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TEMPORAL ARTERITIS*†

BY

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ALTHOUGH temporal arteritis was first described by Hutchinson (1890) over 70 years ago, it received scant attention until shortly before the second world war. Since then a vast literature on the disease has accumulated and it has become recognized as a common disorder. Despite increasing knowledge of its pathology and clinical manifestations its causation remains completely unknown. For reasons unexplained it is a disease of those in their later years, and the trend towards a longer life span which has been evident during the past three decades has probably resulted in a real increase in incidence, but most of the apparently greater frequency of the disease doubtless stems from more accurate diagnosis through increasing awareness of the condition and more widespread knowledge of its clinical features.

Present Investigations

This communication is based on 72 cases observed by the authors during the past 15 years.

Age and Sex Incidence.—The mean age of the 72 patients included in this study was 71 years (range 53 to 83). There was no significant difference in the sex incidence and the age of the males and females was approximately the same. Most of the patients were between 65 and 80 years of age (Table I; Fig. 1).

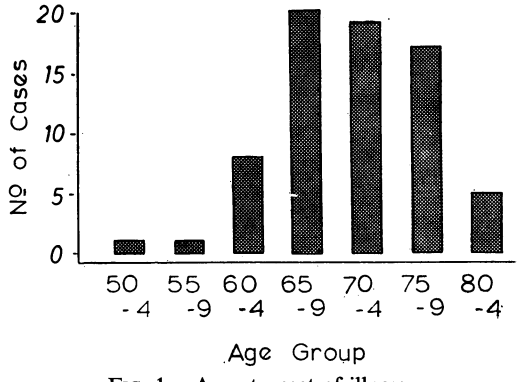

FIG. 1.—Age at onset of illness.

TABLE I

SEX AND AGE DISTRIBUTION

Sex		Male	Female	Total
Age (yrs)	Mean	71·81	70·44	71·06
	Range	55–83	53–80	53–83
Total No. of Cases		33	39	72

* Based on the Middlemore Lecture for 1961 given by A. G. W. Whitfield.

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Pathology.—The *post mortem* examinations and arterial biopsies performed on patients in this series have shown an exactly similar arterial pathology to that described by other writers. It comprises a round cell infiltration around the vasa vasorum in the adventitia, a replacement of the media by granulation tissue, and its infiltration with plasma cells, lymphocytes, large mononuclear, and giant cells, a disappearance of the elastic laminae, and an acellular thickening of the intima which produces marked reduction of the lumen of the artery and is often associated with thrombosis. As the arteritis subsides the inflammatory reaction becomes less evident and fibrosis supervenes with virtual closure of the arterial lumen.

Although the name and often the clinical features suggest that the disease is limited to the temporal arteries, Cooke, Cloake, Govan, and Colbeck (1946) pointed out that the arteritic process is generalized; necropsies on their cases showed involvement of the aorta, and of the coronary, cerebral, subclavian, femoral, mesenteric, and radial arteries.

Many subsequent reports have confirmed that, though the brunt of the disease tends to be borne by the carotid arteries and their branches, any part of the arterial system may be affected (Heptinstall, Porter, and Barkley, 1954; Harrison, Harrison, and Kopelman, 1955; Lander and Bonnin, 1956; Paulley and Hughes, 1960). The cases series here reported fully accords with these findings. There were numerous examples of coronary and cerebral artery involvement, three cases of aortic aneurysm, and instances of aneurysm of the subclavian and axillary arteries and of intermittent claudication.

In order to give nominal recognition to the generalized nature of the disease it has been suggested that it would be more suitably termed "arteritis of the aged" but the name "temporal arteritis" had become sanctioned by usage and any change in nomenclature would tend to confusion and misunderstanding.

Clinical Features.—Fig. 2 shows the first symptom in each of the 72 patients.

