weeks before endoscopy. Only six (17%) of these patients presented with dyspepsia compared with 13 (65%) of the 20 patients in the same age group who had not taken the drugs ($p<0.001$, χ^2 test). The patients who had taken the drugs therefore constituted 81% (30/37) of those without dyspepsia. In the group aged 65-74 who had taken non-steroidal anti-inflammatory drugs the numbers with and without dyspepsia were similar. Overall, most of the patients who had taken the drugs presented with either bleeding or iron deficiency anaemia.

Comment

We suggest that non-steroidal anti-inflammatory drugs not only contribute to ulceration but also mask the pain that would normally lead to its diagnosis. This is a dangerous combination in elderly patients because it will cause them to present late with a serious complication such as bleeding or severe anaemia. Not only will this lead to an underestimate of the true incidence of ulceration in people aged 75 and over but it may also partially explain the worse prognosis of ulcers in the elderly.⁴

The higher incidence of gastric ulcer in women in our study was partly due to our having recruited more women overall, but it is possible that women are more susceptible to gastric ulceration or that they are more likely to take non-steroidal anti-inflammatory drugs.

Why do elderly patients taking these drugs not complain of dyspepsia? Although the elderly are known to complain of pain less than other people when they have, for instance, heart attacks or a perforated bowel,⁵ this would not explain the differences observed between our patients who had or had not taken non-steroidal anti-inflammatory drugs and yet belonged to the same age group.⁵ One possibility is that the drugs induce local or systemic analgesia; another is that they cause bleeding in a hitherto "silent" ulcer.

Our results indicate that the indiscriminate use of non-steroidal anti-inflammatory drugs in the elderly must be controlled. This is even more difficult now that ibuprofen, like aspirin, is available without prescription.

We thank the many colleagues who allowed us to study their patients.

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Increased bacterial binding to respiratory epithelial cells in vitamin A deficiency

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Malnutrition is an important risk factor for infection.¹ Vitamin A deficiency is common in economically deprived populations, including those in industrialised countries. It is associated with a high incidence of infection, particularly respiratory disease, and contributes considerably to childhood morbidity and mortality.² It occurs in 30-75% of all patients with protein and energy malnutrition and enhances the overall risk of death. Vitamin A has an important role in regulating immunocompetence³: impaired immune responses were observed in people with vitamin A deficiency as well as in deprived laboratory animals.

Little is known about the barrier function of epithelial cells in vitamin A deficiency. Bacteria must adhere to mucosal cells before systemic invasion begins. The alterations in the morphology and turnover of

respiratory epithelial cells in vitamin A deficiency⁴ suggest that the ability of mucosal cells to prevent penetration by pathogenic bacteria is compromised. I report the binding of bacteria to nasopharyngeal epithelial cells in children with vitamin A deficiency.

Subjects, methods, and results

I studied three groups of Indian children. Group 1 comprised apparently healthy children without ophthalmological evidence of vitamin A deficiency whose plasma retinol concentration was $>1.4 \mu\text{mol/l}$. Group 2 comprised children with mild vitamin A deficiency and a plasma retinol concentration of $0.7-1.4 \mu\text{mol/l}$. Group 3 comprised children with eye signs of moderately severe vitamin A deficiency and a plasma retinol concentration $<0.7 \mu\text{mol/l}$. Current or recent respiratory infection was ruled out by clinical evidence and estimation of C reactive protein concentrations. Three 24 hour dietary intakes were recorded on three days by a dietitian and plasma retinol concentration was measured by high performance liquid chromatography. The table gives the demographic and nutritional data.

Nasopharyngeal secretions were obtained by injection of 0.5 ml saline through a soft nasal catheter with immediate suction. This procedure was repeated three times. The epithelial cells were washed and counted and the concentration adjusted to 0.025×10^9 cells/l. The average viability of the cells was 72%. A clinical isolate of *Klebsiella pneumoniae* was grown in broth culture containing amino acid mixture labelled with $0.93 \text{ MBq carbon-14}$. After 15 hours the micro-organisms were washed to remove excess free radioactivity and resuspended to a concentration of 5×10^9 bacteria/l. The amount of radioactivity remaining was related to the number of bacteria as determined by the pour plate method. The bacterial adherence technique of Niederman *et al*⁵ was followed with slight modification, 200 bacteria per cell being used. Differences between group means were analysed by Student's *t* test.

