

Amaurosis Fugax in a Danish Community: A Prospective Study

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A prospective study of amaurosis fugax was carried out in a Danish community (population 481,000); case ascertainment was based on the collaboration of practicing ophthalmologists and general practitioners. Over a 3-year period we registered 131 cases; the annual incidence of "first amaurosis fugax episodes coming to medical attention" was 8.6 and 6.2 per 100,000 population for men and women, respectively. On the basis of a comparison of the age-incidence curves for cerebral and retinal ischemic attacks, the "true" incidence of amaurosis fugax is estimated to be approximately 14/100,000/yr, or 25–30% of the reported incidence of transient ischemic attacks. Clinical and/or radiologic signs of a carotid lesion on the appropriate side were present in 56% of the patients, and an additional 27% had symptoms or signs of other organic cardiovascular disorders. Forty-three (68%) of the 63 patients who underwent arteriography had an atheromatous lesion apparently amenable to carotid endarterectomy. In spite of the case-finding procedures employed in the study, cases of amaurosis fugax suitable for carotid surgery were thus ascertained at a rate of only 3/100,000/yr. This suggests that surgical treatment of patients with retinal ischemic attacks is of minor importance as a preventive measure against stroke in the community. (*Stroke* 1988;19:196–199)

Nearly all previous studies of amaurosis fugax have been based on patients referred to departments of neurology or vascular surgery.^{1–16} In the absence of community studies of this type of ischemic attack, little is known about the number and clinical characteristics of those patients with amaurosis fugax who are not routinely referred to a hospital.

In particular, we do not know the number of such patients who might be suitable candidates for carotid surgery. The lack of such knowledge prompted our present study of amaurosis fugax cases coming to medical attention in a representative Danish community.

Subjects and Methods

Study Area and Population

Northern Jutland is a geographically well defined and administratively independent Danish county with an area of 6,172 km² (Figure 1) and a population of 480,000. There are 190 general practitioners in the district and 10 hospitals. Departments of neurology and ophthalmology are present in only the two largest hospitals (in Aalborg and Hjørring). In addition, 15 ophthalmologists are in private practice. The Danish health care system stipulates that all medical service provided within the home county is easily accessible and free of cost to the patients, whereas hospital treatment outside the county meets with certain administrative and financial barriers; admission to hospitals in neighboring counties is therefore very unusual. Any citizen is free to consult an ophthalmologist without being referred by his own doctor.

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Case Ascertainment

Registration started on January 1, 1982. Patients were recruited in close collaboration with the ophthalmologists in private practice, all of whom agreed to refer every new case of amaurosis fugax, irrespective of the age and general condition of the patient, to one or another of the participating departments. Further, among routine admissions to the hospitals we made a continuous search for patients who gave a history of monocular visual disturbances, even if the patients were admitted for other reasons. We notified all the general practitioners of our study, using every opportunity to encourage referral of any case of suspected amaurosis fugax. Throughout the study period we repeatedly checked the sources of information.

Definition

Amaurosis fugax, or transient monocular blindness, is defined as an episode of partial or complete loss of vision in one eye lasting <24 hours. Visual obscurations (lasting a few seconds) were not counted as amaurosis fugax.

Diagnostic Evaluation

The clinical assessment included a systematic history, neurologic and ophthalmologic examinations, recording of blood pressure and arterial bruits, and routine laboratory tests. In addition, patients admitted to Aalborg Hospital underwent clinical cardiologic examination and echocardiography.

Cerebral angiography was performed on patients who were considered candidates for vascular surgery. With few exceptions, the Seldinger technique was used, with views taken in at least two planes. The carotid lesions demonstrated by angiography were graded as 1) irregularity of the vessel wall, with or without visible ulceration; 2) stenosis, with at least 25% reduction of the lumen; or 3) occlusion.

