REFRESHER COURSE FOR GENERAL PRACTITIONERS

CLINICAL ASSESSMENT OF BACKACHE

BY

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An ordered approach to the subject of backache is difficult to achieve. In spite of the discovery about 16 years ago of the prolapsed disk syndrome we are still left with many cases in which speculation replaces certainty, and in which there is no agreement on pathology, diagnosis, or treatment. No matter how one approaches the

imposed on a structural deformity of the spine, and the first point in the clinical examination is an attempt to separate defective posture due to spasm from that due to a fixed bony deformity. This can usually be done by careful inspection of the spine while the patient is bending forward, or by noting the obliteration of the deformity when he is lying on the face completely relaxed (Fig. 1).

FIG. 1.—*Muscle spasm but no obvious skeletal defect.*—(a) A typical sciatic scoliosis showing a lumbar deviation to the left. (b) On bending forward the scoliosis usually increases and the patient tends to flex the affected knee. In this case, which is unusual, the scoliosis has altered to the opposite side: this is a recognized occasional variant. (c) This shows almost complete obliteration of the scoliosis on lying down, indicating that the primary cause is muscle spasm.

possible causes of backache, there remains an indefinite fringe of cases in which no certain diagnosis is possible. This group is characterized by either an absence of clinical findings or a clinical finding of painful muscular spasm for which there are alternative explanations.

Wherever the seat of the primary disorder may be, it manifests itself to the consciousness in three ways: (1) well-localized pain accompanied by areas of tenderness to pressure—for example, over the spinous processes or a muscular attachment; (2) pain due to pressure on nerve trunks which is felt at a distance over the dermatome supplied by the nerve; and (3) referred pain due to a "spread-over" at higher levels in the nervous system from sources of pain which have no cortical representation—for example, interspinous ligaments, intervertebral disks. A precise anatomical diagnosis can usually be made in the first two groups. In the third group, in which the pain is referred, difficulty arises, and often there is accompanying muscle spasm.

Muscle Spasm or Structural Deformity?

Muscle spasm usually produces a constant pattern of deformity—a flattening of the lumbar spine on standing, increased tone in one or both erector spinae with limited lumbar flexion, and a scoliosis of the spine increased by flexion. We often find that the patient with muscle spasm is reluctant to bend with both knees straight, but is able to bend with one knee flexed, and that he has a slight reduction in extensibility of the spine. This pattern is most marked in acute protrusion of an intervertebral disk with root pressure. Muscle spasm may or may not be super-

imposed on a structural deformity of the spine, and the first point in the clinical examination is an attempt to separate defective posture due to spasm from that due to a fixed bony deformity. This can usually be done by careful inspection of the spine while the patient is bending forward, or by noting the obliteration of the deformity when he is lying on the face completely relaxed (Fig. 1).

Fixation of the spine in a normal anatomical position, such as may occur in the early stage of spondylitis ankylopoietica, is easily overlooked. Likewise, muscle spasm alone may so fix the spine that there appears to be a structural rigidity. Here it is important to note a few further characteristics of the deformity produced by muscle spasm alone. The spasm is usually unequal, so that forward flexion is disproportionately limited to lateral flexion of the spine and to rotation. When the patient is placed on a couch the spine relaxes and the normal lordosis of the spine reappears or the scoliosis straightens. Such observations exclude the presence of a fixed structural deformity. Unfortunately they do not exclude the presence of spinal abnormality, and in the last resort this can be excluded only by radiography. While this is often necessary, especially in cases with significant clinical features such as recent trauma or a history of pulmonary tuberculosis, radiography can be avoided only if those cases in which an x-ray picture is unlikely to be helpful are excluded.

