

SPONDYLITIS TUBERCULOSA MULTIPLEX

*A Report of Cases from
The Slavern Coastal Hospital (Chief Physician: H. Sundt, M. D.).*

BY

HERMAN THRAP-MEYER

It is a well known fact that tuberculosis of bones and joints often occurs in multiple form. Thus, *Sven Johansson* (1924) states that of his material, embracing 407 cases (children), 88, or 21 per cent., had multiple foci in bones and/or joints, while *Clairmont, Dimtza* and *Winterstein* (1931), in their mixed material, find no less than 24.8 per cent.

The occurrence of multiple foci in the vertebral column has however been regarded as a comparatively rare phenomenon. In *Hayashi* and *Matsuoka's* report from 1912, respecting 700 cases of tuberculous spondylitis the possibility of multiple occurrence of the lesion is not mentioned at all. *Karl Rummelhardt* (1930) finds among 178 cases treated in the course of 20 years 6 cases, or 3.4 per cent., with two localisations. *Valtancolli* (cit. *Johansson*) finds 1.9 per cent., and *Johansson* has among his 95 cases only one single case, i.e., 0.6 per cent., with 2 separate foci in the spinal column.

In strong contrast to these low figures we have *Businger's* report of no less than 9.8 per cent. with double localisation (cit. *Rummelhardt*), but this may perhaps be explained by the special character of his material, which consisted entirely of soldiers.

Pitzen, in 1929, points out that multiple foci in the spinal column are not so very rare, and in 1930 *Kremer* and *Wiese* claim to have observed on several occasions two foci, and in two cases actually three foci, in the same column. None of these authors state, however, the number of cases of spondylitis among

which those findings were made. *Clairmont, Dimitza* and *Winterstein* (1931) find as many as 14 cases out of 103 with two or more separate localisations, including in two cases 3 and in one case 4 foci. *Palmèn*, finally, in 1932, has found, among 444 cases of spondylitis, 2 separate foci in 6 per cent. of the cases (cit. ref. in *Nordisk Medicinsk Tidsskrift*).

It seems evident that there has been an increase in the number of these cases during the last few years. At any rate, the possibility of their occurrence is now being more clearly recognised than formerly.

In good accordance with these observations is also the fact that among 75 cases of spondylitis at present under treatment in the Coastal Hospital at Stavern there are no less than 7 indubitable cases of multiplex tuberculous spondylitis—*that is, cases in which one or more sound, or at any rate non-tuberculous, vertebræ intervene between two or more tuberculous foci in the same spinal column.*

As the diagnosis of such multiple foci is so very important, I have thought that an account of these 7 cases might be of some interest, and I therefore give the following particulars from the case-records in question:

Case I. — Esther. Farmer's daughter. Born in 1916. Admitted in March 1931.

There is tuberculosis in the family. In March 1930 she got measles and afterwards had inconstant, sometimes radiating pains in the middle of the back. The affection was regarded as »rheumatic pains« and continued almost unchanged until March 1931. She became stiff in the back and a gibbus was »accidentally« discovered. A week later she was admitted to the hospital.

Condition on March 25th, 1931: She is thin. Subjectively in good health. Temp. 37.5° C.

