

Egg allergy and immunisation in children

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Hens' egg (HE) allergy is common in infancy and childhood ($\pm 2\%$), but the majority of children become *clinically tolerant* by the time they start school. Of concern is the whether the recommended immunisation schedule should be followed in children with a possible/proven HE allergy. The overall incidence of anaphylaxis from all vaccines is less than 1 per million doses. Most cases of anaphylaxis occur in HE-allergic children.

In children with a suspected egg allergy, 5 ml of clotted blood can be tested, to assess the risk of allergic reaction (see Table I). There are potential allergens in vaccines other than egg (see Table II). Vaccines that are of concern for a child with egg allergy are those produced in embryonated eggs, e.g. *yellow fever, influenza and rabies* vaccine.

Measles/mumps/rubella vaccine (MMR)

The MMR is produced in fibroblast cells derived from a chick embryo and thus does not contain any significant egg protein. Anaphylaxis after MMR vaccination is rare and has been reported in both egg-allergic and non-allergic individuals. In some instances hypersensitivity to the gelatine or neomycin component of the vaccine is responsible for the anaphylactic reaction. The minute quantity of egg protein contained in the MMR vaccine seems insufficient to cause an allergic reaction in egg-allergic individuals.

Several studies have reported uneventful MMR immunisation in egg-allergic people and in those with positive MMR skin tests.

Rabies vaccine

Rabies vaccine may contain egg protein. There are 3 types of rabies vaccine: those produced in chick embryo cell culture, which may contain egg protein, and human diploid cell and purified verocell vaccine, both of which do not contain any egg protein. Although the low amount of egg protein in rabies vaccine produced in purified chick embryo culture is very unlikely to cause a

Table I. Assessment of risk of clinical reaction in egg allergy using ImmunoCap Allergen tests

Low risk	Low risk	High risk
F1 Negative	F1 Positive	F1 Positive
f233 Negative	f233 Negative	f233 Positive
	Tolerates cooked egg	Egg allergy tends to persist

f1 = egg white; f233 = Ovomucoid.

Table II. Potential allergens in vaccines

Allergen	Source
Gelatine	MMR, DTaP, varicella, influenza, typhoid, yellow fever, Japanese encephalitis, measles
Neomycin	MMR, polio, rabies
Aluminium	DTaP, hep A+B, Hib, pneumococcal, HPV, anthrax
Streptomycin	Inactivated polio
Yeast	Hep B, HPV
Latex	Contaminant from stopper/gloves
Lactose	
Polymyxin B	
Egg	

reaction, there are no good safety data, thus the recommendation is to use either the human diploid cell or verocell vaccine in patients with egg allergy.

Influenza vaccine

Influenza vaccines contain only very small amounts of egg protein. Amounts vary from manufacturer to manufacturer and from year to year. Most guidelines recommend that egg-allergic individuals not be routinely vaccinated with influenza vaccine. If such a person is at risk of the complications of influenza, they should be seen by an allergy specialist, as vaccination is often possible after careful evaluation.

The vaccine with the lowest ovalbumin level should be used, although there is no evidence to show that ovalbumin is the antigen responsible for the adverse reactions.

There remains no consensus regarding the administration of the vaccine to those with severe allergy or previous anaphylaxis.

Yellow fever

The yellow fever vaccine has the *greatest likelihood* of containing sufficient amounts of egg or chicken proteins to cause an allergic reaction in allergic individuals. There have been several reports of anaphylactic reactions to the yellow fever vaccine in HE-allergic individuals. There are no studies in which the vaccine was administered to egg-allergic individuals prospectively.

The yellow fever vaccine should not be routinely administered and referral to an allergy specialist is recommended, as vaccination might be possible after careful evaluation, skin testing and graded challenge or desensitisation.

Repeat immunisation with any vaccine is contraindicated in an individual with a previous anaphylactic reaction to that vaccine.

General

It is strongly recommended for any provider administering vaccinations, that proper resuscitative equipment is available in the clinic to manage potential anaphylaxis, and that all vaccinated individuals are observed for some time after vaccination.

Repeat immunisation with any vaccine is contraindicated in an individual with a previous anaphylactic reaction to that vaccine. Referral to an allergy specialist is recommended to determine which component of the vaccine was responsible for the allergic reaction.

Further reading available at www.cmej.org.za