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(Accepted 20 May 1994)

C4B*Q0 allotype as risk factor for myocardial infarction

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BMJ 1994;309:313-4

The prevalence of the deficient, silent allotype of the C4B gene (C4B*Q0) is lower in elderly than in young healthy people, particularly in men.[1] This may reflect increased mortality from some disease in middle aged carriers of the C4B*Q0 gene. We determined the presence of the gene in patients with acute myocardial infarction because myocardial infarction is the leading cause of death among middle aged Hungarians.

Patients, methods, and results

We studied 181 consecutive patients with confirmed Q wave myocardial infarction admitted to four hospital departments between June 1992 and January 1993 (125 men, 56 women, aged 42-78), 93 consecutive patients with symptoms of angina pectoris (65 men, 28 women; aged 43-62) who were examined by coronary angiography (coronarography), and 737 previously tested healthy controls (252 young people aged 22-45 and 485 elderly people aged 60-99).[1] Myocardial infarction was diagnosed as typical chest pain lasting at least one hour, an ST segment elevation of at least 1 mm in an electrocardiogram, and typical cardiac enzyme values. We diagnosed inferior and anterior wall infarction in 103 and 70 patients, respectively; in eight patients the localisation of the infarct was uncertain.

We took blood samples from the patients with myocardial infarction within 24 hours of admission and sent them immediately to the laboratory in tubes containing EDTA. Plasma samples were stored at −70°C until tested. C4 allotyping was performed with high voltage electrophoresis, followed by immunofixation with human C4 antibody (Atlantic Antibodies).[2,3] We determined aspartate aminotransferase and alanine aminotransferase values serially with commercially available kits (Boehringer Mannheim, Germany). In order to exclude patients with enzyme elevations unrelated to myocardial infarction, we evaluated peak aspartate aminotransferase values only in patients whose alanine aminotransferase values had not increased concomitantly. Patients with raised aspartate aminotransferase values at the first determination were also excluded from the further evaluation.

The prevalence of C4 allotypes was significantly higher in patients with myocardial infarction than in the healthy elderly controls (27·6% *v* 10·7%; $P<0·0001$)—the only significant difference between the patients and the controls. After age matching, which was possible only in those aged 60-79, 38% (24/63) of male patients and 8% (10/133) of healthy men carried the C4B*Q0 allotype ($P<0·0001$). The odds ratio of a 60-79 year old man with acute myocardial infarction being a C4B*Q0 carrier compared with his healthy counterpart was 7·57 (95% confidence interval 3·31 to 17·2); in women this odds ratio was 0·84 (0·33 to 2·16).

The C4B*Q0 carrier state influenced the outcome of myocardial infarction (table). The odds ratio of dying was significantly higher for men who carried the gene compared with those who did not (18·0 (2·1 to 153) in homozygous men and 5·53 (1·21 to 25·4) in heterozygous men). Data on women were insufficient to calculate odds ratios.

Average peak aspartate aminotransferase values were significantly higher in patients who carried the C4B*Q0 gene than in those who did not (218 U/ml (median 195 U/ml, range 20-635 U/ml) *v* 145 U/ml (median 120 U/ml, range 12-506 U/ml; $P=0·040$ by Mann-Whitney U test). Similarly, the proportion of patients with a peak aspartate aminotransferase value greater than 200 U/ml was significantly higher in

*Outcome of Q wave myocardial infarction in patients with or without C4B*Q0 allotype*

Group	No (%) who died	No (%) who survived
Carrier of C4B*Q0 gene:		
Homozygous (n=6)	3 (50)	3 (50)
Heterozygous (n=38)	8 (21)	30 (79)
Non-carrier (n=137)	17 (12)	120 (88)
Total	28 (15)	153 (85)

$P<0·05$ for difference between patients with and without C4B*Q0 by χ^2 test.

those who carried the C4B*Q0 gene (52·7% *v* 26·5%; $\chi^2 < 0{\cdot}01$). Coronarography did not show any difference in the severity of coronary heart disease according to presence of the C4B*Q0 gene.