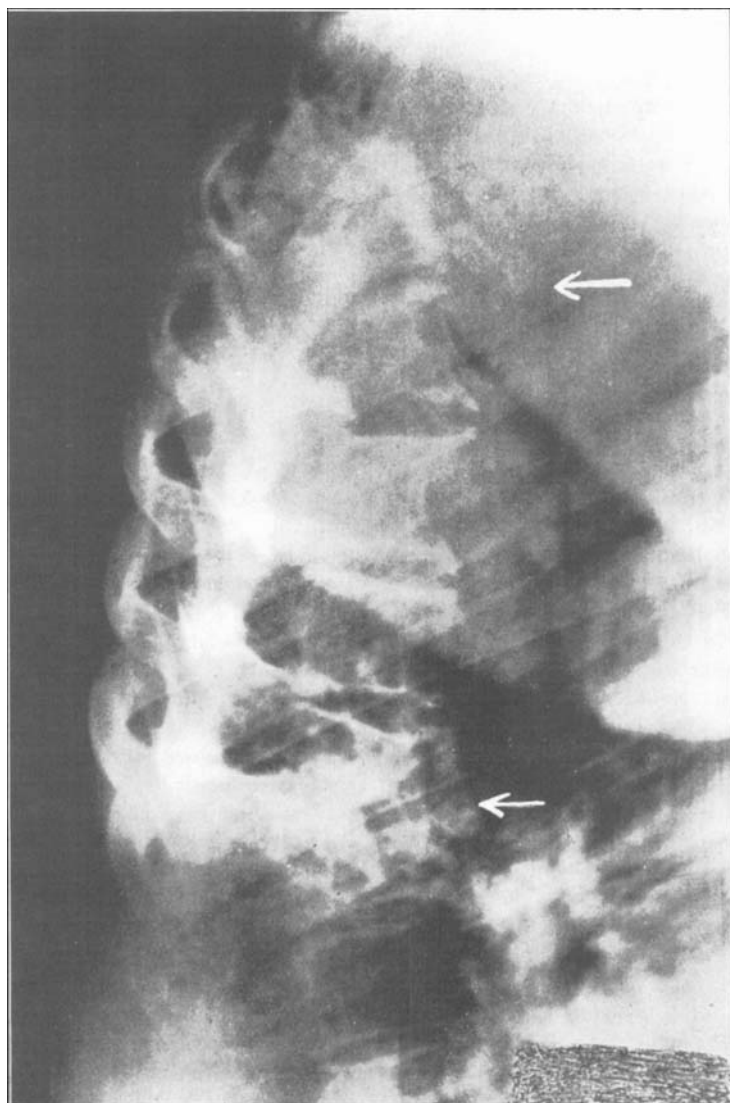
Lungs: Prolonged expiration in the left fossa infraclavicularis.

Spinal column: Angular gibbus at the point of transition between the thoracic and lumbar sections of the spine. No tenderness on pressure, either direct or indirect. The spine remains rigidly fixed when the body is bent forwards. No clinically detectable abscess. Tendon reflexes and sensibility normal. Pirquet positive. WR. negative. SR.: 48 mm.

The Roentgen examination showed the 10th, 11th and 12th thoracic and 1st lumbar vertebræ fused together into one rigid block. There was



Case 1. Ester. Front.



Case 1. Ester. Sag.

considerable calcareous atrophy and a partially calcified paravertebral abscess shadow could be distinctly seen.

The patient was put in plaster bed forthwith.

The back remained unchanged. Clinical and roentgenologic control every third month. Roentgen examination Sept. 26th, 1931, showed increased deposition of calcium. SR.: 25 mm.

Nov. 18th, 1931: During the last 3 days an abscess has appeared under the skin between the shoulders. No tenderness or distinctly palpable abnormality of the spinal column at that place. *Roentgen:* The old affection is practically unchanged, but also the 6th and 7th thoracic vertebræ are now destroyed and have collapsed. SR. increased to 37 mm.

In spite of being twice punctured the abscess became fistulous. It closed in the course of 4 months. The patient has since shown steady progress. SR. Nov. 14th, 1932: 14 mm.

Case II. — Simon. Farmer's son. Born 1905. Admitted October 1932.

