The Changing Incidence of Paediatric Empyema in NE England 2006-2010
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Introduction

- The incidence of empyema has been increasing in children over the last 15 years1. However a recent report has suggested that numbers in the UK may now be declining2.
- Empyema in UK children is predominantly a pneumococcal disease3.
- The 7-valent pneumococcal conjugate vaccine (PCV-7) was introduced to the UK routine immunisation schedule in September 2006.
- Previous reports have suggested that the vaccine may have only a limited impact on empyema but this has not been formally studied in the UK4.
- We investigated trends in the incidence of paediatric empyema in the NE England from 2006 - 2010.

Methods

- All admissions of patients aged 0 - 18 yrs with ICD-10 codes J86.0 and J86.9 for pyothorax with/without fistula from 1st January 2006 until 31st May 2010 to the Newcastle Upon Tyne Hospitals Trust were collated.
- A generalised least squares modelling technique was employed to investigate trends in child cases in relation to local average monthly maximum and minimum temperature and monthly rainfall.
- The timing of the introduction of the PCV-7 vaccine was included as a co-variate.
- Temperature, rainfall and introduction of PCV-7 included in regression analysis.

Results

- 183 cases identified.
- Introduction of the PCV-7 vaccine was associated with a reduction in cases (t = -5.00, p = 0.02).
- There was a negative relationship between number of cases and average maximum temperature in the month of admission (t = -2.24, p > 0.0001).
- No significant relationship between the number of cases and average monthly rainfall.
- Fitted values from the model and the observed trend in cases are shown in the Figure below.
- R-squared of the final model was 0.36, whilst that for model without the vaccine was 0.30. This suggests that only 6 % of the variation in cases could be explained by the introduction of the vaccine.

Discussion

- Introduction of PCV-7 vaccine was associated with a reduction in the number of cases which may be related to a combination of direct and indirect vaccine effects including improved herd immunity.
- Mean maximum temperature in the month of admission appears to be a significant predictor of cases of empyema and correlates with the cyclical pattern of cases.
- Further work is required to establish whether this finding is generic across the UK and the underlying mechanisms driving this phenomenon.

Conclusion

- The PCV-7 vaccine had a negative impact on the number of cases of paediatric empyema in North East England.
- Empyema is a seasonal condition and low monthly temperatures are strongly associated with greater numbers of cases.

References


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