Acute Flaccid Myelitis

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Overview

• What is acute flaccid myelitis (AFM)?
• Epidemiology of AFM
• Potential causes of AFM
• AFM surveillance and reporting
What Is AFM?

• Rare neurologic condition
• Specifically affects the central, or gray matter, of the spinal cord
• Involves acute onset of flaccid limb weakness
• Often preceded by a prodromal respiratory, febrile, or gastrointestinal illness approximately one week before limb weakness onset
AFM Symptoms

- Sudden arm or leg weakness
- Facial droop or weakness
- Difficulty moving the eyes or drooping eyelids
- Difficulty with swallowing or slurred speech

Image Source: Centers for Disease Control and Prevention (CDC)
Other Potential AFM Symptoms

• Pain in the arms or legs
• Rare symptoms:
  – Numbness or tingling
  – Inability to pass urine
• Severe cases may develop respiratory failure requiring ventilator support.
History of AFM Investigation in the United States

- AFM is not a new condition.
- Increase in U.S. cases beginning in 2014 is new.
- AFM has been investigated by the Centers for Disease Control and Prevention (CDC) since August 2014.
AFM Surveillance: Case Definitions

• **Confirmed:**
  • An illness with onset of acute flaccid limb weakness AND
  • MRI showing spinal cord lesion largely restricted to gray matter and spanning one or more spinal segments

• **Probable:**
  • An illness with onset of acute flaccid limb weakness AND
  • CSF showing pleocytosis (white blood cell count >5 cells/ mm$^3$)**

**Will be updated per CSTE 2019 vote to base classification on spinal cord lesions.**
Epidemiology of AFM

- Most cases (>90%) among children
- Affects fewer than one in a million people in the United States annually
U.S. AFM Trends

Number of confirmed U.S. AFM cases reported to CDC by month of onset, August 2014 - October 4, 2019 ^**†

Source: Centers for Disease Control and Prevention (CDC).
## Confirmed AFM Cases

<table>
<thead>
<tr>
<th>Year</th>
<th>United States</th>
<th>Indiana</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014 (Aug. 1 – Dec. 31)</td>
<td>120 (34 states)</td>
<td>5</td>
</tr>
<tr>
<td>2015</td>
<td>22 (17 states)</td>
<td>0</td>
</tr>
<tr>
<td>2016</td>
<td>153 (39 states)</td>
<td>4</td>
</tr>
<tr>
<td>2017</td>
<td>37 (16 states)</td>
<td>2</td>
</tr>
<tr>
<td>2018</td>
<td>236 (41 states)</td>
<td>2</td>
</tr>
<tr>
<td>2019*</td>
<td>22 (9 states)</td>
<td>0</td>
</tr>
</tbody>
</table>

*As of November 6, 2019.
WHAT’S CAUSING AFM?
What It’s Not:

All available stool specimens from AFM cases have tested negative for poliovirus.
Suspected Cause

- Viral infection likely involved.
- >90% of AFM patients had mild respiratory illness or fever consistent with a viral infection prior to limb weakness onset.
Other Evidence for Viral Etiology

• Temporality:
  – Biennial pattern
  – Peaks in August – October

• Coincides with circulation of many viruses, including non-polio enteroviruses

• 2014 AFM cases corresponded with large outbreak of EV-D68 respiratory illness.
Challenges to Pathogen Identification

- Only 4 of 590 AFM cases in 2014 – 2019 had a pathogen detected in CSF.
- Included:
  - Coxsackievirus A16
  - EV-A71
  - EV-D68
Why the Lack of CSF Findings?

- Pathogen already cleared?
- Pathogen present but difficult to detect?
- Pathogen triggers immune response causing spinal cord damage?
# Timing of Specimen Collection

## Median Days from Limb Weakness Onset to Specimen Collection, U.S. Confirmed AFM Cases, 2018

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Median (Days)</th>
</tr>
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<tbody>
<tr>
<td>CSF</td>
<td>2</td>
</tr>
<tr>
<td>Respiratory</td>
<td>3</td>
</tr>
<tr>
<td>Serum</td>
<td>4</td>
</tr>
<tr>
<td>Stool</td>
<td>7</td>
</tr>
</tbody>
</table>

Pathogens Detected from Other AFM Patient Specimens, 2018

Pathogens Detected from Other AFM Patient Specimens, 2018

- Respiratory: 54/123 (44%) Positive
- EV-A71: (10)
- EV-D68: (30)
- Other/Untyped EV/RV: (14)

Pathogens Detected from Other AFM Patient Specimens, 2018

- EV-D68 (1)
- EV-A71 (2)
- Echovirus 11 (1)
- Coxsackievirus (3)
- Parechovirus (4)
- Other/Untyped EV/RV (2)

Stool
13/100 (13%) Positive

Other Lab Evidence

Mishra et al.:
Detection of Antibodies to Enterovirus Peptides in CSF:

- 11/14 (79%) patients with AFM
- 1/5 (20%) Non-AFM Patients with CNS Disease
- 0/10 Children with Kawasaki Disease
- 2/11 (18%) Adults with non-AFM CNS Disease

Mishra et al.: Detection of Antibodies to EV-D68 Peptides:

- **No EV-D68 antibodies detected in CSF or serum of three non-AFM control groups.**

AFM Investigation

State and National Surveillance

Academic Research

AFM Task Force
AFM Investigation Process

Providers/Hospitals
- Report suspect cases to ISDH.
- Submit requested documentation.
- Collect and submit lab specimens.

