UNEXPLAINED SPASTIC MYELOPATHY

41 CASES IN A NON-EUROPEAN HOSPITAL

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One of the objects of a survey of neurological disorders among Bantu patients at Edendale Hospital[1] was the identification and correlation of certain cases of undiagnosed disease. Among those which emerged from this analysis was a group of cases with unexplained spinal cord disorder. This group of patients has now been augmented and analysed in greater detail. The purpose of this report is to demonstrate that many of these cases have features in common. They may represent a clinical entity which has not been described in South Africa before.

MATERIAL AND METHODS

Selection of Cases

The most common causes of spinal cord disorder among the Bantu are spinal tuberculosis, trauma, syphilis and transverse myelitis. Tumours, nutritional deficiencies, parasitic infestations, spondylosis and vascular disorders account for a small proportion of cases. The 41 patients in this group were cases in which there was unequivocal evidence of spinal cord disease, yet none of these diagnoses could be applied. These patients were admitted to the medical unit of Edendale Hospital during a 5¼-year period between March 1959 and July 1964. They have thus been selected from some 93,000 general hospital admissions. The only grounds for selection were that they had undoubted spinal cord disease which could not be allocated to a definite diagnostic category. With one exception, an Indian male, all the patients were Bantu.

Incidence

One peculiarity noticed among these patients was that the majority (27 cases) originated from remote rural districts. This geographical distribution may be significant in that it is at variance with that of the patient population, most of whom come from periurban areas and reserves immediately surrounding Pietermaritzburg. Relatively few of the patients with unexplained myelopathy came from this area—many of them were referred from distant country hospitals, particularly those of Northern Natal.

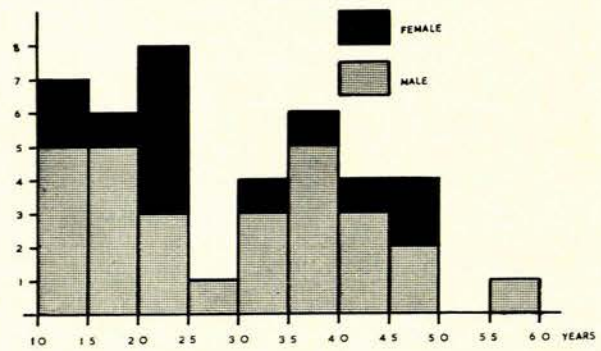

Fig. 1. Age and sex distribution.

The age and sex distribution of the patients is shown in Fig. 1. Many of the patients were below 25 years of age. Males predominated in the approximate proportion of 2:1.

Clinical Presentation

The history was usually of progressive weakness of the legs in a previously healthy person. The duration of the complaint varied from a few days to several years. In 26 patients the condition had developed during a period of 2 weeks to 6 months. Disability was usually maximal at the time of admission and the weakness did not increase, either in extent or severity, after this time. Most patients improved after admission, although slowly. Sensory symptoms such as numbness and paraesthesiae were never prominent. In no case was there a history of similar disability in another member of the family.

The most pronounced physical finding in most cases was symmetrical spastic weakness of both legs (Table I).

TABLE I. PRESENTING FEATURES

Presenting feature	*Slow development*	*Rapid development (history less than 1 week)*
Spastic weakness of both legs ..	24	3
Total spastic paraplegia ..	7	4
Spastic weakness predominantly affecting one leg	2	0
Flaccid weakness of both legs ..	0	1
Total	33	8

A few cases, particularly those of recent onset, were initially flaccid but developed signs of spasticity during their subsequent courses. The usual findings were exaggerated tendon reflexes and ankle clonus. In some cases one leg was more affected than the other, and a few patients showed spastic weakness of one or both arms in addition. Bladder function was disturbed, in varying degrees, in 12 patients.

At all stages of the disease abnormalities of sensation were less in evidence than motor signs (Table II). Eighteen patients had no sensory disturbance whatsoever. Thirteen showed sensory loss with an upper level of segmental distribution on the trunk, most commonly at the lower thoracic segments. The remainder had either mild peripheral sensory loss of 'stocking' type, or a deficit confined to vibration and sense of joint position. Though detailed examination of the visual fields was not undertaken, no patients complained of visual disturbances during their illness. Similarly, florid disturbance of 8th nerve function was not observed.

