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EMERGENCIES IN GENERAL PRACTICE

IS IT POLIO ?

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Before one tries to answer this question—which may be posed to the general practitioner silently by his own thoughts or openly by the anxious parents—it is necessary to realize that it will never be asked at all for the greater proportion of those infected. Even in the largest epidemics the majority of those who acquire the infection either remain unaware of any disturbance or at most suffer a brief and usually mild systemic illness for which medical advice is not sought. With many other infectious diseases the doctor is often put on his guard by the knowledge that cases are occurring in his area; with poliomyelitis, in many parts of the country overt infections will be uncommon and it may be that a practitioner will encounter but one or two paralytic cases during the whole season. No doubt his awareness of the possibility of the disease during the summer months will be increased by the lay press, which still tends to regard even the single case as news. The purpose of the present article, therefore, must obviously be to try to sharpen the focus in regard to the clinical pictures which the disease can present. In order to clarify the issue the question may be discussed in regard to three distinct problems. First there is the attention to be paid to minor illness during the poliomyelitis season; second there is the question of the correct diagnosis of the patient who presents with apparent paralysis; and third there is the proper appraisal of the signs of bulbar involvement.

Clinical Course of Poliomyelitis

Although in some cases the appearance of paralysis marks the onset of illness, the classical course—which is most often seen in epidemics—has a biphasic character. That is to say, at the onset the patient experiences a "minor" illness the symptoms of which are quite non-specific and raise no suspicion of the true nature of the disease. This illness lasts for a few days, at the end of which complete recovery seems to take place. However, after an interval of several days the patient again becomes ill (this is often termed the "major" illness)—this time with symptoms and signs which point to central nervous system involvement. It seems possible that the minor illness marks the entry of the virus into the blood stream and that it is during the latent stage that the virus invades the central nervous system. From the practical point of view it is clear that four different clinical patterns may be produced: (i) there may be a minor illness only which is followed by complete recovery; (ii) the minor illness may be succeeded by a major illness during which actual paralysis does not ensue; (iii) the minor illness is succeeded by a major illness with paralysis; (iv) there may be no observable minor illness and the apparent onset dates from the beginning of paralysis.

The Minor Illness

The patient is febrile and may complain of a variety of symptoms. Lassitude, general pains, slight soreness of the throat, vague discomfort in the abdomen are common enough—but the important point to stress is that the clinical picture is indefinite and is unlikely to call for particular comment—except perhaps that "influenzal" attacks are un-

usual in the summer. In common with so many other virus infections, there is no means of making a precise diagnosis of poliomyelitis in such a case: one can only suspect. Nevertheless, at the risk of seeming over-cautious, there is need to suggest that vague febrile illnesses for which no precise explanation can be offered should, during the "polio season," be given special attention. This cautious attitude may be commended for two reasons. In the first place such abortive attacks of poliomyelitis are infectious and can be foci from which further spread of the disease occurs. Although one fully appreciates that healthy carriers far outnumber those with apparent infections, it seems possible that the individual with an overt attack may be more infectious, and, especially when there is still little local evidence of epidemic spread, such cases may be more dangerous. Secondly, from the point of view of the individual involved, it seems possible that careful management of the minor illness may lessen the severity of the major illness. Although this particular point is still unproved, there is no doubt of the danger of excessive physical activity during the early stage of the major illness, and it thus seems wise to preach that the minor illness when suspected should be seriously regarded. In this respect too it is surely worth emphasizing once again that in all these vague febrile illnesses which are presumed to be of virus origin there is no evidence whatsoever that antibiotics are of any value. The association between intramuscular injections and the appearance of paralysis in the limb used for the injection must be regarded as proved. It is therefore very unwise to administer penicillin, and this is a strong argument in favour of the practitioner trying to avoid intramuscular injections during the polio season, except when there are clear-cut indications of a bacterial infection which will respond to their administration.

It is therefore strongly recommended that at this time of the year unexplained fever should be considered with some gravity; the patient should be confined to bed during the febrile episode and he should be made to avoid undue activity for one week after the temperature has become normal.

The Major Illness

Although here again it is impossible to define a group of specific symptoms or signs, pain and paraesthesia dominate the picture. In infants and young children this almost certainly accounts for the restlessness, the extreme irritability, and the fractiousness. In this age group, too, the mother often comments that she was struck by the slackness of the muscles when the child was lifted. Vomiting is seen in from a third to a half of the cases. In the older patient who can voice his complaints the commonest in order of frequency are headache, irritability or listlessness, muscle pains, constipation, inability to pass urine or incontinence, sore throat, and abdominal pain.

