Ask-the-Expert: COVID-19 & Vaccines

Vaccines and children with DM
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Myotonic Dystrophy Foundation
Vaccines and children with DM

- Please discuss vaccines and children.
- What do we know about vaccines in children with DM specifically? Is there any data or is anyone studying this?
- Are COVID-19 vaccines safe for children with DM?
  - If so, are any vaccines better/worse for children with DM?
  - When might a vaccine not be advisable for a child with DM?
- Are boosters safe/recommended for children with DM?
- If children receive the vaccine and/or booster, or have had COVID-19 before, should precautions change?
Why is a PICU doc talking about vaccines?

• Acute COVID infections do happen in children
• MIS-C (Multisystem Inflammatory Syndrome in Children)
• Children with COVID-19 share with everyone
• Hospitals are full!
• Vaccines work and are safe


### Table 2 Coronavirus 2019 (COVID-19) risk by neuromuscular disease

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Level of risk for COVID-19 or having severe COVID-19 disease course</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor neuron disease</td>
<td>Moderate/high</td>
<td>Higher risk related to more advanced disease, use of ventilator or noninvasive ventilation, dysphagia, comorbid diseases</td>
</tr>
<tr>
<td>Neuropathies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inherited</td>
<td>All levels</td>
<td>Low with uncomplicated neuropathy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High with autonomic involvement or cardiac involvement (e.g., amyloidosis), scoliosis with respiratory involvement</td>
</tr>
<tr>
<td>Immune-mediated</td>
<td>All levels</td>
<td>Related to degree of immunosuppressive therapy and respiratory/bulbar weakness</td>
</tr>
<tr>
<td>Idiopathic, nutritional, toxic</td>
<td>Low</td>
<td>No appreciable increased risks</td>
</tr>
<tr>
<td>NMJ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEMS</td>
<td>All levels</td>
<td>Consider underlying malignancy/chemotherapy</td>
</tr>
<tr>
<td>gMG</td>
<td>All levels</td>
<td>Risk related to bulbar and respiratory weakness, immunosuppressive therapy</td>
</tr>
<tr>
<td>CMS</td>
<td>All levels</td>
<td>Adult-onset, stable for &gt;10 years without bulbar or respiratory weakness likely low risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Actual or possible (based on mutation) bulbar or respiratory muscle weakness higher risk</td>
</tr>
<tr>
<td>Muscle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inherited</td>
<td>All levels</td>
<td>Risk related to bulbar and respiratory weakness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Related disease-specific comorbidities (i.e., diabetes, cardiac disease) influences risk</td>
</tr>
<tr>
<td>Inflammatory/immune-mediated</td>
<td>All levels</td>
<td>IST determines risk</td>
</tr>
</tbody>
</table>

Abbreviations: CMS = congenital myasthenic syndromes; gMG = generalized myasthenia gravis; IST = immunosuppressive therapy; LEMS = Lambert-Eaton myasthenic syndrome; NMJ = neuromuscular junction.
SARS-CoV-2 mRNA vaccines (Pfizer and Moderna)

1. Copy the genetic program for making spike protein
2. Wrap it up in an oily envelope
3. Inject it into the body
4. The body’s cells will then make spike proteins
5. The immune system will learn how to fight the virus

Images from nytimes.com
Adenovirus vector vaccines (J&J...AZ...)

What are viral vector vaccines?

- SARS-CoV-2 Genetic material: The virus's genetic material. Contains instructions for making proteins.
- Spike protein gene: The instructions the virus uses to make the spike protein.

The SARS-CoV-2 virus contains a gene which the virus uses to make its spike protein. Scientists have identified this gene and can alter the genetic material of other viruses to contain it.

Viral vector

Protein gene

Vaccine shot

The gene for the SARS-CoV-2 spike protein is added to the genetic material of another virus: a viral vector. The viral vectors are genetically altered so they can't cause disease.

Viral vector

Human cell

Immune response

The vaccine contains viral vector particles. Once the viral vector is inside our cells, it produces the virus spike protein. This then triggers an immune response in our bodies.

