Disease in the Elderly

Peripheral vascular disease – the geriatrician's tale

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Summary: One hundred and twenty four elderly patients with peripheral vascular disease were seen by a geriatrician over a period of just under 4 years. Half of them presented with critical ischaemia and had not been previously known to have peripheral vascular disease. Two-thirds were shown to have bilateral disease; 14.5% of the series developed manifestations of the condition during the course of acute systemic illnesses and in 5 cases this was almost certainly, and in several more probably, due to haemodynamic crises. A third were dead within 3 months and so far a further 18.5% are known to have died within 2 y of first encounter. Of those who survived 3 months, at least 37% required treatment for persistent rest pain or had skin ulceration or necrosis, or had developed gangrene or come to amputation. Only 5 patients, after investigation, underwent successful limb salvage procedures. Peripheral vascular disease in old people is common, is likely to continue to be so, carries a dismal prognosis, and appears on the evidence presented here to be under-suspected until an advanced stage in the disease. Those dealing with the aged must be constantly on the alert for it since it calls for scrupulous care of the feet and for especial vigilance during acute systemic illness.

Introduction

Many hospital departments are highly specialized and principally welcome patients who may be helped by the techniques they offer. Geriatric medicine is that paradox, a very general specialty; patients are only selected by age and severity of illness. A review of peripheral vascular disease of the legs (Wake & Mansfield, 1980) perpetuates the tradition that the majority of patients are male, virtually all are cigarette smokers, and that intermittent claudication is the commonest presenting symptom. Although the prevalence of the disease increases with age (Kannel *et al.*, 1970), the received wisdom is based on classic reports of series of patients who are not particularly old by today's standards (Juergens *et al.*, 1960). Much of the literature is concerned with the results of specific treatments and is thus confined to a limited range of subjects. The picture generally presented is somewhat at variance with my own experience of the disease, which I report because it may be more representative of peripheral vascular disease in the UK today. The patients I see are only selected by their age and by their presentation which did not automatically suit them for referral to the vascular surgeon.

Methods

Between 1 September 1980 and 31 July 1984 I saw 124 patients with peripheral vascular disease during the course of a geriatric practice with inpatient, outpatient and liaison responsibilities. My estimated total work load over this period would have been 3,600 admissions and 400 new outpatient referrals – 4,000 patients altogether.

Some of the patients had clearcut evidence of lower limb ischaemia in one of its more typical guises, and others aroused suspicion on account of less pathognomonic features. They were all fully assessed clinically, and in order to confirm the diagnosis, the ankle systolic pressure was measured by Doppler ultrasound and compared with the higher of the two brachial systolic pressures measured by the same technique. The ratio of the ankle systolic pressure to the brachial pressure is known as the pressure index (PI). A PI below 0.97 is often taken as indicating occlusive disease severe enough to reduce distal pressure (Padayachee *et al.*, 1984). In order to avoid 'false positives' and to include only those with unequivocally significant disease, a PI of 0.75 was adopted as the lower limit of normal as this is the lowest quoted by any authority encountered (Lennihan & Mackereth, 1973). Rest pain or necrotic, ulcerating, or pregan-

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grenous skin lesions were defined as constituting critical ischaemia. This clinical definition was preferred to one couched in terms of the ankle pressure, since, although a pressure below 60 mm Hg is generally regarded as critical, a higher reading is sometimes found (Carter, 1983).

Outpatients were followed up where appropriate. Inpatients were followed up in the clinic after discharge unless their symptoms did not warrant it or they were inconvenienced by the visit to hospital. Those referred to a vascular surgical team were in most cases referred back following completion of treatment. In all cases not under regular review, the case notes were examined at the conclusion of the study to ascertain whether the patient had been admitted, operated on, or died, and in those patients lost to follow-up the general practitioner was contacted by letter and asked for the current situation.

The patients

There were 68 women and 56 men (confirming a relative male preponderance) with a mean age of 80.2 years and a range of 61 to 98 years. Twenty-four (19%) were clinically diabetic and the remainder were either non-diabetic or had equivocal evidence of impaired glucose tolerance at some stage. In general, it was not useful to distinguish between diabetics and non-diabetics, since, judging from the Doppler pressure studies, the former all had large vessel disease. Some of them clearly had small vessel disease as well since the highest ankle pressures associated with non-healing of ischaemic skin lesions and with progression of claudication to critical ischaemia were both seen in diabetics (130 and 120 mm Hg, respectively). Although a low PI is indicative of occlusive disease of major arteries, for a given PI the clinical picture is

often worse in diabetics because of additional small vessel involvement (Carter, 1972).

