dislocation is simple or complicated by fracture. If the deformity is slight it may be difficult to decide, in spite of palsies, whether we are dealing with a fracture or merely with compression due to hemorrhagic effusion. In many cases a positive diagnosis is not possible.

CHAPTER XXXVIII

TUBERCULOSIS OF THE VERTEBRAL COLUMN

Tuberculosis of the vertebræ occurs only in certain well-defined portions of the bones. In the cervical segment the disease is in some cases situated in the articular processes; as a rule, however, the bodies, and, still more definitely, the anterior surface of the bodies, are affected. In children the erosion of the vertebræ makes rapid progress; the corresponding spinous process becomes prominent early in the disease, causing what is known as the Pott's hump or angular kyphosis. As soon as this is present, no further doubt need be entertained about the nature of the trouble, for the kyphosis seen in rachitis is *arcuate*; the column is arched, with convexity directed backward, and a slight lateral curvature is usually present. In Pott's, in addition to the painful, prominent vertebræ, the symptoms of a gravitation abscess may often be found. Such a symptom-complex is unmistakable. In the initial stages an expert may fail to recognise the disease. I therefore emphasize that the most trivial symptom must receive due attention. The mother usually draws our notice to the first symptoms. She relates that the child now maintains a strained, uncertain posture, and that the gait has become staggering. Turning or sitting grows difficult; the child sits down

carefully and slowly, without bending its back. On attempting to pick up some object from the floor, the patient holds his spine rigidly. Approaching close to the object, and flexing both hips and knees, the child squats down with its back held straight, and picks up the object from the side. The condition is one of muscular rigidity of the spinal column, analogous to the fixation of the hip-joint in coxitis. The child avoids jarring of the body, and refuses to jump or run. It must not be forgotten, however, that in some cases both the rigidity and precautions against jarring are not prominent symptoms. Occasionally children with angular gibbus jump about and appear so active that a spondylitis is scarcely suspected. The other signs in these cases, therefore, require special attention. Sometimes from the onset, if the site of the lesion is in the dorsal segment of the spine, unilateral or bilateral intercostal pain or paræsthesiæ are found. Such patients have girdle sensations about the chest or a feeling of oppression in the epigastrium. Not to examine the spine, if these symptoms are present, would constitute no slight degree of carelessness. Palpation of the spines of the vertebræ will lead to the discovery of one which is exquisitely *tender* to pressure. Copeland recommends that a warm sponge be passed along the back; when the sponge passes over the inflamed vertebræ it is said to cause pain. Rosenthal passed the electrodes of a constant current, keeping them close to one another, along the spinous processes. At the diseased spot this manœuvre produced burning pain. If weakness of the extremities is already well marked at this period of the disease, it frequently happens that the weakness at once disappears if the superincumbent weight is removed from the diseased part by supporting the patient from the axillæ. This, of course, applies only to disease of the dorsal or lumbar spine. Early occurrence of contracture in some joint, for instance at the hip, may mislead, and cause us to suspect coxitis. The hip-joint is found flexed, extension is resisted, and the weakness of the extremities, to which attention is called by the parents, is assumed to cause a voluntary limp. I have seen an excellent surgeon fall into this error, therefore never omit to examine the spine in all cases of beginning hip disease. To mistake the diagnosis in a single case is more aggravating than to make many apparently superfluous and useless examinations. If increasing but gentle force serves to overcome the contracture without causing much pain, and yet the deformity soon recurs, coxitis may be ruled out. In the further course of the disease other symptoms arise which make it impossible to overlook the affection. In order to judge the stages of the disease properly, the general condition of the patient and the following three points must be kept in mind:

1. The local *deformity.* In discussing abnormal positions of the head, we have already drawn attention to the fact that when the trouble is located in the bodies of the vertebræ, kyphosis makes its appearance very early. It appears especially early in the dorsal segment, where the normal spinal column has a kyphotic curve from the time at which the child begins to walk to advanced age, in which a marked bow-like curvature —the senile gibbus—develops. Here the gibbus—the projecting spinous process—is most readily demonstrated. In the concave segments—in the cervical and

lumbar portions—the projecting spine of the vertebra is more difficult to discover. In the neck, especially in disease of the lower cervical vertebræ, a visible kyphosis develops. If torsion (rotatory deformity) is an early symptom, it speaks in favour of a focus of disease in the superior or inferior articular processes.

