BRITISH MEDICAL JOURNAL

LONDON SATURDAY DECEMBER 17 1938

SCIATICA AND ITS TREATMENT*

BY

WILFRED HARRIS, M.D., F.R.C.P.

Consulting Physician, St. Mary's Hospital; Physician, Maida Vale Hospital for Nervous Diseases

Sciatica, or pain which is referred along the course of the sciatic nerve, may arise from a great number of causes. One of the commonest is a perineuritis of the sciatic sheath in the region of the sciatic notch where the nerve escapes from the pelvis into the buttock, which may be due to the spread of rheumatic or gouty fibrositis of the lumbo-sacral fascia or lumbar muscles, known as lumbago.

The nerve trunk may be the subject of a neuritis from toxic causes, such as diabetes, lead, arsenic, etc., or an infective neuritis from dental sepsis. I have known it produced by a direct chill to the buttock from sitting on a cold wet seat; and trauma to the buttock from a fall in the hunting field or prolonged pressure from lying on a hard surface, as in coma due to mine explosions, will produce it.

Types of Sciatica

One may speak of two types of sciatica, high sciatica and low sciatica, the latter form being due to lesions in the neighbourhood of the sciatic notch, as already referred to. In this type the Achilles jerk is often lost, and there may be a tendency to lean over towards the affected side. High sciatica would be due to lesions in the neighbourhood of the intervertebral foramina around the fourth and fifth lumbar nerves, due to rheumatic or septic inflammation, or even to osteo-arthritis. In this form the Achilles jerk is usually unaffected, as this reflex is concerned in the first sacral root, and there is often well-marked contralateral scoliosis in which the hip on the affected side is thrown outwards and the patient leans away from that side. In these cases forcing the body into an erect position causes pain down the affected leg. In this type of case, unless contractures have developed after many months of suffering, the scoliosis disappears on lying flat, especially if the legs are pulled down, with the body held to resist the pull. This disappearance of the scoliosis without producing pain is probably due to the nerve roots no longer being pressed on at the intervertebral foramina, and is a demonstration that the contralateral scoliosis apparent on standing is an involuntary posture assumed by the patient to relieve the pressure at these points and is not caused by arthritis of the intervertebral articulations, as asserted by Putti.

* Read in opening a discussion at a joint meeting of the Sections of Neurology and Psychological Medicine, and Orthopaedics and Fractures at the Annual Meeting of the British Medical Association, Plymouth, 1938.

Aetiology

Pain in the sciatic distribution may be caused by many forms of bony abnormality, such as sacralization of the fifth lumbar vertebra, or a separate first sacral piece which may be called a sixth lumbar vertebra. Sacro-iliac subluxation from trauma or due to the flat back acquired on an operating table under a prolonged anaesthetic is another cause of pain in the region of the lower part of the buttock which may be associated with pain down the back of the thigh. This pain, which is sometimes agonizing, may be due to the lumbo-sacral cord being pressed on by the sharp edge of the sacrum at the sacro-iliac joint. These cases are sometimes dramatically cured by manipulation under an anaesthetic.

Bony disease in the pelvic bones, such as Paget's disease affecting the ischium, or other tumours of the pelvic bones or in the pelvis, secondary malignant growths in the lumbo-sacral spine, or tumours in the lumbo-sacral cord or cauda equina, have all to be considered in the diagnosis of obscure cases of pain in this region. What may be called malignant sciatica is by no means an uncommon sequel of carcinoma of the breast.

In the diagnosis of these cases care must be taken to examine for muscular wasting in the leg or thigh, for patches of anaesthesia, or for alterations of the deep reflexes. If the knee-jerk is diminished or lost we know at once that the case is not a true sciatica, but that the anterior crural system is involved. Lumbar puncture and examination of the cerebrospinal fluid may give a clue in tumours low down in the spinal canal involving the sacral cord or cauda equina. Besides the more usual forms of tumour such as fibroma or sarcoma, cysticercus, lipoma, and chronic arachnoiditis, with cystic formation, may be mentioned, and herniation of the body of an intervertebral disk. These will scarcely show in radiographs, except with careful lipiodol pictures. The pressure may be found to be below normal, and there may be other evidences of spinal block, with high protein content in the fluid.