TABLE II. DISTURBANCES OF SENSATION

	No. of patients
No sensory disturbance	18
Sensory loss of segmental distribution	13
Peripheral sensory loss only	6
Sensory loss confined to posterior column sensation	4
Total	41

In one case the neurological symptoms developed during convalescence from typhoid fever in a country hospital. Except for 3 patients who showed signs of mild pellagra, all the patients were adequately nourished. Physical examination was otherwise uniformly negative.

Investigations

All the patients were investigated by means of urine examination, full blood counts, X-ray of the chest and spine, examination of the cerebrospinal fluid (CSF) and Wassermann reactions. Myelography was performed in those cases where the possibility of a focal lesion in the spinal cord existed.

Haematology. On account of the possibility of vitamin-B_{12} deficiency producing this clinical syndrome, attention was paid to haemoglobin levels. Two patients who were moderately anaemic were subjected to bone-marrow examination. No sign of megaloblastic anaemia was found. It is unlikely that any of these cases were examples of subacute combined degeneration of the spinal cord.

In the previous analysis[1] it was noticed retrospectively that a considerable proportion of patients with undiagnosed myelopathy had eosinophilia. Since this observation was made, greater attention has been paid to this aspect and the tendency for some of these patients to show eosinophilia has been confirmed. The differential counts are demonstrated in Fig. 2, relating total leucocyte count

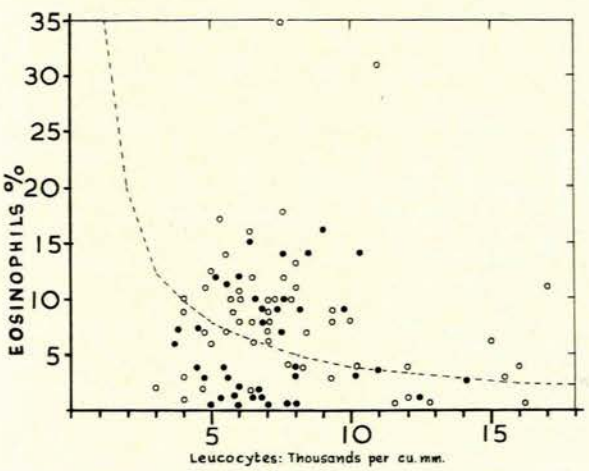

Fig. 2. Leucocyte counts. *Dots* represent average eosinophil counts in individual cases. *Circles* represent range of eosinophil counts. *Interrupted line* represents eosinophil count of 400/cu.mm.

to percentage of eosinophils. In one case the records of blood counts have been lost. An average of 2 counts were done on each patient. The patients who came later in the series had 4 or 5 counts each, while the earlier ones had 1 count each. Sixteen patients had eosinophilia. It is possible that this might have been detected more frequently among the early cases if repeated counts had been done.

X-ray examinations of the spine were normal in all cases.

X-ray examination of chest. All the chest X-ray examinations were normal except in 4 patients who had evidence of minimal tuberculous infiltration. None of these patients had previous treatment for tuberculosis.

Blood and CSF Wassermann reactions. Four patients had positive blood Wassermann reactions but the titre was never higher than 4 dilutions. The CSF reaction was negative in all cases. It is unlikely that neurosyphilis could explain the spinal cord disorder in any patients.

CSF studies. In all patients the CSF pressure was normal and manometric studies showed no sign of intrathecal block. Only 4 patients had more than 5 white cells/cu.mm. When the cells were increased the preponderance was usually lymphocytic. An increase of protein content above 60 mg./100 ml. was unusual and was usually parallelled by a slight increase in globulin content (Table III). Sugar and chloride levels were always normal.

TABLE III. CSF FINDINGS

	No. of patients
Cells	
Less than 5/cu.mm.	37
5—10/cu.mm.	3
10—20/cu.mm.	1
Protein	
Below 40 mg./100 ml.	24
41— 60 mg./100 ml.	7
61— 80 mg./100 ml.	5
81—100 mg./100 ml.	1
101—120 mg./100 ml.	3
121—140 mg./100 ml.	1

Myelography. Where there was a clinical possibility that the neurological disorder might be due to a focal lesion, e.g. a tumour, positive contrast myelography was performed. This was done in 22 cases. In 17 the appearances were entirely normal. In 2 cases there was evidence suggestive of a partial filling defect in the theca. In 2 there was similar evidence of an even more equivocal nature. The remaining patient showed irregular filling defects suggestive of arachnoiditis.

