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Missed opportunities for secondary prevention of cerebrovascular disease in elderly British men from 1999 to 2005: a population based study

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Abstract

Objective—We examined patterns in medications use for secondary prevention of cerebrovascular disease in older British men from 1999-2005, and investigated socio-demographic and disease-related influences on medication use.

Methods—Prevalences of antiplatelet drugs, blood pressure lowering drugs and statins use were examined in men, aged 65-87years in 2005, with a doctor diagnosis of stroke or transient ischaemic attack (TIA) from a population-based cohort based in one general practice in each of 24 British towns.

Results—In 1999, most men with cerebrovascular disease received antiplatelet drugs (67%). However, few received blood pressure lowering drugs (50%) and statins (13%). By 2005 the use of all drug types had increased; each were now received by at least half of patients. However, only one-third of patients received all three medication types and combined blood pressure treatment was limited. Older age, a diagnosis of TIA rather than stroke, and absence of co-existing CHD were associated with lower rates of use of specific medication categories.

Conclusions—Despite improvements in secondary prevention medication use, there is scope for achieving the full potential of these medications, particularly by increasing combination blood pressure treatment and statin use, and ensuring that older patients receive the benefits of prevention.

Keywords

Secondary prevention; medication use; cerebrovascular disease

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Introduction

Stroke is the third largest cause of death in the UK and worldwide and is the single largest cause of disability.1;2 Patients with a history of transient ischaemic attack (TIA) or stroke are at increased risk of recurrent vascular events.1;3 During the past 15 years, the role of medications in reducing the risk of recurrent vascular events in patients with a history of stroke or TIA has become increasingly clear. Antiplatelet drugs, blood pressure lowering drugs (particularly in combination) and cholesterol lowering drugs, particularly statins, independently reduce the risk of recurrent vascular events by about one quarter among patients with a history of TIA or stroke; these benefits are observed across a wide range of risk factor levels and are not restricted to patients with exceptionally high risk factor profiles.4-7

Several hospital-based studies have reported on the extent to which patients with TIA or stroke receive these medications immediately after the event.8-10 However, there are fewer reports in the population of patients with cerebrovascular disease, which provide better overall estimates of the extent of secondary prevention, including patients with less recent events and those managed in primary care.11 The recent update of the National Service Framework for Older people and the Chief Medical Officer's report in 2006 emphasised the need for adequate and equitable provision of effective treatments for chronic diseases, with cerebrovascular disease a particular priority.12;13 In this study we aim to ascertain the use of secondary prevention medication for cerebrovascular disease in a population-based study of older British men studied in primary care settings. We aim to explore whether there were improvements in medication use from 1999 to 2005 and investigate socio-demographic factors and disease characteristics associated with the use of these medications.

Methods

The British Regional Heart Study (BRHS) is a prospective study of cardiovascular disease which includes a socially and geographically representative sample of men recruited from one general practice in each of 24 towns representing all major British regions.14;15 Participants were enrolled in 1978-80 and have been followed up through the National Health Service Central Register (Southport and Edinburgh), general practice records and questionnaires to study participants. More details of BRHS methods are reported elsewhere.15

Regular two-yearly reviews of general practitioner's records were carried out to identify subjects with stroke and TIA; information on coronary heart disease (CHD) diagnoses (particularly myocardial infarction and angina) was also obtained.15 Standard WHO definitions were used to define stroke and TIA, which were considered as two separate categories. Subjects with both diagnoses were included as stroke cases. Reports of current medication are based on questionnaires completed by study participants in 1998-2000 (referred to as the mid-year 1999 in this paper), 2003 and 2005. Details of all current medications including non-prescription medications were sought on each occasion.

Prevalences of use of different medications (antiplatelet drugs, blood pressure lowering drugs and statins) individually and in combination were calculated at the three time points for stroke and TIA patients. Use of medication in all cerebrovascular disease patients (both stroke and TIA) in 2005 was examined in relation to age, social class, region, time since last diagnosis, presence of disability, type of vascular event (stroke or TIA), and previous CHD event. The age of the subjects in 2005 was 65-87 years. Subjects were divided into two approximately equal age groups, 65-75 and 76-87 years. Social class was derived from the longest held occupation recorded at the time of baseline questionnaire using the Registrar

General's classification of occupations, with categories grouped as non-manual (I, II and III non-manual) and manual (III manual, IV and V). Men in the armed forces at baseline were excluded from this analysis. Regions were divided into north and south depending on whether the town of residence was north or south of a line joining Bristol and the Wash. Presence of disability was ascertained by self-report of any long-standing illness, disability or infirmity in the questionnaire in 2005. Time since diagnosis was ascertained using the date of last (most recent) diagnosis of stroke or TIA before 2005. The 'time since diagnosis' variable was categorised into three groups of less than 5 years, 5-10 years and greater than 10 years. Information on previous event of CHD was collected from general practitioner's records. Prevalence ratios were calculated with 95% confidence intervals (CI) using Clinstat software and were expressed as percentage reductions or increases.

