

*Leading article***Diet and diverticulosis – new leads**

In the search for dietary causes of gastrointestinal disease the case control study is turning out to be quite an effective tool, thanks largely to better planning and, especially, better statistics. There are many pitfalls in this kind of study – inadequate numbers, inappropriate control groups, inaccurate dietary recall and the close interrelationships between the intake of different nutrients, to name but a few – but correction or allowance can be made for most of them. It is important to remember that a case control study can answer only one question – namely, within a given population, what are the differences between those who have developed a disease and those who have not? A case control study is liable to yield negative results if the disease in question is so common that it eventually affects most people, or if the level of exposure to the aetiological agent is rather uniform over the whole population. In such situations the main difference between cases and controls may be genetic susceptibility and all a case control study will show is a familial tendency to the disease.

So, in prospecting for the causes of a very common western disease such as diverticulosis of the colon, there is much to be said for doing case control studies in a country which has varied life styles and diets and also a relatively low incidence of western diseases, but a reasonably homogeneous ethnic composition. Greece is just such a country, so one welcomes the well-conducted case control study from Athens reported by Manousos and his colleagues on p. 544 of this issue. Their report owes much of its value to the detailed and sophisticated statistical analysis carried out by Dr Day of the International Agency for Research on Cancer at Lyon (IARC). Cancer epidemiologists lead the world in researching diet and disease and they have recently made notable contributions to the understanding of the dietary factors in colorectal cancer¹⁻⁴ and gall stones.⁵

The findings of the Athens study are that people who attend hospital with abdominal complaints and have a barium enema which shows diverticulosis, have eating habits which are strikingly different from those of people attending hospital with fractures, or orthopaedic complaints. (The latter group can be assumed to contain less than 10% of cases of diverticulosis, because that is the prevalence of the disease in Greece). The patients with diverticular disease ate vegetables much less, and meat much more often. They also ate less brown bread and potatoes and instead tended to have more dairy products. Dietary fibre intakes were not calculated, but it is clear that patients with diverticulosis ate less fibre.

Fibre deficiency has been the leading theory for the aetiology of diverticular disease since Painter and Burkitt published their geographical and historical surveys 14 years ago.^{6,7} Since then it has received support from several quarters. In a case control study in Reading, patients with diverticular disease had a low intake of crude fibre,⁸ but this is a poor

indicator of dietary fibre intake. The stools of patients with symptomatic diverticulosis contain subnormal amounts of β -sitosterol, an unabsorbed plant sterol whose excretion is a marker of dietary fibre consumed.⁹ Vegetarians have been shown to have less than half the expected prevalence of asymptomatic diverticulosis.¹⁰ The prevalence of the disease has increased in the Japanese since the Second World War, at the same time as their consumption of dietary fibre has declined.¹¹ Rats develop more and more diverticula when they are given less and less bran in their diet.¹²

There are weaknesses and anomalies in the evidence. Even on a very high fibre stock diet, 10% of rats eventually develop diverticula.¹² The benefits of bran and a high fibre diet in the treatment of symptomatic diverticular disease are, at least in part, attributable to a placebo effect.¹³⁻¹⁵ The low prevalence of diverticulosis in vegetarians is only partly because of their higher fibre intake. Curiously, vegetarians with diverticulosis eat more fibre than meat eaters without it.¹⁰

The Greek study also suggests that meat eating matters. Indeed, the dietary item which had the greatest effect on the relative risk of diverticulosis was lamb meat. This is a mystery. Dietary meat protein has no consistent effect on stool weight, or transit time.¹⁶ What it does to pressures in the colon is quite unknown. A high meat diet does change bacterial metabolism in the colon.¹⁷ This raises the speculative possibility that, under the influence of a high protein intake, bacteria may produce a toxic metabolite which favours diverticulosis – perhaps a spasmogen, or an agent which weakens the wall of the colon. The age related changes which occur in the colonic wall need to be explained¹⁸ and, especially, those which seem to be specific for diverticular disease.¹⁹

One problem with the Athens study is that all the patients with diverticulosis had abdominal symptoms. These were presumably colonic symptoms, as they led to a barium enema being done. Patients with diverticulosis who have symptoms are not necessarily representative of the silent majority, who do not. Increased pressures in the sigmoid colon were found by Weinreich and Andersen²⁰ only in those patients who had the symptoms of spastic colon: lower abdominal pain and distension. A similar motility pattern was found in patients with spastic colon symptoms, but with no diverticula. This raises the possibility that the conclusions of the Athens group really apply to the spastic colon type of irritable bowel syndrome, rather than to diverticulosis.

Like any good study, the report of Manousos *et al* raises as many questions as it answers. Where should we go from here? Provided the ethical problem of radiographing normal people can be overcome, we need a large survey of the general population for diverticulosis and colon spastic symptoms so that dietary histories can be obtained from groups of people with neither disorder, with each disorder on its own and with both disorders. It would be a formidable undertaking, but without it doubts will remain.

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