NEUROLOGY IN THE GENERAL HOSPITAL*

BY

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To discuss the differences between the practice of neurology in the general and the special hospital is to take advantage of the traditional licence of the opening lecturer to deal with the general rather than with the particular. The subject is one which invites controversy.

Functions of the Special Hospital

The metropolitan special hospital, of which the National Hospital is an outstanding example, fulfils two main functions. An administrative unit of the National Health Service, it provides a court of appeal at a national level in the difficult clinical problem. Such a splendid diagnostic service is difficult to maintain and easy to undervalue, but it is an inestimable boon to every neurologist working outside London, and to his patients. Even apart from other considerations it fully justifies the existence—and the expense—of the special hospital. Together with responsibility for disseminating the highest standard of current clinical practice by teaching and example, it represents, however, only the topical function of the teaching hospital, its more long-term aim being the development and application of new knowledge and new methods.

Of the many physicians trained in neurology at Queen Square most will spend the rest of their professional lives in less specialized institutions. The unequalled standards of systematic case-taking characteristic of the special hospital are equally applicable to the different categories of diagnostic problems encountered there. Laboratory and instrumental methods of the highest calibre may be employed to amplify clinical evidence of the patient's *status*, but the fact is never lost sight of that only a skilfully elicited and interpreted history can lay bare the chain of interlinked events which constitute the "disease" and reveal the nature of the pathological *process* involved. The remarkable precision of the traditional methods of clinical neurology is very much taken for granted here, but it strikes anew the physician who leaves the special for the general hospital: less often than most other branches of medicine is neurology found to degenerate into the shuffling of sheaves of laboratory or radiological reports. Despite the current contributions of the electrophysiologist, it is still the most clinical of specialties, and the trained human mind remains a more ingenious and subtle electronic device for its prosecution than even the electrocorticogram.

The environment of the special hospital undoubtedly favours the cultivation of the highest degree of diagnostic virtuosity, as well as of the most highly developed ancillary skills. It affords unparalleled facilities also for the collection and analysis of groups of rare cases, work superficially unpromising which may, however,

at any time throw unexpected light on commoner and more intrinsically important clinical problems. Nevertheless for clinical research in neurology as a whole the general hospital offers opportunities which are in no way inferior, and which are indeed complementary to the more evident ones of the specialized institution.

The differences between the clinical material of the neurologist in the general and in the special hospital are of intrinsic interest, and they raise issues also of importance to any consideration of the future of the subject.

Problems of the General Hospital Neurologist

Every general hospital—even a teaching centre—is primarily a district hospital. The special position of the teaching hospital arises from the fact that it attempts, with more or less success, the difficult task of combining its function as a district hospital—a role as essential from the teaching as from the service point of view—with that of a special reference hospital for the vast but still fairly well defined conurbation around it. Patients come to the neurologist in the general hospital, in the main, first-hand and unselected. Since practically all the important neurological cases in his area will pass through his clinic, he is in a position to assess the incidence and distribution of neurological disorders in the population at large—ecological information which is a source of vital evidence in aetiological studies.

Under such circumstances, for example, the early recognition of small epidemics of nervous disease such as vertigo or infective polyneuritis is easy. More significantly, such information may serve to indicate appropriate fields for his clinical investigations. It will take him only a few weeks to learn, for example, that cerebrovascular disease is the commonest serious neurological disorder, or that the heredo-degenerative conditions which occupy so disproportionate an amount of space in the literature pale into numerical insignificance by comparison with the problem of disseminated sclerosis, of which every out-patient day yields two or three fresh cases. If he works amongst the maritime population of Liverpool he will remain familiar with the manifestations of neurosyphilis, steadily becoming both less common and less classical in type: in Newcastle this disease is so great a rarity that we stand in some danger of overlooking the occasional case of general paresis amongst the many patients who present with non-specific presenile dementias.

But, more than this, the provincial neurologist serves a relatively static population, and the universal coverage of the National Health Service has provided him with unequalled and as yet largely unexploited fields for long-term follow-up studies. The special hospital, with its episodic relationship with patients and its concentration on the serious or difficult case, may yield erroneous

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ideas about the natural history of a disease as it occurs in the general population. Such a difference must surely be responsible for the observation that in Newcastle, as in Leeds and Manchester, myasthenia gravis is most often a mild, chronic, remittent disorder, commonly undiagnosed for several years after the appearance of the first symptom, and in the large majority of instances adequately controlled by drugs, without recourse to the unpredictable hazard of thymectomy, so often necessarily invoked in the more serious cases encountered in the special hospital.

