($\pm$ SD 12.1). Most (39) of the cat breeders and exhibitors lived in cities or towns. At the time of the survey the exhibitors owned 455 cats (mean 6.6); 12 owned more than 10 cats each, and 44 had lived with cats for more than 10 years. Their exposure to cats and to a feline environment was therefore substantial. Moreover, 14 either never wormed their animals or only rarely did so. The evidence therefore indicates that substantial exposure to cats is not associated with a higher prevalence of toxocarasis than is found in the general public. The results of this study were reinforced by the study of the Icelanders (mean age 31.1 years ($\pm$ SD 8.4)), none of whom gave a positive response to the toxocara ELISA test.

Toxoplasmosis—In Britain 10–40% of persons aged 11 to 40 years have titres of 1/16 or more on toxoplasma dye testing (Dr D G Fleck, Toxoplasma Reference Laboratory, London SW17 0QT). In comparison 24 of the 67 cat breeders (35.8%) and 38 of 208 (18.3%) of the Icelanders from whom there was sufficient serum to test for toxoplasmosis after testing for toxocarasis had titres of 1/16 or more, a highly significant difference ($\chi^2=8.9$, $n=1$, $p<0.01$).

Comment

Toxocarasis—Our study indicates that cat owners do not acquire toxocaral or toxoplasma infection more frequently than the general British population, and cats in a community such as that of Iceland do not give rise to detectable toxocaral infection. This contrasts with dog exhibitors, of whom six times as many¹ have toxocaral antibodies compared with the general population (15.7% *v* 2.6%). The difference between those exposed to the canine as compared with the feline environment probably results from the cat's practice of burying its faeces and its more domestic habits. Thus cats are seldom found in public parks and, unlike dogs, do not go with their owners for walks into public parks and there deposit their faeces. The severity of the Icelandic winter does not prevent survival of toxocaral ova in the soil, as they survive the more severe winter in Montreal: Ghadirian *et al*³ carried out a study there similar to that of Borg and Woodruff,⁴ who found that 24% of soil samples in public parks in Britain contained the ova. It is also important to note that the toxocara ELISA detects the presence of antibody to *Toxocara cati* and *Toxocara canis*.

Toxoplasmosis—The 18.3% of Icelandic subjects who yielded titres of 1/16 on toxoplasma dye testing is similar to that found in other Icelandic surveys. The proportions of subjects with such titres in the groups studied here fell within the range expected among the general population in Britain, but that among the cat breeders was near the upper limit of the normal range. Why should contact with cats lead to toxoplasma but not toxocaral infection? Cats excrete resistant and highly infective oocysts within three to 10 days of ingesting *Toxoplasma gondii* cysts from tissues of animals. Infective forms of *Toxoplasma gondii* are readily disseminated from floors and concrete areas⁵ and do not depend on soil for transmission to the same extent as do ova of *Toxocara cati* or *Toxocara canis*. Cats infected with toxoplasma thus cause more infective pollution of the environment than cats infected with *Toxocara cati*.

Cats clearly constitute a much lesser risk to the general population than do dogs in respect of transmission of toxocaral infection but not in respect of toxoplasmosis.

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Relief from digital vasospasm by treatment with captopril and its complete inhibition by serine proteinase inhibitors in Raynaud's phenomenon

A patient with Raynaud's phenomenon was successfully treated both immediately and long term with the angiotensin-converting enzyme inhibitor captopril.¹ The acute vasodilator action of captopril was completely blocked by the serine proteinase inhibitors, aprotinin, and ethyl-p-(6-guanidino hexanoyloxy) benzoate methanesulfonate (FOY),² whereas infusion of angiotensin II antagonist (1-Sar-8-Ile-angiotensin II) had no effect on digital blood flow but merely an agonistic action on the systemic blood pressure. This suggests that captopril may be a promising candidate for the treatment of Raynaud's phenomenon and, more interestingly, that the vasodilator action of captopril in Raynaud's phenomenon may be caused mainly by accumulated circulating kinins, not by the inhibited production of angiotensin II.

Case report

A 51-year-old Japanese woman visited the outpatient clinic in February 1980 for recurrent episodes of pallor of the fingers and toes which had gradually increased in frequency and duration since onset in October 1977. Her Raynaud's phenomena, though the duration was less than three years, were considered to be primary according to Allen's criteria for Raynaud's disease, and physical and laboratory examinations were suggestive of no other diseases.

The patient was kept recumbent throughout the experiments in a room with a controlled temperature of 20–21°C with approximately 50% humidity. Photoplethysmography of the second finger of the right hand and second toe of the right foot, blood pressure, and heart rate were monitored at five minute intervals. After one hour, when she had adapted to the room temperature, she was treated according to four different protocols. Firstly, 12.5 mg of captopril was given by mouth. Secondly, angiotensin II antagonist was infused at a rate of 100 ng/kg/min. As blood pressure rose by 32 mm Hg systolic and 16 mm Hg diastolic 10 minutes after the infusion was started, the infusion rate was not increased and was fixed at that dose for two hours. In the next two experiments serine proteinase inhibitors, aprotinin and FOY, were used after confirming that no change in the digital circulation occurred by infusion of the solvent alone. Thirdly, aprotinin (50 000 U) was first given intravenously and then by infusion at a rate of 5 U/kg/min for two hours. Captopril 12.5 mg was given by mouth after the bolus injection of aprotinin (50 000 U). Fourthly, after FOY was infused at a rate of 40 µg/kg/min for 30 minutes captopril (12.5 mg) was given by mouth. FOY was continuously infused for two hours more thereafter.

