Predicting the clinical course of suspected acute viral upper respiratory tract infection in children

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Introduction

Suspected acute viral upper respiratory tract infection (SAVURTI) is the commonest reason why children consult UK GPs. Over half are still unwell four days after consulting and some are still unwell two weeks after consulting. There is wide variation in the speed of recovery for these children. About one in five children re-consult for the same SAVURTI episode. If clinicians had better tools that were feasible to use in everyday care for predicting which children are likely to suffer a prolonged course, re-consult and subsequently be prescribed antibiotics, then additional explanations and possibly treatments could be provided at the initial consultation that could enable carers to manage the condition without re-consulting and with less anxiety.

We therefore set out to identify factors that predict an abnormal clinical course of children consulting in general practice with SAVURTI.

Methods

We conducted a secondary analysis of a randomized controlled trial cohort of children consulting with SAVURTI. The methods and results of the trial are summarized in Box 1. We explored the relationship between the data obtained by the clinicians at the recruitment consultation and Canadian Respiratory Illness and Flu Scale (CARIFS) (see Box 1) items completed by carers on this day with total CARIFS score at day seven, re-consultation and eventual treatment with antibiotics. Variables that were associated with CARIFS scores on day seven at the 10% level in the univariate analysis were included in a regression model with log CARIFS as the dependent variable. This model was fitted hierarchically so that items obtained by clinicians during the recruitment consultation (day one)
of methods and results of randomized controlled trial cohort of children consulting with suspected acute respiratory tract infection

The study was approved by the Bro Taf, Iechyd Morgannwg and Gwent ethics committees.

Children consulting in a situation of usual care with an acute illness affecting the upper respiratory tract and which, in the clinician’s opinion, was probably caused by a virus, were eligible. Children prescribed antibiotics at the initial consultation were excluded.

290 children aged between 6 months and 12 years were opportunistically recruited into a randomized controlled trial. Outcomes were compared for children treated with intranasal sodium cromoglicate ($n=153$) and intranasal saline as control ($n=137$). 4

As there were no notable clinical or statistical differences in outcomes between the treatment groups, we examined data for the children as a single group.

The main outcome measure was the 18-item Canadian Respiratory Illness and Flu Scale (CARIFS).\(^3\) CARIFS scores range from 0 to 54, with a higher score indicating a sicker child. Four of the CARIFS items relate directly to the upper respiratory tract (for example, nasal congestion and sore throat) and the remainder assess general signs and symptoms of acute infection (for example, irritability and poor appetite).

On Day one, at the initial consultation, clinicians recorded age, duration of illness and clinical characteristics (coryza, cough, raised temperature, pharyngitis, enlarged lymph nodes, malaise). Carers began daily CARIFS assessments in a symptom diary.

On Day seven, 246 carers were contacted by telephone and CARIFS was completed for this day for 240 over the phone.

On Day 14, 195 diaries were returned with 169 CARIFS assessments for day 14. 247 carers were contacted by telephone and CARIFS was completed for this day for 240 over the phone.

Data on re-consultation and prescribing was available from the day 14 telephone follow up ($n=247$). By this point, 17% (43/247) of children had re-consulted with a GP or nurse. Two percent (6/247) had been taken to an accident and emergency department. However, only three of these consulted for conditions related to SAVURTIL. Children who re-consulted had higher and more variable CARIFS scores at seven days. These were ‘fever’ ($P=0.01$) and ‘low energy, tired’ ($P=0.04$). These two variables from the clinician’s data (‘age’ and ‘cough’) and the two variables from CARIFS completed by carers on day one (‘fever’ and ‘low energy, tired’) explained approximately 15% of the variation present in CARIFS scores on day seven. Carer-completed variables accounted about half of the variance (7.7%) that could be explained by the data we collected (see Table 1).

Re-consultation

Data on re-consultation and prescribing was available from the day 14 telephone follow up ($n=247$). By this point, 17% (43/247) of children had re-consulted with a GP or nurse. Two percent (6/247) had been taken to an accident and emergency department. However, only three of these consulted for conditions related to SAVURTIL. Children who re-consulted had higher and more variable CARIFS scores at seven days with median (IQR) scores of 5 (16) and 2 (6) for those who did and did not re-consult, respectively ($P=0.003$). The presence of underlying chronic illness such as asthma or eczema did not predict re-consultation. Age, duration of illness before consultation, clinical characteristics recorded by clinicians at the initial consultation and individual CARIFS items recorded by parents on this day were not associated with re-consultation.

Antibiotics

An antibiotic was prescribed at some point during the 14 day follow up period after the initial consultation for 26/247 (11%) of the children. None of the baseline
descriptive variables (age and gender), clinical characteristics or day one CARIFS items were significantly associated with receiving antibiotics during the follow up period. Children who received antibiotics had higher and more variable CARIFS scores on day seven (median (IQR) 4.4 (16.5) versus 2 (6.4); \( P = 0.04 \)), but there were no differences on day 14.

**Discussion**

Consultations for SAVURTI are common and for most children microbiological or blood tests will not be necessary, feasible or acceptable. This secondary analysis sought to identify factors obtainable on history and examination that might help predict an abnormal clinical course for children consulting in general practice with SAVURTI. Of the eight items clinicians recorded about children presenting with SAVURTI, comorbidity, and the 18 symptom and function items of CARIFS carers recorded on the same day, the best predictors of an abnormal course were younger age, presence of a cough, and carer assessments of fever and low energy.

The presence of cough at the first consultation for sore throat has previously been found to be associated with a longer illness course.\(^5,6\) However, these four items explained only 15% of the variance in CARIFS scores seven days later. A new study would be required to evaluate whether targeting additional explanations to children with these characteristics would safely lead to reduced re-consultations, antibiotic prescription and reduced carer anxiety.

A large proportion of the variance in outcome is likely to be explained by the range of infecting agents (both viruses and possibly bacteria) giving rise to SAVURTI and the broad inclusion criteria used in this pragmatic study. It is possible that more variance could be explained if we had included greater numbers of clinical items at the initial assessment and conducted near-patient or other tests on the children. However, lengthy assessments and additional investigations are unlikely to be feasible in general practice.

It was not possible from the data we collected on day 1 to predict which children would eventually be prescribed antibiotics. This study does not address the issue whether a subgroup of children with SAVURTI might benefit from antibiotic treatment. However, nearly one in five of our sample re-consulted and one in ten were prescribed antibiotics at some point during the two weeks after the initial consultation. This indicates the potential benefits that could be achieved if carers were better informed about the course of their child’s illness and more appropriate explanations targeted to those children at high risk of an abnormal clinical course.

Hay and colleagues have shown that clinicians tend to underestimate the clinical course of cough in children, and that parents may overestimate the likely duration of symptoms.\(^6\) Clinicians discuss the likely natural history and provide information on appropriate re-consultation in the minority of consultations with children with respiratory tract infection.\(^7\) The present study therefore re-establishes the importance of what Byrne and Long over 30 years ago called ‘considering the condition’ or ‘information sharing’ with patients.\(^8\) Children and carers may benefit from a clear account of the evidence that the clinical course of RTIs in children may be longer than expected (but still benign), that there is wide variation and that predicting clinical course for individual children is difficult. General practice may benefit form reduced second consultations and associated reduced antibiotic prescriptions for children with SAVURTI.

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**Declaration**

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References