Is aspiration during swallowing a significant co-factor for pneumonia in children with aboriginal identity?

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Winterpeg – the coldest city of its size in the world
It’s a dry cold...
We too have urban moose
Where are we?
Where we are…

In Manitoba 26% of children age 0-14 are of aboriginal identity

In Canada 6% of children age 0-14 are of aboriginal identity

At any given time 75% of children in the only children’s hospital in our catchment area have indigenous heritage
What do we know about lung health in children with indigenous heritage

- What do we know for sure:
  - They have more pneumonia than other children
  - They have some of the highest rates of lower respiratory tract infections in the world
  - Incidence of severe chronic lung disease has not changed significantly in several decades in Canadian children of indigenous heritage
Are we missing something that’s causing more respiratory illness?

- We know certain factors impact lung health:
  - Crowding
  - Tobacco smoke exposure
  - Poverty
  - Dental caries

- But… is there something else we can do something about?
Shania

3 year old typically developing child of indigenous heritage with chronic lung disease
First pneumonia @ 3 months with RSV
Required ventilatory support on three occasions
Immune work-up, sweat test, bronchoscopy
Supine bottling
Shania

- Large family crowded living circumstances
- 2nd hand smoke exposure
- Woodstove
- No running water
Marked decrease in LRTI after
- Cessation of bottle feeding and oral intake
- Fundoplication
- Extensive dental work
- Regular chest physiotherapy
- Non-smoking environment
- Living in an environment with lower viral burden
Why did she get better?

- Steady improvement in VFSS every 4 months.
- No further aspiration during swallowing documented at 5 years of age.
The search for other Shaniyas
7 children between 1998-2001 aspirated but had no known risk factors for aspiration
All had aboriginal identity

All were typically developing & had normal anatomy.

All presented with pneumonia requiring admission to tertiary care hospital prior to 6 months of age.

6/7 had diffuse bilateral infiltrates.

3 had gastrostomy tubes.

Serial swallowing studies demonstrate continued improvement in swallowing safety.

On average they “outgrew” the aspiration by 21 months.

...a clustering of cases due to genetic, biologic or environmental factors?
Is aspiration during swallowing more common in children with aboriginal identity?
Who aspirates?
Who aspirates in Manitoba

- Many children with neurodevelopmental problems who aspirate everyday but never get sick

- Contrast, typical children with aspiration who have frequent lower respiratory tract infections
325 consecutive children seen for swallowing studies 2004-6

Variety of medical conditions, diagnoses & ethnic backgrounds

- 62% males
- Mean age: 32 months, median age 14 months
- 37% of the total group aspirated

Aspiration correlated with LRTI (p<.0001)
Indigenous heritage (p=.08)
cough (p=.001)
congestion after eating (p<.0001)
Characteristics Associated with Indigenous Heritage Logistic Regression (p<0.05)

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<thead>
<tr>
<th>Variable</th>
<th>p</th>
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<tbody>
<tr>
<td>Aspiration</td>
<td>.009</td>
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<tr>
<td>Lower Respiratory Tract Infection</td>
<td>.0001</td>
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Aspiration: what matters?

- If you aspirated and had indigenous heritage you were more likely to have LRTI ($p = .028$)
- If you aspirated but did not have indigenous heritage you did not have an increase in pneumonia (univariate)

So, maybe aspiration matters BUT only if you have other risk factors for pneumonia... OR other risk factors for aspiration?
What constellation is required for aspiration to matter??
Are aspiration and pneumonias causally linked?

- Independent risk factors associated with pneumonia:
  - Dependent feeding (OR 19.98)
  - Dental caries
  - Smoking
  - Multiple medical diagnoses

- Aspiration was not…

Are aspiration and pneumonias causally linked?

...[aspiration] is “an important risk for aspiration pneumonia, but generally not sufficient to cause pneumonia unless other risk factors are present as well.”

- Weir K et al. Restriction of oral intake of water for aspiration lung disease in children. The Cochrane Database of Systematic Reviews 2005;4
Is supine bottling dependent feeding?

Barium being swallowed

Barium being aspirated and filling the RUL
Do caries increase risk of aspiration pneumonia?
And what about smoke exposure?


Dua K et al. Effect of chronic and acute cigarette smoking on the pharyngoglottal closure Reflex. Gut 2002;51:771-775
Aspiration during swallowing may only matter if:
- You are a dependent feeder (supine bottling)
- You are smoke exposed
- You have bad teeth
- You are sick...
An Approach
Don’t eat like this...
Is aspiration during swallowing a significant co-factor for pneumonia in children of Aboriginal Identity: Maybe
Does aspiration matter?
Do we need more information?