2. *Gravitation abscess.* We have mentioned, in discussing caries of the bodies of the cervical vertebræ, that retropharyngeal abscess may occur and lead to dysphagia and later to impairment of respiration. The difficulty experienced in swallowing is extremely troublesome, especially if a continuous desire to swallow is produced by the irritating action of the tumour. If a retropharyngeal abscess exists, it is safe to assume that the focus is in the body of the vertebræ. If the articular processes are the seat of the trouble, the abscess develops laterally in the neck, and leads to well-marked lateral bending of the cervical segment—that is, to torsion, scoliosis, lateral kyphosis, etc. These remarks may be applied to the other portions of the spine, *mutatis mutandis.* A gravitation abscess which descends along the anterior surface of the bodies of the vertebræ indicates that the bodies are the seat of the disease. Just as retropharyngeal abscess results from caries of the upper cervical vertebræ, so retro-esophageal abscess may be due to caries of the lower cervical or upper dorsal vertebræ. More frequently the pus points farther down, forming narrow, tortuous tracts, without causing compression or stricture of the esophagus. The inflammatory thickening of the neighbouring tissues prevents the rupture of the abscess into the thoracic or abdominal cavities. The abscess, by following along the track of the large vessels, finally enters the pelvis,

and attracts attention as a pelvic abscess. Very exceptionally perforation, with resulting fatal pleuritis or peritonitis, takes place. Lambl has described a case of rupture into the trachea. We have observed a case in which the abscess ruptured into the intestine. In its course downward into the pelvis the abscess can scarcely ever be recognised by percussing the back, because it forms long, narrow, tortuous tracts, which fail to give physical signs. After entering the pelvis, the abscess can be more readily demonstrated. In some instances a sense of increased resistance can be obtained in one iliac fossa, or as soon as attempts at deep palpation are made the child holds the muscles of the affected side of the abdomen more tense than on the normal side. At other times a deep-seated, resistant mass may be felt. Percussion may give dulness, or fluctuation may be obtained. I never fail to make this examination in every child with kyphosis of inflammatory origin. It is a remarkable fact that such abscess may disappear during the summer months, especially after suitable treatment has been instituted, only to reappear during the winter. Puncture may give only pure sero-pus. If, in spite of the presence of such an abscess, the hip-joint is free from psoas contracture, we may assume, with much certainty, that the abscess has made its way along the subserous tissues. It is retroperitoneal, but does not involve the psoas. If signs of psoitis are present, the abscess lies beneath the iliac fascia. With but few exceptions, psoas abscess is due to caries of the lumbar vertebræ. The symptoms have been described elsewhere.

In the cervical region caries of the transverse processes, or more often of the joints between the ascend-

ing and descending articular processes, causes laterally situated abscesses in the neck. In the dorsal spine caries of the joints produces gravitation abscesses along the back. The pus works its way through the numerous layers of muscles, creating a narrow, tortuous passage, and finally points far from the original site. The distance traversed may be considerable, usually below and farther from the median line, so that at first sight the causal factor may not be recognised. However, the local point of tenderness, discovered by deep pressure alongside the spinous processes, the limitation or absence of all rotatory movements of the spinal column, and the normal condition of ribs, scapula, and ilium—for abscesses may point upward along the back from this bone—permit the diagnosis to be made.

3. Symptoms indicating participation of the *spinal cord*, *meninges*, and *nerves*. Pathological anatomy has shown that the swelling of the inflamed portions of bone may involve the nerves, and thus give rise to the processes of neuritis and perineuritis. In the advanced stage the nerves appear atrophied, either as a result of a neuritis or secondary to degenerative changes in the cord. The meninges take part in the process as the result of inflammation by contiguity. Not only do thickening and clouding of the membranes occur, but the pus derived from the osseus inflammation spreads and peels the meninges away from the bone. The resulting abscesses may narrow the spinal canal to a considerable degree. The inflammation often involves the cord itself, so that myelitis is a not infrequent sequel. Soft, sometimes actually fluid, areas are found as a result of the myelitis. In the course of months, secondary degeneration of the tracts, both

upward and downward, occurs in the typical manner first discovered and described by L. Türk. Another frequent complication is compression of the cord due to various causes which have been previously indicated. How do these processes show themselves? Clinically, the neuritis manifests itself as neuralgia. The eccentric pain, intercostal neuralgia, and evident participation of the intercostal nerves characterizes the process, if in the dorsal region. The meningitis, as such, gives no symptoms. Involvement of the cord results in compression palsies. This is accounted for by the fact that, in addition to the myelitis, some compression is always caused either by bony displacement or by an abscess pointing into the canal. Paralysis due to compression is characterized by certain features: 1. The predominance of motor over sensory disturbances. 2. The great exaggeration of reflexes on the side subjected to irritation, unless the lesion is situated high up in the medulla, when the increase appears on the opposite side. Sometimes slight tickling of the sole of the foot promptly causes movement of the toes, foot, knee, and hip-joint on the paralyzed side, and, more rarely, erection of the penis. 3. The more or less complete disappearance of all the signs of paralysis where extension or a well-fitting corset is applied.