Acutely Ill Patients

A second, immediately noticeable, difference is that in the general as opposed to the special hospital the neurologist's patients are often acutely and sometimes catastrophically ill. Indeed, perhaps the commonest of all the problems the neurologist is asked to help his hospital colleagues to elucidate is that of the patient admitted unconscious—a differential diagnosis so simple in the textbook, but in fact comparable in difficulty only to that supreme test of diagnostic skill the acute abdomen. It is clear that topographical neurology affords little help in a problem of this nature, which emphasizes at once the truism that the neurologist in the general hospital must be a physician even before he is a neurologist. In this connexion I think one of our most humiliating experiences is the infrequency with which the neurologist can add anything of value to the elucidation of the common and baffling problem of the infant or young child comatose with an acute cerebral illness. The diagnostic problems posed by the comatose patient are indeed illimitable, but I will quote three brief cases in illustration of my point.

A 6-year-old child was admitted to hospital in a state of mental confusion. He had been vaguely off colour for a few days with symptoms described as "influenzal," and then he began to vomit. At the same time his behaviour became successively odd, curiously psychotic, and finally completely disorientated: within 24 hours a confusional state gave place to stupor and then to deep coma. An irregular fever was accompanied by intermittent generalized muscular twitching and by signs of left hemiparesis, without meningism or spinal fluid changes. A diagnosis of encephalitis, probably of post-infective type, had already been made. The only clue to the nature of the condition on examination was faint icterus, with a little bile in the urine, followed by a progressive decrease in liver dullness. Necropsy revealed an acute hepatitis as the only abnormal finding and the presumable cause of his cerebral illness.

A few years ago I published an account of a family in which three children had several episodes of encephalitic illness each arising in relation to apparently non-specific infections of the upper respiratory tract. More recently I thought I had encountered another such case, and it was only the combination of an astute paediatric registrar and a series of blood barbiturate estimations which revealed that the recurrent episodes of stupor in this case were in fact due to a psychopathic mother's repeated attempts to poison the child with her sleeping tablets.

In the history of a comatose woman of 30 admitted as a case of probable cerebral accident, the only significant feature was that for five years she took 4 pints (2.3 litres) of water to her bedroom every night, and drank them all by morning. Her blood urea was 450 mg./100 ml. and necropsy revealed a solitary aplastic kidney the size of a walnut, probably the result of a foetal nephritis.

Undiagnosable Cases

Since practically all the neurological material presenting at the general hospital is unselected it follows also that patients are often seen early in the development of their disease—often too early for the comfort of the neurologist. Most of the cases in our wards are definitely "membership" cases, and the florid physical signs which are the delight of the Conjoint candidate are strangely lacking in the provinces. Sometimes our cases are frankly undiagnosable. More often they resist the whole gamut of hospital investigation to declare themselves with the passage of months or years.

I have in mind a problem encountered in the children's department—the child who begins to walk abnormally. I

refer not to the occasional very young child who, as she learns to walk, obstinately does so for a period of months on the toes of both feet with her heels raised. I have never heard any plausible explanation of this curious phenomenon, but it seems in most instances to demand little more than reassurance of the mother. I refer rather to the child of from 5 to 10 years old who starts to invert or plantar-flex one foot while walking. At first this is intermittent; but gradually it persists, though even at this stage the child may occasionally be able to walk almost normally for a few minutes. The diagnosis of a missed poliomyelitic infection which has usually been made in such cases is negated by the firm or intermittent spasm which can be felt in the muscles involved. The patient has usually already resisted manipulation under anaesthesia, the application of a plaster splint, and psychiatric investigation. As over the months the gait becomes more bizarre, and inexplicable on any of the crude physiological bases with which we are familiar, it becomes indeed almost certain that the child will spend some time in the hands of a psychiatrist, and my own experience is that if the dread diagnosis of torsion spasm is made at all before the child is seen by a neurologist it is most often the psychiatrist who has made it.

To see cases too early is a mixed blessing, and affords less immediate satisfaction than the working out of the more fully developed problem as it often presents itself later in the special hospital.