Results

Response rates for questionnaires were 77% in 1999 and 80% in both 2003 and 2005. In 1999, 2003 and 2005 there were 141, 186 and 159 subjects with a history of stroke and 171, 213 and 190 with a history of TIA. Table 1 shows the prevalence of use of different secondary prevention medications at the 3 time points in stroke and TIA subjects. In 1999, the highest levels of medication use were seen for antiplatelet drugs (67-73%) followed by blood pressure lowering drugs (51-61%); prevalence of statin use was very low. Prevalence of use of all medications increased between 1999 to 2005; the relative increase was particularly marked for statins, which were now received by more than 50% of patients. Three quarters of subjects were receiving antiplatelet and blood pressure lowering drugs. However, fewer than half of subjects were receiving two or more blood pressure lowering drugs and only a third were receiving a combination of treatment with antiplatelet, blood pressure lowering and statin drugs. Among patients not receiving antiplatelet drugs, an appreciable proportion were receiving anticoagulant treatment (44% of stroke patients and 53% of TIA patients in 2005%.)

Table 2 shows the influence of socio-demographic factors and disease characteristics on the use of medications in all patients with cerebrovascular disease (stroke and TIA) in 2005. The prevalences of all medication use were lower in older subjects compared with younger subjects. This age difference was particularly marked in the use of statin (64% in younger patients, 41% in older patients). There was no systematic variation in medication use by social class or region. TIA patients had a lower prevalence of blood pressure lowering drug use than stroke patients, though there was no appreciable difference in the use of other drugs. Subjects with cerebrovascular disease who also had a history of CHD were appreciably more likely to receive blood pressure lowering drugs and statins than those without previous CHD. Though the prevalence of antiplatelet drugs and statin use tended to decrease with increasing time since diagnosis of a vascular event, this difference was not statistically significant. There was no appreciable relation between physical disability and the use of secondary prevention.

Discussion

Main findings of this study

Our results show that the use of secondary prevention medication in older British men with stroke and TIA in primary care settings has increased from 1999 to 2005. There still, however, remains room for further improving the completeness of medication use in older subjects. In 2005 three quarters of stroke patients were taking antiplatelet drugs and blood pressure lowering treatment and about half were on statins. However, fewer than half were receiving the benefits of combined blood pressure treatment and only one third of all patients were receiving a combination of antiplatelet, blood pressure lowering and statin

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treatment. Patients at particular risk of not receiving secondary prevention included older patients (less likely to receive statins), those with TIA rather than stroke (less likely to receive blood pressure lowering drugs) and those without concurrent CHD (less likely to receive blood pressure lowering treatment and statins).

What is already known about this topic

Medications form an important part of the secondary prevention programme in stroke and TIA patients to prevent recurrence of these events. The effectiveness of antiplatelet drugs, blood pressure lowering drugs (particularly in combination) and cholesterol lowering drugs in reducing the risk of recurrent vascular events in patients with cerebrovascular disease is now well established1;5-7;16;17 even in older people (these reports had subjects aged over 65 and up to 75 or 80 years in some trials5;16).The use of these medications in preventing recurring strokes has been shown to also be cost-effective.17-20 Given the higher risk of stroke in older people,1 the need for secondary prevention is even greater. Deficiencies in the use of secondary prevention medication for vascular disease have been reported by other studies in the UK.9;21-23 However, most studies on secondary prevention of cerebrovascular or cardiovascular disease in the UK and elsewhere have been hospital-based or with patients in acute care.8-10;23

What this study adds

Our study is based on a highly representative sample of British men and is likely to reflect closely the current uptake of secondary prevention medications for cerebrovascular disease. The increase in medication use in our study appears to have followed the publication of key reports such as Antiplatelet Trialists Collaboration, Heart Protection Study and PROGRESS trial,4-6 and policy initiatives like the National Service Framework (NSF) for Older People24 and the Quality and Outcomes Framework (QOF)25. However, it is difficult to comment on how much of the observed increase in medication use in our study was a results of these initiatives. It is likely that the increased evidence-base and the NSF may have had more of an influence on our findings than the QOF since this came into effect much later in the period of our study, but it could be useful for further improvement in secondary prevention.