Viral vector vaccines for COVID-19

There are two types of viral vector vaccines: replicating viral vector vaccines or non-replicating viral vector vaccines. The vaccines for COVID-19 are non-replicating, which require higher doses but are safer than replicating viral vectors.

Replicating

Non-replicating

What viruses are being used as vectors?

Different viruses can be used as viral vectors in these vaccines. The COVID-19 viral vector vaccine candidates use a range of different viral vectors to deliver their genetic cargo.

Human adenovirus (Ad) vectors

- Gamaleya Research Institute (RUS): Ad5 & Ad26
- Johnson & Johnson (USA): Ad26
- CanSino Biologics (CHN): Ad5

Primate adenovirus (Ad) vectors

- Oxford/AstraZeneca (UK): Chimp Ad
- ReiThera (ITA): Gorilla Ad

Some people may have some immunity to human adenoviruses, which cause a small proportion of common colds. This immunity means the vector produces an immune response, potentially reducing vaccine effectiveness.
COVID-19, Before and Beyond

Hello from the world of the medically fragile...

WELCOME

Hoard hand sanitizer and living in quarantine before it was cool.
### The Best Defense is a Good Offense - Vaccinate

**Rationale for Eventual Mandatory Pediatric SARS-CoV-2 Immunization**

1. Although uncommon, severe COVID does occur in children in the form of MIS-C and pulmonary disease.

2. Children do become infected and excrete virus that could infect parents, teachers, and other children.

3. Because childhood infection is often asymptomatic, other precautions will not suffice.

4. If strain change decreases long-lasting immunity, children will at least be primed for an accelerated response to infection or revaccination.

5. Vaccination of children will be needed to reach high coverage and, potentially, herd immunity.

6. Viral mutations are generating variants, such as the one from the United Kingdom, that are spreading more readily to children.

7. Pediatric vaccination programs have a highly successful international track record in making major advances in reducing infectious diseases.

8. There is a well-developed international infrastructure for pediatric immunization that will be a practical path to ensure global immunization against SARS-CoV-2.

9. After immunizing teachers, pediatric vaccination will further accelerate opening of schools and normalize children's activities key to their well-being and parental work productivity.

10. As is the case for other vaccines, mandatory vaccination of children guarantees high coverage, as opposed to strictly voluntary vaccination.

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Percent of People Receiving COVID-19 Vaccine by Age and Date Administered, United States

December 14, 2020 – December 02, 2021

Age Group | # Children at least 1 dose | # Children Full Vaccinated
---|---|---
5-11 | 4,461,075 | 643,954
12-17 | 15,514,175 | 13,030,990

Age data were available for 99.9% of vaccinations.

Myotonic Dystrophy Foundation
Clinical Considerations: Myocarditis and Pericarditis after Receipt of mRNA COVID-19 Vaccines Among Adolescents and Young Adults

Summary

Since April 2021, increased cases of myocarditis and pericarditis have been reported in the United States after mRNA COVID-19 vaccination (Pfizer-BioNTech and Moderna), particularly in adolescents and young adults. There has not been a similar reporting pattern observed after receipt of the Janssen COVID-19 Vaccine (Johnson & Johnson).

In most cases, patients who presented for medical care have responded well to medications and rest and had prompt improvement of symptoms. Reported cases have occurred predominantly in male adolescents and young adults 16 years of age and older. Onset was typically within several days after mRNA COVID-19 vaccination, and cases have occurred more often after the second dose than the first dose. CDC and its partners are investigating these reports of myocarditis and pericarditis following mRNA COVID-19 vaccination.

CDC continues to recommend COVID-19 vaccination for everyone 12 years of age and older given the risk of COVID-19 illness and related, possibly severe complications, such as long-term health problems, hospitalization, and even death.

https://www.cdc.gov/vaccines/covid-19/clinical-considerations/myocarditis.html

https://vaers.hhs.gov/reportevent.html_Vaccine Adverse Events Reporting System
Recognition and Thanks

• Mike Knaapen and Myotonic Dystrophy Foundation
• The C.A.P.E. and Home Ventilation Program staff
• Drs. Greg Priebe and Thomas Sandora

• FLU SHOTS, Too!!!

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Questions
For Dr. Graham about vaccines and children with DM.