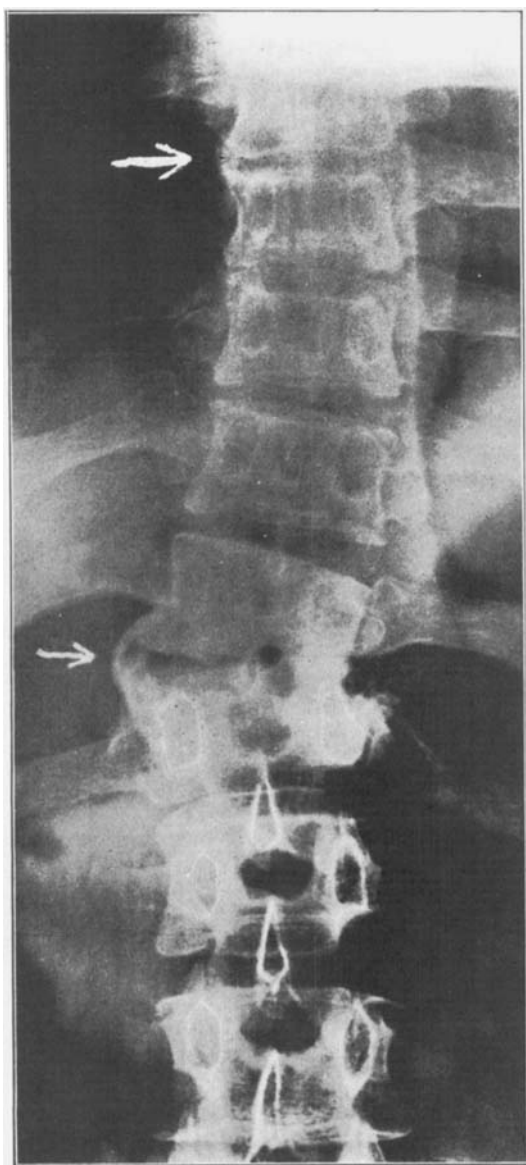
No data as to tuberculosis in his family or immediate associates. Had been in good health during boyhood. In 1929 he got a blow in the middle of the back while working, but continued his work (roadmaking) and after 3 days felt no pain in the back.

In October 1931 he had spontaneous but transitory pains in the back during work, but they passed away of themselves. In January 1932 the pains returned. They were seated in the lowest part of the thoracic section of the spine and became more severe when he walked or lifted something heavy. He went to a doctor, who diagnosed »strain«, but as the treatment employed had no effect, he went about in an ailing condition and unfit for work until June 1932, when he consulted another physician. The latter detected, both clinically and roentgenologically, a spondylitis in the lowest part of the thoracic column. In spite of this finding the patient continued to go about, waiting for room in the Coast Hospital, to which he was admitted on Oct. 10th, 1932.

There were then found some hard, nut-sized, indolent glands in the neck, but otherwise nothing pathological was observed, clinically, in the lungs, heart or abdomen. Pirquet positive. WR. negative.

Spinal column: There is a dextroconvex kyphoscoliosis with its apex over the 11th and 12th thoracic vertebræ, where the patient also feels direct and indirect tenderness to pressure. Moreover, there is a direct tenderness to pressure over the 7th and 8th thoracic vertebræ. All mobility is greatly restricted owing to pains around the gibbus. Normal reflexes, and no disturbance of sensibility.

The Roentgen examination showed destruction and considerable collapse of the 11th and 12th thoracic vertebræ, and also diminished

