

Adverse events following immunization: Pathophysiology and Communication to Parents and the Public

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Where does the information come from?

■ The Parents

- iPHIS

- The referring doctor

The referral:

8 mmol/L W & E No reaction
to 4 mL vaccination - your assessment certificate
is appreciated.

Thank you

Hives

- 10 month old
- 2 month immunizations fine
- 4 months: within 10 minutes hives and edema of the lower lip
- Adrenaline given s/c and im
- Rushed to ER

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 - 2 month immunizations fine
 - 4 months: within 10 minutes hives and edema of the lower lip
 - Adrenaline given s/c and im
 - Rushed to ER
- “But doctor, did he come to any harm because his 6 month vaccines were not given on time”

Vaccine Adverse Events: Report from Institute of Medicine 1991

- Can it?

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- Can it?
- Did it?

Vaccine Adverse Events: Report from Institute of Medicine 1991

- Can it?
- Did it?
- Will it?

Vaccine Adverse Events:

Can it?

- Strength of association
- Analytic bias
- Biologic gradient
- Consistency
- Biologic plausability

Vaccine Adverse Events: Did it?

- Previous general experience
- Is there another etiology
- It happened before to this recipient
- Timing

After this:

- 4 year old boy
- Pre-school visit
- 2 hours later: widespread hives
- Soon after wheezing, itchy eyes
- Goes to the ER

Vaccine Adverse Events:

Will it?

- Rechallenge

After this:

- 4 year old boy
 - Pre-school visit
 - 2 hours later: widespread hives
 - Soon after wheezing, itchy eyes
 - Goes to the ER
-
- It is all in the story.....

Mechanisms of Adverse Events:

1) The immunization process

- Poor injection technique

- Vaso-vagal
 - faints
 - Funny turns
 - Hypotonic/Hyporesponsive Episode (HHE)

Mechanisms of Adverse Events:

1) The immunization process

- Dermographism



UNDEER

IMB KIN

Long term consequences:

- 15 year old girl
- At 2 months old had received a single immunization
- 2 hours later, found limp, grey and unresponsive
- Paramedics ++
- ER: “likely reaction to pertussis component”
- MHO: “Hypotonic/Hyporesponsive Episode”, “will never recur”

Long term consequences 15 year old girl continued:

- It did!
- At 4 months:
- 2 hours later; eyes rolled back and went limp
- Pediatrician; “we are not doing that again”
- No immunizations since

Mechanisms of Adverse Events:

2) Direct effect of vaccine components

- Viral replication
- Local suppuration and adenitis (BCG)

Mechanisms of Adverse Events:

3) Host immune response

- Local inflammation results from the innate immune response
 - Toll-like receptors (TLRs)
 - Macrophages and dendritic cells move in
 - Results in redness and swelling

Mechanisms of Adverse Events:

3) Host immune response

- The Arthus reaction
 - Antigen deposit is met with lots of antibody
 - Redness, swelling AND Pain

Mechanisms of Adverse Events:

3) Host immune response

- Systemic inflammatory response
 - Fever
 - Irritability
 - Nausea
 - Vomiting
 - Muscle aches

Mechanisms of Adverse Events:

3) Host immune response

- Systemic inflammatory response - host factors:
 - Age – younger less likely
 - Gender – girls worse than boys
 - Genetics - ??
 - Previous infection
 - Previous doses of vaccine

Mechanisms of Adverse Events:

3) Host immune response; Allergic reactions

- Type I hypersensitivity reactions
 - Urticaria
 - Angio-edema
 - anaphylaxis

Mechanisms of Adverse Events:

3) Host immune response; Allergic reactions

- Type IV hypersensitivity reactions
 - 72-96 hours after immunization
 - Especially thiomersal containing vaccines

Mechanisms of Adverse Events:

3) Host immune response

- “Other”
 - Thrombocytopenia
 - Autoimmune
 - Guillain-Barré syndrome
 - Etc, etc, etc.

The future:

- CISA (and similar)
- Clinical Immunization Safety Assessment Network
- Goals:
 - Clinical evaluation, diagnosis and management of AEFIs
 - Understand AEFIs at the individual level
 - Evidence based algorithms for the next shot
 - Experts for inquiries

Summary

- It is all in the story
- Parents remember
- There are individual and family consequences to what you say
- Give a clear account of why you think what happened happened
- If you don't know – say so