A small girl was sent to me from a distance because, although her sole symptom had been two major epileptic fits, her electroencephalogram was so wildly abnormal that the psychiatrist who carried it out was suspicious of structural brain disease. When I saw her a week later the only abnormal physical signs were some very slight unsteadiness on her feet while dressing, which could not be elicited by formal testing, and a fine intermittent irregular tremor of her left hand made worse by willed movement. Despite the unusual onset, difficulty in deciding the nature of this involuntary movement immediately raised the suspicion of Wilson's disease, in which it is so often difficult to disentangle the striatal and the apparently cerebellar components of such tremors. There was indeed a strong suspicion of change in temperament and of early intellectual deterioration. The history, however, was short, there had been recent morning headache, and the child vomited as she was brought into the consulting-room. She was admitted to hospital at once, where full investigation with a view to the exclusion of tumour drew a complete blank, as did biochemical tests, which lent no support to the suspicion of hepato-lenticular degeneration. She was sent home undiagnosed, to return a fortnight later with acutely advancing cortical blindness bespeaking a diagnosis of Schilder's disease.

A Field for Clinical Investigation

To the neurologist working in a general hospital the nervous complications of established disease involving other systems of the body, often already under treatment by his medical and surgical colleagues, afford a major interest. That this is a fruitful field for clinical investigation needs no emphasis. It is necessary to refer only to recent studies of the flaccid ascending paralyses occasionally seen in renal disease, after ureteric transplantation, or during the treatment of diabetic coma, and to their dramatic relief by the administration of potassium salts; or to the striking episodic neuropsychiatric manifestations of chronic liver disease, so consistently associated with a raised blood ammonium level and preventable by restriction of protein intake. There are other examples of neurological illness based on functional and reversible humoral changes arising outside the nervous system, elucidation of which defies both neurological examination and the microscope of the neuropathologist, but yields to the techniques of the biochemical laboratory.

The ophthalmological, diabetic, and endocrine clinics are well-known mines of material for the neurologist, and this traffic is two-way. Experience in the clinical recognition of masked thyrotoxicosis is vital to the diagnosis of an appreciable proportion of cases of chronic ophthalmoplegia in middle-age, while Addison's disease may present as flaccid paraplegia. But there is scarcely a department of the hospital which has not something similar to offer.

Only close contact, for example, with a busy haematological clinic reveals the frequency in leukaemia of neurological complications due to infiltration, thrombosis, or haemorrhage. This disease may present with such signs as unilateral or bilateral exophthalmos, hemiplegia with or without papilloedema, an acute transverse lesion of the spinal cord, paralysis especially of the sixth or seventh cranial nerve, or subacute lesions of peripheral nerve trunks. Changes in the spinal fluid which are highly suggestive of infective meningitis may further confuse assessment.

Even the apparently banal cerebrovascular accident may depend on a critical aetiological event occurring outside the neuraxis, and on occasion outside the cardiovascular system.

A general practitioner taken acutely ill in his surgery was pale, confused, and disorientated. He was unable to understand simple questions, his speech was incoherent, and there was weakness of the right lower face without signs of paresis elsewhere. He was at this stage unable to give any history. The blood pressure was low and the case appeared to be one of cerebral thrombosis. However, within three hours of admission to hospital the neurological signs had completely disappeared, and at this time he was able to complain of mid-sternal pain. Examination revealed a rub over the praecordium, and electrocardiography confirmed the presence of a small posterior cardiac infarct.

The implication of some such major pathogenic factor is of course common in hypotensive vascular lesions of this kind. Sometimes the occurrence of a profuse haematemesis or melaena clarifies the pathogenesis in a confused or stuporous old man admitted with sudden hemiplegia. Less obvious was the case recently encountered of a woman of 39 in whom the deep stupor of a brain-stem infarction, still evident a month later in bilateral ptosis and hemianaesthesia, accompanied the exsanguination of a ruptured ectopic pregnancy.

Nervous Complications

The nervous complications of general diseases have, however, a special importance for the neurologist. We know much more about the aetiology and pathogenesis of general diseases than we do in the case of primarily neurological disorders, and on occasion the nature of pathological changes in the nervous system may be revealed only by considering the quality of such changes involving other parts of the body. The lessons of general pathology may be applicable to problems which are at first sight purely neurological.