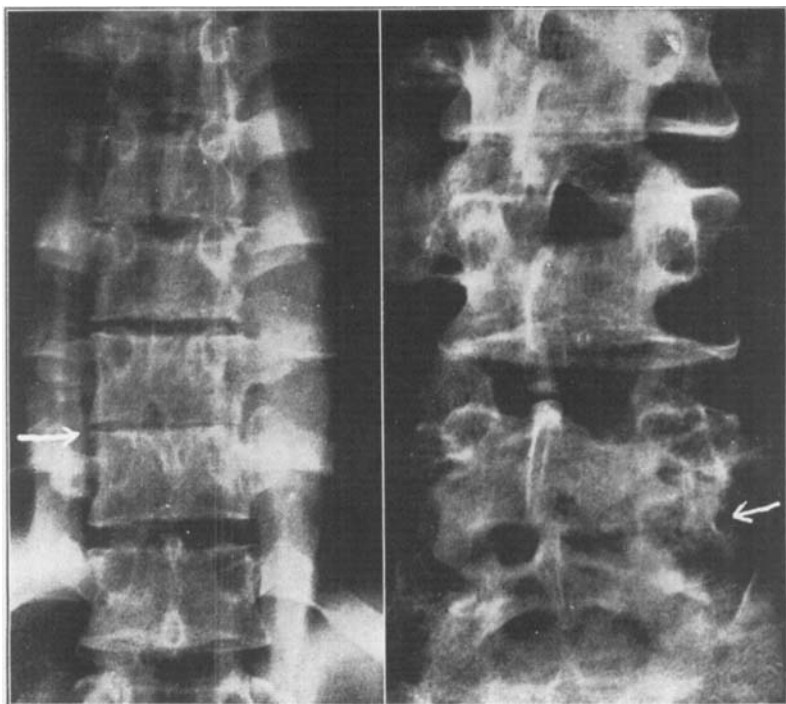


Case 2. Simon.

distance between the 7th and 8th vertebrae of the same section. On the right side is seen a distinct osteophytic formation — an incipient bridge. The spine shows calcoatrophy. No sign of abscess. SR.: 14 mm. Patient was laid in plaster bed.

Case III. — Ingvar. Flight-sergeant. Born 1908. Admitted June 20th, 1932.

The patient is the 6th child in a family of nine. Tuberculosis among his immediate relatives or associates is denied. He has had the usual illnesses of childhood, but has otherwise been healthy when a boy. In the summer of 1930 he had pleurisy. During the autumn of the same year he got pains, localised to the right of the lumbar section of the spine, partly radiating down to the region of the right hip. He consulted a physician about New Year 1931. In spite of repeated examinations



Case 3. Ingvar. Vert. thorac. et. lumb. front.

only »rheumatism« could be diagnosed, wherefore he still continued his employment in a workshop. Meanwhile, as he constantly got worse, he consulted another physician in July 1931. Spondylitis was now detected, both clinically and roentgenologically, in the thoracic and lumbar sections of his columna. He was sent to hospital and laid in plaster bed. Since New Year 1932 he has had abscesses in both iliac fossæ. In spite of repeated puncturing the abscess in the right side became fistulous in the following spring, and that in the left side at the end of October same year. (42 punctures in the course of 33 days).

On June 20th, 1932, the patient was transferred to the Coastal Hospital here, and the following findings were made:

Spinal column: Gibbus of lower part of the thoracic, as well as of nethermost part of the lumbar section. Fistula with profuse secretion and severe mixed infection in the iliac fossa on the right side, as well as a large abscess in the left iliac fossa.

Normal tendon reflexes and no disturbances of sensibility.

Roentgen examination (only the frontal view reproduced): Considerable calcareous atrophy in the lower part of the thoracic section of the spine. Evident affection of the cartilages between the 9th and 10th and 10th and 11th thoracic vertebræ, with especially distinct collapse between the latter two. A paravertebral abscess-shadow is seen on both sides of the columna. Besides, there is severe destruction and collapse of the 4th and 5th lumbar vertebræ.