Fifty-seven (46%) were practising or reformed smokers, 45 (36%) regarded themselves as non-smokers, and in 22 the information was unreliable or difficult to interpret. In 43 (35%) there was evidence of a stroke before or during the study.

The presenting clinical features of the current episode of peripheral vascular disease are given in Table I, and where these are simply described as critical ischaemia it indicates that there was no earlier history of intermittent claudication to distinguish this group from those with critical ischaemia developing against a background of claudication. In exactly half the patients, critical ischaemia was the first manifestation of their disease. Three patients presenting with painful ischaemic events related the onset of their symptoms to treatment from a chiropodist. A further 5 patients presenting with critical ischaemia during acute hospital admission for major medical reasons had well documented hypotensive episodes and many others had illnesses liable to produce haemodynamic crises affecting perfusion (heart failure, myocardial infarction, arrhythmia). This occasionally resulted in the sudden onset of ischaemic manifestations in the feet being regarded as embolic: in such patients as are reported here, vascular disease was confirmed by arteriography, operation, or post-mortem.

In all but 20, there was clear evidence of lower limb ischaemia such as pain at rest or on walking, non-venous ulceration, skin necrosis or gangrene. Table II demonstrates that in the large majority (66%) the disease was bilateral.

Outcome

Almost a third were dead within 3 months of initial

Table I Clinical presentation of peripheral vascular disease in 124 patients

<i>Clinical features</i>	<i>Number of patients</i>	<i>(%)</i>	<i>Number dead within 3 months</i>
Presents with critical ischaemia (rest pain, ischaemic ulcers, skin necrosis)	44	(35.5)	13
Critical ischaemia presenting during course of serious systemic illness	18	(14.5)	13
Claudication progressing to critical ischaemia	13	(10.5)	5
Claudication	20	(16)	2
Infection of foot or leg	6	(5)	1
Past history or physical signs suggest peripheral vascular disease	9	(7)	2
Atypical but suspicious symptoms	8	(6.5)	2
Heel sore	6	(5)	4

Table II The state of the contralateral leg in 124 patients presenting with peripheral vascular disease

	<i>Number of patients</i>	<i>%</i>	<i>Number of diabetics</i>
Clinically normal and $PI^* > 0.75$	26	(21)	5
Presenting with bilateral disease clinically	29	(23)	5
Other leg asymptomatic but $PI < 0.75$	38	(31)	4
Previously amputated	10	(8)	5
Unchecked but clinically normal	16	(13)	4
Clinically normal but treated earlier for disease or subsequently became diseased	5	(4)	1
Total	124	100	24

*Pressure index (see text)

examination (41% of those with critical ischaemia, 22% of the remainder) (Table I). Death was due to unrelated causes in 20 of the 31 patients with critical ischaemia and 9 of the 11 with other manifestations of the disease, and was mostly from the other serious cardiac or pulmonary conditions previously mentioned. Specialized surgical advice was immediately requested in all 43 consenting new patients who had severe symptoms but who were not terminally ill. Those selected for further investigation and treatment had all presented with critical ischaemia apart from two (diminishing claudication distance and infection). It was left to the surgeon to refer the patient to an anaesthetist with a view to lumbar chemical sympathectomy when pain was persistent or skin lesions failed to heal but arteriography demonstrated diffuse disease. Figure 1 shows the outcome in 34 subjects who presented with critical ischaemia but who were otherwise sufficiently well: 4 were referred to me by the surgeon for medical treatment, rehabilitation, or long

term care, and the other 30 were referred to the vascular surgeon by me and were thought to warrant further investigation and treatment.

The results of lumbar sympathectomy are notoriously subjective since the only hard end points are healing of ulcers on the one hand or amputation on the other, so those given are a best estimate and a favourable response might indicate relief of rest pain. The amputations were generally above knee, only 2 being below knee. Tables III and IV illustrate the outcomes in the 3 month survivors at the end of the study, and include patients sent to me either by the general practitioner or the surgeon during the current illness.

