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Referrals for MMR immunisation in hospital

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ABSTRACT

Concern exists about measles, mumps and rubella (MMR) vaccine in egg-allergic children, although this has been shown to be safe. Guidelines from the Royal College of Paediatrics and Child Health (RCPCH) and British Society of Allergy and Clinical Immunology (BSACI) suggesting which children should be referred to hospital for MMR, were published in 2000. We audited referrals to hospital for MMR against these guidelines. One hundred and ten children were referred for MMR to Birmingham Heartlands Hospital (2002–2004) and Alder Hey Children's Hospital (2006–2009). Eighty-two (75%) children did not meet the published criteria. Only 13 children (12%) had severe egg allergy. The first dose of MMR vaccine was delayed by >30 days in 81% of children. All children were given MMR, none had a significant reaction. Children with egg allergy do not need to be given MMR in hospital, but MMR is often delayed by unnecessary hospital referral. New BSACI guidelines encouraging MMR vaccination of egg-allergic children in primary care need to be disseminated.

INTRODUCTION

Measles is a serious infection which can be prevented by immunisation with measles, mumps and rubella (MMR) vaccine.¹ Uptake of MMR vaccine in the UK has fallen since 1998 so there is a real risk of a measles epidemic. Primary Care Trusts are being encouraged to offer MMR vaccine to those aged 13 months to 18 years who have not previously received it.¹

Concern exists over the use of MMR vaccine in egg-allergic children. Components of the vaccine are grown in chicken fibroblast cell culture, so there is a perception that MMR may contain egg antigen. However, MMR vaccine contains less than the minimum amount of egg antigen required to elicit an allergic reaction.² Numerous studies have demonstrated the safety of MMR immunisation in egg-allergic children, even those with severe egg allergy.² Immediate, anaphylactic reactions to MMR are extremely rare. Only 11 cases were reported in the USA during 1990–1996, although >70 million doses of MMR vaccine were distributed. This compares with one case of anaphylaxis among 100 763 children given hepatitis B vaccine and 0.65–3.0 adverse events per 1 million doses of diphtheria-containing vaccines given.³

Guidelines from the Royal College of Paediatrics and Child Health (RCPCH) and British Society of Allergy and Clinical Immunology (BSACI) about which egg-allergic children should be referred to hospital for MMR immunisation, were published in 2000² (see table 1).

The aim of this audit was to study the reasons why children were referred to hospital for MMR

What is already known on this topic

- ▶ Measles, mumps and rubella (MMR) immunisation is safe in egg-allergic children, even those with severe egg allergy.
- ▶ Guidelines suggesting which children with egg allergy should be referred to hospital for MMR immunisation were published in 2000.

What this study adds

- ▶ Seventy-five per cent of egg-allergic children referred to hospital for measles, mumps and rubella (MMR) vaccine did not meet the Royal College of Paediatrics and Child Health/British Society of Allergy and Clinical Immunology 2000 criteria.
- ▶ Despite reassurance that MMR immunisation for egg-allergic children was safe in the community, some parents and GPs still requested MMR in hospital.

immunisation and review what proportion met the RCPCH/BSACI criteria from 2000.

METHODS

Patient identification

Children were included who had been referred to hospital for their MMR vaccine in two different centres: Birmingham Heartlands Hospital between 2002 and 2004 and Alder Hey Children's NHS Foundation Trust 2006–2009. Birmingham data were collected retrospectively. Liverpool data were collected prospectively, at the immunisation appointment. All children referred to the hospitals were seen, assessed and given their MMR immunisation at the same visit. A history was taken and the severity of their allergic reaction to egg assessed. Additionally a history of asthma, investigations for egg allergy, other allergies and availability of rescue treatments for allergies were recorded. All children referred were given MMR vaccine and observed for 2 h on a day case ward. Any reactions were recorded. Following discharge, a letter was sent to the referring GP outlining the criteria for referral of children with egg allergy to hospital for MMR immunisation with explanatory information.