Brown-Séquard noticed that the paralysis disappeared after twenty-four hours of extension. V. Dumreicher presented the case of a blacksmith before the Vienna Society of Physicians, in which the patient, who previously was barely able to crawl about, at once walked several miles, after a well-fitting apparatus had been applied, in order to fetch the money demanded for the support. Of course the outcome is not invariably favourable. The sudden subsidence of the palsy seems magical on supporting the patient with both hands in the axillæ, thus raising the superincumbent weight from the inflamed parts. Such a

successful experiment at once convinces both the patient and relatives that mechanical treatment is far superior to salves and other remedies.

With such a variety of symptoms to rely upon, it is evident that there should be no difficulty in making the diagnosis of spondylitis. If a distinctly anæmic or scrofulous child has an angular kyphosis, with local tenderness over the prominent spinous process, it is suffering with spondylitis. That is the whole diagnostic apparatus. The diagnosis can be difficult only at the onset, before deformity appears. After its appearance, disease of the vertebræ can no longer be doubted.

The course of spondylitis in adults differs materially from that in children. While the gibbus develops in the course of a few months in infancy, it may require years to develop in the adult. In adults the rigidity of the spine, pain or pressure over the spinous processes, and especially pain produced by jarring (for instance, driving over uneven cobble-stones), is especially striking. As the course of the disease is more insidious than in children, its diagnosis becomes more difficult. In spite of this fact, even in the early stages, it can be confused with but few diseases. One disease requiring differentiation from Pott's disease is the so-called *hysterical spine*, which is characterized by marked sensitiveness over one or more vertebræ, and by pain on moving the spinal column. This is one of the chief symptoms of *spinal irritation*. It is seen in nervous, hysterical persons. The lightest pressure upon the spinous process causes much pain; firmer pressure is less painful; immobility is slight, and the symptoms are inconstant. Another case might be characterized by neuralgic pains, girdle sensations (feeling of a constricting band), and later by

the signs of a compression palsy. These may be due to circumscribed myelitis or tumours of the cord. In spondylitis, deformity must be well advanced before symptoms of compression appear. The neuralgic pains which precede the paralysis in diseases of the cord, as the first symptom, are unaccompanied by the rigidity of the spine, which is well marked in the early stages of spondylitis. At the onset, and even longer, the diagnosis may hover between caries and sarcoma of the vertebræ. The decision usually rests upon the great severity of the pain from the very outset in sarcoma, upon its persistence in spite of prolonged rest and proper treatment, and the failure of angular deformity to develop later on. Schlesinger mentions the following points in favour of the diagnosis of neoplasm: Bow-shaped kyphosis, *lateral* displacement of the spinous processes, tenderness to pressure next to the spine (without tenderness of the spinous processes), trophic skin disturbances, and herpes zoster.

In recent years several other diseases of the bones, which lead to distortion of the trunk, have been recognised.

Kümmel has described, as a special variety, a *traumatic spondylitis* in which there is a painful period following the trauma; subsequently a painless one, during which, in the course of months, a slowly progressing deformity of the trunk develops. In the majority of cases we probably are dealing with an unrecognised fracture of the vertebræ.

Paget's disease is the name applied to a certain variety of osteitis deformans. Its chief symptoms are the advanced age at which it makes its appearance, the bow-shaped kyphosis and rigidity of the spine, the slow, protracted course extending over many years, frequently starting with pain and deformity of the legs (position of supination and adduction), or the unsightly enlargement of the head, which is tilted forward.

Kahler's symptom-complex comprises the following: Severe distortion of the trunk (vertebral column, ribs, and sternum), great ten-

derness of certain spots, alternating with painless intervals, excretion of the Bence-Jones body in the urine. The suspicion that multiple myelomata always gave rise to this complex has not been verified.

In contrast to these rare forms we now mention the frequent picture of *osteomalacia*, which is well known from time immemorial: Onset during pregnancy or puerperium, exacerbation during succeeding pregnancies, changes in the bony pelvis, paresis of the ilio-psoas, adductor contracture, therapeutic influence of phosphorus.

CHAPTER XXXIX

SCOLIOSIS

In the domain of lateral deviation of the spinal column the physicians of our time are still guilty of many sins. On the one hand, beginning scoliosis often escapes unrecognised; on the other, slight lateral deviations are not taken seriously, and are passed over with the remark that they will disappear without treatment. The physicians should learn from the mothers—this includes both the recognition and the due appreciation of the gravity of the trouble. Scoliosis in a young girl is of the greatest significance, for it may endanger her life later on.

In dealing with a beginning scoliosis have the child stripped naked and place it upon a table or chair, in order to carefully observe it from the back. The child must stand in military posture, with its arms hanging down naturally and with the knee-joints fully extended. First of all, determine whether the legs are of equal length or not (the position of the gluteal folds will show this), for not infrequently scoliosis is purely of *static* origin. In these cases the deformity disappears as soon as the shortening is corrected by placing a book or piece of board beneath the foot of the shorter side. If the legs are of equal length, the relation of the arms to the trunk should be compared on both sides. If one