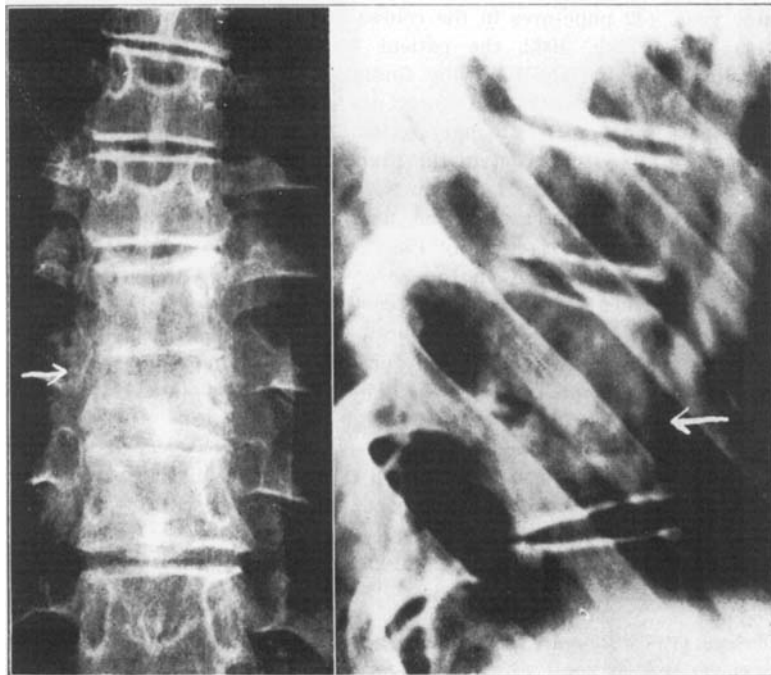
The fistulæ with mixed infection have by degrees cleaned out well. The patient's general condition, which in September 1932 was very bad (SR.: 111 mm.), has steadily improved (SR., January 1933: 41 mm.).

Case IV. — Ragnar. Electrician. Born 1907. Admitted May 23rd, 1930.

He is the youngest of five children. His family is stated to be free from tuberculosis. His health in boyhood was good. In August 1927 he first got »sciatica« in the left thigh. After four months in bed, partly in hospital, he was »well« for two weeks, whereupon he had to lie in bed again for two months with »sciatica« in the right thigh. Also this time he lay in hospital, but was not roentgenographed on this occasion either. From the end of January 1928 till June 1929 he attended without remission a technical school, but he states that he felt pains »every day« at the bottom of the lumbar section of his spine, especially when lifting anything heavy. He is not able to run. The pains became worse during the autumn, and in January 1930 he visited a specialist, who both clinically and roentgenologically made the diagnosis: Double spondylitis. He was at once put in plaster, and in May 1930 he was transferred to the Coast Hospital.

On admission: Gibbus, tender to pressure, over the 8th and 9th thoracici vertebræ. Otherwise nothing pathological clinically observed in regard to the spine; mobility tests being refrained from. Sensibility and tendon reflexes normal.

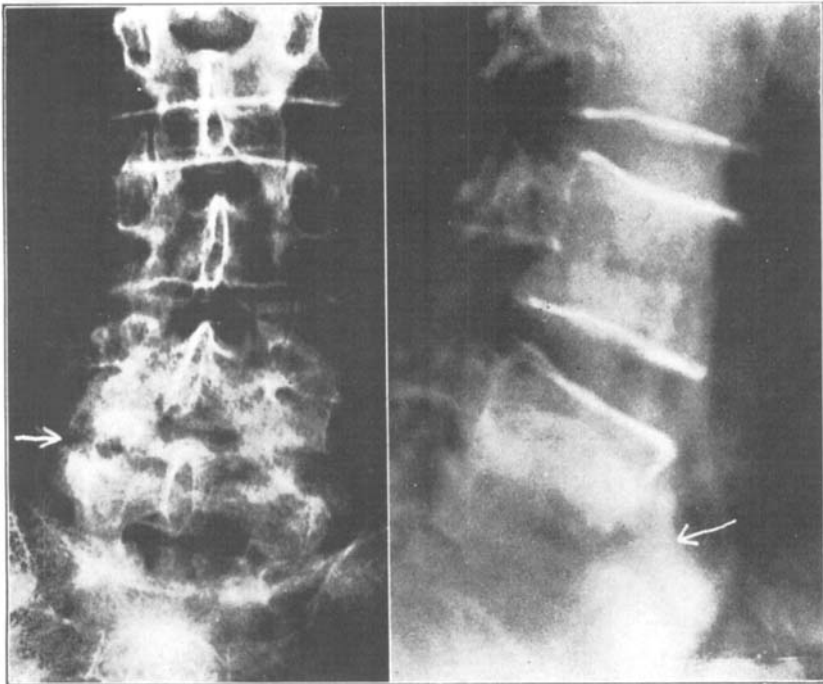
Roentgen examination shows considerable calcareous atrophy of the spine. There is distinct destruction and collapse of the 8th and 9th



Case 4. Ragnar. Vert. thorac. front. et sag.

thoracic, as well as of the 4th and 5th lumbar vertebræ. No sign of abscess.