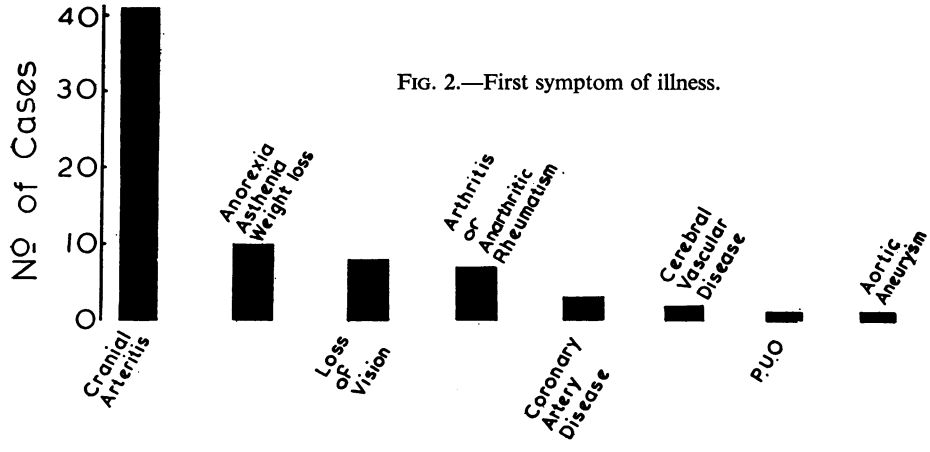

FIG. 2.—First symptom of illness.

It will be seen that in over half the cases the arteritis was cranial. This was either temporal or occipital or both, but it was more commonly temporal—unilateral in some patients and bilateral in others. Where both sides were affected the involvement was in most instances concurrent but in a few consecutive. It produced very severe head pain in the area involved by the arteritic process and usually persisted for some weeks. The pain was sufficient to prevent sleep and the scalp was so tender in some patients that brushing and combing the hair was impossible and even laying the affected side of the head on the pillow was uncomfortable. Many patients with temporal arteritis found mastication painful. The inflammatory thickening of the temporal arteries was very striking, particularly in those with scanty hair and was often noticed by friends and relations (Fig. 3). Pulsation in the affected arteries was in most patients diminished or absent and when the cranial arterial involvement was severe and widespread the scalp showed areas of ischaemic ulceration (Fig. 4). In one seventh of the group a period of anorexia, asthenia, and weight loss preceded all other symptoms, and a general failure of health of this type in an aged individual should always suggest temporal arteritis as a possible diagnosis. In eight patients visual symptoms were the first manifestation and the fact that they may occur before all other features of the disease must be emphasized. Polyarthritis or anarthritic rheumatism was another common initial clinical picture and seven patients presented in this way. The first symptom in the remainder was unexplained pyrexia, coronary or cerebral vascular episodes, or disease of other arteries.

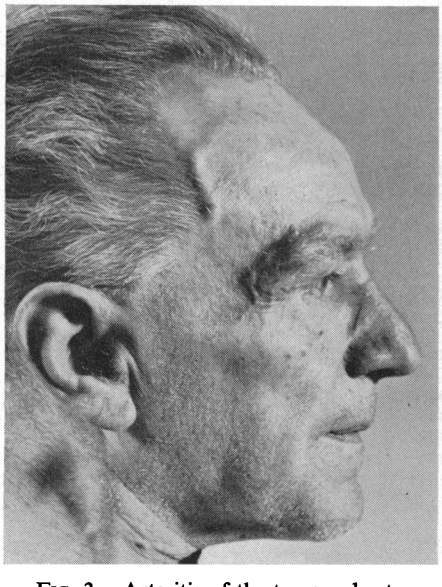

FIG. 3.—Arteritis of the temporal artery.

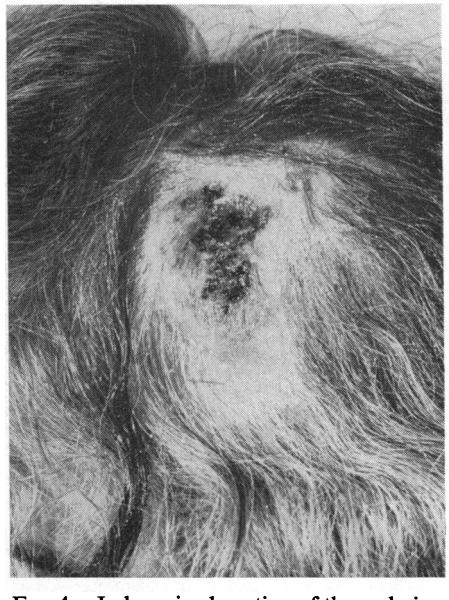

FIG. 4.—Ischaemic ulceration of the scalp in a patient with severe and widespread cranial arteritis.

In due course almost all the patients developed other features of the disease; Fig. 5 shows that all but two of the group showed cranial arteritis at some stage of their illness and 49 of them had visual symptoms of some sort.