The lower rates of medication use observed in our study, when compared with some previous studies with patients in acute care,8;9;23 probably reflect the population setting of our study, which included patients followed-up for a longer period beyond acute care. The prevalence of antiplatelet drug use was very high; an appreciable proportion of those not taking antiplatelet treatment were receiving anticoagulants. The prevalence of blood pressure lowering drug use was also reasonably high overall. However, blood pressure treatment use was less prevalent among TIA patients, and the use of combined blood pressure lowering treatment (shown in the PROGRESS Trial to be particularly effective in reducing recurrent vascular events)6 was limited. Appreciable opportunities also remain for increasing the uptake of statin use. Because the actions of antiplatelet, blood pressure lowering and cholesterol lowering treatment are independent, increasing use of the combination of these treatments would provide considerable gains in reduction of recurrent cerebrovascular disease.

We observed systematic variations in the use of these medications within our study population in 2005. The lower rates of statin use observed in older patients and the lower rates of use of all medications in those without CHD are consistent with the findings of other studies.9;26-29 The overall use of medications in our cerebrovascular patients was lower than in CHD patients of our cohort, which we have previously reported.11 We did not find a social class difference in medication use in our study which has also not been observed in

earlier papers on CHD patients.30;31 There was also no variation in medication use by region or presence of disability.

The reasons for the apparent 'treatment-paradox'27 seen in the under-use of secondary prevention medications, despite substantial evidence for the usefulness of these medications in reducing recurrence of vascular disease, are not clear. This may to some extent reflect the delay in implementation of medical evidence; the benefits of statin treatment and blood pressure reduction specifically after stroke have been demonstrated relatively recently. To a large extent the low rates of medication use are likely to reflect a failure to initiate treatment; 32 there is little evidence from the patients with cerebrovascular disease studied repeatedly that cessation of medication use is the underlying problem. Compliance rates to antithrombotic and antihypertensive medications in other studies have generally been reported to be good.33;34 The low rates of medication in this context do not appear to reflect concerns about quality of life and disability among patients; presence of disability did not influence prevalence of medication use, which was in any case lower among patients with transient ischaemic attack than in subjects with established stroke. It appears overall that implementation of secondary prevention for cerebrovascular disease is less advanced than that for coronary heart disease, which had a strong influence in the present population on the likelihood of receiving treatment.

Strengths and limitations of this study

The results of our study provide current data on medication use in a socio-economically representative sample of older British men with stroke and TIA. Because the study is based in primary care it provides a population-wide view of patients, and is not restricted to recent cases; we were able to include patients whose event had been as long as 10 years previously. Thus, these results give a picture of the long-term use of medication in the community and not just in acute care after an event of stroke or TIA. Our cases were ascertained by a thorough two yearly review of general practice records. Medication use is based on current reporting by study subjects, and does not rely on general practice records of medication use, which might be a poor reflection of actual use. While our results are limited to men, previous studies suggest that secondary prevention may be less complete in women.35;36 A limitation of the present investigation was the lack of systematic information on type of stroke (infarct or haemorrhage). Almost all the strokes seen in this population are likely to have been infarcts rather than haemorrhage as has been reported in previous studies9;37; this presumption is also reflected in the high rates of antiplatelet treatment observed in our study. However, the use of blood pressure lowering and statin treatment would have been applicable both to infarct and haemorrhagic disease.

Implications and conclusions

Given the high risk of recurrent vascular events and death after stroke/TIA 1;3;38 there should be a greater focus on ensuring that patients obtain the full benefits of secondary prevention; the treatment deficiencies observed in our study suggest that this is not currently being achieved. This evidence-treatment gap needs to be narrowed with a greater consensus on use of blood pressure lowering and antiplatelet drugs and also combination treatments which are shown to produce greater risk reductions in secondary prevention. Studies have shown that an early initiation of medication during hospitalisation influences the long-term use of medication.32;39-41 The transition from acute care to primary or community-based care is crucial and will improve long-term use of medications by patients. Nevertheless, there is a need to target and focus efforts on improving both prescription rates and patient compliance. Primary care services play a special role in ensuring that benefits of recent advances in treatment are obtained by patients with a history of stroke or TIA in the community thus achieving the full potential of these medications. Greater uptake of

secondary prevention medications has important implications both for health services and patients.