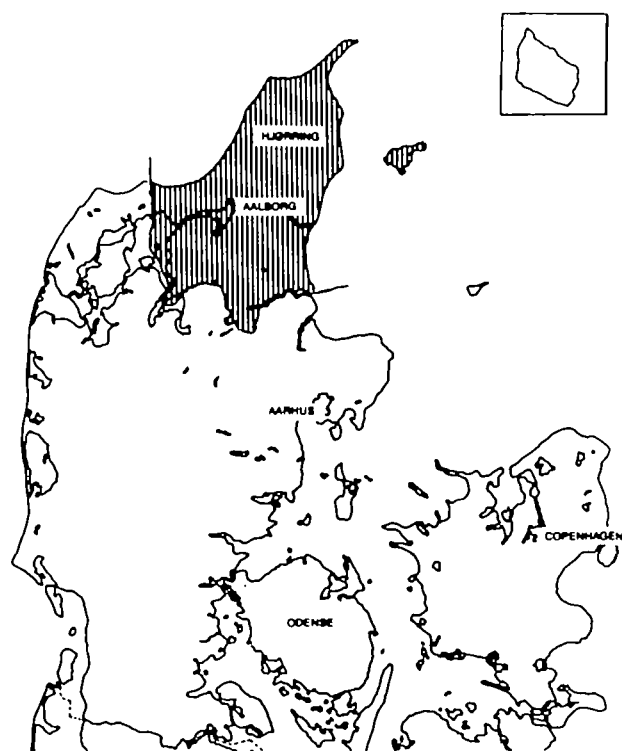


FIGURE 1. Map of Denmark, showing the study area (cross-hatched).

Statistical Methods

For the calculation of incidence rates we used population data from the 1983 Danish census. Confidence intervals were calculated using Poisson distribution probabilities.

Results

During the period 1982–1984 we registered 131 patients with visual episodes conforming to the above definition of amaurosis fugax. There were 75 men and 56 women; their mean ages were 61.1 and 61.2 years, respectively (range 15–82 years).

Incidence Rates

The incidence rates were calculated using only the 107 patients who had their first visual episode during the study period. Within the age range 25–84 years the average annual incidence rate per 100,000 population was 13.7 for men (95% confidence interval 10.5–17.6) and 9.4 for women (6.8–12.6). For the whole population (all ages) the rates were 8.6 and 6.2, respectively. The incidence rises steeply with age, peaks in the seventh decade, and falls in the very old (Table 1, Figure 2). Except at ages 35–44 years, the rates in every age group were higher for men than for women; because of the relatively small number of patients, however, the confidence intervals are wide. No difference was found between rates in rural and urban areas.

Clinical Profile and Arteriographic Findings

The basic data for the total series of 131 patients are presented in Table 2. Associated cardiovascular dis-

TABLE 1. Average Annual Incidence Rates for Amaurosis Fugax (First Episode Only) per 100,000 Population, 1982–1984

Age (years)	No. of cases/No. at risk		Rate (no./100,000/yr)		
	Men	Women	Men	Women	Total
25–34	3/34,375	0/32,923	2.9	0	1.5
35–44	4/35,491	4/33,820	3.8	3.9	3.8
45–54	8/25,866	5/26,019	10.3	6.4	8.4
55–64	19/24,861	12/26,382	25.5	15.2	20.2
65–74	23/20,202	18/22,531	38.0	26.6	32.0
75–84	5/10,152	5/14,210	16.4	11.7	13.7
Total	62/150,947	44/155,885	13.7	9.4	11.6
All ages	62/240,261	45/241,702	8.6	6.2	7.4

orders, in particular ischemic heart disease (25%), hypertension (24%), and claudication (20%), were common. Previous cerebral transient ischemic attacks (TIAs) were reported by 19% of the patients, stroke by 8%. Forty-nine (65%) of the men and 33 (60%) of the women gave a history of at least one of the diseases listed in Table 2.

The cardiologic findings, which will be reported in detail elsewhere, may be summarized as follows: 39 of 70 patients (56%) had either clinical or echocardiographic signs of structural heart disease, including 15 cases of aortic valve disease and two of atrial fibrillation or flutter. Only one patient was found to have mitral valve prolapse.

Carotid bruits were present in 59 patients, ipsilateral to the affected eye in 34 cases, contralateral in 7, and bilateral in 18.