While the patient was in the hospital coxitis developed in his left hip, with abscess below the trochanter. He also presented symptoms from both lungs. His general condition, however, was all the time good, and all the foci sclerotised rapidly, so that he could be discharged on Nov. 18th, 1932 with a short hip bandage.



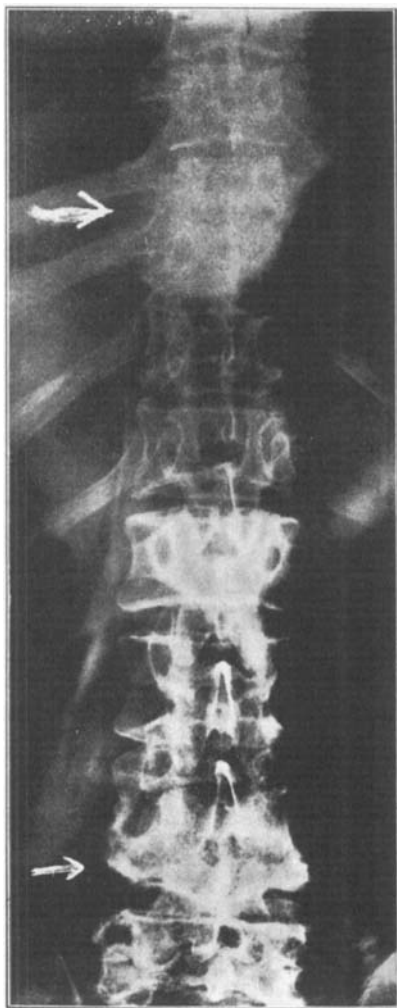
Case 4. Ragnar. Vert. lumb. front et sag.

Case V. — Alf. Farmhand. Born 1907. Admitted May 28th, 1929.

Family healthy, with no record of tuberculous affection. The patient had pleurisy in 1924, and in 1925 pulmonary tuberculosis. After lying at home for eighteen months he was for three years in a sanatorium for tuberculous cases, from which he was transferred to the Coastal Hospital in May 1929. In the course of these three years he developed fistulous tuberculosis of the left shoulder and typical symptoms of spondylitis in the lower part of the lumbar section of the spine. In spite of these multiple localisations he was most of the time out of bed and free from fever. On his admission here, his left lung was found to be especially attacked, but he had no cough.

Left shoulder: Diffuse swelling, severe pains on any attempt at movement. Also well as 6 fistulæ, from some of which there is profuse secretion.

Spinal column almost rigidly fixed. There is a gibbus, tender to pressure, over the 4th lumbar vertebra. Otherwise no palpable deformity. To the right of the lower thoracic vertebræ there is an abscess under the skin, 10×6 cm. in size.



Case 5. Alf.

Roentgen examination severe destruction of the osseous parts around the left shoulder, enlarged hilus glands and film over the right lung. The 9th and 10th thoracic as well as the 3rd and 4th lumbar vertebrae are destroyed and collapsed. Around the upper focus is seen a para-vertebral abscess-shadow.

The patient has lain in plaster, has had light-baths and Gerson diet.

In May, 1930, resection of the left shoulder was performed. In spite of numerous punctures new fistulæ continue to occur. His general condition is now less satisfactory. In December, 1932, albuminuria appeared for the first time. SR. was then 67 mm.