Urine examination and cystoscopy. Urine specimens from all the patients were examined microscopically on at least 1 occasion. Bilharzia ova were not found. Because of the occurrence of eosinophilia, and the possibility of schistosomiasis of the spinal cord, 4 recent patients with eosinophilia have been examined cystoscopically. In 2 the bladder was normal, and in 2 there was evidence of bilharzial infestation. In one of these, in whom biopsy was performed, the bilharzia was proved microscopically.

Investigations have, therefore, most commonly been negative. When present, the abnormalities have been of a non-specific nature and have rarely provided any information which might lead to a diagnostic solution.

PROGRESS, TREATMENT AND RESULTS

In most cases the condition did not progress after the patient's admission to hospital. Almost invariably the disability was maximal at the time of initial presentation. In only 3 patients was there definite objective evidence of deterioration and this was eventually arrested during the patient's stay in hospital. No patients have died and relapse has not been known to occur.

The usual course was that, with prolonged physiotherapy for periods as long as 6 months, patients who were previously unable to walk have become ambulant. They have frequently been left with some spastic disability and have required orthopaedic appliances, crutches or walking sticks to assist their recovery. In many cases some degree of spasticity will be permanent.

Only 1 patient, a 23-year-old male with normal CSF and myelographic evidence of a filling defect in the upper thoracic region, was explored surgically. No tumour was found. Tissue removed was reported to show infiltration with chronic inflammatory cells but no specific changes. In all other cases a conservative policy was adopted, principally because there was not conclusive evidence of focal lesions in the spinal cord, and because the condition showed a natural tendency to improve.

Seven patients were given empirical courses of antimony preparations on the assumption that their spinal cord disease, and their eosinophilia, might be due to bilharzia. In only 1 patient did any rapid improvement follow this treatment, and this may have been coincidental. In the other 6 cases there was no acceleration of the natural slow improvement in neurological status. It is therefore difficult to ascribe any benefit to treatment for schistosomiasis.

DISCUSSION

From the anatomical point of view these patients showed a spectrum of neurological disturbance which included one or more of the following features:

1. All patients had signs of predominant pyramidal tract disturbance which was usually bilateral, symmetrical, and maximal in and below the thoracic spinal cord.
2. When sensory deficit was present, it had the features of a focal lesion in the cord with segmental distribution in 13 patients. In 4 patients the signs suggested bilateral posterior column involvement and in 6 it was purely peripheral and presumably due to neuropathy.

Viewed broadly these patients could be considered as having postero-lateral sclerosis with accent on the pyramidal tract involvement. In a few, the signs suggested a transverse lesion of the cord rather than a longitudinal one.

It has not been possible to identify the pathological nature of the lesions, and it is in this respect that there is the greatest scope for conjecture. The investigations and clinical progress have excluded the possibility of spinal tumours or other focal expanding lesions. Acute or subacute degeneration, affecting the pyramidal tracts predominantly, is the most likely possibility.

No two cases were identical. Apart from clinical impression we have no concrete grounds for arguing that these patients belong to a homogeneous group. They have in common the feature that they all had spinal cord disease which could not be explained by the usual clinical means. Most of the patients were young, and they showed a certain consistency in their physical signs. The trend of similarity was most obvious in the patients below the age of 30 years. When unusual features occurred these were mostly among the older patients. It is possible that other diagnoses could have been applied to some of the latter. The fact that the younger patients showed the greatest homogeneity is, in itself, significant. It tends to exclude chronic degenerative disorders and points to some acquired disease.

Before claiming for this group of cases the distinction of a new syndrome, it is necessary to consider whether they could represent unusual manifestations of common diseases. Syphilis is common in this community and accounts for 8% of all neurological disease.[1] Only 4 patients had positive serological tests and these were in low titre. None had positive tests in the CSF.

In the 4 patients with pulmonary tuberculosis the possibility of associated intrathecal tuberculous granuloma was considered. While cases of this condition, as described by Arseni and Samitca,[2] have occasionally been diagnosed at this hospital, these have had signs of focal spinal cord lesions in association with CSF abnormalities and evidence of florid tuberculosis elsewhere. They have responded to treatment with tuberculostatic drugs.

The eosinophilia which occurred in 39% of the cases may be due to coincidental parasitic infestation. This incidence of eosinophilia is, however, higher than occurs in our patient population as a whole, and may indicate that the spinal cord disorder in some of our cases was directly due to parasites. The parasite most likely to involve the spinal cord is bilharzia, which is prevalent in this area.