Clinical Classification

On the basis of whether muscle spasm and structural deformity are present all cases of backache can be grouped as follows: (1) Obvious skeletal defects and no muscle spasm (Fig. 2)—for example, spondylitis ankylopoietica, healed tuberculosis, and postural deformities. (2) Obvious

FIG. 2.—*Obvious skeletal defect but no muscle spasm.* (a) A marked thoracic kyphosis and lumbar lordosis in an elderly patient unaware of a long-standing spondylitis ankylopoietica. (b) On forward bending the curves of the spine remain unchanged. There was an associated gross limitation of lateral flexion and rotation of the spine.

FIG. 3.—Muscle spasm masking a definite skeletal defect. (a) Flattening of the lumbar spine due to erector spinae spasm without scoliosis. (b) Limitation of flexion and persistence of spasm on forward bending. (c) Relaxation of the spasm on recumbency, with the appearance of small kyphosis at the lumbosacral junction which was confirmed radiologically to be due to early tuberculosis of the spine with destruction of a single intervertebral disk.

skeletal defects with muscle spasm (Fig. 3)—for example, active tuberculosis, and aggravated osteoarthritis. In this group the deformity is primarily bony and not caused by the spasm. The spasm may serve to show the degree of activity of the underlying disease. (3) No obvious skeletal defect and no muscle spasm—for example, referred pain from visceral causes, poliomyelitis, and hysterical spine. (4) No obvious skeletal defect and muscle spasm (Fig. 1)—for example, lumbago, and prolapsed intervertebral disk. The largest proportion of cases fall into group 4, and to begin with can be safely treated at home, where observation of their reactions to rest in bed will prove a useful guide to the necessity for further investigation.

Cases with Negative Clinical Findings

The most difficult cases to diagnose may belong to group 3, with negative clinical findings. As clinical examination is so inaccurate in the spine, supplementary radiography is needed. This may result in cases falling into group 1, although the changes in the spine are minimal and only recognizable by radiography. Spondylolisthesis and other developmental abnormalities around the lumbo-sacral junction, early tuberculosis, and localized osteoarthritic changes around a single intervertebral disk are examples of conditions which may be brought to light only by radiography.

Where no assistance is given by radiography the problem may be insoluble, or the answer may be provided only by watching the progress of the disease. It is in this type of case that the history is of primary importance to exclude the visceral causes—for example, renal, gastric, and pelvic disease; to assess the patient's personality in cases following injury in which there may be malingering or hysteria; and to elicit the relationship to pregnancy and the puerperium in the post-natal backache of young women.

Cases with Muscle Spasm Only ("Lumbago")

The cases in group 4, with muscle spasm but no deformity, are usually classed together as "lumbago." From this group must first be separated those cases due to prolapsed intervertebral disks. This can usually be done by noting the characteristic type of pain: severe aching pain, radiating over a recognized dermatome, often with sciatic pain as well as backache; aggravation of the sciatic pain on coughing, sneezing, or postural changes; complaints of numbness and tingling; and periods of sudden relief, or aggravation.

Examination may show: altered sensation—hyperaesthesia or impaired sensation over a dermatome; absence or diminution of a knee-jerk or ankle-jerk; wasting and loss of tone in the glutei, hamstring, or calf muscles; loss of

muscular power in the calf, extensors of the toes, tibialis anterior, and peronei; areas of deep tenderness in the buttock and calf on the affected side; and increased pain on stretching the sciatic nerve (Lasègue's sign and its variations).

Radiological confirmation of changes in the disk space are comforting to the diagnostician, but the essential basis of diagnosis of a prolapsed intervertebral disk remains neurological. Two groups can be recognized: those with objective neurological signs, and the less satisfactory but equally common group with subjective signs only. Where these are characteristic and supported by skeletal signs the diagnosis is definite, but there may be an indeterminate group in which the distinction between acute "lumbago" and prolapsed intervertebral disk remains impossible until the case has been observed for some time, when positive neurological or radiological findings may appear.

After thus excluding prolapsed intervertebral disk as completely as possible there then remains the analysis of the other causes of muscle spasm in the back. These cases form a rather unsatisfactory group. They may be divided up into myofascial strain, paroxysmal "lumbago," and fibrositis or myofibrositis.