Pain may be generalized, but is often most severely complained of in the head and down the spine. Nuchal rigidity and spinal stiffness are usually present, but if tested for by the conventional lifting of the head up from the pillow their presence will often be missed. When the patient's confidence has been gained he should be asked to sit up and to try to "kiss his knees" or to touch his knees with his chin. Characteristically the patient cannot bend forward at all; the whole spine is held stiffly, the head tends to fall backward, and the body has to be supported by the arms spread out behind—the well-known "tripod" sign.

The pain and tenderness of muscles is often generalized and can be exquisite. For this reason the clinical examination must be carried out with the greatest patience and forbearance. In the majority of cases all the essential information can be elicited by careful and prolonged inspection, and it is quite unnecessary and indeed often undesirable to attempt detailed muscle testing. Although it should not need to be said, the use of painful stimuli such as pinpricks to see if the limb will be moved is entirely out of place and must be seriously condemned. The examination of the restless and querulous child with possible poliomyelitis should present a challenge to the physician to elicit his information with the least upset.

If first seen at the onset of the major illness paralysis will usually be absent, although its presence may be simulated by the failure to move the limbs as a result of the inhibiting effect of the muscle pain. Paralysis, if it is going to develop, usually appears within two to three days. Spread of paralysis may continue for as long as a week. There is therefore no ground for the common mis-statement that "the maximal paralysis is seen at the onset," but it is in a general way true to say that if paralysis is going to occur it will have appeared within five days of onset of the major illness and that extension of the paralysis is unlikely to occur after ten days from the onset.

Helpful Features in Diagnosis

It is at the beginning of the major illness that the practitioner is most frequently consulted. To what points should attention be specially directed?

1. *History*: The biphasic form of the illness is especially common during times of epidemic prevalence, so that a history of a preceding minor illness will often be elicited. Contact with an actual paralytic case is not usual, but a history of contact with others who have had unexplained febrile illnesses is often obtained.

2. *Signs and Symptoms*: The importance of generalized or local pain and tenderness has already been emphasized. Disturbance of bladder function is strongly in favour of a diagnosis of poliomyelitis, and, although retention is most common, incontinence (not necessarily due to overflow) is also sometimes observed.

3. *Cerebrospinal Fluid*: It is, of course, during this stage of the disease that C.S.F. changes are first seen. When for one reason or another the diagnosis of poliomyelitis can be made with certainty on clinical grounds, it seems unnecessary to submit the patient, in whom excessive pain is a paramount symptom, to an unnecessary lumbar puncture. There are, however, many cases, particularly when nuchal rigidity is marked, in which the diagnosis is uncertain and where lumbar puncture is called for. It is unnecessary to remove a large quantity of fluid, for the main examinations required are the cell count and the sugar content. The conditions which require to be excluded are the acute forms of meningitis, tuberculous meningitis, and (in certain districts) leptospirosis. I have not personally observed any deleterious effects from the operation.

4. *Localized Pain*: Although localized pain and indeed pain flitting from one site to another are not unknown in poliomyelitis, when present they should give rise to the suspicion that some other condition may be the cause. Trauma and local acute inflammations of bone or joint are the commonest pitfalls. Judging from hospital experience, these are (apart from the more obvious and more easily diagnosed infections of the upper respiratory tract) the conditions which seem to give rise to most difficulty. So far as trauma is concerned, one must bear in mind that most children are constantly falling, and such a history should not cause one lightly to set aside the possibility of poliomyelitis. Observation over a few days is wise, and it is in such cases that the avoidance of a fussy and pernickety examination at the first visit will repay itself. The child's co-operation having been gained by causing little pain or discomfort, subsequent examinations will be conducted with

increasing ease. Osteomyelitis and acute arthritis may produce all the appearance of a paralysis, especially in young patients. The intensity of the pain, its constantly focal character, the local swelling, and the toxic appearance are useful guides. Although the patient with poliomyelitis can appear very ill and highly febrile, the eyes are usually bright, the tongue is seldom dry or heavily coated, and the adynamic appearance of the child with a severe bacterial infection is absent. Examination of the white blood cells will give valuable information in such cases, for a polymorphonuclear leucocytosis is not seen in poliomyelitis.

