish Poisoning in Tasmania

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Overview

- Paralytic shellfish poisoning
- Shellfish monitoring in Tasmania
- 2015 outbreak
- Outbreak response
- Discussion
  - Opportunities
  - Future predictions
Paralytic Shellfish Poisoning

- Dinoflagellate algae produce paralytic shellfish toxins
- Bivalve filter-feeding shellfish bioaccumulate toxins
- Contaminated seafood smells, tastes and appears normal
- Not destroyed by cooking or freezing
- Estimated 2000 cases/year globally 15% mortality
PSP: Clinical Features

• Onset usually within 2 hours (15 mins to 10 hours)
  – Paraesthesia
  – Numbness
  – Weakness
  – Muscle incoordination
  – Difficulty speaking
  – Diplopia
  – Floating sensation
  – Difficulty breathing
  – Severe cases respiratory failure → death

• Treatment: supportive

• Lab confirmation: saxitoxin in urine or seafood
Paralytic Shellfish Poisoning in Tasmania

- Notifiable as “Suspected cases of food or water-borne illness”
- Tasmania:
  - Anecdotal cases 1980s and 1990s
  - 1 documented case 2011
- No other cases in Australia
- Monitoring: Tasmanian Shellfish Quality Assurance Program (TSQAP)
Outbreak 2015

- Algal bloom east coast Tas from July 2015
- Public Health Alert Friday 2\textsuperscript{nd} October 2015
- Initial two cases notified Friday 2\textsuperscript{nd} October
Outbreak Response

- Outbreak team established
- Case definitions: probable and confirmed
- Active case finding
- Temporary signs erected
- Communication to public
- Telephone interviews with cases
- Tourism information
Descriptive epidemiology

• 2 – 12 October
• 5 suspected cases notified
  – 4 confirmed, no probable
• 3/4 males
• Age range 51-61 years
• Median number of mussels consumed: 14 (6-35)
• Median time exposure → symptoms: 1.25 hours (30 minutes to 12 hours)
## Clinical Features

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Number affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paraesthesia or numbness</td>
<td>4/4</td>
</tr>
<tr>
<td><strong>Mouth or Face</strong></td>
<td>4/4</td>
</tr>
<tr>
<td><strong>Fingers</strong></td>
<td>3/4</td>
</tr>
<tr>
<td><strong>Legs</strong></td>
<td>1/4</td>
</tr>
<tr>
<td>Dizziness</td>
<td>3/4</td>
</tr>
<tr>
<td>Floating sensation</td>
<td>3/4</td>
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<tr>
<td>Nausea</td>
<td>3/4</td>
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<tr>
<td>Vomiting</td>
<td>1/4</td>
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<tr>
<td>Muscle weakness</td>
<td>4/4</td>
</tr>
<tr>
<td>Difficulty with swallowing or speech</td>
<td>1/4</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>2/4</td>
</tr>
</tbody>
</table>
Environmental Investigations

Images courtesy of Google Earth and TSQAP
Paralytic Shellfish Toxin levels for Little Swanport and Spring Bay, July to November 2015

Total PST (mg/kg)

- Regulatory limit
- Spring Bay Mussels
- Little Swanport Pacific Oysters
- Public health alert and first 2 cases
- Little Swanport Wild Mussel

3rd case
4th case
30-Oct
2-Oct
6-Oct
10-Oct
14-Oct
18-Oct
22-Oct
26-Oct
30-Oct
3-Nov
7-Nov
11-Nov
15-Nov
19-Nov
23-Nov

14-Jul 18-Jul 22-Jul 26-Jul 30-Jul
4-Sep 8-Sep 12-Sep 16-Sep 20-Sep 24-Sep 28-Sep

Paralytic Shellfish Toxin levels for Little Swanport and Spring Bay, July to November 2015
Opportunities for improvement

- Monitoring for PST
- Clinician awareness and notification
- Communication
  - Permanent signage east coast + high risk alerts
  - Early alert when PST levels exceed limits
- Future planning
  - Guidelines
  - Fact Sheet
  - Surveillance
Future predictions

- Harmful algal blooms increasing in frequency and geographic distribution
  - Sunlight
  - Water temperature
  - Nutrient levels
  - pH
  - Ocean currents
  - Winds
  - Surface runoff
  - Increased awareness and testing
Acknowledgements

• Michelle Green (OzFoodNet)
• Kate Wilson (TSQAP)
• Stewart Quinn, Scott Burton, Mark Veitch, David Coleman, Maureen Davey, Scott McKeown

When we found ourselves in Peril Strait, we turned to eating mussels because of a shortage of fresh fish. They must have been poisonous at this time of year for a few hours later more than half of our men died. Even I was near death, but remembering my father’s advice, to eat smelt (korushki) at such times, I vomited and recovered my health.

Heinrich Johan Holmberg 1798
Campbell et. al. 2013, The 2012-13 paralytic shellfish toxin event in Tasmania associated with the dinoflagellate alga Alexandrium tamarense, Tactical Research Fund


Tasmanian Shellfish Quality Assurance Program, Biotoxin Management Plan, Version 3.1, 2015, Department of Primary Industries, Parks, Water and Environment

Australia New Zealand Food Authority, Shellfish toxins in food: a toxicological review and risk assessment, Technical Report Series 14,