



Repeat Anaphylaxis to the MMR Vaccine Mediated by IgE Sensitivity to Gelatin

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Disclosures

- None
- The views expressed are those of the presenters and do not reflect the official views or policy of the Department of Defense or its components



Introduction

- It is estimated that a severe allergic reaction to any vaccine occurs at a rate of 1 per 1.3 per million doses of vaccines given.¹
- MMR is typically a well-tolerated vaccination with rare reports of severe allergic reactions.
 - Reactions to the MMR vaccine are often caused by additive or residual vaccine components.
 - In addition to MMR viral antigens, the vaccine also contains egg protein, neomycin, sorbitol, and gelatin.³

Introduction

- MMR vaccination is mandatory for new recruits in the military.
- We report a case of anaphylaxis following MMR vaccination.
- Laboratory and skin testing suggest that anaphylaxis was due to an IgE mediated antibody reaction to the gelatin component of the vaccine.

Case Presentation

- Patient is a 19-year-old male in the United States Air Force Basic Military Training program
- During military in-processing, he was given a penicillin intramuscular (IM) injection, then the MMR vaccine 15 minutes later.
- 2-3 minutes after the MMR vaccine, he developed facial urticaria, bilateral periorbital swelling, congestion, rhinorrhea, red and itchy eyes, and slight cough accompanied with an itchy throat.
- He was promptly treated with a 0.3 mg epinephrine intramuscular (IM) injection and 25 mg of diphenhydramine intravenously.

Case Presentation

- He was taken to the ER for observation, where symptoms resolved over a 6 hour period.
- He was discharged back to training on a 5-day course of 50mg of prednisone per day, 150mg of ranitidine twice daily, and 25mg of diphenhydramine every 8 hours as needed for allergic reaction.
- A referral was placed to the allergy clinic for further evaluation of possible allergic reaction to penicillin or the MMR vaccine.

Past Medical History

- Patient denies history of penicillin allergy, but cannot recall if has taken this in the past.
- At 6-years-old, he reported a reaction to the varicella vaccine.
 - Chest tightness
 - Chest heaviness
 - Vomiting.
- States symptoms gradually resolved on their own without treatment.

Past Medical History

- Patient also reports a suspected history of pork allergy.
 - Chest tightness.
 - Throbbing over his ribs.
- Patient also reports suspected history of gelatin allergy.
 - Throat tightness and rib throbbing with gummy candy.
 - Facial hives with gelatin-containing facial creams.



Physical Exam

- Eyes: Conjunctiva clear
- Nose: Nasal mucous pale without discharge
- Mouth: Oropharynx clear
- Respiratory: Lungs clear to auscultation bilaterally
- Musculoskeletal: No tenderness to palpation over ribs bilaterally
- Skin: No visible urticarial lesions

Lab Results

Lab	Patient's Result
Varicella Zoster Ab IgG	Immune
Rubella Virus Ab IgG	Immune
Mumps Virus Ab IgG	Immune

Lab Results

Lab	Patient's Result
Varicella Zoster Ab IgG	Immune
Rubella Virus Ab IgG	Immune
Mumps Virus Ab IgG	Immune
Rubeola Virus Ab IgG	Non-Immune

Lab Results

Lab	Patient's Result
Varicella Zoster Ab IgG	Immune
Rubella Virus Ab IgG	Immune
Mumps Virus Ab IgG	Immune
Rubeola Virus Ab IgG	Non-Immune
Cat Dander Ab IgE	<0.35 kU/L
Pork Ab IgE	<0.35 kU/L
Gelatin Ab IgE	1.20 kU/L

Recommendations

- Patient required 1 additional MMR dose as was is in a postsecondary institution with multiple close contacts.⁴
- Initial skin testing with MMR vaccine showed wheal & flare of 9x23 mm with good positive and negative controls.
- Although skin test result was positive, a second documented dose of MMR was needed to remain in the military.

Recommendations

Administration Of Vaccine In Graded Doses
0.05 mL 1:10 dilution
0.05 mL full-strength
0.1 mL full-strength
0.15 mL full-strength
0.2 mL full-strength

Vaccine Challenge

- Patient given the first dose of the MMR vaccine at 0.05mL of 1:10 dilution.
 - No adverse reaction.
 - Observed for 15 minutes.
- Next given 0.05 mL of the MMR vaccine at full-strength.
 - Itching and redness of both eyes, congestion, sneezing, and periorbital swelling.



Recommendations

- Administration of the MMR vaccine was immediately stopped due to concern for anaphylaxis.
- Patient was treated with one dose of IM epinephrine 0.3 mg, one dose of oral cetirizine 10 mg and one dose of oral ranitidine 150 mg.
- He reported feeling better but continued to have mild periorbital swelling 15-20 minutes later.
 - An additional dose of oral cetirizine 10 mg was given.
 - Improvement in the periorbital swelling, and resolution of all symptoms.

Follow Up

- Results from vaccine challenge suggests that anaphylactic episodes were due to the MMR vaccine.
 - Likely mediated by an IgE sensitivity to gelatin in the vaccine.
- At the time, patient did not meet retainability purposes for the military at the time as he lacked documentation for 2 full doses of the MMR vaccine.
- A penicillin allergy could not be unequivocally ruled out.
 - Recommended testing to aforementioned drug in the future.

Discussion

- Anaphylaxis results from the release of inflammatory mediators from mast cells and basophils, leading to a severe acute allergic response.⁶
- Our patient showed a history of repeat anaphylaxis to the MMR vaccine in the setting of a suspected gelatin allergy.
 - Serum testing confirmed positive IgE antibody to gelatin.
- Data suggests that the hydrolyzed gelatin added to the vaccine was the cause of his anaphylactic reaction.

Conclusion

- Rates of anaphylaxis to the MMR vaccine are rare.²
 - Caused by reaction to the additive or residual component of the vaccine.
- In addition to MMR, several other vaccines are known to contain high amounts of gelatins.
 - Risk-benefit discussions should address concerns regarding additional doses of these vaccines in patients with a suspected gelatin allergy.

Conclusion

- If additional doses required and skin tests positive to a vaccine, may give vaccine in graded doses.
- Be prepared to treat anaphylaxis.

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Questions?

