Travel and ischaemic heart disease*

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Summary and conclusions

The hypothesis that travel precipitates acute ischaemic heart disease (IHD) was tested in a case-control study of holidaymakers admitted to hospital in Great Yarmouth. The distance that patients with IHD had travelled to reach Great Yarmouth was on average greater than that travelled by patients with other diseases.

I conclude that the greater distances travelled by patients with IHD may have helped to precipitate the attack.

Introduction

The search for precipitating causes of myocardial infarction, in contrast to that for predisposing factors, has had limited success. Strenuous physical work is associated with only a small proportion of attacks,^{1,2} and the role of stress remains equivocal.³ In 1975 Horsley *et al* suggested that long, unbroken journeys by road were a potent cause of heart attacks in holidaymakers visiting Cornwall.⁴ The present study was designed to test the hypothesis that travel of any kind is a precipitating factor in attacks of acute ischaemic heart disease (IHD) (ICD (8th revision) codes 410-412 and 414, excluding angina pectoris). Holidaymakers visiting Great Yarmouth formed a convenient population for the study, in which I compared the distances travelled to reach Great Yarmouth from home by patients admitted to hospital with acute IHD and control patients admitted with other diseases.

Methods

SELECTION OF PATIENTS AND DATA COLLECTED

Through the Hospital Activity Analysis (HAA) the East Anglian Regional Health Authority provided details of 121 patients not normally resident in Great Yarmouth Health District who were admitted to the medical wards of Northgate Hospital, Great Yarmouth, during 1972-5 with a discharge diagnosis of acute IHD. For each of these patients a control patient, matched for age (± 5 years) and sex and suffering from any disease other than acute IHD, was selected from the same source.

In the summer of 1976 I interviewed all patients not normally resident in Great Yarmouth who were admitted to the medical wards. In addition to the information normally obtainable from the HAA I noted the patient's occupation (or spouse's occupation, or former occupation), time taken to travel to Great Yarmouth, time between arrival in Great Yarmouth and admission to hospital, and smoking habits. I interviewed 127 patients, of whom 11 were excluded from the study because essential information was missing. When IHD was diagnosed in one of these patients it was independently checked by obtaining two electrocardiograms and measuring serum aspartate aminotransferase and β -hydroxybutyrate dehydrogenase concen-

trations. When the diagnosis could not be confirmed the patient was excluded from the study.

For each patient with confirmed IHD a control matched for age and sex was chosen from the remaining inpatients interviewed. Practical limitations prevented confirmation of the diagnoses made during 1972-5, but the inclusion of doubtful cases should have reduced any difference between cases and controls. Table I shows the number of case-control pairs finally included.

TABLE I—Numbers of paired cases included in the study by year of incidence and mean age

	Year					Total No of cases	Mean age in years
	1972	1973	1974	1975	1976		
Men	11	16	25	24	23	99	59.7
Women	11	8	9	17	10	55	65.0

MEASUREMENT OF DISTANCE TRAVELLED

The distance travelled to reach Great Yarmouth was measured with a map and a tape measure and taken as a straight line, although the line was "bent" around the Wash and the Thames estuary.

Results

I studied 154 case-control pairs, of whom 99 were men and 55 women. Table II shows the mean distances travelled by patients and controls, for each sex and year. In each year men with IHD had

TABLE II—Mean ($\pm$ SD) distances travelled by inpatient cases and controls. (Distances given in km)

Year	Cases	Controls	Difference
<i>Men</i>			
1972	233.6 $\pm$ 102.5	182.3 $\pm$ 99.5	+ 51.3
1973	180.2 $\pm$ 101.7	166.1 $\pm$ 68.0	+ 14.1
1974	242.1 $\pm$ 115.2	210.3 $\pm$ 113.6	+ 31.8
1975	231.0 $\pm$ 113.9	201.4 $\pm$ 112.5	+ 29.6
1976	243.3 $\pm$ 115.4	216.4 $\pm$ 125.4	+ 26.9
All years	228.7 $\pm$ 111.4	199.3 $\pm$ 108.1	+ 29.4
<i>Women</i>			
1972	223.6 $\pm$ 83.1	199.4 $\pm$ 58.8	+ 24.2
1973	179.0 $\pm$ 63.0	224.6 $\pm$ 83.4	- 45.6
1974	264.4 $\pm$ 100.3	203.5 $\pm$ 81.3	+ 60.9
1975	258.5 $\pm$ 119.2	215.6 $\pm$ 63.1	+ 42.9
1976	210.7 $\pm$ 84.6	190.9 $\pm$ 48.3	+ 19.8
All years	232.2 $\pm$ 98.0	207.2 $\pm$ 65.0	+ 25.0
<i>Both sexes</i>			
All years	230.0 $\pm$ 106.6	202.1 $\pm$ 94.9	+ 27.9

travelled on average about 30 km further than the controls, but for women the difference was more variable. Table III shows the numbers of patients living in each 50 km "ring" around Great Yarmouth. Patients with IHD outnumbered controls at distances of over 200 km, while more controls than cases lived within 200 km. The difference between cases and controls was more consistent in men than women; differences were significant ($P < 0.01$, rank-sum test) in men and in both sexes combined but not in women.

Although cases and controls could not be matched for either social class or smoking habits there was no significant difference between the groups in 33 pairs studied.