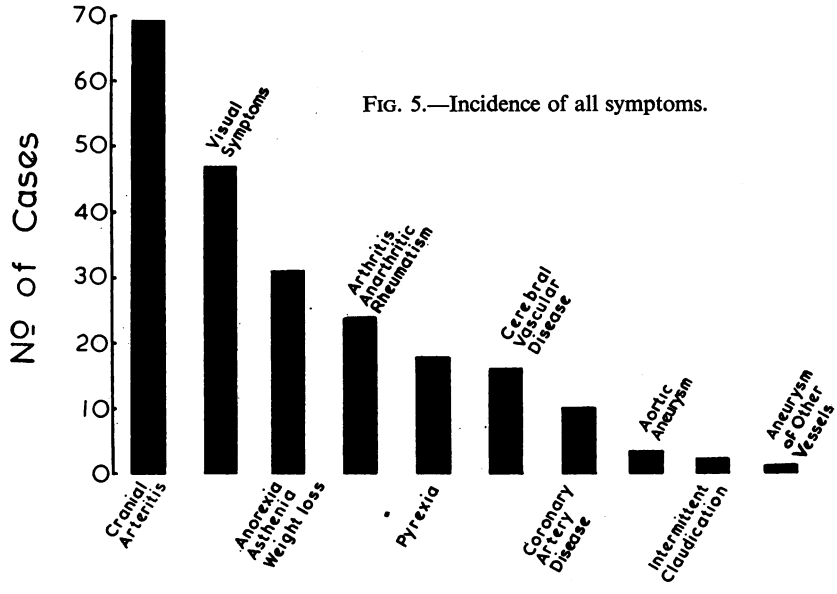

FIG. 5.—Incidence of all symptoms.

This incidence of ocular involvement is probably higher than occurs in all cases of the disease as many of the patients were seen at the request of ophthalmological colleagues who sought our co-operation in their care, and in consequence an abnormal number with visual symptoms is probably included in this series. It is difficult to know how high the incidence of ocular complications actually is, but the literature suggests that they occur in one third to one half of all cases (Table II).

TABLE II

INCIDENCE OF OCULAR INVOLVEMENT RECORDED IN THE LITERATURE

Authors	Date	Percentage Ocular Involvement
Kilbourne and Wolff	1946	33
Andersen	1947	40
Harrison	1948	33
Migone and Mortara	1949	55
Cardell and Hanley	1951	38
Roux	1954	50
Heptinstall, Porter, and Barkley	1954	57
Wagener and Hollenhorst	1958	44
Ross Russell	1959	46
Paulley and Hughes	1960	39

Nearly half the patients showed general failure of health, with anorexia, asthenia, and weight loss, and in a quarter pyrexia was a feature, often with drenching night sweats. Polyarthritis or anarthritic rheumatism was present in a third of the patients. In two cases a disabling polyarthritis of rheumatoid type (but without rheumatoid factor in the serum) developed after the other features of the disease had receded. In one of the two it persisted until death from myocardial infarction 18 months after the onset of illness, and in the other it has been present for about a year at the time of writing and shows no sign of improvement. One quarter of the group developed evidence of cerebral vascular disease and one sixth of coronary artery disease. Symptoms due to involvement of other major arteries were present in seven patients and three showed mental confusion. The psychiatric disturbances reported by other writers cannot always be attributed to cerebral arteritis (Migone and Mortara, 1949; Vereker, 1952; Paulley and Hughes, 1960).

Haematological Findings.—Over half the group showed some degree of normocytic, normochromic anaemia which in many cases had proved unresponsive to iron, folic acid, and vitamin B_{12}. In the majority of those with subnormal counts the anaemia was moderate but in a few it was severe (Table III). It improved spontaneously as the disease became inactive or when it was controlled by steroid therapy. The total white count was increased by a polymorphonuclear leucocytosis in three-fifths of the patients, but only a minority showed counts in excess of 15,000 per c.mm. Several patients who had normal white cell counts when first seen developed considerable polymorphonuclear leucocytosis after steroid therapy had been instituted, though in every other way steroids appeared to be controlling their disease satisfactorily. This reaction is seen in the absence of any overt infection in patients receiving steroid therapy for rheumatoid arthritis and other conditions and appears to be without serious significance.

One patient whose disease appeared to have become inactive, apart from a persistently raised sedimentation rate, developed a circulating anticoagulant of anti-haemophilic globulin inhibiting type. It caused severe haemorrhagic episodes but was controlled by steroid therapy and eventually disappeared (Whitfield, Meynell, Fessey, and Hudson, 1962).