The figure shows that administration of captopril by mouth resulted in appreciable improvement in the digital circulation, subjectively, objectively, and plethysmographically. Digital spasm neither disappeared nor worsened with infusion of angiotensin II antagonist, and only an agonistic action was shown in the systemic blood pressure with such a low dose. Digital vasodilation by captopril was completely inhibited by the serine proteinase inhibitors aprotinin and FOY. After these tests she was treated with oral captopril in a dose of 37.5 mg daily for several months with remarkable improvement.

Effects of captopril, angiotensin II antagonist (1-Sar-8-Ile-angiotensin II), captopril plus aprotinin, and captopril plus FOY on digital photoplethysmography in a patient with Raynaud's phenomenon.

Comment

The main vasodilator effect of captopril is thought to be due to inhibition of the production of angiotensin II, one of the most potent vasoconstrictors. It has previously been thought that accumulated kinins due to the inhibition of kininase II played a small part in captopril's vasodilator action, especially in hypertensive patients. Recent studies in hypertensive rats³ and humans⁴ have shown, however, that the kallikrein-kinin system plays an important part in the blood pressure lowering effect of captopril. Lopez-Ovejero *et al*⁵ described two patients with vascular scleroderma and renal crisis in whom captopril relieved both digital ulcers and exaggerated hypertension. This may be the first report showing that captopril could improve the digital circulation.

We have reported a patient with Raynaud's phenomenon who was successfully treated by both acute and long-term oral administration of captopril. Captopril probably improved this patient's digital circulation, especially in the acute phase, not by inhibiting the production of angiotensin II but by allowing the accumulation of circulating kinins.

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Reversible overt nephropathy with Henoch-Schönlein purpura due to piroxicam

Even though newly developed effective antiarthritic agents may initially be reported as causing only minor side effects, toxic reactions, which are often undetected in early studies, may occur. Piroxicam has recently been repeatedly shown to act as a strong inhibitor of prostaglandin synthesis and may be taken once a day because of its long plasma half life of 36-58 hours.¹ Non-steroidal anti-inflammatory drugs may cause nephrotoxicity as an effect secondary to their inhibition of prostaglandins²; this differs from phenacetin-induced analgesic nephropathy.

We report on two patients who as a result of hypersensitivity to piroxicam (Pfizer Inc, Karlsruhe, West Germany) developed acute nephropathy with characteristic features of Henoch-Schönlein purpura.³

Case reports

CASE 1

A 27-year-old male student with a two-year history of classical seronegative rheumatoid arthritis regularly attended the rheumatic disease service of our department. Active joint disease (American Rheumatoid Arthritis Association criteria) affected both hands, his fingers, knees, and ankle joints, with signs of synovitis rather than joint destruction. After treatment with aspirin and ketoprofen without improvement he began

taking 20 mg piroxicam daily, which induced appreciable clinical remission. He observed painless macroscopic haematuria associated with a mild purpuric rash.

Clinical examination, renal x-ray films, echography, and scintigraphy showed no abnormalities except for a mild disseminated rash and peripheral oedema. The ratio of blood urea nitrogen to creatinine concentration and electrolyte concentrations and chemistry profiles were normal, but urine analysis showed macroscopic haematuria. Piroxicam was stopped and his nephropathy and rash had disappeared by the fourth day after admission. Treatment with piroxicam was not repeated.

CASE 2

A 51-year-old postmenopausal woman with no history of renal disease was admitted for treatment of an active phase of classical rheumatoid arthritis (American Rheumatoid Arthritis Association criteria). She took 20 mg piroxicam daily with an excellent clinical response. Prostaglandin E₂ concentrations (measured radioimmunochemically) in synovial fluid aspirated from inflamed knee joints were reduced (see figure). She had painless

Sequential data on patient (case 2) with piroxicam-induced nephropathy and Henoch-Schönlein purpura.

macroscopic haematuria and complained of a rash and abdominal discomfort and so was readmitted to hospital; treatment with piroxicam alone was continued.

Clinical examination showed a purpuric rash, peripheral oedema, and gastrointestinal haemorrhage. Signs of nephropathy were macroscopic haematuria, proteinuria, and a reduced glomerular filtration rate (figure). The ratio of blood urea nitrogen to creatinine concentration, electrolyte concentrations, and further chemistry profiles were within normal limits. Concentrations of circulating IgA immune complexes (using the Raji-cell assay and direct fluorescein isothiocyanate-labelled antimouse rabbit gamma-globulin method) were raised (figure). Thus she fulfilled the criteria for Henoch-Schönlein purpura.⁴

Her condition improved rapidly and completely after piroxicam was stopped, and IgA immune complexes fell to within normal limits (figure). When her condition had completely stabilised she was rechallenged with piroxicam 10 mg daily. She again showed signs of Henoch-Schönlein purpura and impaired renal function associated with increased IgA complexes.

Comment

The rapid improvement that occurred in case 2 when piroxicam was withdrawn, and the relapse of clinical symptoms on rechallenge, strongly suggest that piroxicam was causally related to the acute Henoch-Schönlein purpura.

Some features of Henoch-Schönlein purpura suggest a vasculitis caused by circulating immune complexes containing IgA, which in particular are deposited in the glomerular mesangium and in normal as well as affected skin.⁴ Thus the urinary symptoms in case 1 and the drug-induced multisystemic disease in case 2 closely resembled classical Henoch-Schönlein purpura, which principally affects children.