Tuberculous caries of the ilium or sacrum, with or without psoas abscess, or intrapelvic pressure from a high forceps delivery in childbirth may press upon the nerve and cause severe dropped foot, with anaesthesia of the sciatic distribution. I saw one such case, with left sciatic paralysis, in which delivery was accomplished under an anaesthetic. There was also paralysis of the musculo-

spiral nerve on the right side from arm pressure against the edge of the table. The diagnosis which had been sent up with the case to hospital was "crossed paralysis."

Osteo-arthritis of the hip-joint may cause pain not only in the region of the hip and knee but even down to the ankle, and true sciatic neuritis may result from spread of the inflammatory reaction around the hip-joint to the sciatic nerve, which passes only half an inch behind it. In all cases it is advisable to examine the movements of the hip-joint to make sure that they are free. In many cases of sciatica, whether of the low or the high type, the pain will be increased by stretching the nerve, as by flexing the hip with the knee straight. This sign is usually known as Lasègue's sign, which is precisely the same as Kernig's sign in meningitis. Patients suffering from sciatica usually prefer to lie on the opposite side, with the affected knee slightly drawn up, and a pillow should be given to separate the knees, with a curved support under the bedclothes to prevent the weight pressing on the foot.

Points in Diagnosis

There are many points, therefore, to attend to in the diagnosis of a case of apparent sciatica when first presented: knee-jerks and Achilles jerks should be compared with those on the other side, muscular wasting should be looked for, and the sensation also tested. The hip-joint should be moved and the nerve stretched gently to look for increase of pain, and a rectal examination is generally advisable. If the knee-jerk is diminished, tabes dorsalis may be thought of and the pupils examined, or alcoholic or diabetic neuritis looked for.

Tenderness over the notch in the buttock and along the upper part of the nerve is common in the low type of sciatica, but usually this is not present in high sciatica with contralateral scoliosis. There is no wasting of muscles in the common rheumatic types of sciatica, either of low or high type, except in the very chronic cases of many months' or years' duration, when the nerve may be actually shrunken and cord-like. In such extreme cases it will be necessary to cut down upon the nerve and scarify it longitudinally in order to free the adhesions.

Treatment

The treatment of sciatica will vary according to the type. In the low type of sciatica, especially when there is tenderness at the notch and the patient leans towards the affected side, rest in bed should be insisted on, and local heat by radiant-heat lamp or infra-red rays may give considerable relief. Some practitioners favour short-wave radiotherapy, and I have seen this successful when most other treatments have failed, but as a rule I have not found diathermy to be of much service. Galvanism often aggravates the pain in the acute stage of sciatica, though in the chronic stage it sometimes may prove valuable. Moist hot packs, such as cataplasma kaolini or mud packs, or mud baths at Harrogate or at the Continental spas such as Pistany or Acqui, may be given in chronic cases where the patient is able to walk. The very acute cases must be treated in bed. Local applications of liniments, such as A.B.C. or methyl salicylate, may be applied in addition to hot packs, and for the acute pain analgesics should be used freely. Compound aspirin tablets with or without codeine, and in more severe cases pyramidon, heroin, and medinal cachets, or actual injections of omnopon or morphine, may be necessary to tide the patient over the severe attacks of pain and to produce sleep.

Two methods of massive injection of novocain and saline may be used with great benefit in a large proportion of cases, and sometimes rapid cure may follow their use. In the low type of sciatica such as that following lumbosacral fibrositis, in which there is tenderness on pressure over the nerve in the buttock and at the notch, the injection may be made into the nerve trunk itself at the notch and a second injection at the level of the small trochanter. This is not the place to give the details of the method of injection, but 2 c.cm. of 2 per cent. novocain are first injected into the nerve and then 80 to 100 c.cm. of normal warm saline. A second injection may be of service a few days later. This method of injection of the nerve was first used in 1902 by Lange (1904).