One example will suffice. During the last twenty years neurologists have played a prominent part in describing the clinical and pathological features of polyarteritis nodosa. Meanwhile in a brilliant series of pathological and experimental observations Arnold Rich had demonstrated the identity of the changes observed in this disease with those seen in human and experimental serum sickness, and had afforded convincing evidence that, in many cases at any rate, polyarteritis represents a vascular manifestation of anaphylactic hypersensitivity to a variety of antigens. It had also been shown that the polyneuritis of this disorder, often symmetrical and indistinguishable in many instances from so-called "infective polyneuritis" of the Guillain-Barré type, is based not on vague "toxic" changes but on microscopic arteritic occlusions of the vasa nervorum. More recently it became clear that, like the fever, arthralgia, and abdominal pain of the disease, the peripheral neuritis of polyarteritis nodosa often responded strikingly to cortisone. The administration of this drug in cases of infective polyneuritis was an obvious step. The frequent and sometimes very dramatic therapeutic response encountered lends support to the view that the polyneuritic, like the myelitic and encephalitic, complications of acute infections are in all probability neurological manifestations of hypersensitivity mediated through the vascular tree—a view which has of course received further support from recent experimental observations.

Treatment

Another important difference worthy of attention is in the matter of treatment. The neurologist in the general hospital works as a member of a medical team, most members

of which have at their command potent therapeutic agents ranging from hormones and antibiotics to such complex developments as the artificial kidney. He cannot feel entirely at ease in such company if his contribution is limited to the exercise of an ability to attach appropriate labels to rare, obscure, degenerative, and untreatable disorders, no matter how accurate his diagnoses. Much of the charge of therapeutic nihilism levelled at the neurologist is of course unjustified. One reason for what may appear to be a relative poverty of neurological medicine in the therapeutic field is that as soon as radical therapy is developed in the case of a neurological disorder its management not unnaturally ceases to be the exclusive preserve of a small group of specialists.

This trend to pass back from neurology into the realm of general medicine what has already been clarified is surely one to be welcomed: the special skills and opportunities of the neurologist are more profitably employed in the elucidation of unresolved problems at the growing edge of his subject. However, the rather unkind observation of a medical colleague that only three out of the last hundred papers published in *Brain* held out any hope for the patient is perhaps not entirely without significance. In fact, there have been two and a half papers in that journal devoted to treatment during the past three years, and two of these dealt with the not exactly day-to-day problem of the control of myotonia. It is difficult to rebut in its entirety the imputation that neurologists are not very interested in treatment, and one looks in vain through the current British literature of the subject for reports of those carefully controlled therapeutic trials which represent so characteristic and valuable a contribution to other fields of modern medicine. The researches of the neurologist in the general hospital may on occasion be hampered by the less highly developed technological services available to him, but for reasons outlined above he may well be in a very favourable position to initiate controlled investigations into scientific therapy.

Approach to Clinical Research

It is indeed a comparison of their approaches to clinical research which reveals the most significant difference between these two neurological orientations. Any such generalization immediately evokes the quotation of exceptions, but it is probably broadly true that the investigational work of the more highly differentiated physician whose main sphere of activity is the special hospital tends to draw its inspiration predominantly from neurophysiology, that of the general hospital neurologist from general medicine. The more specialized or academic physician in neurology, as in other branches of medicine, usually leans to the current view of clinical science which we owe to Sir Thomas Lewis and which finds its chief, and in some hands its exclusive, expression in the instrumental and laboratory investigation of clinical phenomena. Most such observations are devoted to the pathophysiology of symptoms, and the neurologist of this school tends to regard his investigations as a clinical pendant to those of the neurophysiologist. Such research is indeed often frankly directed towards elucidation of normal physiological mechanisms by the study of clinical lesions.

The research interests of the general hospital neurologist are usually more pragmatic. Constantly reminded that medicine was a useful art long before it tried to become a science, he remains more vitally concerned with the causes, management, and prevention of nervous diseases than in analysis of their intimate mechanisms. His conception of clinical science is catholic, leaning commonly towards the approach of the natural historian rather than to that of the experimental scientist.

Conclusion

It is indeed curious that the more restricted phenomenological view of clinical science enjoys at the moment so much more prestige than the traditional and broader biological concept which regards the natural history of disease in all its aspects as a valid subject for scientific inquiry. But these two approaches are, of course, complementary and in no

way mutually exclusive. What we term a disease is not an entity but a chain of interlinked events a few of which are faintly illumined here and there by the dim and flickering light of partial understanding. It is the physician's business to break this chain at some point along its course and thus free the patient from the inexorable development of his lesion. In this connexion recent vindications of the observational method, reinforced by the revolutionary contemporary techniques of statistics and epidemiology, are surely no less dramatic than the triumphs of the laboratory. The relation of maternal rubella to developmental defects, of cigarette-smoking to lung cancer, or of parity, sexual habits, and religion to carcinoma of the cervix uteri are contributions of basic biological significance, while by illuminating causation they point the way clearly to prevention and control.

