Delay in diagnosis of childhood asthma and its influence on respiratory consultation rates

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Abstract

A survey of cases of asthma in two general practices with a special interest in the disease identified 212 asthmatic children aged 0–16 years by the end of January 1989 who had been registered in that practice since birth. Delay in diagnosis, both in terms of time (median 2·95 years) and number of consultations (median 7), was considerable. Annual rates of consultations for respiratory symptoms that were initiated by the patients fell significantly after diagnosis (median before= 1·80, after=0·95 consultations/year), but the number initiated by the doctors rose significantly (median before=0, after=1·01 consultations/year). The overall rates before and after diagnosis were not significantly different (median before=2·04, after=2·21 consultations/year). Increased efforts are required to reduce this delay thereby minimising the morbidity of asthma in childhood.

The underdiagnosis of asthma in children was first highlighted by Speight in 1978.[1] Since then Levy and Bell have shown that even in their practice, which has a special interest in asthma, the median category of number of consultations for respiratory symptoms before a diagnosis of 'asthma' was made was 16–20[2]; the mean time between first respiratory consultation and diagnosis was 50·4 months (M Levy, personal communication). Jones and Sykes found a diagnostic delay of roughly 40% of the child's age.[3]

In this study we have examined delay in diagnosis, both in terms of time and numbers of consultations, and rates of consultation for respiratory symptoms before and after diagnosis.

Subjects and methods

Two practices with a special interest in asthma were studied: the urban practice of 8100 patients attached to the University Primary Medical Care Group in Southampton, and a training practice of 7990 patients in Aylsham, Norfolk. Only those children aged under 16 years who had been registered since birth were included. Disease registers were used to identify the asthmatic children in this group. For each eligible asthmatic child the date of birth, date of first respiratory consultation, date of diagnosis of asthma, and the number of consultations for respiratory symptoms before and after diagnosis (up to the end of January 1989), were recorded.

These consultations were divided into those initiated by the patient and those initiated by the doctor. Those initiated by the patient were defined as those consultations at which the patient had been recorded as presenting with one or more of the following: cough, wheeze, upper or lower respiratory tract infection, or sleep disturbed by coughing. Respiratory consultations initiated by the doctor were defined as those in which review was mentioned in the notes, those at a prescribed time after a previous visit (for example, 'see in two weeks'), or those where respiratory symptoms were reviewed when the patient attended for some other reason.

Delay in diagnosis was calculated by subtracting the age of first consultation for respiratory symptoms from that at which the word 'asthma' first appeared in the notes. The number of such consultations before diagnosis included both the first consultation and that at which the diagnosis was made. Annual rates for both types of consultation were calculated before diagnosis for patients whose delay in diagnosis was at least one year, and after diagnosis for those whose diagnosis had been made at least 12 months previously. This period was chosen for two reasons: firstly, to avoid the more recent period in which asthma clinics run by nurses were operating in both practices, and secondly, to avoid calculating annual rates based on less than one year's data. Rates before diagnosis were calculated by dividing the number of consultations up to and including that at which the diagnosis of asthma was made by the delay in diagnosis. Rates after diagnosis were calculated by dividing the number of respiratory consultations since diagnosis by the period between diagnosis and the end of the study. Data were analysed using the Statistical Package for the Social Sciences (SPSS) PC package for IBM compatible personal computers[4] and the Confidence Interval Package of Gardner *et al*.[5] The annual rates before and after diagnosis were compared by the Wilcoxon matched pairs signed rank test.

Results

A total of 212 children (123 boys and 89 girls) fulfilled the criteria for entry, 112 from Aldermoor and 100 from Aylsham. This gives a lifetime prevalence of asthma of 11% for Aldermoor and 10% for Aylsham. Table 1 shows the number of diagnoses of asthma made in 168 children diagnosed before the age of 8 years according to the year of diagnosis. This shows the time trend in the diagnosis of asthma for these younger children during the study period.

The median delay in diagnosis for the whole

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Table 1   Time trend in diagnosis of asthma in 168 children aged ≤8 years

Year of diagnosis	Age at diagnosis (years)	
	0–4	4–8
1973–6	2	0
1977–80	5	7
1981–4	20	25
1985–8	55	54
Total	82	86

Table 2   Annual respiratory consultation rates before and after the diagnosis of asthma

	Annual consultation rate	
	Mean (SD)	Median (interquartile range)
Before diagnosis (n=158, delay in diagnosis at least one year):		
Consultations initiated by patient	2·29 (1·72)	1·80 (1·04–3·03)
Consultations initiated by doctor	0·31 (0·66)	0 (0–0·34)
Total consultations	2·60 (2·08)	2·04 (1·10–3·12)
After diagnosis (n=156, time since diagnosis at least one year):		
Consultations initiated by patient	1·38 (1·36)	0·95 (0·41–1·86)
Consultations initiated by doctor	1·46 (1·42)	1·01 (0·43–2·03)
Total consultations	2·84 (2·36)	2·21 (1·11–4·12)

group of 212 children was 2·95 years (95% confidence interval (CI) 2·58 to 3·69) with the median number of consultations before diagnosis being 7 (95% CI 6 to 8). The median age at first presentation with respiratory symptoms was 0·8 years (95% CI 0·69 to 1·02). The rates of consultations initiated by the doctor and by the patient, and the total consultation rates for respiratory complaints before and after the diagnosis of asthma for the 158 children whose diagnosis had been delayed at least one year, and for the 156 children who had been followed up for at least one year since diagnosis are shown in table 2.

