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Small bowel permeability in patients with nasal polyposis

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SUMMARY

Small bowel absorption defects have been noted in a proportion of patients with atopic eczema. Eighteen patients with recurrent nasal polyps had the cellobiose/mannitol ratio test performed in order to assess their small bowel function.
Evidence for atopy was found in 11 of 18 patients. Histologically the polyps were described as allergic but the cellobiose/mannitol ratio was normal in all cases. No evidence for a small bowel absorption defect was obtained.

INTRODUCTION

The aetiology of nasal polyps remains obscure but their association with atopic diseases is well known. Not only are nasal polyps frequently accompanied by bronchial asthma but they are often harbangers of asthma which may develop at a later date (Wentges, 1979). The incidence of asthma in nasal polyp patients has been estimated as 57% (Frenkiel et al., 1982). In atopic eczema, several groups (Ukaban et al., 1984; Jackson et al., 1981; Strobel et al., 1984) have been able to demonstrate abnormal small bowel permeability to large probe molecules, such as cellobiose in the cellobiose/mannitol ratio test or polyethylene glycol (mol wt 6000) in approximately 50% of patients with atopic eczema. This raises the possibility that the small bowel may be permeable to dietary allergens which could have an aetiological role to play in atopic eczema. The present study is to test the hypothesis that small bowel permeability may be similarly abnormal in a proportion of patients with nasal polyps.

SUBJECTS AND METHODS

Twelve male and 6 female patients, age range from 26–70 and with recurrent allergic nasal polyps, were studied. None of these patients had any history of gastrointestinal upset. A full biochemical and haematological screening was undertaken to detect any evidence of vitamin or mineral deficiency suggestive of occult malabsorption. Skin prick testing to six common allergens was performed and in 14 patients immunoglobulin estimations were undertaken. Small intestinal absorption studies were performed as outpatients. The patients reported at 8 a.m. after an overnight fast. After emptying their bladders the patients were given a

mannitol and cellobiose sugar test solution to drink within 5 minutes. They then fasted for a further 5 hours except that water, tea or coffee without milk or sugar was allowed after $2^1/_2$ hours. All urine passed within 5 hours was collected, measured and an aliquot stored at −20°C.

The sugar test solution was composed of 2 g mannitol, 5 g cellobiose, 20 g lactose and 20 g sucrose made up to 150 ml with tap water to give an osmolality of approximately 150 m osm.

The mannitol in urine was measured by the method of Corcoran and Page (1947) and the cellobiose was measured by the method described by Strobel et al. (1984). The percentage urinary recovery of the two molecules, cellobiose and mannitol, was calculated and the final ratio of the percentage recovery of cellobiose to the percentage recovery of mannitol was calculated. Any patient with an abnormal cellobiose/mannitol ratio test was to proceed to peroral jejunal biopsy.

Nasal polypectomy was then performed under general anaesthesia and the polyps were submitted for routine histological examination.

RESULTS

The haematological and biochemical screening was normal apart from one case of normochromic anaemia of 10.1 g/dl in a 42 year old female. The results of the skin testing, total IgE estimation, cellobiose/mannitol ratio and the histological description are summarised in Table 1. Eight patients had evidence of atopy, three

Table 1. Results of allergy testing, small bowel absorption and polyp histology.

age	sex	skin tests	IgE (U/ml)	cellobiose/ mannitol ratio	histological description of polyps
57	M		196	0.028	allergic
42	F	+	180	0.017	inflammatory
48	M		>1000	0.013	allergic
28	F	++	396	0.008	inflammatory
42	M	+++	--	0.003	inflammatory
59	M		6	0.015	allergic
70	M		224	0.012	allergic
35	F	+++	61	0.011	allergic
62	M		22	0.012	inflammatory
36	M		--	0.005	allergic
43	M	++	1430	0.011	allergic
44	M		114	0.006	allergic
65	F		80	0.014	allergic
35	M		18	0.004	allergic
37	M	+++	80	0.014	allergic
68	M		--	0.018	inflammatory
41	M	+++	525	0.007	allergic
54	F		--	0.015	allergic

with skin prick tests of ++ or greater, three with skin prick tests of ++ or greater and a serum IgE level of greater than 200 U/ml and two with elevated IgE levels alone. In 13 of the patients the polyps were described as allergic in appearance by the histopathologist; in the five cases where the polyps were described as inflammatory, the presence of an eosinophil and plasma cell infiltrate was noted. Despite the unequivocal evidence of atopy in some patients and the apparently classical allergic histology of the nasal polyps, the cellobiose/mannitol ratio was completely normal in all of the patients studied. No patients, therefore, underwent jejunal biopsy.

DISCUSSION

Kern and Schenk (1933) first proposed that all nasal polyps were the result of allergy. More recent work has not always confirmed this and chronic infection has been implicated as a causative factor; nasal polyps do occur more commonly and at a younger age group in atopic individuals (Wentges, 1973) and the role of allergy has been demonstrated in a proportion of patients (Small et al., 1981). Our study demonstrates a high incidence of atopy among the patients studied. If the normal upper limit of IgE of 100 U/ml (Wittig et al., 1980) is taken then 8 of the 14 patients on whom IgE estimations were performed are atopic and 11 of the 18 patients studied had evidence of atopy.

The normal cellobiose/mannitol ratios in all 18 patients is good evidence of normal small bowel function. Other workers have obtained abnormal cellobiosê/mannitol ratios in patients with morphologically normal small bowel epithelium and the cellobiose/mannitol ratio is considered to reflect subtle changes in small bowel function (Strobel et al., 1984).

The question of whether nasal polyps are secondary to allergic phenomena remains unproven. Drake-Lee et al. (1982) suggested that their electron microscopic studies may have indicated a different mode of mast cell activation from the classical IgE mediated sequence, possibly occuring over a longer time scale. Mullarkey et al. (1980) suggested that the occurence of nasal oesinophilia is random and they demonstrated a three fold increase of nasal polyps in non-allergic compared to allergic patients in the 142 patients they studied.

Certainly the link between nasal polyps and type 1 allergic reactions is far from simple and other factors must apply.

ZUSAMMENFASSUNG

Mängel in der Absorptionsfähigkeit des Dünndarms wurden in einigen Patienten mit spezifischerm Überempfindlichkeitsekzem festgestellt. Achtzehn Patienten mit regelmässig wiederkehrenden Nasalpolypen wurden einem cellobiose/mannitol Ratiotest unterzogen, um ihre Dünndarmfunktion zu bewerten.

Eine spezifische Überempfindlichkeit konnte in 11 der 18 patienten festgestellt

werden. Histologisch stellten sich die Polypen als allergisch dar, aber das cellobiose/mannitol Verhältnis war in allen Fällen normal. Ein Nachweis für einen Mangel in der Absorptionsfähigkeit des Dunndarms konnte nicht enbracht werden.

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