Another method of epidural injection was advocated in 1901 by Sicard (Sicard, 1921)—by injection of novocain and saline up to 100 c.cm. into the sacral canal through the sacro-coccygeal foramen. Owing to the sacral canal not communicating with the intrathecal space, which ends at the level of the lower end of the first piece of the sacrum, the saline forces its way upwards outside the theca, stretching the sacral and even the lumbar roots as they emerge. This method is probably of greater service in the high form of sciatica. Other solutions are sometimes used, such as 10 to 20 c.cm. of a 40 per cent. solution of antipyrine, as Feiling (1928) recommends.

For obstinate chronic cases Dogliotti's method of intraspinal injection of absolute alcohol has been recommended; but it is a dangerous treatment, and should not be undertaken by a novice. I have used it with success in a case of eight years' severe constant pain and misery due to sacralization of the fifth lumbar vertebra, procuring several months' complete relief of pain, though for the first fortnight sphincter paresis was present.

Fixation of the limb with a Liston splint along the side has been advised, but I do not recommend it, as patients usually cannot bear to be kept in a fixed position for many hours. Another form of fixation is sometimes of benefit—namely, a plaster jacket, applied with the patient slung up by the armpits and head so as to stretch the spine, the plaster bandages being applied from under the armpits to just below the level of the great trochanters. The advantage of a plaster jacket is that the patient can get about and even attend to his business, in reason, though it has certain obvious disadvantages. An alternative is keeping the patient confined to bed, with the feet raised on six-inch blocks, and extension to the spine applied by means of leather anklets attached by cords running over pulleys fixed on the foot of the bed to separate shot-bags weighing 6 to 8 lb. A certain amount of counter-extension by padded axilla rings tied to the head of the bed will probably be necessary in addition to the raising of the foot of the bed on blocks. This method of extension does not preclude a certain amount of lateral movement or rotation by the patient, and the weights are easily detached at night or for toilet purposes.

If a plaster jacket is applied it is very important that proper extension to the spine, including the neck, should be arranged for during the whole period of the fixing of the plaster and its setting. This is best done by the use of Sayre's extension apparatus, with tripod and pulleys fixed to leather bands for the chin and occiput, and axilla pads. The patient is slowly and carefully raised by the pulleys on to his toes, most of the weight being taken by the arms. If raised in this way the patient can remain quite comfortably semi-suspended while plaster bandages are applied from axillae to trochanters over a

stockinet vest, the bony prominences, such as the iliac crest, being well padded with adhesive felt, known as elephant plaster.

Conclusion

Briefly, therefore, the treatment of an acute severe sciatica should be complete rest in bed, with local anodyne liniments and cataplasma kaolini, and sometimes local heat by infra-red rays. Analgesic drugs must be given, such as aspirin, phenacetin, and caffeine tablets, with or without codeine or opium, and even morphine or heroin injections may be required for a few days. Sleep may be obtained by the use of $7\frac{1}{2}$ grains of medinal with two veganin tablets. Massage must never be used in the acute stage. Later in the more chronic stage massage may help, and galvanism, diathermy, or local heat should be tried. If these fail, massive injection of the nerve or epidural injection by novocain and saline, and extension by weights attached to anklets, with counter-extension at the axilla, should be tried. If these give only temporary relief, it may be advisable to fix a plaster from the axillae to the trochanters so that the patient may be able to get about and attend to a certain amount of business.

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INTERVERTEBRAL DISK LESIONS AS CAUSE OF SCIATICA*

BY

JOSEPH S. BARR, M.D.

Boston, Mass.

(WITH SPECIAL PLATE)

A symposium such as this, which brings before us the experience of various men gained from the laboratory, the operating theatre, and the office or dispensary, is a valuable method of integrating our expanding knowledge concerning sciatica. It gives me particular pleasure to open the discussion, and I am deeply sensible of the honour conferred upon me.