In the 120 cases in which there had been a delay in diagnosis of more than a year, and a time since diagnosis of more than a year, the rate of consultations initiated by the patient after diagnosis was significantly less than it had been before diagnosis ($z=-6·13$, $p<0·0001$), but the rate initiated by the doctor after diagnosis was significantly greater than it has been before diagnosis ($z=-7·94$, $p<0·0001$). There was no significant difference between the total rate before and after diagnosis ($z=-0·56$, $p=0·58$).

Discussion

Although our study—which was done in 1989—cannot be compared directly with that of Levy and Bell (published in 1984),[2] our results do indicate a trend towards a reduction in the total time period and the number of consultations for respiratory symptoms that occurred before the diagnostic label of 'asthma' is used in practices with an interest in the disease. The delay still remains substantial, however.

Does this delay matter? Firstly, our definition of delay must be somewhat arbitrary, because children may present with respiratory symptoms before they truly have 'asthma',

which may exaggerate the period of real delay. Howie argued that general practitioners tend to proceed from symptoms to treatment without necessarily making a diagnosis.[6] This is because general practitioners are often dealing with the early symptoms and signs of undifferentiated problems and precise diagnostic labels are often not justified. The importance of the label 'asthma' in ensuring correct treatment has, however, been clearly shown.[7]

In 1978 Speight examined 34 unselected patients who were referred to paediatric outpatient clinics in Newcastle and London and were diagnosed as having asthma.[1] In only two children had asthma been diagnosed before referral, but most showed appreciable clinical improvement after diagnosis. He highlighted three factors that seemed to militate against the diagnosis of asthma being made in general practice. These were: parents' choice of symptoms, over-emphasis on the role of infection, and reluctance to use the word 'asthma'.

In 1983 Speight *et al* conducted a large survey of 7 year old children at school in North Tyneside.[8] Of 2700 children, 279 were reported by parents to have had a history of wheeze since they went to school. A sample of about two thirds (n=179) was studied further. Only 21 had been diagnosed as having asthma, six after referral to hospital. Only a third of those who had more than 12 episodes of wheezing a year had been diagnosed as having asthma. By the end of the survey 31 children who were receiving prophylaxis had considerably reduced the amount of time that they spent off school.

A similar survey of 8 year olds in London was done in 1981 by Anderson *et al*; this also showed that wheezy children were being undertreated.[7] Those said to have asthma were significantly more likely to have used antiasthmatic drugs than those who were not (56/94 compared with 8/185).

Our data have shown an almost exponential rise in the number of cases of asthma diagnosed, which although not related to total numbers of children in the practices, represents a substantial change in the diagnostic behaviour of the general practitioners concerned. From the available evidence, this increase should have resulted in a greater use of appropriate treatment and a possible reduction in morbidity. Further reduction in the substantial delays in diagnosis may increase this effect. There is likely, however, to be a period of delay during which the potential benefits of early treatment of asthma are outweighed by the risks of engendering anxiety and overtreatment. The magnitude of this 'optimal delay' is unknown.

Our results did not show that diagnosing asthma in a child reduces the total number of consultations for respiratory symptoms, but the desired endpoint is reduced morbidity, not reduced workload. It can be inferred, albeit indirectly, that some reduction in morbidity did occur after diagnosis, as rates of consultations initiated by the doctor (proactive) rose significantly and those initiated by the patient (reactive) fell significantly. This implies that some reactive or acute presentations may have been prevented by proactive care. To be certain that

reducing diagnostic delay in childhood asthma in general practices leads to lowered morbidity requires a lengthy study relating delay to morbidity over time in that setting.

Clearly, merely labelling a child as 'asthmatic' cannot reduce morbidity, but if the application of the label leads to improved care in terms of greater attention to inhaler technique, proactive follow up by the nurse or doctor, the development of self management skills, and better explanation to parents, morbidity should be reduced. The nature of general practice may permit proper management of illnesses without precise diagnostic labelling, but we feel confident in recommending that in childhood asthma increased efforts should be made in primary care to further reduce diagnostic delay.

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Bird attack and campylobacter

Campylobacter jejuni is the commonest enteric bacterial pathogen in England and Wales. Most cases are sporadic and the source of infection is usually unknown but an outbreak in South Wales in May 1990 may have been caused by the contamination of milk by birds (Southern *et al, Lancet* 1990;336:1425-7).

In a case-control study involving 32 cases and 64 controls significantly more cases reported that their milk bottles had been attacked by birds especially in the week before the onset of illness. Controls were less likely to have their milk delivered to the door and more likely to have discarded milk from attacked bottles or to have taken measures to protect the bottles from birds.

The suspected birds are magpies and jackdaws. *Campylobacter* spp have been grown from the beaks and cloacae of these birds. You can hazard a guess at what kind of bird has been at your milk by looking at the bottle top. Tits, it seems, peck holes in the shiny bottle top but magpies tear off the top completely.

How many paediatricians know that the word pica is taken from the latin for magpie (*Pica pica*)? Alfred Hitchcock devotees, of course, have known for a long time that the birds are out to get us.

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