

## Letter to the Editor

# Diabetes, gall stone disease, and pancreatic cancer

Sir – Previous studies have indicated that there is an association between diabetes and pancreatic cancer. However, it is not clear to what extent this could be explained by diabetic manifestations from an early undiagnosed pancreatic tumour (Kessler, 1970; Wynder *et al.*, 1973; Ragozzino *et al.*, 1982; Manousos *et al.*, 1981). An association between gall stone disease and pancreatic cancer has also been suggested, but the findings have been somewhat contradictory (Wynder *et al.*, 1973; Manousos *et al.*, 1981; Haines *et al.*, 1982). In a recent case-control study we examined the association of pancreatic cancer with previous diabetes and gall stone disease.

All subjects aged 40–79 with a pancreatic cancer diagnosed at three Swedish hospitals during the study period (1982–4) were included as cases. Two series of controls were used. Hospital controls were selected as a stratified (age, sex) sample of subjects aged 40–79 with newly-diagnosed inguinal hernia in the same hospitals during the study period. Population controls were selected from population registers covering the catchment areas of the three hospitals. Population controls were matched to the cases by age, sex, and parish. More details on the selection of subjects are given elsewhere (Norell *et al.*, 1986).

Each case received a questionnaire after preliminary diagnosis, but only subjects whose diagnoses were later confirmed were included in the

analysis. As soon as a case was found, a questionnaire was mailed to the corresponding population control. Hospital controls received a questionnaire after clinical diagnoses. Whenever necessary, subjects were contacted by telephone by an interviewer to complete specific items in the questionnaire. The numbers of eligible subjects (and subjects who filled in the questionnaire) were: 120 (99) cases, 179 (163) hospital controls, and 162 (138) population controls. The Mantel-Haenszel procedure was used for estimation of the relative risk, accompanied by 90% test-based confidence limits based on the Mantel-Haenszel test (Breslow & Day, 1980).

The relative risk of pancreatic cancer for subjects who reported that they had diabetes and gall stone disease, respectively, are shown in the Table. To exclude recent illness which could be an early manifestation of cancer of the pancreas, we reanalysed our data after exclusion of subjects who reported that they had diabetes or gall stone disease only during the last 5 years. However, there was still an association with diabetes as well as with gall stone disease, although the number of subjects with diabetes was quite small. Due to the fact that some subjects were severely ill, it was accepted that the questionnaire was filled in by spouses for 16 cases, 2 hospital controls, and one population control. When the data were reanalysed after the exclusion of these subjects, the relative risks associated with

**Table:** Relative risk of pancreatic cancer associated with certain characteristics (together with 90% confidence limits), estimated from comparisons with hospital controls and population controls.

| Exposure                                 | Cases:<br>Exposed<br>number | Hospital controls: |                                 | Population controls: |                                 |
|--|-----------------------------|--------------------|---------------------------------|----------------------|---------------------------------|
|  |                             | Exposed<br>number  | Relative risk<br>(90% conf lim) | Exposed<br>number    | Relative risk<br>(90% conf lim) |
| Diabetes                                 | 20                          | 3                  | 19.7 (7.8–50.1)                 | 11                   | 3.3 (1.7–6.4)                   |
| Gall stone disease                       | 26                          | 27                 | 1.7 (0.9–3.0)                   | 19                   | 2.7 (1.5–4.7)                   |
| Diabetes<br>5+ years ago                 | 4                           | 2                  | 6.9 (1.7–28.9)                  | 3                    | 2.4 (0.6–9.7)                   |
| Gall stone disease<br>5+ years ago       | 18                          | 26                 | 1.2 (0.6–2.3)                   | 13                   | 2.9 (1.5–5.6)                   |
| Biol relative with<br>diabetes           | 26                          | 17                 | 2.7 (1.4–5.2)                   | 36                   | 1.0 (0.6–1.7)                   |
| Biol relative with<br>gall stone disease | 40                          | 46                 | 1.4 (0.9–2.4)                   | 51                   | 1.3 (0.8–2.1)                   |

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