

SHORT REPORT

Changes in the epidemiology of epiglottitis following introduction of *Haemophilus influenzae* type b (Hib) conjugate vaccines in England: a comparison of two data sources

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SUMMARY

Paediatric cases of epiglottitis declined markedly in England following the introduction of safe effective immunization against *Haemophilus influenzae* type b (Hib). With the recently described resurgence in Hib infections, a corresponding rise in the number of presentations of clinical epiglottitis in children was observed, although numbers were still well below those reported prior to vaccine availability. This was seen both in microbiology reports and hospital admissions data for England. In keeping with the more diverse aetiology of epiglottitis in adults, Hib vaccination had minimal impact on hospital presentations with upper airway infections in those aged 15 years and over, which showed an overall increasing trend over 10 years. The need for a high index of suspicion to allow early diagnosis of this life-threatening clinical presentation is reinforced.

The introduction of conjugate vaccines against *Haemophilus influenzae* type b (Hib) in many developed countries in the 1980s and 1990s had a rapid and dramatic impact on the incidence of epiglottitis in children [1]. A smaller effect on adult cases was observed, in keeping with the more diverse aetiology of epiglottitis in adults [2]. Hib vaccine was included in the United Kingdom's infant immunization schedule in October 1992 as a three-dose primary course given at 2, 3 and 4 months of age without a booster dose. Despite initial successful disease control, resurgence of invasive Hib infections was noted in British children and adults between 1999 and 2002 [3]. We here describe the effects of this trend on the number of cases of epiglottitis in children and adults (≥ 15 years of age) in England from 1990 to 2002. In order to ensure that changes in laboratory reporting

over time had not been a cause of ascertainment bias, we compared the number of cases reported by microbiologists with independently obtained hospital admissions data relating to upper airway infections.

Laboratory-reported cases of Hib were identified from a combined Health Protection Agency *Haemophilus* Reference Unit (HRU)/Communicable Disease Surveillance Centre (CDSC) dataset of invasive *Haemophilus* infections. Those with a diagnosis of epiglottitis, as identified by the reporting microbiologist, were selected for study. Hib was isolated from blood in 414 out of 424 children (98%) and in 89 out of 100 (89%) adults. In the remaining cases, the clinical case definition was supported by the isolation of Hib from an upper airway swab. Serotype was confirmed by polymerase chain reaction (PCR) for those organisms sent to the HRU.

Hospital admissions data were derived from the Hospital Episode Statistics (HES) system database, which contains information regarding in-patient episodes submitted annually by English hospital providers to the Department of Health. Between

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March 1989 and March 1994, discharge diagnoses were classified according to ICD-9 criteria: acute epiglottitis 464.3, acute laryngitis and tracheitis 464. From March 1995 to March 2003, the corresponding ICD-10 codes were used: J05.1 acute epiglottitis, J05 acute obstructive laryngitis (croup) and epiglottitis.

A total of 524 laboratory reports of Hib epiglottitis were received between 1990 and 2002. The proportion of all invasive Hib disease presenting as epiglottitis remained constant at between 10 and 20% of cases, in both children and adults (data not shown). There was no observed increase in case fatality over time. Disease outcome was reported in 75% of paediatric cases, with 13 deaths (6%) and in 78% of adult cases with seven deaths (11%) over the period.

In total, 4650 hospital admissions for infections with a focus in the upper airway were recorded over the same time-frame. A broad range of case definitions were included in the searches of the hospital datasets that clearly incorporated upper airway infections attributable to a range of bacterial and viral pathogens, but these were the most sensitive and specific codes available for study. As other aetiologies would be unaffected by the introduction of Hib vaccination, we were interested to see whether we could observe changes in the proportional reduction of presentations identified by these codes over time. The numbers of cases derived from each reporting source by age group and year are shown in the Figure (a, b).

Both the microbiology and hospital datasets confirmed a reduction in epiglottitis cases in childhood following introduction of the Hib conjugate vaccine in late 1992. The rise in laboratory-reported isolates in 2001 was accompanied by a near doubling of paediatric hospital admissions for acute upper airway infections in the same year, confirming that the observed increase in cases did not merely represent improved ascertainment.

Hib epiglottitis reports fell and rose in a similar sequence in those aged ≥ 15 years, but no similar correlation with in-patient episodes was observed in the adult data. While Hib causes almost all cases of childhood epiglottitis, a more diverse range of aetiological agents is recognized in adults. Only 20% of adult epiglottitis patients have blood or laryngeal cultures positive for Hib [4, 5], with pneumococcus and Group A streptococcus the next most common organisms associated with this presentation [6].

Our study of trends in epiglottitis presentations attributable to Hib over the past 13 years in England

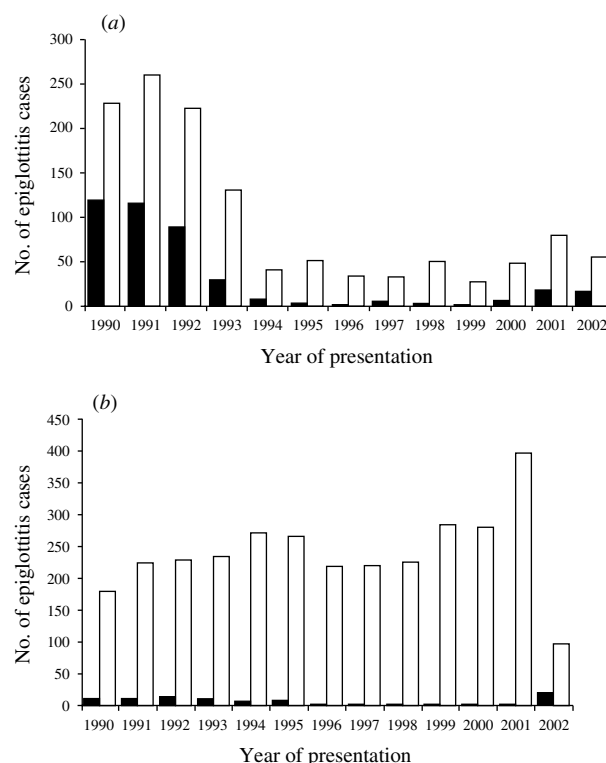


Fig. Laboratory-reported cases and hospital admissions, 1990–2002, for epiglottitis in (a) English children <15 years and (b) English adults ≥ 15 years. ■, Laboratory reports; □, Hospital Episode Statistics data.

places a number of recently published case series in context [7, 8]. Since the introduction of widespread Hib immunization, paediatric epiglottitis has become rare, making recognition and early diagnosis more challenging [9]. While it is encouraging to note that this increased difficulty has not been associated with any rise in disease mortality, a high index of suspicion must be maintained to aid diagnosis. Reassuringly, the catch-up immunization campaign against Hib which was conducted in UK children aged <4 years during 2003 has once again reduced presentations of this nature in England, along with all other manifestations of invasive Hib infection [10].

DECLARATION OF INTEREST

None.

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