TABLE III
HAEMATOLOGICAL FINDINGS

Cells		Haemoglobin Percent.	Percentage Cases
Red (million)	Over 4	80	45
	Under 4	80	47·5
	Under 3	60	7·5
White (1,000)	Under 10		41·5
	10–15		51·2
	Over 15		7·3

Plasma Proteins.—These were normal in about a quarter of the patients, the remainder showing either a low albumin, a high globulin, or both. The globulin increase when present was attributable to elevation of the alpha-2 globulin in half the patients and elevation of both the alpha-2 and gamma fractions in the rest.

Erythrocyte Sedimentation Rate (Fig. 6).—This was normal in 8·7 per cent. of the patients, 15–50 mm. in one hour in 45·7 per cent., 50–100 mm. in 30·4 per cent., and over 100 mm. in 15·2 per cent. The increased rate is largely attributable to the plasma protein changes, particularly the elevation in the gamma fraction, but in a few patients high sedimentation rates were associated with normal serum proteins, and it is presumed that fibrinogen increase also plays a part, but no fibrinogen estimations were carried out on the patients we have studied. However, the fact that steroid therapy rarely reduces the sedimentation rate to normal levels suggests that factors other than gamma globulin increase are to some extent responsible for its elevation.

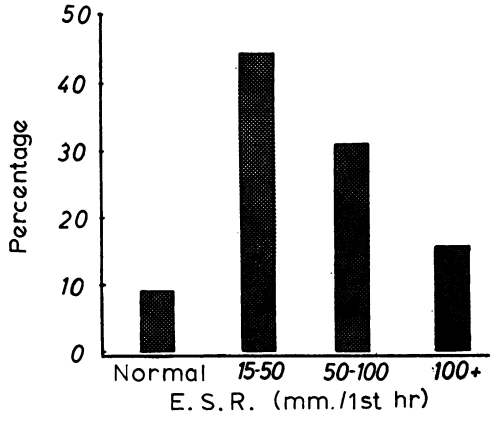

FIG. 6.—Erythrocyte sedimentation rate.

Prognosis

Fifteen (that is approximately one-fifth) of the patients died, apparently as a result of their temporal arteritis. The commonest cause was cerebral vascular disease, which accounted for six of the deaths, three were attributable to myocardial infarction, and two each to congestive cardiac failure, ruptured aortic aneurysm, and pneumonia. In aged people death from degenerative cardiovascular disease is of course extremely common and without careful *post mortem* examination and relevant histology it is impossible to be certain whether the fatal lesion has been caused by temporal arteritis or has been unrelated. Most of the patients died at home and no autopsy was possible, so these figures may not be wholly accurate but they are the best that can be offered.

The duration of the disease is difficult to estimate. The majority of the patients had had symptoms for some months, sometimes for over a year when first seen. Though steroid therapy usually controlled the disease sufficiently to render the patient symptom free, the sedimentation rate almost always remained raised, in three patients for upwards of 3 years, and in many instances relapse occurred on steroid withdrawal often after prolonged therapy. Patients not given steroids were usually ill for at least a year, often for much longer.

Ophthalmic Features

Twenty-three of the 72 patients had no visual symptoms or objective ophthalmic abnormality at any time (Table IV). Of the remaining 49, two showed ptosis and twelve had diplopia. Both these manifestations cleared up completely in days or at the most weeks, but in seven of the patients who had diplopia permanent visual loss developed later. Diplopia was essentially a subjective symptom and only exceptionally was any defect of ocular movement apparent on examination. It arises from arteritic involvement of the branches of the ophthalmic artery supplying the oculomotor nerves and muscles. Transitory loss of vision occurred in eight patients and in three of them it was followed by permanent visual loss. One patient had fifteen or twenty episodes of transitory loss of vision each lasting about a minute every day for a week as the first symptom of temporal arteritis but no permanent damage to sight was sustained. The visual loss may be due to carotid, ophthalmic, or retinal arteritis.

TABLE IV

VISUAL SYMPTOMS

Symptoms			No. of Patients	
None			23	
Ptosis			2	
Diplopia			12 (followed by permanent visual loss in 7)	
Amaurosis Fugax			8 (followed by permanent visual loss in 3)	
Permanent Visual Loss	Total	One eye	3	40
		Both eyes	12	
	Partial	One eye	5	
		Both eyes	16	
	Total in one eye and partial in the other		4	

Forty of the 72 patients sustained permanent visual loss. Twelve lost all vision in both eyes and seven were completely blind in one eye; four of the latter with partial visual loss in the other eye also. Twenty-one others had partial visual loss, sixteen in both eyes and five unilaterally. Visual loss invariably occurred suddenly so that the patient was able to state the day on which it developed. Where both eyes were affected the interval between visual loss on the two sides was usually a matter of days, but in some instances it was months, and occasionally both eyes were affected simultaneously.