Comment

We found that the prevalence of the C4B*Q0 gene was higher in men with myocardial infarction than in controls and that peak aspartate aminotransferase values and mortality from infarction were higher among those who carried the gene than among those who did not. The extent of myocardial infarction is related to peak aspartate aminotransferase values,[4] and both early and late (up to five years) mortality are adversely affected by increased size of infarct.[5] The C4B*Q0 allotype therefore seems to be associated with a poor prognosis after infarction. We conclude that people who carry the gene have a shorter life expectancy,[1] partly because of their higher mortality from myocardial infarction, the leading cause of death among middle aged and elderly Hungarians.

This work was supported by the National Scientific Research Foundation (OTKA 211). We thank Peter Vargha (Semmelweis University Medical School, Budapest) for his help in statistical analysis.

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(Accepted 3 March 1994)

Survey of private nursing homes in seven English counties

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BMJ 1994;309:314

On behalf of the Association of County Councils of England and Wales we undertook a survey of private nursing homes in England.[1] Our results challenge the view that the NHS has become a dumping ground for increasingly dependent residents of nursing homes.

Methods and results

Three hundred and six nursing homes across seven English counties were surveyed by postal questionnaire; replies were received from 230 (75%) homes. Data were gathered on the home, all current residents, and all residents who had been discharged (which included those who had died) during 1989-91. Questions were analysed with respect to numbers responding to that question, so denominators vary. The analysis is in terms of discharged residents, and 95% confidence intervals apply to the difference in proportions between 1989 and 1991.

Forty three per cent (4314/10 032) of discharged residents were aged 85 or more, and 46% (4587/9972) were classed solely as being frail. Seventy six per cent 7474/9834) of all residents had lived in the home for one year or less. Forty one per cent (4077/9944) of the discharged residents had come from the community and 43% (4192/9749) from a hospital.

Fifty nine per cent (5446/9230) of the discharged residents died in the nursing home (table). The proportion of residents dying in the home decreased significantly from 62% (1550/2500) in 1989 to 56% (2009/3587) in 1991 (2·7% to 7·7%). Seventy per cent (2993/4276) of the residents admitted from a hospital subsequently died; this was significantly higher than the 45% (1862/4138) of residents admitted from the community who died (23% to 27%).

Numbers (percentages) of discharged residents of 230 private nursing homes 1989-91

	1989	1990	1991	Total
Died	1550 (62)	1887 (61)	2009 (56)	5446
Left to live in:				
Community	585 (23)	739 (24)	1020 (29)	2344
Other nursing home	156 (6)	178 (6)	184 (5)	518
Residential care home	84 (3)	105 (3)	94 (3)	283
Left to be admitted to:				
Acute hospital	62 (2)	78 (3)	107 (3)	247
Long stay hospital	14 (1)	26 (1)	21 (1)	61
Unspecified hospital	47 (2)	60 (2)	47 (1)	154
Other	16 (1)	35 (1)	80 (2)	131
Total	2514	3108	3562	9184

Twenty six per cent (2344/9015) left the home to live in the community. The proportion of residents doing so increased significantly from 23% (585/2543) in 1989 to 29% (1020/3517) in 1991 (3·3% to 7·7%). Although 95% (2331/2454) of residents who left to live in the community did so within six months, many of them may have entered the home for respite care.

Five per cent (462/9240) of residents who left were admitted to hospital, most to acute hospitals. The proportion of those who came to the home from hospital and were discharged back to hospital did not change significantly over the three years, remaining at about 6%.

Comment

The proportion of residents who were admitted to hospital from their nursing home remained low, regardless of whether the residents had been living in the community or been in hospital. This suggests that hospitals are not being used as dumping grounds by nursing homes unable or unwilling to continue to care for residents. It is noticeable that about three quarters of those who enter a nursing home from hospital and then return to hospital do so within six months—is this an acceptable rate of return?

Our results predate the implementation of the NHS and Community Care Act in April 1993. What effect, if any, this will have on discharge patterns from nursing homes remains to be seen. Assessment for state funded residents of nursing homes is now in the hands of the social services, whose criteria may alter the pattern of admissions and, in consequence, discharges. Ironically, given the current policy of rationalising long stay beds within the NHS, if any change were to lower death rates this might increase the discharge rate to acute hospitals.

We thank the owners and staff of the nursing homes who gave their time freely to the survey. We also thank the officers of the participating counties and the Association of County Councils of England and Wales for their administrative support and enthusiasm, especially Graeme Lythe for all his help.

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(Accepted 22 February 1994)