Discussion

Peripheral vascular disease is well known to occasion a great deal of pain, distress, dependency and death

Figure 1 Flow-chart illustrating procedures performed on 34 patients with critical ischaemia selected for intervention (8 died within 3 months).

Table III Outcome at end of study in 44 patients presenting with critical ischaemia and surviving 3 months

Improved following sympathectomy	6
Improved spontaneously	5
Failed to improve or progressed following sympathectomy	7
Progressed untreated	8
Amputation	11
Successful salvage procedure	5
Lost to follow-up	2

among persons of advanced age. It is clearly a common condition and is likely to remain so with increasing numbers of people over the age of 75. Despite the relative male preponderance, this series contained more old women than men because there are over twice as many 80 year old women as men.

It is well recognized how frequently in this age group peripheral vascular disease presents with critical ischaemia with no history of claudication, because the subjects have often been relatively immobile. Thin, shiny, hairless skin over the extremities and brittle, dull opaque nails often occur in old age (Hanna & MacMillan, 1978) and may easily be disregarded. Unsuspected peripheral vascular disease may be unmasked by trauma, and chiropodists should be alert to the possibility of asymptomatic but serious disease in their patients. It is sometimes acknowledged that acute ischaemia in patients with advanced atherosclerosis may be precipitated by other factors leading to thrombosis such as associated heart failure, hypovolaemia or myeloproliferative disorders (Lusby & Wylie, 1983). It remains insufficiently appreciated how commonly ischaemia of the foot follows a hypotensive episode and this situation is closely analogous to the hypotensive stroke (Mitchinson, 1980). Medical students and junior doctors should also be strongly disabused of the widely quoted belief (de Bono, 1983) that impalpable foot pulses are insignificant in old people – it is a common finding but a potentially serious one.

It should also be stressed that almost the most important aspect of the assessment of these patients is the examination, preferably including Doppler

ultrasound if the foot pulses are absent, of the other leg. In somewhat younger subjects, it was found that 50% of amputees were likely to come to contralateral amputation by 24 months (Bodily & Burgess, 1983). Of 24 out of the present series who presented with critical ischaemia bilaterally or with a previous amputation, 11 were dead within 3 months and 10 retained unhealed skin lesions or rest pain until the end of the study. It is probably due to reluctance to inflict a second amputation on an 80 year old with the object of prolonging life that only one of this series became a double amputee during the period of observation. In the aged, an equally important consideration is the prolonged rehabilitation required by the amputee with a pressure sore on his remaining heel and the risk of this occurring is enhanced by occult vascular insufficiency. High risk patients need education concerning the necessity of foot warmth and hygiene and meticulous care of the nails. Their doctors need education concerning prompt and effective treatment of infections or trauma of the foot, and the value of sheepskin pads under the heels during any period of bed rest.

Although it may be of value in confirming the diagnosis of peripheral vascular disease, neither the absolute ankle pressure nor the PI were found to be particularly helpful in predicting the outcome in this series, since the overlap between values associated with viability and non-viability was considerable. Raines *et al.* (1976) found that a pressure of 60 or 70 mm Hg represented the dividing line for viability.

It is a distressing vindication of the pessimistic view often taken of this disease that definitive salvage procedures were only considered feasible in 6 of these patients (in one of whom it was unsuccessful) and that, of those presenting with critical ischaemia, 41% died within 3 months and (so far) 64% within 2 years. It is nevertheless recognized (Tracy, 1983) that not all patients with critical ischaemia go on to amputation when treated without operation, and 10 out of 45 survivors with critical ischaemia improved with conservative management compared with 28 out of 38 with less severe disease who improved or stayed the same.

Five of the 11 patients with a disappointing response to sympathectomy were diabetic, and it is possible that these patients had already undergone sympathectomy by autonomic neuropathy. Alternatively it may be that small vessel disease precludes worthwhile vasodilatation. Phenol sympathetic block is a fairly minor procedure and well tolerated, so a minority of favourable responders can be said to justify its use. Nevertheless, reconstructive surgery or angioplasty offer the best chance of limb salvage in critical ischaemia, and an aggressive approach to this illness is warranted.

Table IV Outcome at end of study in 38 patients presenting with non-critical ischaemia and surviving 3 months

Symptoms unchanged or improved	28
Lost to follow-up	7
Critical ischaemia or gangrene	2
Amputation	1

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