

Immunisation Against Tetanus, in a Hypersensitive Individual, Using a Graded Dosing Regimen

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Sir,

Tetanus vaccination is a well established way of preventing a disease with considerable morbidity and mortality. Since the introduction of an active immunisation programme in 1961, there has been a significant reduction in the reported incidence of the disease.¹ However, in the Western world poor immunity against tetanus appears to be a continuing problem,² particularly in women.³

Although reactions to tetanus toxoid preparations encompass a wide spectrum of symptoms, it remains a safe vaccine.⁴ Documented neurological sequelae or a serious hypersensitivity preclude the use of booster immunisations.⁵

We report the successful immunisation of a 52-year-old lady, in a high risk occupation, with a previous history of immediate hypersensitivity reactions to tetanus toxoid, using a graded desensitisation programme.

The lady who worked with the police force, requested vaccination against tetanus. She had a past history of severe allergy to tetanus vaccine and recent testing had shown her to be without tetanus antibodies. She had not received routine immunisation against tetanus in childhood. On first receiving a dose of tetanus toxoid, 30 years ago, she had experienced an acute anaphylactic reaction, consisting of loss of consciousness, difficulty in breathing and swelling of her face, arms and legs. A booster dose 10 years later provoked a similar but less severe reaction. Her third and most recent injection, in 1975, carried out in hospital under steroid and antihistamine cover was associated with mild facial swelling only.

On presentation she was normotensive with no abnormal findings on examination. She reported previous allergic reactions to benzylpenicillin and co-trimoxazole and was known to be allergic to horse serum. Desensitisation was carried out as outlined in Table 1. Absorbed tetanus vaccine (Tetavax Merieux) was used to prepare the required solutions. All injections were prepared under aseptic conditions using serial dilutions and were supplied in duplicate. Mild erythema was noticed around the injection site with the injection of the first three dilutions. The remaining five injections were given with no immediate adverse effect. Over the following 24 hours the patient developed some itching around the site of injection, with some erythema and

Table 1. Stages of desensitisation

No. of injection	Volume (ml)	Dilution	Route	Immediate reaction
1	0.02	1:1,000	ID	Mild local erythema
2	0.02	1:100	ID	mild local erythema
3	0.02	1:10	sc	mild local erythema
4	0.1	1:10	sc	none
5	0.05	full	sc	none
6	0.1	full	sc	none
7	0.15	full	sc	none
8	0.2	full	sc	none

Injections given at 30 minute intervals

ID = intradermal

sc = subcutaneous

induration of the skin which responded promptly to treatment with oral antihistamines. At follow up 6 days later her tetanus antibody level was measured, using an ELISA at 521U/ml, indicating adequate immunity.

Hypersensitivity reactions to tetanus toxoid vaccines may result from an immediate allergic-hyperergic reaction (60%) or a less frequent Arthus reaction (30%) and a rarer delayed reaction (10%).⁶ Immediate hypersensitivity reactions range from local symptoms of erythema, swelling, soreness, induration and urticaria to more serious systemic anaphylactic reactions manifesting as angioedema, bronchospasm, convulsions and cerebral responses. The reactivity of a patient to a vaccination correlates with serum antitoxin of >5 units/ml in the susceptible population,⁷ the generally accepted minimum protective level being 0.01 IU/ml.⁸ Jacobs *et al.*⁴ reported successful immunisation of 95 armed personnel, 94 of who had a history of anaphylactic reactions but subsequently negative intradermal skin tests.

More recently Carey and Meltzer, in 1992, reported successful immunisation of a 5-year-old boy with a history of IgE mediated anaphylaxis to DPT vaccine using a graded dosing schedule.⁹ We describe a case of a 52-year-old lady with documented immediate hypersensitivity reactions to previous tetanus vaccination and who was non-immune at presentation. She perceived herself to be at high risk due to the nature of her work with the police force and therefore sought immunisation. This was successfully carried out using a modified graded desensitisation/dosing protocol based on that described by Carey and Meltzer.⁹ Subsequent demonstration of high levels of antitoxin in her serum confirmed adequate immunisation.

We suggest that the above protocol is worth considering in those non-immune individuals who give a history of hypersensitivity and where tetanus immunisation is perceived to be mandatory. Reliance on the suppression

of the hypersensitivity response using steroids and antihistamines would seem unreliable and potentially dangerous.

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Tropical Aquaria Water and Diarrhoea

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Sir,

We previously reported the isolation of *Salmonella java* and *S. litchfield* from the water in which live tropical fish

had been imported from Singapore.¹ The fish themselves were free from any obvious signs and symptoms of disease, perhaps reflecting the rarity of salmonellosis in fish,² with only one report in the literature, that of a fatal *S. arizonae* septicaemia in a piracuru (*Arapaima gigas*) from a Japanese zoo.³ In our previous report, we commented upon the possibility of other water-borne human bacterial pathogens being present in freshwater fish 'carriage' water and subsequently in aquaria in retail outlets for exotic fish, then the home and restaurants, where aquaria are often part of the decor. Here we report the findings from a short survey of samples taken from the storage tanks used to hold tropical fish at the premises of commercial aquarists in Glasgow, and from domestic aquaria.

A total of 20 storage tank water samples were collected from seven importers of tropical fish over the period October to November. Thirteen (65%) samples contained viable bacteria as detected by agar culture. Twelve (60%) of these samples contained known or strongly suspected diarrhoeal inducing bacteria (Table 1).

Three samples contained *Plesiomonas shigelloides* which not only has enteropathogenicity,⁴ but has been indicted as a cause of neonatal septicaemia and meningitis.⁵ *Vibrio cholerae* non-O1 which was isolated from four samples, is generally associated with sporadic cases of gastroenteritis and extraintestinal infections;⁶ some strains from India can produce cholera toxin.⁷ Of 12 domestic aquaria sampled 1 (8%) yielded *V. cholerae* non-O1 and *V. mimicus* (both diarrhoea causing bacteria) from an undergravel sample of the tank, the water of which was held at a temperature of 27 °C.

Use of domestic waste-water for cultivation of fish is practiced in various parts of the world where exotic fish are bred for export; use of such contaminated water is clearly a public health hazard, since some human

Table 1. Bacteria found in samples

SOURCE	SAMPLE			
	1	2	3	4
A	ND	<i>V. cholerae</i> nonO1	<i>P. shigelloides</i>	ND
B	<i>A. sobria</i> ¹	ND	ND	ND
C	<i>V. cholerae</i> nonO1 <i>V. parahaemolyticus</i>	<i>P. shigelloides</i> <i>A. sobria</i> ¹	<i>S. wansdworth</i>	<i>V. fluvialis</i> ²
D	<i>V. cholerae</i> non O1 <i>P. shigelloides</i>	<i>A. sobria</i> ¹ <i>A. hydrophila</i> ¹	—	—
E	<i>V. cholerae</i> nonO1 <i>S. java</i>	<i>A. sobria</i> ¹ <i>S. litchfield</i>	—	—
F	<i>A. salmonicida</i>	ND	—	—
G	<i>A. sobria</i> ¹	ND	—	—

ND no bacteria detected on agar

— no sample collected

¹ possible enteropathogenic role; isolated from wounds and soft tissues

² circumstantial evidence for enteropathogenicity