Myofascial Strain.—The alternative diagnosis to this is a minor disk injury, and this cannot be disproved. Myofascial strain is characterized by a history of strain either by lifting a heavy weight or by lifting in a bent position; a feeling of something snapping in the spine; localized pain on pressure to the side of the spinous processes; recurrence of pain on attempting to straighten from the flexed position; a vague radiation of pain, often bilateral, which never goes below the knee; and recovery with rest and physiotherapy in seven days or less. The diagnosis is seldom confirmed by observation of a haematoma, though there may be an occasional palpable thickening in a muscle. The tenderness is well localized, and complete temporary relief can usually be achieved by procaine infiltration.

Paroxysmal "Lumbago."—This may be related to overwork or unusual work. There is seldom any definite injury, and the condition may be recurrent in certain individuals. Repeated examinations often show osteoarthritic changes in the spine in later years of life which are disproportionate to the age of the patient and these may be the basic cause of the attacks. It is characterized by an onset when the patient is flexed and an inability to straighten up; a pain worse on attempting to straighten the back, but the patient can overcome his fears enough to bend forward; a severe pain that has some of the features of cramp, although the individual is not frightened by it and often feels he would like to laugh at himself; an immediate alteration in the quality of the pain after deep massage, with restoration of full or almost full extension; and complete recovery within a week or less.

Fibrositis or Myofibrositis.—The onset of the pain in these cases is usually more gradual. The patient may have had similar attacks elsewhere—for example, recurrent stiff neck or fibrositis of the trapezei. It is characterized by slow development sometimes associated with a cold or mild influenzal attack; a tendency for signs to be bilateral—for example, the spasm may involve both erector spinae without flattening of the lumbar spine; areas of tenderness in the muscles that may change from day to day; localized areas of thickening or tenderness over certain recognized areas, notably the twelfth ribs, the lumbo-dorsal fascia, and the iliac crests. Similar tender areas may be found in other muscles at a distance—for example, the trapezei. The recovery is slow, possibly taking two to three weeks, but is complete.

Complete recovery is characteristic of these three groups. A course of rest in bed, local heat, hot baths, and analgesics is therefore not only good treatment but a useful step in confirming the diagnosis. If recovery does not occur within a week a course of more active physiotherapy is helpful. Radiant heat followed by deep massage and extension exercises of the spine will clear up the residual pain in all but a small group of cases.

Severe Pain

Severe pain in the back may be alarming to the patient and may result in behaviour which causes a suspicion of hysteria. Assessment of the patient's personality is therefore important, remembering that, in general, severe back pain is not a common presenting symptom of hysteria. The following conditions may have to be excluded: acute disk prolapse with severe sciatica; acute prolapse of a disk into the vertebral body without nerve-root pressure; early tuberculous disease, in which the pain is sometimes nocturnal, occurring when the patient relaxes in bed; and collapse of a vertebral body due to any destructive lesion such as a secondary malignant deposit or myeloma. Severe pain unrelieved by rest demands early radiological examination, though rapid recovery with rest is the general rule.

Conclusion

While it is true that the diagnosis of many cases of backache demands radiography, this examination will be negative in almost half of the cases submitted to it. The simple lines of assessment indicated here will enable a satisfactory clinical diagnosis to be made in the first instance, and this can be modified by observing the patient's reaction to rest in bed and simple comforting domestic measures. It is better to diagnose a case as "lumbago" and treat it as such than to alarm the patient with the current bogey of disk prolapse and to send him to hospital for investigation. In most cases the first line of investigation in hospital will take the form of observing the patient's reaction to rest in bed.

Next Refresher Course Article.—"Food-poisoning," by Dr. Joan Taylor.