Many such aetiological factors must lie buried in the histories of our neurological patients. But the weakest link in the chain is not always at its beginning, and the clinical scientist whose studies are devoted to mechanisms of symptom-production can justifiably point to many instances in which it is his investigations which have led to the effective control of disease by interrupting the pathogenetic sequence at some later stage in its course. After all, both alkalis and gastrectomy are more generally effective in the treatment of peptic ulcer than psycho-analysis, the initial lesion of diabetes mellitus remains veiled in mystery despite the adequate control of the disease which can be achieved with insulin, and modern anticonvulsant drugs will control many cases of epilepsy in the genesis of which the respective contributions of genetic and environmental factors remain at present entirely obscure.

LYMPHADENOID GOITRE (HASHIMOTO'S DISEASE)

A CLINICO-PATHOLOGICAL STUDY

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Following the pioneer work of Roitt *et al.* (1956), the pre-operative diagnosis of lymphadenoid goitre may now be made with some precision. A series of cases is presented with a view to defining with like precision the histological features of the thyroid gland in this condition. At the same time the clinical features are described and the treatment and aetiology of the disease are discussed.

Present Series

The series consists of 33 cases of lymphadenoid goitre and represents all patients with this disease operated on at the Middlesex Hospital by the surgical staff over the last twenty years. It should be pointed out that the criteria on which inclusion in this series was based were strict; consequently a further 20 cases, whose claim to inclusion was the presence of lymphocytic infiltration in the thyroid gland, have been excluded. In addition a small number of patients not operated upon, but whose diagnosis has been confirmed and who have been treated medically, are discussed.

During the period 1935-55 2,141 thyroidectomies were done at the Middlesex Hospital, which represents an incidence of lymphadenoid goitre of 1.54%. Our impression is that this figure is too low and stems probably from the fact that most of these thyroidectomies were undertaken for toxic goitre.

In 1937 McClintock and Wright were able to identify a total of only 50 cases in the world literature, while

Joll (1939) found an incidence of 0.9% in 5,650 thyroidectomies. More recently Heptinstall and Eastcott (1954) described an incidence of 2.7%. If the figures for thyroidectomy at the Middlesex Hospital be

FIG. 1.—Age distribution in 32 cases of lymphadenoid goitre.

examined over the last five years the incidence of lymphadenoid goitre rises to 2.6% in 660 thyroidectomies.

Age.—Lymphadenoid goitre characteristically affects middle-aged women. Our youngest patient was 37 years and the oldest 73, with an average of 51 years (Fig. 1). This age incidence agrees closely with that found by other authors. The disease may, however, rarely occur in childhood; for example, Statland *et al.* (1951) describe two cases in girls of 10 and 14 years, the latter having had a goitre since the age of 6.

Sex.—In all series described there is an overwhelming preponderance of female patients, the incidence being over 95%. We have only one example of lymphadenoid goitre occurring in the male, a doctor of 64. Likewise Marshall *et al.* (1948) describe only one male case in a series of 78 patients.

Symptoms

The Goitre.—A swelling in the neck has been noticed by the patient in all cases, but the duration of history varies widely from as little as one month in one case up to 35 years in another. However, the simple average in our cases is 2½ years; this is a fairly representative figure of the duration of the goitre before medical advice is sought. We have doubts, which are expressed below, whether the few patients who give a history of goitre of many years' duration have in fact had a lymphadenoid goitre during all that time.

Discomfort in Neck.—This is a common symptom, and appears to be a characteristic feature of the disease, occurring more commonly with lymphadenoid goitre than with colloid goitres of comparable or larger size. Over one-third of our patients complained of a feeling of discomfort and tightness in the neck, not amounting to pain but nevertheless a constant annoyance, particularly when lying prone. In only three cases was the onset of the goitre marked by definite pain in the neck, although seven patients had noticed pain and tenderness in the goitre at various times. Headache was not uncommon and was complained of by one-third of the patients.

Thyroid Deficiency.—Gross myxoedema is uncommon, but one-third of the patients volunteered the information that their voice had become hoarse, and this feature corresponds broadly with those who showed other signs of thyroid deficiency. In two such patients a recurrent laryngeal nerve palsy was suspected, but laryngoscopy demonstrated only