Should children with inherited metabolic disorders receive varicella vaccination?

M Varghese,1 M Cafferkey,2 M O’Regan,1 A A Monavari,1 E P Treacy1

ABSTRACT
The aim was to determine the rate of varicella infection and complications in children with disorders of intermediary metabolism (IEMs) at high risk of metabolic decompensation with potentially catastrophic consequences. A number of IEMs also have an associated immunodeficiency.1 Varicella is an acute, highly communicable viral disease with worldwide distribution for which a preventative vaccination is available. In the USA, more than 90% of infections and two thirds of varicella-related deaths occur in children.2 Infection may also be fatal in immunocompromised individuals. Complications include secondary bacterial infections commonly by Streptococcus pyogenes and/or Staphylococcus aureus.2 Other complications include postinfectious cerebellar ataxia, encephalitis and respiratory complications, including pneumonitis.

Communicable infectious diseases of childhood place children with inborn errors of metabolism (IEMs) at high risk of metabolic decompensation with potentially catastrophic consequences. A number of IEMs also have an associated immunodeficiency. Varicella is an acute, highly communicable viral disease with worldwide distribution for which a preventative vaccination is available. In the USA, more than 90% of infections and two thirds of varicella-related deaths occur in children. Infection may also be fatal in immunocompromised individuals. Complications include secondary bacterial infections commonly by Streptococcus pyogenes and/or Staphylococcus aureus. Other complications include postinfectious cerebellar ataxia, encephalitis and respiratory complications, including pneumonitis.

Varicella vaccine is a live attenuated Oka strain and has been marketed since 1974, with two products now available, the univalent Varicella Virus Vaccine Live (VARIVAX) and multivalent ProQuad (MMR + varicella). Varicella vaccine is considered to be 85–90% effective in preventing varicella infection and 100% effective in preventing moderate or severe disease. Seroconversion after a single dose can reach up to 95% in healthy children. The US Advisory Committee on Immunization Practices (2006) now recommends two doses, the first at 12–15 months and the second at 4–6 years.

We sought to determine the rate of varicella infection and complications in the cohort of patients with IEMs actively followed at our centre, the National Centre for Inherited Metabolic Diseases.

METHODS
Patients with inborn errors of intermediary metabolism aged between 1 and 16 years at 1 July 2007 were identified from the National Centre for Inherited Metabolic Disorders database. Patients with Phenylketonuria, Galactosaemia, Homocystinuria and other conditions not associated with major metabolic decompensation during an acute illness were excluded from this study. A questionnaire was mailed to parents to ascertain whether the child had a prior history of varicella infection, any complications following varicella and/or history of varicella vaccination prior to the study.

RESULTS
We identified 126 patients at risk for metabolic decompensation, to whom the questionnaire was mailed. Non-responders were contacted by telephone. The total response rate was 97% (52% by post and 45% by phone). There was a history of varicella in 64 (53%) patients. Five patients had previously been vaccinated. Fifty-three (43%) patients did not have a history of clinical varicella infection. Of the 64 children with a history of varicella infection, five required hospitalisation for complications, including life-threatening lactic acidosis in one patient with mitochondrial disease and metabolic decompensation in four patients. In conclusion, varicella infection may cause an increased risk of metabolic decompensation in patients with IEMs. We propose that a trial of varicella vaccination be considered for this cohort of patients with monitoring of its safety and efficacy.
complications of varicella in children with IEMs. We propose that a trial of varicella vaccination is considered for this cohort of patients with monitoring of its safety and efficacy.

Management of our patients typically included administration of “unwell dietary regimens”. We propose that varicella vaccination in children with IEMs shown by serology to be varicella negative may be beneficial. Follow-up with monitoring of patient seroconversion rates and documentation of any adverse events following vaccination will be required. Potential drawbacks from giving varicella vaccine to children with IEMs are metabolic decompensation and contraindication due to immunodeficiency. Fifteen per cent of children develop a fever following varicella vaccination, so they might be at risk of metabolic decompensation. However, our practice is to give an “unwell regime” with extra calories (or decreased protein intake in the case of organic acidurias) prophylactically at the time of vaccination and as required if there is a fever following vaccination.

Vaccination with varicella vaccine, a live vaccine, may be contraindicated in metabolic diseases associated with a significant immunodeficiency such as Glycogen Storage Disorder 1b and poorly controlled propionic and methylmalonic aciduria; each case should be evaluated individually.\(^1\)

In conclusion, varicella infection may cause an increased risk of metabolic decompensation in patients with IEMs. We propose that a trial of varicella vaccination is considered for this cohort of patients with monitoring of its safety and efficacy.

Acknowledgements Angela Hayes, RN, is thanked for her assistance with this study.

Competing interests None.

Provenance and peer reviewed Not commissioned; externally peer reviewed.

Patient consent Obtained.

REFERENCES