Examination of the fundi in some cases showed cotton-wool patches which were believed to be due to local ischaemia of the retina resulting from arteritis of branches of the retinal or posterior ciliary arteries. They usually disappeared within a fortnight. Retinal haemorrhages were frequently seen and where vision had been largely or wholly lost papilloedema was evident in the majority of cases. It did not however become apparent until one or two days after visual loss had been sustained and the disc swelling rarely exceeded 2 dioptres. It subsided in about 2 weeks and was followed by atrophy, the atrophic disc being creamy in colour and the physiological cup somewhat filled in (Whitfield, Cooke, Jameson-Evans, and Rudd, 1953). Less commonly in patients with visual loss the only fundal abnormalities were disc pallor and narrow vessels. Sometimes macular changes were seen and these usually resulted from arteritic narrowing of the posterior ciliary arteries.

Every variety of field defect was encountered. Segmental loss with the apex centrally, which is a common finding, may result from involvement of a branch of the retinal artery or from ischaemia of a segment of the optic nerve. Chiasmal arteritis may produce varying types of field loss, and homonymous hemianopia may result from carotid arteritis producing ischaemic damage to the optic radiations or vertebral arteritis causing infarction of the occipital lobe.

When sight is partially or wholly lost, it is tempting to try to localize the arteritic lesion that is responsible. It may be in the ophthalmic artery, in the retinal artery before it enters the optic nerve or within the optic nerve, in the circle of Zinn arteries, in the posterior ciliary arteries, the chiasmal arteries, or the carotid or vertebral arteries. Homonymous hemianopia strongly suggests that the carotid or vertebral artery is responsible; a pale disc with narrow arteries indicates a lesion of the retinal artery far forward; papilloedema points to involvement of the ophthalmic artery or of the retinal artery further back. Macular lesions indicate arteritis of the circle of Zinn or posterior ciliary arteritis. Such diagnostic accuracy is however of no value to the patient and its futility is demonstrated by a necropsy reported by Crompton (1959) on a patient blind in both eyes who died from a coronary occlusion. Both carotid and vertebral arteries, the chiasmal arteries, both retinal arteries before they entered the optic nerve and within the optic nerve, the circle of Zinn arteries and the posterior ciliary arteries all showed severe narrowing and gross involvement by the arteritic process. Autopsies on some of our 72 patients who had lost vision showed thinning and atrophy of the optic nerve but nothing definite could be made out regarding the site of the arteritis responsible. Certainly occlusion of the arteries by thrombosis does not always appear to be the lesion precipitating visual loss. Often no thrombosis is apparent and diminution in blood flow from arteritic narrowing of the lumen seems to be responsible.

Treatment

Before the clinical features of the disease became so widely known and appreciated, arterial biopsy was an essential diagnostic step and the accessibility and common involvement of the temporal artery made it the usual choice. Section of the artery often reduced arteritic pain and the procedure was thought to have some therapeutic as well as diagnostic value. To-day this method is largely discarded, as it is rarely necessary for diagnostic purposes, the nature of the disease not usually being in doubt on clinical grounds, and it is now appreciated that arterial section has no effect on the course of the illness apart from reducing local pain. Furthermore, Heptinstall and others, (1954) and Birkhead, Wagener, and Shick (1957) have pointed out that the arteritic process is a patchy phenomenon and a negative biopsy does not exclude the diagnosis.

To-day a diagnosis of temporal arteritis calls for immediate and prolonged steroid therapy. In our patients it produced prompt subsidence of any fever that was present, a disappearance of asthenia, and a return of appetite and well-being. Weight loss was halted and polyarthritis, anarthritic rheumatism, and cranial arteritis usually subsided in 1 or 2 weeks. Any anaemia that was present gradually improved and the leucocyte count if raised usually returned to normal. As has already been stated, steroids did not often restore a normal erythrocyte sedimentation rate, but it usually fell to lower levels than before the institution of therapy. Withdrawal of steroids before the sedimentation rate had returned to normal led in some cases to an exacerbation of symptoms and despite their undoubted beneficial effect fresh manifestions of the disease occasionally developed while the patient was receiving what would ordinarily be regarded as adequate dosage. One of our 72 patients lost vision and developed overt cranial arteritis in these circumstances, another had transitory amblyopia, two cerebral thrombosis, and one myocardial infarction. Other writers (Meadows, 1954; Birkhead and others, 1957) have reported the occurrence of visual loss in similar circumstances.