ISDH
- Compiles and submits documentation and specimens to CDC.

CDC
- Expert panel of neurologists reviews documentation and makes case determination.
- Tests submitted specimens.

ISDH shares case determination with provider.

CDC shares case determination with ISDH.
1. AFM Patient Summary Form

2. Additional Records

Send copies of the following to your health department for sharing with CDC:
- admission and discharge notes
- neurology and infectious disease consult notes
- MRI report
- MRI images
- vaccination history
- laboratory test results

Image Source: Centers for Disease Control and Prevention (CDC)
AFM Specimen Submission

• Specimens should be shipped to the ISDH Labs.

• ISDH Labs will prepare specimens for shipment to CDC.

• Additional specimen collection and storage information is available at https://www.cdc.gov/acute-flaccid-myelitis/hcp/instructions.html.
Clinic Recommendations

1. **Recognize AFM early**
   - Be alert for onset of acute flaccid limb weakness and consider AFM on your differential diagnosis.

2. **Collect specimens & then get MRI**
   - Collect cerebrospinal fluid (CSF), serum, stool, and nasopharyngeal (NP) swab as soon as possible, and handle and store specimens properly.

3. **Rapidly report to health department**
   - If the MRI shows a spinal lesion with some gray matter involvement, alert the health department and send specimens and medical records.

4. **Diagnosis & medical management**
   - Refer to specialists, monitor for signs of worsening symptoms, hospitalize if indicated, and begin treatment and rehabilitation.

*Image Source: Centers for Disease Control and Prevention (CDC)*
Notes on AFM Reporting

• Be alert for AFM, particularly:
  – Among children
  – Following a respiratory illness or fever
  – During the months of August through October

• Case definition includes people of all ages.

• Ideally, report within 24 hours.
AFM Treatment

• No specific treatment for AFM.

• Interventions may be recommended by a neurologist on a case-by-case basis.

• CDC: Interim considerations for clinical management of patients with AFM:
  • [https://www.cdc.gov/acute-flaccid-myelitis/hcp/clinical-management.html](https://www.cdc.gov/acute-flaccid-myelitis/hcp/clinical-management.html)
AFM Physician Support

AFM Physician Consult and Support Portal

The goal of the AFM Physician Support Portal is to connect medical professionals and offer 24/7 consultation. If you suspect a case of Acute Flaccid Myelitis (AFM) and would like to schedule a consult with neurologists specializing in AFM and other rare neuroimmune disorders, please complete the form below. We will help set up a peer to peer consult for clinical support from physicians at the University of Texas Southwestern's Transverse Myelitis Center or Johns Hopkins University Transverse Myelitis Center.

Take future action with a single click.
Log in or Sign up for fastAction

Contact Information

First Name

Last Name

Email

email@email.com

Long-Term Outcomes

• Long-term prognosis of patients is unknown.
• Patients have shown a range of outcomes.
• Patient/parent interviews post onset:
  - 60 days
  - 6 months
  - 12 months
  - Assess residual impairment and level of care needed
2018 Case Series

• Hypothesis-generating interview
• Confirmed case-patients from 2018
• Interviews completed
• Results pending
Prevention

• There is **no specific action** to take to prevent AFM.
• People may decrease the risk of getting or spreading viral infections by:
  − Frequent, proper handwashing with soap and water
  − Avoid touching the face with unwashed hands
  − Avoid close contact with people who are sick
  − Stay home when sick
  − Cover coughs and sneezes with tissue or upper sleeve
  − Clean and disinfect frequently touched surfaces
Messaging

• AFM remains a rare condition.
• Many people get viral illnesses each year; the vast majority recover and do not develop AFM.
• Seek medical attention right away if signs/symptoms of AFM develop.
• Reiterate prevention messaging about reducing the spread of viruses.
Resources

- ISDH:  https://www.in.gov/isdh/26952.htm
- CDC:  https://www.cdc.gov/acute-flaccid-myelitis/index.html
  - Patient summary form and instructions
  - Case definitions
  - Specimen collection instructions
  - Interim considerations for clinical management of patients with AFM
  - FAQs for clinicians
  - AFM surveillance data
Summary

- AFM is a rare but serious condition.
- Viral etiology is suspected, but no single cause has been consistently identified.
- Multiple investigations are ongoing to understand more about the causes and outcomes of AFM.
- Reporting and specimen submission are critical to enhancing the understanding of AFM.
Contact Information

ISDH Epidemiology Resource Center
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