Previous allergic reactions to egg were categorised as mild, moderate or severe by a consultant

Short report

Table 1 Advice about measles, mumps and rubella (MMR) immunisation in egg-allergic children**Immunisation against Infectious Disease (Green Book) 1996**http://www.dh.gov.uk/en/PublicHealth/HealthProtection/Immunisation/Greenbook/DH_4097254 (accessed 4 August 2009)

If there is concern, paediatric advice should be sought with a view to immunisation under controlled conditions such as admission to hospital as a day case

Standing Committee on Infection and Immunisation of the Royal College of Paediatrics and Child Health, and the British Society of Allergy and Clinical Immunology 2000²<http://www.bmj.com/cgi/content/full/320/7239/929?andorexacttitleabs=and&date=3%2F31%2F2001&sortspec=date&hits=10&date=1%2F1%2F1999&author1=Khakoo+GA&andorexacttitle=and&andorexactfulltext=and&FIRSTINDEX=0&resourcetype=HWCIT&searchid=1&RESULTFORMAT=1> (accessed 3 Mar 2010)

The only children who need to be vaccinated in hospital are those with an allergy to eggs in whom previous exposure led to cardiorespiratory reactions and those with coexisting active, chronic asthma requiring inhaled steroids or other prophylaxis to control symptoms

Summary of Product Characteristics Priorix GlaxoSmithKline Vaccines 2004http://www.mmrthefacts.nhs.uk/resources/pdf/Priorix_SPC.pdf (accessed 4 Aug 2009)

Persons having egg allergies, that are not anaphylactic in nature, can be considered for vaccination

Immunisation against Infectious Disease (Green Book) 2006⁴http://www.dh.gov.uk/en/PublicHealth/HealthProtection/Immunisation/Greenbook/DH_4097254 (accessed 4 Aug 2009)

If there is a history of confirmed anaphylactic reaction to egg-containing food, paediatric advice should be sought with a view to immunisation under controlled conditions such as admission to hospital as a day case

Summary of Product Characteristics MMR II Sanofi Pasteur MSD Limited 2007<http://emc.medicines.org.uk/emc/assets/c/html/DisplayDoc.asp?DocumentID=1445> (accessed 4 Aug 2009)

Caution should be observed and if there is concern, paediatric advice should be sought with a view to immunisation under controlled conditions such as admission to hospital as a day case

British Society of Allergy and Clinical Immunology Paediatric Allergy Group 2007⁵

MMR vaccine may be administered to all egg-allergic children as a routine procedure in primary care

Summary of Product Characteristics M-M-RVAXPRO Sanofi Pasteur MSD Limited 2008<http://emc.medicines.org.uk/medicine/20968/SPC/MMRVAXPRO/> (accessed 4 Aug 2009)

Persons with a history of anaphylactic, anaphylactoid, or other immediate reactions (eg, hives, swelling of the mouth and throat, difficulty breathing, hypotension, or shock) subsequent to egg ingestion may be at an enhanced risk of immediate-type hypersensitivity reactions. The potential risk-to-benefit ratio should be carefully evaluated before considering vaccination in such cases

Summary of Product Characteristics Priorix GlaxoSmithKline Vaccines 2008<http://emc.medicines.org.uk/document.aspx?documentId=2054> (accessed 4 Aug 2009)

Persons with a history of anaphylactic, anaphylactoid or other immediate reactions (eg, generalised urticaria, swelling of the mouth and throat, difficulty breathing, hypotension, or shock) subsequent to egg ingestion may be at an enhanced risk of immediate-type hypersensitivity reactions after vaccination, although these types of reactions have been shown to be very rare. Individuals who have experienced anaphylaxis after egg ingestion should be vaccinated with extreme caution, with adequate treatment for anaphylaxis on hand should such a reaction occur

BNF for children 2009<http://www.bnfc.nhs.uk/bnfc/bnfc/current/201781.htm> (accessed 4 Aug 2009)

There is increasing evidence that MMR vaccine can be given safely even when the child has had an anaphylactic reaction to food containing egg (dislike of egg or refusal to eat egg is not a contraindication). For children with a confirmed anaphylactic reaction to egg-containing food, MMR vaccine should be administered in a hospital setting

paediatrician with experience in allergy (AR), using published criteria.⁴ Severe reactions were defined as marked dyspnoea or hypotensive symptoms (collapse/loss of consciousness).⁴

The standard used for the audit was the RCPCH/BSACI guideline published in 2000.² Ethical approval and informed consent were not required for this audit, but it was registered with the audit department at Alder Hey Children's NHS Foundation Trust.