Arteriography was performed on 63 patients, of whom 50 (79%) had a lesion of the appropriate carotid artery. Table 2 shows that 43 patients had a surgically

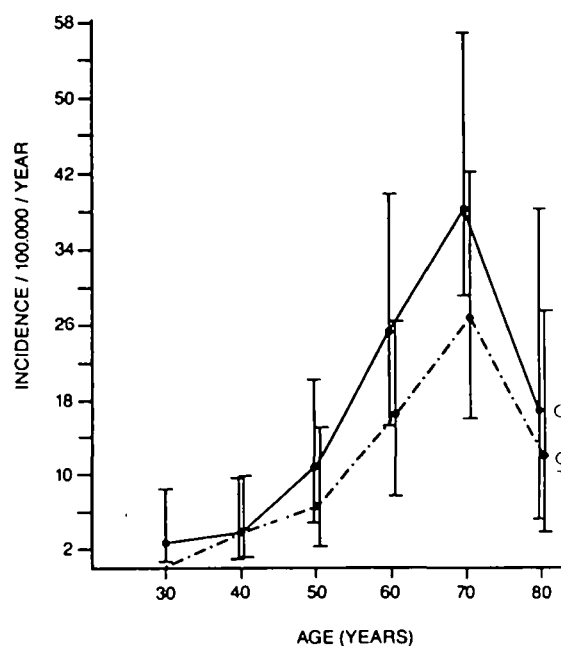


FIGURE 2. Age- and sex-specific annual incidence rates for amaurosis fugax. Vertical bars indicate 95% confidence intervals.

TABLE 2. Clinical Features and Angiographic Findings in Patients With Amaurosis Fugax

	Men (n = 75)		Women (n = 56)	
	No.	%	No.	%
Preceding cardiovascular disorders				
Ischemic heart disease*	22	29	11	20
Hypertension	16	21	16	29
Claudication	12	16	14	25
Cerebral transient ischemic attack	15	20	10	18
Stroke	5	7	5	9
Mean blood pressure (mm Hg)	157/91		164/90	
Cervical bruits on relevant† side	33	44	26	46
Angiographic appearance of relevant† carotid artery				
Number	40		23	
Normal	5	13	8	35
Irregularity	13	32	4	17
Stenosis	18	45	8	35
Occlusion	4	10	3	13

*Previous myocardial infarction or angina.

†Ipsilateral to recent visual episode.

accessible carotid lesion, that is, either a stenosis or an irregularity of the vessel wall. Altogether, 74 patients (59% of the men, 54% of the women) had clinical signs (bruits) or angiographic evidence of an ipsilateral carotid lesion. Of the remaining 57 patients, 35 had symptoms or signs of other vascular disorders (previous cerebrovascular episodes, heart disease, claudication, or hypertension). This left only eight men and 14 women without clinical evidence of organic vascular disease. Five of these patients, one man and four women, gave a history of migraine.

Discussion

We found the average annual incidence of amaurosis fugax (first episodes) in the study population to be 7 per 100,000. Directly comparable figures are lacking since all previous incidence studies of ischemic attacks were concerned with TIAs as a whole, without distinguishing between cerebral and retinal episodes. In five such studies¹⁷⁻²¹ the incidence rates for first TIAs were 35-50/100,000/yr, that is, 5-7 times the rate for amaurosis fugax we found in our study. A similar TIA: amaurosis fugax ratio was found in the Oxfordshire Community Stroke Project (M. Dennis, personal communication).

The rates we observed in our study, as in those referred to above, are not genuine incidence rates, but rather "first ischemic episodes coming to medical attention" rates.²⁰ We have no information about patients who may have had visual episodes without consulting a doctor. Particularly in elderly, incapacitated people, an episode of blurred monocular vision, less alarming than an attack of hemiparesis, may well be ignored. The point is illustrated by Figure 3, which, on a semilogarithmic scale, shows an exponential rise of the incidence of amaurosis fugax until the age of 60 years, followed by a deflection of the curve, and finally a decline; in contrast, the rates for TIA observed in three community studies rise exponentially throughout the age range.

Assuming that this difference merely reflects incomplete ascertainment of visual episodes in the aged

population, the "true" incidence of amaurosis fugax in the eldest age groups can be estimated by extending the rectilinear part of the graph beyond age 60 years (broken line in Figure 3). The estimated rates at ages 70 and 80 years, as read off the vertical axis, will then be about 50 and 125, respectively. When these rates, instead of the original ones, are used in the calculation of the rate for all ages combined, the result is an overall incidence of 14/100,000/yr, or twice the observed rate.