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Table 1

Use of medications for secondary prevention of cerebrovascular disease in patients with stroke and transient ischaemic attack (TIA)

	STROKE			TIA		
	1999 N = 141 n (%)	**2003 N = 186 n (%)**	**2005 N = 159 n (%)**	**1999 N = 148 n (%)**	**2003 N = 213 n (%)**	**2005 N = 190 n (%)**
Anti-platelet drugs	94 (67)	139 (75)	118 (74)	108 (73)	160 (75)	154 (81)
Statins	19 (13)	80 (43)	87 (55)	20 (14)	82 (39)	96 (51)
Blood pressure lowering drug (any) *	86 (61)	130 (70)	116 (73)	75 (51)	120 (56)	116 (61)
Any 1 blood pressure lowering drug	52 (37)	67 (36)	50 (31)	50 (34)	55 (26)	54 (28)
2 or more blood pressure lowering drugs	34 (24)	63 (34)	66 (41)	25 (17)	65 (30)	62 (32)
Combination treatment (antiplatelet, blood pressure lowering and statin)	9 (6)	51 (27)	50 (31)	17 (11)	54 (25)	67 (35)

* Blood pressure lowering drug includes any of - thiazides, diuretics with potassium, beta-blockers, drugs affecting the rennin-angiotensin system and other antihypertensives, and calcium channel blockers

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Table 2

Determinants of medication use in cerebrovascular disease (stroke and TIA) patients in 2005

	N (%)	Anti-platelet drugs		Blood pressure lowering drugs*		Statins	
		n (%)	Prevalence ratio (95% CI)	n (%)	Prevalence ratio (95% CI)	n (%)	Prevalence ratio (95% CI)
Age							
Younger	168 (48)	137 (82)	1.00	116 (69)	1.00	108 (64)	1.00
Older	181 (52)	135 (75)	0.91 (0.82, 1.02)	116 (64)	0.93 (0.79, 1.08)	75 (41)	0.64 (0.52, 0.79)
Social class							
Non-manual	177 (51)	143 (81)	1.00	122 (69)	1.00	95 (54)	1.00
Manual	167 (49)	127 (76)	0.94 (0.84, 1.05)	107 (64)	0.93 (0.79, 1.08)	86 (52)	0.96 (0.78, 1.17)
Region							
North	112 (32)	91 (81)	1.00	69 (62)	1.00	61 (54)	1.00
South	237 (68)	181 (76)	0.94 (0.84, 1.05)	163 (69)	1.12 (0.94, 1.32)	122 (51)	0.95 (0.77, 1.17)
Time since diagnosis							
<5 years	151 (43)	121 (80)	1.00	100 (66)	1.00	83 (55)	1.00
5-10 years	109 (31)	88 (81)	1.00 (0.89, 1.14)	72 (66)	0.99 (0.84, 1.19)	56 (51)	0.93 (0.74, 1.18)
>10 years	89 (26)	63 (71)	0.88 (0.76, 1.03)	60 (67)	1.02 (0.85, 1.22)	44 (49)	0.89 (0.69, 1.16)
Disability							
No	198 (57)	157 (79)	1.00	126 (64)	1.00	106 (54)	1.00
Yes	151 (43)	115 (76)	0.96 (0.86, 1.08)	106 (70)	1.10 (0.95, 1.28)	77 (51)	0.95 (0.78, 1.17)
Type of vascular disease							
Stroke	159 (46)	118 (74)	1.00	116 (73)	1.00	87 (55)	1.00
TIA	190 (54)	154 (81)	1.09 (0.97, 1.22)	116 (61)	0.84 (0.72, 0.97)	96 (51)	0.92 (0.76, 1.13)
Coronary heart disease							
No	234 (67)	177 (76)	1.00	143 (61)	1.00	104 (44)	1.00
Yes	115 (33)	95 (83)	1.09 (0.98, 1.22)	89 (77)	1.27 (1.09, 1.46)	79 (61)	1.55 (1.28, 1.87)

*Blood pressure lowering drugs include - thiazides, diuretics with potassium, beta-blockers, drugs affecting the rennin-angiotensin system and other antihypertensives, and calcium channel blockers