When in doubt the only course is to wait and see. During this period the essential prescription is to ensure that the patient is completely rested—mentally and physically. It is perhaps not too much of a paradox to say that the need of the moment is calm, both on the part of the doctor and that of the patient's family. If at this stage the word polio is only silently raised in the doctor's mind so much the better. But if the fear is voiced by parents or relatives it is very desirable that any appearance of that fear or anxiety is kept out of the sickroom. It is, I am satisfied, a great disservice to the patient to be given the impression by the solemnity of the doctor or the tears of the relatives that something awful is happening. Serious as the condition is, we need constant reminding that a high proportion of the cases in which a definite diagnosis is made go on to a first-class functional recovery. There is therefore every reason for surrounding the patient at the outset with an aura of hope and confidence.

The Paralysed Patient

Particularly in young children, but often enough even in adults, the first sign of the disease is the discovery of paralysis. The mother observes a limp arm or leg when dressing the child; the adult complains of a weakness of the leg or a stiffness and pain in the neck. In such cases careful and painstaking muscle testing must be carried out to define the affected group. Starting with the toes and fingers, the ability to move each joint is tested, without and with slight resistance. It must be appreciated that every conceivable grade of involvement may be encountered and that no muscle groups are immune. The muscles supplied from the lumbar and cervical enlargements are those most often implicated, the lower limbs most commonly of all. If two limbs are affected it is usual to find that the paralysis is asymmetrical. Pain and tenderness are often very slight in this type of case, and, apart from avoiding any overtesting of the patient, the examination should be patient and painstaking.

The paralysis is, of course, due to involvement of anterior horn cells so that the deep reflexes disappear from the group affected. The loss of reflexes is not a very useful guide, for their absence is most obvious when the paralysis is severe and the diagnosis otherwise easy; in mild cases with minimal involvement, therefore, the presence of reflexes will not prove helpful. Loss of muscle tone takes place very rapidly, and careful palpation may elicit suggestive evidence in young children who cannot be made to assist in the examination. Similarly vasomotor changes may produce a localized coldness of the skin appreciable to the sensitive examiner. During this early stage muscle testing by electrical reaction is quite unnecessary.

The other forms of paralysis which will require to be considered include diseases of the cord such as Landry's paralysis and haematomyelia, polyneuritis—for example, post-diphtheritic—and polyneuropathy (Guillain-Barré syndrome). The precise diagnosis of such conditions is often made retrospectively and will usually depend upon special examinations only possible in hospital. A point of clinical value is that in poliomyelitis no sensory disturbance is observed. This may therefore constitute an important negative sign.

Finally a word must be said regarding hysterical paralysis. Hysteria will be mentioned again in regard to the question of respiratory paralysis, but in every epidemic there are encountered undoubted examples of hysterical skeletal pseudo-paralysis. Such a diagnosis should always be reached

with reluctance, for it is too easy for the busy doctor to be deluded into regarding the rather anxious adult as a hysteric. In some cases the paralysis is so bizarre as to force one to the conclusion fairly rapidly. But it is better to be innocently deluded on occasions than to risk the much worse situation of finding that one has so misdiagnosed a true case of poliomyelitis.

Respiratory Involvement

Death in poliomyelitis always arises from disturbance of ventilatory function. This may result from paralysis of the respiratory muscles, from abolition of the swallowing and cough reflex, or perhaps from actual viral involvement of the respiratory centre. It is always a danger when an attempt is made to rationalize a subject for the purposes of teaching that one thereby tends to oversimplify. It should therefore be emphasized at once that the correct diagnosis and proper assessment of ventilatory defect is always a matter of extreme difficulty and that it is impossible to lay down clear-cut pictures of "typical" cases. Further, the signs produced by actual virus damage may be confused by the presence of changes resulting from cerebral anoxia and carbon dioxide retention, and the separation one from the other will prove an impossible and fruitless clinical exercise.

Involvement of respiration may arise in two main ways. In the first a patient who has originally presented with a skeletal paralysis shows ascending involvement with paralysis of diaphragm, intercostals, or abdominal muscles. Such cases are often termed "dry" because they have retained the capacity to swallow. Provided adequate ventilation can be obtained, these patients will often remain dry. In the second group the respiratory muscles may retain adequate power and the almost sole defect is that of swallowing. These constitute the "wet" cases. Stated thus, this simple grouping is neat and tidy; unfortunately many cases exhibit aspects of both groups so that the borderland is hazy and ill defined.