The clinical characteristics of the present series are in accordance with the view that amaurosis fugax, like carotid TIA in general, is often caused by embolism, the source being the internal carotid artery or, less frequently, the heart.²² Clinical and/or angiographic signs of a carotid lesion ipsilateral to the visual episode were thus demonstrated in 56% of our patients, and a number of such lesions may also have been present in those patients who, mainly because of major medical risk factors, did not undergo arteriography. As to the

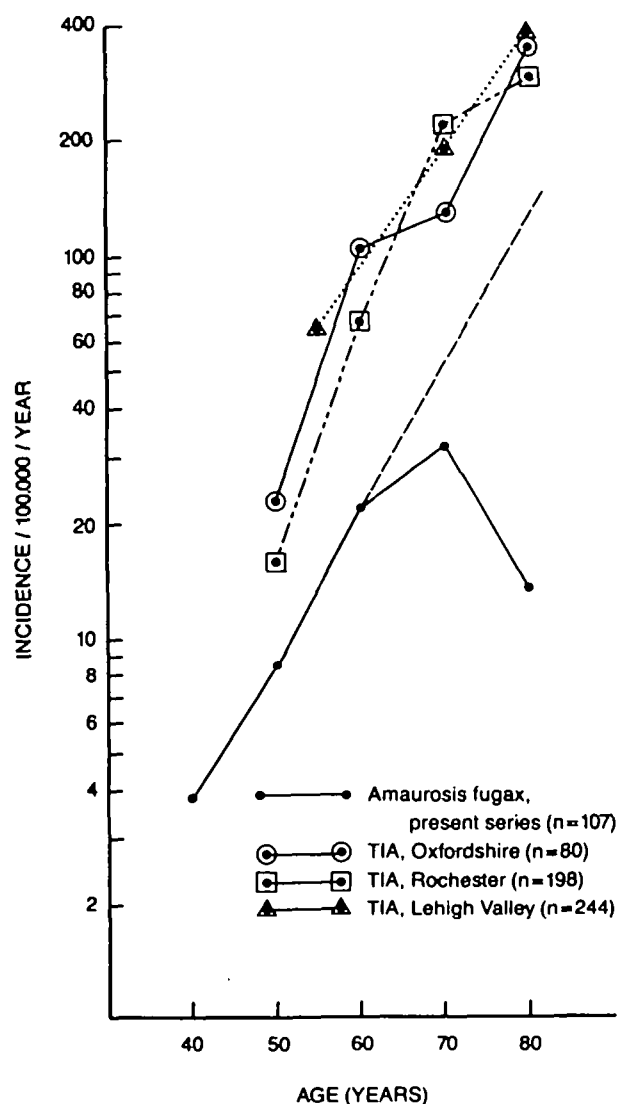


FIGURE 3. Age-specific incidence rates for amaurosis fugax (present series) compared with incidence rates for transient ischemic attack (TIA) in three previous studies (References 17, 20, and 21). Logarithmic scale.

possibility of emboli from the heart, cardiologic examination demonstrated valvular abnormalities in 16 of the 70 patients examined, but direct echocardiographic evidence of cardiogenic thromboembolism was absent. In two series of patients with TIA (including amaurosis fugax), potential sources of embolism from the heart were found in 20–30%.^{14,23}

Of the 63 patients who underwent arteriography, 43 (68%) had an ipsilateral lesion apparently accessible to endarterectomy, that is, stenosis or irregularity of the proximal internal carotid artery wall. Almost identical percentages of operable lesions were reported by some workers,^{2-4,12} whereas others found proportions in the range 35–55%.^{1,7,9,10,16} These differences may merely reflect variations in referral patterns and indications for angiography.

According to our results, the number of patients with amaurosis fugax who are suitable candidates for carotid endarterectomy does not exceed 3 per 100,000 population per year. This means that carotid surgery in this category of patients, even if beneficial in the individual case, is of minor importance as a preventive measure against stroke in the community.

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KEY WORDS • Denmark • epidemiology • amaurosis fugax