The Department of Health for Scotland recently issued a circular to local authorities containing suggestions for improving the welfare arrangements for old people. Many of the points made may seem rather obvious, but they have not hitherto been summarized in this way. Helpful suggestions are included on how to meet the needs of old people living at home. Briefly, the circular deals with three main problems: old people suffering from neglect in their own homes, the provision of meals for such people, and the use of hospital and residential accommodation for them. One way of meeting the first problem would be the publication locally of the name of the official to whom such cases should be reported, and those local authorities who have not already done so are advised to keep a list of old people, needing attention, who live at home in the area. Health visitors should be used as part of every welfare scheme for the old. A separate memorandum enclosed with the circular discusses the organization of meals services; these should be provided by voluntary effort supported by local authorities. No good reason is seen for charging less than 9d. for a normal meal, as the National Assistance Board can help anyone receiving meals because of special needs. The memorandum emphasizes that the aim of a meals service is not in any way to discourage relatives living within reasonable distance from fulfilling their normal family duties. Finally, the present statutory position is that responsibility for deciding the admission of an old person to hospital or local authority accommodation rests with the hospital or the local authority. Failing the one, the other must be responsible.

THE BRAIN AS A MACHINE

SIR HENRY COHEN'S ROYAL INSTITUTION DISCOURSE

The Friday evening discourse at the Royal Institution on February 29 was given before a distinguished company by Sir HENRY COHEN, who addressed himself to the theme, "The Brain as a Machine."

The history of this problem, he said, dated back to Descartes and his period, the first half of the seventeenth century, when the mechanical laws of the "physical" world were being elucidated. Descartes postulated reflex action as explaining movements in which brain and nerves played an essential part, but he realized that man was more than such an automaton, and he regarded phenomena such as memory, judgment, and decision as properties, not of the brain, but of the "spirit" or psyche. Cartesian dualism conceived the human being as body and mind; the body, which was material, could be known perceptively and obeyed the laws of physics and chemistry, while in contrast the mind was not subject to mechanical laws and was only to be known introspectively by its possessor, or, if known to others, only by behaviour, the inferences from which might be misleading. The brain was regarded as the control exchange through which the mind influenced any part of the body.

The physician, said Sir Henry Cohen, was at the outset prejudiced against this conception. He saw a patient whose memory for recent events was clouded, who was indecisive, slovenly, nervous, depressed, but whose behaviour, after a brain tumour had been removed, returned to normal. He saw a child victim of lethargic encephalitis, who before the illness was well behaved, but afterwards lost moral control and developed aberrations. These disturbances were the result of organic disease of the brain and disappeared when the structural damage was made good.

The Biological Approach

In the seventeenth century physiological phenomena were explained in terms of levers, pulleys, pumps, and the like, but, although these might be accepted as representing muscular movements and movements involved in circulation, not very much of what the brain did could be explained in that manner. The experimental biologist applied the techniques of physics and chemistry to the living organism. This approach was exemplified by Loeb's tropisms, Pavlov's conditioned reflexes, Watson's behaviourism, and Lashley's work on the localization of the "engram." But the story was far from complete, and the approach by analogy was not without its dangers.

Another approach was to see what machines could accomplish. During the last 10 or 20 years electronic computing machines had been developed and these appeared to possess many supposedly rational properties of mind. Sir Henry gave an astonishing list of what such machines could do. They could learn what they were told, apply instructions when needed, read and remember numbers, add, subtract, multiply, and divide, carry out a long chain of operations one after the other, write out the answers, and—an attribute not entirely human in these days—work unattended. They stored in some form the results of preliminary calculations, a process analogous to memory, and made use of the results at the right time. These machines might be only in their infancy. One saw them handling the routing of telephone calls, translating from one language to another, even making strategic decisions in simplified military operations. The answers they gave were not simply "yes" and "no," but more flexible.

A Clue to Brain Mechanism

The question was how far these automata afforded a clue to the mechanism of the brain. Were the structure and function of the nervous system, so far as known, consistent with the action of an electronic machine? Recent electro-