For our purposes we may define sciatica as a symptom characterized by the complaint of pain in the posterior thigh and postero-lateral calf. You will note that I do not call it neuralgia, neuritis, or radiculitis, nor do I state that it is pain in the course of the sciatic nerve. It is presumably peripheral pain in the regions supplied by the sciatic nerve, due to irritation of the nerve or of any of the roots of the lumbo-sacral plexus which form the nerve. It must be obvious to all but charlatans and quacks that there are many causes of sciatic pain, the mere enumeration of which is tedious. The actual pathological change present in many, perhaps most, of the clinical cases of sciatica is unknown. It is quite probable that further advancement in our knowledge of this condition will come chiefly from increased experience of the actual pathology present and not from theoretic considerations or didactic therapeutic tests. A search of the literature reveals a plethora of cures and a sad dearth of know-

ledge as to what is being cured. There is one group of patients whose sciatica we have come to recognize as being due to the pressure of intervertebral disk tissue displaced posteriorly against one or more roots of the cauda equina. It is of this pathological entity that I wish to speak.

Anatomy

A normal intervertebral disk is composed of a semi-fluid gelatinous central nucleus pulposus which is encircled by a ring of dense coarse fibrous tissue, the annulus fibrosus. The annulus is intimately attached to the cartilaginous end-plates of the vertebrae immediately above and below each disk and also blends with the strong anterior and posterior longitudinal vertebral ligaments. Each intervertebral disk has a certain internal pressure which prevents its collapse when the superincumbent weight is placed upon it. The total amount of spinal mobility is the summation of the mobility of each of the intervertebral disks.

The function of the disk is to permit mobility of the spine, to cushion the central nervous system from trauma, and to transmit the body weight from one vertebra to another. Schmorl has made exhaustive studies of the pathological changes which occur in intervertebral disks. Extrusion of the nucleus pulposus may occur in any direction, following weakening of its surrounding tissues by developmental defect, disease, or trauma. If the cartilaginous end-plate is weakened, protrusion may occur into the vertebral body. Such lesions can often be detected by radiographs. (See Fig. 5, Special Plate.) So far as is known, these protrusions never cause radiating pain. If the annulus fibrosus is weakened by disease or trauma, peripheral protrusion of intervertebral disk tissue will occur, sometimes slowly, as a developing hernia, sometimes very rapidly, as a traumatic rupture. Schmorl found that small posterior protrusions into the spinal canal occurred in about 15 per cent. of spines examined at necropsy. He felt that they were of no particular clinical significance. Kocher in 1898 and Middleton and Teacher in 1911 reported cases of traumatic posterior intervertebral disk ruptures of sufficient size to cause paraplegia.

Neurological surgeons have recognized and removed tissue arising from intervertebral disks and pressing on the spinal cord or nerve roots, and have called these tumours chondromas or ecchondromas. It is quite probable that most of these tumours were not true new growths, but were actually displaced intervertebral disk tissue. With the advent of localizing diagnostic procedures, particularly the use in the subarachnoid spaces of iodized oil opaque to the roentgen ray, we have begun to appreciate that these posterior protrusions are not uncommon lesions and that many patients whose sciatica was previously unexplained, or who had been treated for sciatic scoliosis or lumbo-sacral or sacro-iliac strain, were in fact suffering from pressure on one or more roots of the cauda equina caused by displaced intervertebral disk tissue. We have had over eighty cases verified by operation at the Massachusetts General Hospital. Posterior ruptures of intervertebral disk tissue may occur at any level, but seem to occur most frequently in the cervical and lumbar regions. The disk between the fourth and fifth lumbar vertebrae is by far the most common site. This is probably due to the fact that this represents the apex of the anterior lumbar curve and the point of maximum stress from the superincumbent body weight. About 50 per cent. of the lumbar lesions occur at this disk; 35 per cent. at the lumbo-sacral disk. It is obvious, I think, that the symptoms and signs of a ruptured lumbar

* Read in opening a discussion at a joint meeting of the Sections of Neurology and Psychological Medicine, and Orthopaedics and Fractures at the Annual Meeting of the British Medical Association, Plymouth, 1938. Material from previously published articles by Dr. J. W. Mixer, Dr. A. O. Hampton, and the author has been freely adapted for this paper.