In patients without visual symptoms our usual practice is to give 30–40 mg. prednisone daily until symptoms are fully controlled and then gradually to reduce to a maintenance dose of 15 mg. daily and to continue this until the erythrocyte sedimentation rate is normal, cautiously and gradually stopping treatment altogether thereafter. If, as often happens, withdrawal or dose reduction leads to an exacerbation of symptoms then it is resumed in larger dose. Where vision is already affected it is probably wise to commence treatment with ACTH either intramuscularly or by intravenous drip (Parsons Smith, 1959).

The effect of steroid therapy on visual loss is seen in Table V, which shows that in totally blind eyes no vision returned. This has been the experience of other observers (Birkhead and others, 1957; Wagener and Hollenhorst,

1958). In the majority of patients with partial visual loss substantial improvement occurred, visual acuity increased, and field defects were reduced, but normal vision was only rarely restored. The sooner steroid therapy was commenced after visual loss had been sustained the better the prospects of recovery appeared to be. In one patient one eye was affected 5 months and the other 8 months before steroid therapy was instituted and no improvement resulted. It may reasonably be argued that, in the patients with partial visual loss, similar improvement would have occurred without steroids and we have no control series to present for comparison. Bennett (1956), however, compared a group of steroid-treated patients with a group of untreated cases (some were his own patients and some were obtained from the publications of other workers), and he found improvement in nearly three times the number of treated as compared with untreated eyes.

TABLE V

RESPONSE OF VISUAL LOSS TO STEROID THERAPY

Visual Loss			No. Improved
Total	Patients	7	0
	Eyes	12	0
Partial	Patients	12	10
	Eyes	18	14

Certainly steroids appear to prevent visual loss and to safeguard such vision as remains in patients whose eyes have already been affected. Birkhead and others (1957), in comparable series of treated cases and controls, found this to be so, and their abstraction of 250 untreated cases from the literature further emphasized the protective value of steroid therapy as far as vision is concerned (Table VI, opposite). Ross Russell (1959) treated ten patients with steroids and none sustained visual loss, while of thirteen treated with salicylates five became blind. In our series only one patient sustained any visual damage while on steroids.

Stellate ganglion block and vaso-dilator drugs were employed in some of our patients with visual loss but no benefit accrued from their use. Other workers have used anticoagulants (Meadows, 1954; Wagener and Hollenhorst, 1958; Ross Russell, 1959) but these appear to have been similarly ineffective. Procaine injections (Meneely and Bigelow, 1953) have been used to control arteritic pain, but their effect is transitory and the necessity for their use cannot often arise.

TABLE VI

EFFECT OF STEROID THERAPY IN PREVENTING VISUAL LOSS
BIRKHEAD, WAGENER, AND SHICK (1957)

Treatment		Steroids		No Steroids			
No. of Patients		55		53		250 from literature	
State of Vision		Admission	Discharge	Admission	Discharge	Admission	Discharge
	Normal	35	34	33	30	144	129
	Bilaterally blind	5	5 (9 per cent.)	3	9 (17 per cent.)	42	54 (22 per cent.)
	No. of blind eyes	16	18	16	24	103	121

Summary

(1) The clinical, pathological, haematological, and biochemical features of 72 patients suffering from temporal arteritis are presented.

(2) The protracted course of the disease and the generalized nature of the arteritic process were a feature of the series.

(3) Fifteen of the group died, apparently as a result of temporal arteritis. Six deaths were due to cerebral vascular disease, three to myocardial infarction, and two each to congestive cardiac failure, ruptured aortic aneurysm, and pneumonia.

(4) Forty-nine of the patients had visual symptoms and forty sustained permanent visual loss. Twelve were left totally blind in both eyes and seven completely blind in one eye.

(5) Steroid therapy speedily controlled the symptoms and restored well-being, but its effect appeared to be suppressive rather than curative as the sedimentation rate usually remained raised and relapse often followed premature cessation of treatment or dose reduction. It had no effect on blind eyes but appeared to improve sight in those with partial visual loss and to safeguard remaining vision.

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