RESULTS

One hundred and ten children were referred to hospital for MMR immunisation (Liverpool 77, Birmingham 35). The median age at immunisation of children referred for their first MMR was 19 months and for the second dose, 4 years. The first dose of MMR was delayed by more than 30 days in 81% of children.

Eighty-two (75%) children did not meet the RCPCH/BSACI criteria, with only 13 children (12%) having severe egg allergy.

Children were referred by various health professionals; 84 (76%) from primary care (GP, health visitor), 23 (21%) from secondary care (allergy nurse, allergy consultant, paediatrician and asthma nurse), three unknown. Eighteen (21%) primary care referrals and 10 (43%) secondary care referrals met the criteria.

Only 32 (29%) children had previously been investigated for egg allergy (RAST 24, skin prick tests 6, both 2). Thirty-five per cent (n=38) of children had other allergies (cows milk 14, nuts 11, others 13). Only 63 (57%) children had been given rescue treatment for allergy (antihistamines alone 49, epinephrine auto injector and antihistamines 14). Twenty-seven children had asthma, 19 were on regular inhaled steroids (four with severe egg allergy).

Only one child had a reaction to the MMR vaccine when given in hospital (transient local erythema around the injection site which did not require any treatment).

Eighteen of the Liverpool referrals had received a previous dose of MMR, three of whom reported a mild reaction (urticaria 1, blistering rash 1, worsening eczema and fever 1), but the rest had no reaction.

Twenty-two of the children referred in Liverpool had been advised by a health professional to have their MMR in primary care. Despite this, parents of eight children and the primary care team for six children still requested the vaccine to be given in hospital.

DISCUSSION

This audit shows that most egg-allergic children referred to hospital for MMR immunisation did not meet RCPCH/BSACI criteria, leading to a delay in MMR immunisation. With

concerns about a possible measles epidemic,¹ it is important that >95% of children are protected and this delay in MMR immunisation is unjustified. Needless referrals also represent a significant use of time and resources. Misunderstanding among health professionals of the safety of MMR immunisation in egg-allergic children is not unique to this study. Previous studies reported that over half of health professionals thought severe egg allergy was a contraindication to MMR vaccine.⁵

The criteria for referral to hospital (see table 1) changed over the course of the study, but this does not explain why so many children were referred unnecessarily. The 'Green Book' (2006) now restricts referral to hospital for MMR immunisation to children who had an anaphylactic reaction to egg.⁶ Thirty-nine of 43 (91%) referrals since 2006 did not meet these criteria. This may be because some health professionals have not read the *Green Book* or may not understand the phrase 'anaphylactic reaction'. Our definition of severe allergy (difficulty breathing or hypotension) may be more useful.⁴ Health professionals may also be confused by the differing advice given by vaccine manufacturers in their summary of product characteristics (see table 1).

BSACI guidelines were updated in 2007 and suggest that "MMR vaccine may be administered to all egg-allergic children in primary care" (see table 1).⁷ These guidelines are not published, nor available online, meaning those in primary care may be unaware of them. In order to reduce unnecessary referrals of egg-allergic children to hospital for MMR locally, the letter sent to primary care after immunisation now includes the 2007 BSACI guidelines. These new guidelines need dissemination which could be achieved by publication, supported by the RCPCH, as with the previous BSACI guideline.²

A study from New Zealand suggests that children inappropriately referred for MMR in hospital can be referred back and immunised in primary care.⁸ This was not our experience.

Twenty-two children, who had been advised to have MMR in the community, were still referred to hospital. This request for immunisation in hospital came from parents and primary care staff. In this situation our approach is to immunise in hospital, rather than leave the child unimmunised, but this group could be a contributing factor to the majority of referrals not meeting the criteria.

In conclusion, only 25% of egg-allergic children referred for MMR immunisation in hospital met the 2000 RCPCH/BSACI criteria. MMR was often delayed by unnecessary referral to hospital. Healthcare professionals need reassurance that MMR vaccine is safe in egg-allergic children and that they do not need to be referred to hospital for MMR immunisation.

Competing interests None.

Provenance and peer review Not commissioned; externally peer reviewed.

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