be studied before a definite estimate of risk can be made. At present we consider using verapamil as a supplement to propranolol in patients who are either unresponsive to or cannot tolerate long-acting nitrates. We take great care when adding verapamil to a beta-blocker, and either give a single trial dose of 120 mg on an outpatient basis in the coronary care unit or build up the dose gradually from 40-80 to 120 mg three times daily.

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Atopy predisposing to acute bronchiolitis during an epidemic of respiratory syncyial virus

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Abstract
Thirty-one infants admitted to hospital with acute bronchiolitis during an epidemic of respiratory syncytial virus were compared with a control group of 32 infants to establish whether the two groups differed in atopic background. Past history of respiratory illness, eczema, and present reactions to skin testing differed significantly between the two groups. Thus, infants with acute bronchiolitis had a significantly higher atopic predisposition than the controls.

Introduction
Respiratory syncytial virus is the commonest organism isolated from infants during epidemics of acute bronchiolitis. During such an epidemic, however, only a few infants develop the clinical features of acute bronchiolitis. The possibility that respiratory syncytial virus selects out of a given population “only those infants genetically predisposed to wheeze on the basis of an atopic constitution” has been proposed by Ellis.’ While acute bronchiolitis may be associated with subsequent obstructive airways disease2-4 no previous study has compared the atopic status in patients with acute bronchiolitis with that of a control group during an epidemic of respiratory syncytial virus. We report here the results of such a study.

Patients and methods
Study group—All children of less than 1 year and weighing >3 kg who were admitted to two general wards of the hospital over three months (December 1979 to February 1980) with a diagnosis of acute bronchiolitis were included in the study. Since previous authors have failed to agree on a precise definition of acute bronchiolitis, the diagnosis was based on the following clinical features: a history of preceding upper respiratory tract infection; acute onset of illness; dyspnoea and

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tachypnoea; hyperinflation of the chest (both clinical and radiological); and chest recession. Unproductive cough, mild fever, wheeze, rhonchi, and crepitations were variable features. At least two of us had to agree before the diagnosis was accepted.

Control group—This consisted of all acute admissions to these two wards during the same period. The infants were of similar age, and weight to the study group; the predominance of boys in the study group was not statistically significant (table I). The sole difference was the lack of clinical evidence of lower respiratory tract infection in the controls. Since coincident atopy might have occurred in either group, a control who had a confirmed milk allergy was not excluded from the study.

Previous and family history—Details of previous wheeze, skin problems, or chest infections severe enough to require attendance by a general practitioner or admission to hospital, and a thorough family history of asthma, eczema, and hay fever or allergic rhinitis in parents or siblings were the patients were obtained from the parents of children in both groups. The total number of first-degree relatives was also recorded. The children were examined and any eczema noted and graded.

Laboratory tests of atopy—With the verbal consent of the parents, the prick test using Bencard solutions was carried out on the backs of all infants during the early recovery phase when the child could tolerate the procedure without distress. House dust, Dermatophagoides pteronyssinus, milk, grasses, feathers, and a control solution were used: the mean diameters of both erythema and wheal were recorded after 15 minutes. If the wheal was larger than 2 mm the reaction was judged to be positive. No child was taking antihistamines and no control solution produced a wheal larger than 1 mm in diameter. Absolute peripheral eosinophil count was made and serum immunoglobulin concentrations measured either by laser nephelometry, using mono-specific antisera (Scottish Antibody Production Unit), or by radio-immunoassay (IgE only) (Pharmacia). Slides of nasal secretions were examined for eosinophils after Panpilocaulus staining. All general practitioners of the 31 patients in the study group were asked about their referral policy in respiratory disease in infants.

Results

Of the 31 patients in whom acute bronchiolitis was diagnosed, 27 (87.1%) had respiratory syncytial virus in upper respiratory tract secretions, as shown by the fluorescent antibody test. Ten of the controls had upper respiratory tract symptoms and, of these, five had positive results for respiratory syncytial virus.