The possibility of respiratory muscle paralysis will obviously be in mind when the skeletal paralysis is widespread; it is important to realize that it is a possible danger whenever the shoulder girdle and neck muscles are involved, even when that involvement seems slight. Particular attention must be directed to the movements of the intercostals, the diaphragm, and the abdominal muscles. The use of accessory muscles in the neck produces tugging of the sub-mandibular tissues; there may be indrawing of the supra-sternal space; paradoxical movement of the abdomen may be observed during inspiration; or there may be indrawing of the intercostal spaces. Asking the patient to count out loud during an expiration forms a simple and useful test of muscular control, and one which can be repeated to give comparable figures.

Patients with swallowing defect may present without other evidence of paralysis, and such cases can develop signs of distress with great rapidity. The combination of dyspnoea, cyanosis, and moisture in the lungs may closely simulate an acute pneumonia, and indeed such is often the early suspicion. Inspection of the throat discloses the pool of aerated, bubbling secretions. The patient may be drowsy and proceed to actual coma. When paralysis of swallowing is accompanied by a paralysis of the respiratory muscles the outlook is particularly grave.

Such patients are not difficult to recognize, provided the possibility is borne in mind. Once suspicion is aroused there must be no loss of time in obtaining skilled assistance.* Regional centres—usually in the main fever hospitals—are available for the treatment of these difficult cases and immediate admission should be arranged. The importance of placing the patient in the prone position in order to ensure that secretions and vomitus are not drawn into

the lungs is not yet sufficiently widely appreciated. Many doctors seem to be under the impression that when the capacity to swallow or to cough is abolished the patient should be sat up. This is, of course, quite fallacious and may result in the death of the patient.

A further word should be said here regarding hysteria. Patients with ventilatory deficiency are often anxious and apprehensive. They may indeed suffer from hallucinations and become confused and delirious. It is only too easy to delude oneself into thinking that the patient (perhaps known to be the "worrying type") is working himself into an acute anxiety state and that the whole thing is of a hysterical character. The most careful appraisal of such individuals is essential, for often enough subsequent events show that there are strong grounds for the patient's apprehension.

Follow-up of Minimal Cases

When for any reason the tentative diagnosis of poliomyelitis is made as a result of a minor illness or of a non-paralytic episode it is most important to ensure that the patient is reviewed from time to time during the succeeding year. The orthopaedic surgeon frequently encounters patients with early scoliosis, shoulder-girdle weakness, slight dropped foot, or a winged scapula who had a known febrile illness during the polio season. Often enough it transpires that a diagnosis of non-paralytic poliomyelitis was made. Weakness of a muscle group—particularly of the spinal muscles—may be very difficult to assess in the acute stage, and the practitioner should try to follow up such cases in order that remedial measures may be taken before gross deformity results.

Contacts

When the question "Is it polio?" has been answered in the affirmative the emotional concern of family and friends is considerable, and the doctor will be besieged with requests for the action to be taken in regard to contacts. In the first place, with great respect to those who argue in favour of a strict quarantine, it is worth making the point that isolation would seem to have played a very minor role in the prevention of spread of other diseases endemic in the community. For the "exotic" infections such as smallpox, in which the epidemic results from single introductions into a virgin community, strict isolation pays dividends because of the comparative ease with which all affected cases may be recognized. In a situation where the mass of infection is unrecognized and unrecognizable it is difficult to believe that strict isolation of all contacts is likely to succeed in limiting spread. This is, however, a thorny problem which in the present stage of our knowledge cannot be adequately solved by emotional argument, and it is well that the subject is being thoroughly investigated.

So far as the welfare of the individual contact is concerned, the only advice which it seems reasonable to give is to avoid all excessive physical activity. Should any febrile episode occur the patient must go to bed at once and remain there for one week. Even when this practice is carried out faithfully paralysis may still develop, but experience suggests that the subsequent illness is mild. Although double infections in the same family are not common, they occur with sufficient frequency to make it dangerous to assert that they never occur.

Conclusions

Poliomyelitis may present in many guises, by no means all of which are associated with paralysis. The classical form may be diagnosed fairly easily. For many cases, however, no absolute guidance can be given which will serve to answer the question "Is it polio?" categorically. A cautious approach is advised in regard to the occurrence of unexplainable febrile illness during periods of prevalence of the disease. It is possible that strict bed-rest of these patients may lessen the risk of extensive paralysis. Particular watchfulness for patients with evidence of involvement of the respiratory function is desirable, since they comprise the life-threatening forms of the infection.

*See also the earlier article in this series on "Respiratory Insufficiency in Poliomyelitis and Other Diseases," by Dr. W. Ritchie Russell (January 8, p. 98).