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TABLE III—Distances travelled by case and control patients to reach Great Yarmouth

Distance in km:	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400-449	450-499	500-549	550-599	600-
<i>Men</i>													
Cases	7	1	9	28	19	17	5	6	1	1	3	2	
Controls	7	5	11	42	13	9	4	3	1		3	1	
<i>Women</i>													
Cases	1	3	5	15	6	13	5	6				1	
Controls	1	2	5	17	13	12	5						

TABLE IV—Proportions of deaths due to ischaemic heart disease (as %) according to pre-1974 standard regions^b

Region	Age group		
	45-54	55-64	65-74
Eastern regions, near to Yarmouth (East Anglian, East Midlands, South-east)	39.0	35.4	31.7
Intermediate regions (West Midlands, Yorkshire, Humberside)	39.5	35.4	31.5
Regions distant from Yarmouth (North, North-west, South-east Wales)	40.4	36.1	32.5

Discussion

These results show that, on average, patients admitted to hospital in Great Yarmouth with IHD had travelled further to reach the resort than control patients admitted with other diseases.

Few patients who have heart attacks have a reliable warning, but many of the control patients were admitted with chronic diseases, and possibly those patients with symptomatic chronic disease who lived a long way from Great Yarmouth, and who would have made the journey had they felt well, stayed at home. This would have resulted in the selection of patients who lived relatively near to Great Yarmouth. Nineteen cases of symptomatic heart failure (ICD 427) were found in the control patients in 1972, 1973, 1975, and 1976 (information was not readily available for 1974). It is highly likely that this disease would have been under treatment or causing symptoms before the holiday began, yet the average distance travelled by these patients was 205.2 km, whereas the rest of the controls travelled 200.2 km. Therefore, while still possible, selection of control patients seems an unlikely explanation of the findings.

Great Yarmouth is on the most easterly coast of Britain, while the highest mortality due to IHD is in the north and west. If

morbidity while on holiday is related to mortality in the region of origin then the risk of a heart attack would be greater the further a holidaymaker travelled to reach Great Yarmouth. Many diseases other than IHD, however, are commoner in the north and west. The age-specific proportional mortality between ages 45 and 75 did not differ by more than 2% between the standard regions from which the patients came (table IV). This is not enough to account for the difference in distances travelled by cases and controls. By using approximations to the existing data an illustrative model may be constructed to show that if differences in proportional mortality were the only relevant factors the difference in distances travelled by cases and controls would be about 2 km.

Thus the distance travelled in going on holiday and the risk of being admitted to hospital with acute IHD may be associated.

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References

- Pell, S, and d'Alonzo, C A, *Journal of the American Medical Association* 1963, **185**, 831.
- Kinlen, L J, DPHIL Thesis. Oxford, Bodleian Library, 1969.
- British Medical Journal*, 1977, **1**, 408.
- Horsley, S D, Smail, P T, and Thould, A K, *British Medical Journal* 1975, **4**, 276.
- Registrar General, *Statistical Review of England and Wales for the year* 1973, table 19. London, HMSO, 1976.

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ONE HUNDRED YEARS AGO Under the new Dental Bill, which is alleged to have been approved by certain of the examining bodies, it is proposed to confer the title of dental surgeon on every chemist or tooth-puller throughout the kingdom; while, on the other hand, it is to be prohibited in future to surgeons who choose to adopt dental surgery as their specialty, unless they take also the dental licence of one of the Colleges. Now, we would very gladly see the dental profession respectably and satisfactorily organised; but it seems clear that they are here asking too great and quite unnecessary sacrifices. The Parliamentary title of surgeon belongs to members, fellows, and licentiates of the Colleges of Surgeons, and to no other persons. Those persons who take out a dental licence may fairly claim the title of dentists, and that title might properly be reserved for them. The title of dental surgeon should obviously be reserved for those members of the Colleges of Surgeons who take a dental licence. The question is one of common sense. A member or fellow of the College of Surgeons is a surgeon; such a member or fellow, if he take a dental licence, may claim a Parliamentary title as dental surgeon. A licentiate in dentistry may equally claim to have the Parliamentary title of dentist. But it is certainly not desirable to do as is now proposed by this Bill, to treat all licentiates of the future as having a Parliamentary and exclusive claim to the title of dental surgeon, whether they be surgeons or not, and to confound in one category the surgeon who

has a dental licence and the dentist who has no surgical licence, giving, moreover, to the dentist who has no surgical diploma the exclusive use of the word (dental) surgeon, against the surgeon who has no dental licence. The immediate effect, moreover, would be that some hundreds of small chemists, quacks, and tooth-pullers, all over the country, would, as was pointed out at the meeting this week of the Parliamentary Bills Committee, have the immediate right to inscribe dental surgeon over their doors, and might possibly write the "dental" very small and the "surgeon" very large, and thus a new set of traps would be laid for the unwary and the uneducated. If the College of Surgeons really sanctioned such a measure, it is to be regretted; but it is not the first time that the Councils of the Corporations have gone to sleep over interests which did not immediately appear to be bound up with those of the Corporations themselves. It will be right to offer a very energetic opposition to this Bill as at present worded. On the other hand, if the promoters are wise enough to distinguish in their register "dentists" and "dental surgeons" in different columns, they will avoid the rock on which their Bill is most likely to split. As it stands, the Bill cannot pass; and we trust the General Medical Council will interpose at once and aid our Parliamentary Bills Committee preventing this abuse of medical titles. (*British Medical Journal*, 1878.)