The infants with acute bronchiolitis had a significantly higher incidence of previous respiratory illness requiring attendance by a general practitioner or admission to hospital (table II); significantly more also had a past history of atopic dermatitis. Although more of the study group had a family history of atopy and eczematous lesions the difference between the two groups was not statistically significant. Peripheral blood eosinophil counts were similar in both groups but nasal eosinophils were absent in both.

The difference between the results of the skin test in both groups was highly significant (table II). Furthermore, eight infants in the study group had positive reactions to two or more solutions whereas none of the 32 controls reacted to more than one solution.

Table III shows the results of serum immunoglobulin concentrations measured on 29 patients with bronchiolitis and 25 controls; the concentrations in infants with two bronchiolitis and six controls could not be accurately estimated for technical reasons. There were no significant differences between the two groups. Because of the alteration of serum immunoglobulin concentrations with age during the first year of life, the data were also analysed by subdividing both groups into the following age groups: 0-13 weeks, 14-26 weeks, 27-39 weeks, and 40-52 weeks. Again, no significant differences were found.

Discussion

During an epidemic of respiratory syncytial virus in the Edinburgh area 31 children with acute bronchiolitis required hospital admission to two general paediatric wards. These infants probably represented the severe end of the spectrum. This impression was supported by discussion with all the general practitioners concerned with the referrals. Since respiratory syncytial virus infection was identified in some controls immediately after admission many other children in the general population were probably also infected even though they did not develop lower respiratory problems. Because infants with acute bronchiolitis had a significantly increased incidence of some atopic features compared with the controls, an allergic diathesis may predispose to bronchiolitis in response to a viral infection. Previous infection with respiratory syncytial virus may sensitise the infant which may then produce an allergic reaction on sub-
Nuclear magnetic resonance studies of forearm muscle in Duchenne dystrophy

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Abstract

The forearms of six patients with Duchenne dystrophy were examined by the painless and non-invasive technique of high-resolution nuclear magnetic resonance spectroscopy. The phosphorus spectrum was abnormal in that the ratios of phosphocreatine to adenosine triphosphate and to inorganic phosphate were reduced. Absolute quantification under the conditions of this experiment was not possible but it was probable that in dystrophy the concentration of phosphocreatine in muscle was appreciably reduced. A signal in the phosphodiester region of the spectrum was recorded consistently in patients with dystrophy but not in controls. The intracellular pH of the muscle in the dystrophic patients was abnormally alkaline.

The clinical application of nuclear magnetic resonance spectroscopy remains to be proved, but it appears to be a promising non-invasive technique for investigating biochemical abnormalities of muscle disease.

Introduction

The muscular dystrophies are characterised by progressive degeneration of muscle but not affecting the nervous system. The commonest form is Duchenne dystrophy, which is transmitted by an X-linked recessive gene. Signs of the disease usually appear within the first three years of life and are most noticeable in the legs. An initial enlargement of the muscles gives way to profound weakness and wasting, and death from inanition or subsequent exposure to the virus. Furthermore, more severe reactions to infection with the virus have occurred after inoculation with respiratory syncytial virus vaccine.13

Although a recent retrospective study on 8-year-old children showed no difference in the prevalence of atopy between 26 patients who had had acute bronchiolitis in infancy and paired controls, its findings do not compare directly with those of the present study. In studies of the connection between acute bronchiolitis and subsequent asthma Zweiman et al14 found retrospectively that 40-50% of children admitted to hospital because of acute bronchiolitis had recurrent wheeze subsequently and that the risk of this was higher when there was a family history of atopy or the patient showed other allergic manifestations. Bronchiolitis due to respiratory syncytial virus associated with subsequent wheezing was also found in a retrospective study by Rooney and Williams,9 in which 72% of those with recurrent wheeze had a family history of atopy. Hyde and Saed1 found that 39% of infants less than 1 year old who presented with bronchiolitis subsequently had a recurrent wheeze and that 78% of those had a family history of atopy or allergic manifestations. Given that childhood asthma is partly an allergic condition, the fact that a high proportion of those with acute bronchiolitis (particularly those with atopic features) have subsequent episodes of wheeze supports the view that acute bronchiolitis may occur more frequently in an atopic population.

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