The number of bacteria adhering to nasopharyngeal

Clinical data and bacterial binding to epithelial cells

	Children without vitamin A deficiency (group 1)	Children with mild vitamin A deficiency (group 2)	Children with moderately severe vitamin A deficiency (group 3)
No in group	14	10	12
Mean (SE) age (months)	22 (3)	24 (4)	20 (3)
No of boys:girls	8:6	6:4	7:5
Serum retinol ($\mu\text{mol/l}$):			
Mean (SE)	2.2 (0.3)*	1.1 (0.1)*	0.4 (0.1)*
Range	1.4-3.4	0.7-1.4	0.1-0.7
Mean (SE) dietary vitamin A intake (retinol equivalents)	321 (44)*	201 (29)*	186 (22)*
No with:			
Xerophthalmia		4	9
Bitot's spots		2	6
Corneal opacity		1	4
Mean (SE) weight-for-height (% of standard)	81 (4)	77 (3)	74 (5)
Mean (SE) no of bacteria/epithelial cell	4.8 (0.6)*	7.9 (1.0)*	10.3 (0.8)*

* $p<0.01$.

epithelial cells was significantly higher in the samples from the children deficient in vitamin A (table). Vitamin A intake was less than the recommended allowance of 400 retinol equivalents/day in all three groups; the average intake was lower in groups 2 and 3 than group 1. Groups 2 and 3 had a lower weight for height than group 1, but the differences were not significant.

Comment

The increased bacterial adherence to epithelial cells found in children with vitamin A deficiency provides evidence for an additional factor that can contribute to the increased risk of infection in this disease. Nutritional deficiencies impair several host defence mechanisms, but much of the work done in the past 20 years focused on immune responses rather than physical barriers.^{1,3}

This study shows that respiratory epithelial surfaces of vitamin A deficient subjects may permit increased colonisation and thus allow penetration of mucosa,

leading to systemic infection. Various barriers contribute to local defence on mucosal surfaces, including mucus, glycocalyx, cilia, secretory IgA, neutrophils, macrophages, and T lymphocytes. It is not clear which aspects of this barrier are affected by vitamin A deficiency. A prospective study should be done to correlate bacterial adherence to epithelial cells with morbidity. A firm cause and effect relation would be established if vitamin A supplements were found to correct the abnormal bacterial adherence.

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Risk to Metropolitan police officers from exposure to hepatitis B

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Since 1981 St Thomas's Hospital has provided a service to members of the Metropolitan police who have been in incidents conferring a risk of exposure to hepatitis B virus. We describe our experience in assessing this risk and provide recommendations for immunising police officers.

Subjects, methods, and results

In the procedure followed by the police after an incident conferring a risk of hepatitis police surgeons take a blood sample from the officer and, whenever feasible, from the person suspected of having hepatitis (the contact). The officer then attends the virology department, where a doctor assesses his risk and obtains details of the incident and the risk factors.

Samples from officers and, when available, the contact were tested for hepatitis B surface antigen (HBsAg); those found positive were tested for hepatitis B e antigen (HBeAg) and antibody. All samples from officers that were negative for HBsAg were tested for antibody to HBsAg. (If there had been a considerable delay between the incident and presentation specimens from contacts were initially tested with a modified

Hepatest II (Wellcome), which gave results within one hour.) If the suspect was positive for HBsAg the officer was offered hepatitis B immunoglobulin if his eyes or fresh cuts had been contaminated by blood or saliva or after a needlestick incident. When hepatitis B vaccine became widely available it was recommended in addition. A second dose of immunoglobulin was given one month later unless the contact had antibody to HBeAg or hepatitis B vaccination had been started within one week of the incident. When blood from the contact was not available offering immunoglobulin depended on the risk and on the availability of immunoglobulin.

During 1981-6, 503 incidents with a risk of hepatitis were reported in 793 officers, of whom 248 (31%) were given hepatitis B immunoglobulin. The number of officers seen increased considerably, from 46 in 1981 to 187 in 1986. During 1983-6, 33 of 198 samples tested from suspects were positive for HBsAg and half of those were also positive for HBeAg. Most contacts (table) were drug abusers or dealers, whereas the most frequent type of incident was contact with a bleeding person. Altogether 12% of officers attended because they had arrested a person who then claimed to be a carrier. Other contacts included prostitutes, vagrants, transvestites, and corpses. No officers were found to be HBsAg positive and only three (1%) of 425 tested had evidence of past infection. No subsequent attacks of hepatitis B were identified in any of these officers.

Comment

Hepatitis B can be transmitted easily through parenteral contact with infected blood and secretions, and such cases occur in police officers.¹ The number

Details of contacts involved in incidents conferring risk of exposure to hepatitis B to Metropolitan police officers, 1983-6

	Contact					Incident				
	Male homosexual	Drug addict or dealer	Homosexual drug addict	Ethnic origin suggested high risk of carriage of hepatitis B virus	Not known or other	Minimal contact but officer concerned	Bleeding person	Aggressive contact (contact not bleeding)	Needlestick injury	Other
1983	1	72	3		20	13	24	16	38	5
1984		54		2	12	10	19	19	17	3
1985	4	73	2	1	16	11	34	20	27	4
1986	10	100	3		22	13	50	41	23	8
Total (%)	15 (4)	299 (76)	8 (2)	3 (1)	70 (18)	47 (12)	127 (32)	96 (24)	105 (27)	20 (5)