Cases of schistosomiasis of the spinal cord reported in the literature[3] have usually had signs of a focal lesion with segmental sensory loss. Most of our cases did not show this feature, nor did they show the CSF pleocytosis to the extent that has occurred in reported cases of bilharzia of the spinal cord. Bilharzia complement-fixation tests were not done in the present series. It is unlikely that this investigation would have much value in an area where the disease is endemic. Only 2 of our patients had clinical evidence of active bilharzia. This incidence probably represents that in the patient population. The further possibility exists that parasites might produce diffuse changes in the spinal cord through a vascular mechanism or by causing arachnoiditis. Bilharzia usually produces its effects on the spinal cord by means of focal granulomata or acute myelitis. Neither of these mechanisms seem clinically likely among our patients.

If they had occurred in Europe some of these cases would have been diagnosed as multiple sclerosis. For well-known reasons this diagnosis is rarely made among indigenous South Africans, and a well-documented case has never been recorded in a Bantu patient.[4] Viewed as a group, the only point of similarity between this unexplained myelopathy and multiple sclerosis is the age incidence. In their clinical presentation, progress, and particularly their lack of characteristic remission and relapse, our patients differ considerably from classical cases of multiple sclerosis.

It is therefore not likely that any common neurological disease could account for more than a small number of cases of this unexplained myelopathy. Unusual spinal cord disorders have been reported from many tropical and subtropical countries, but these vary considerably in their clinical features. Most reports are of groups of cases in which spinal ataxia, retrobulbar neuropathy, 8th nerve

damage, pyramidal tract lesions and peripheral neuropathy occur in varying degrees. It is in the preponderance of one or more of these features that cases from one area differ from those of another.

From Nigeria, Money[5-7] has reported a number of cases whose disability was mainly a sensory ataxia, indicating posterior column degeneration and in whom spasticity was relatively rare. In most cases these findings were associated with mucocutaneous lesions of vitamin B-complex deficiency. Similar cases have been described by Haddock and his colleagues from Tanganyika.[8]

In the Congo the disease known as *konzo* or 'epidemic spastic paralysis of the Congo' has features of which pyramidal tract damage is predominant and sensory deficit less marked.[9] In Jamaica cases of unexplained neuropathy can be divided into 2 broad groups. The disease which has come to be known as the Strachan-Scott syndrome, or 'central neuritis', is predominantly a sensory ataxia often associated with malnutrition. In other cases, described by Cruickshank,[10,11] the main feature is pyramidal tract damage, and sensory loss is less usual. This spastic variety resembles our cases in clinical features as well as in the absence of florid signs of malnutrition.

A similar spastic disorder occurs in certain parts of India and its name, lathyrism, reflects the supposed cause. It is thought to be due to ingestion of products of plants of the species *Lathyrus*. There is some experimental proof to substantiate this toxic action,[12,13] but an identical syndrome has been reported from other parts of India where *Lathyrus* is not consumed.[14,15]

Reviewing the unexplained tropical neuropathies very broadly, and ignoring individual variations in small groups of cases, it appears that there are 2 main varieties which merge imperceptibly. The present series of cases from Natal shows features akin to those of the spastic group, though there is some coalescence with the ataxic variety. It seems unlikely that the neurological disturbance in our cases can be ascribed to malnutrition. The similarity to lathyrism may incriminate a vegetable toxin, but the species of *Lathyrus* which are inculpated in India are not cultivated for human consumption in Natal.[16] There is, however, experimental evidence to suggest that other legumes, common in Natal, contain toxic factors which may only be destroyed by adequate preparation.[17]

The clinical features of our cases therefore resemble most closely those of the spastic syndrome seen in Jamaica, and those of lathyrism. Without greater knowledge, especially regarding its pathology, the grounds for proposing any aetiological hypothesis are extremely tenuous. The most likely explanation is that it is a subacute degeneration of the spinal cord produced by a toxic dietary factor.

SUMMARY

Forty-one cases of unexplained spinal cord disorder are analysed. The cases showed a certain homogeneity in their neurological features. Pyramidal tract involvement was dominant, and sensory deficit usually minimal or absent. Investigations excluded common causes of spinal cord disorder. It is likely that this syndrome has an unusual cause. It may be related to lathyrism and to a similar spastic condition described in Jamaica.

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