Case VI. — Jenny. Farmer's daughter. Born 1911. Admitted Sept. 1st, 1932.

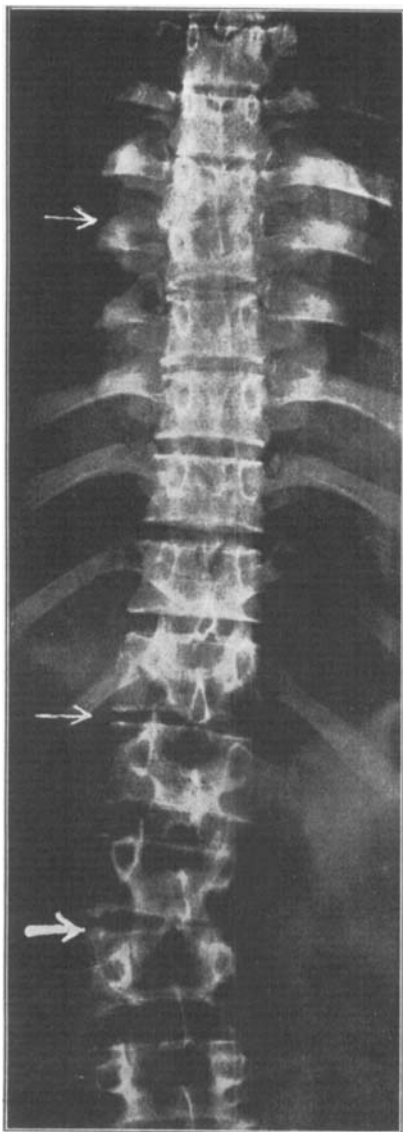
The patient has grown up in a tuberculous family, but is stated to have been healthy herself. The hygienic conditions in her home were bad. In the spring 1931 she got an abscess and afterwards a fistula on the left external malleolus. Spontaneous cure took place in the course of a couple of months. In the summer of 1931 she got a lupous patch on the back of her left wrist, which afterwards persisted. From December 1931 to March 1932 she lay in bed with pleurisy of the right side. During this time she began to get aching pains in the small of the back. The pains grew worse when she got up, but she still kept going about until the beginning of June. She was then so stiff in the small of the back and had such pain that she had to »drag herself up« when she wanted to rise from a stooping position. A gibbus was then discovered in the lumbar portion of her spine, and she has since been confined to bed. She has all the time been free from fever and without cough.

Of the findings made on her admission on Sept. 1st, 1932, the following may be mentioned. The patient is thin. Indolent submandibular glands the size of a pea. *Lungs*: Grating sound over the axillary surface on the right side. *Abdomen*: A large fluctuating abscess in the right iliac fossa and a smaller one in the left. An ossified scar over the left external malleolus.

Spinal column: At the level of the 6th and 7th thoracic vertebræ is seen and felt an indolent gibbus, and there is another gibbus, somewhat sensible to pressure, in the middle of the lumbar section of the spine. No mobility tests were made.

Tendon reflexes and sensibility normal. Urine: Albumen. +; pus +.

Roentgen examination: Pleurisy of the right side, and patches here and there over the right lung. *Spinal column*: The 6th and 7th thoracic vertebræ are destroyed and collapsed. Also the intervertebral discs between the 5th and 6th and between the 7th and 8th thoracic vertebræ are attacked. On both sides is seen a paravertebral abscess-shadow. The 12th thoracic and 1st lumbar vertebræ are in contact with each other, as the intervertebral disc has disappeared. The 2nd and 3rd lumbar vertebræ are destroyed and collapsed. The shadow of the psoas bulges out on both sides. (This unfortunately does not appear in the reproduction of the roentgenograph). The patient was placed in plaster forth with. The



Case 6. Jenny. Front.



Case 6. Jenny. Sag.

abscess in the right iliac fossa has been punctured several times, but constantly renews itself. In November the presence of tubercles in the urine was ascertained by inoculation into guinea-pigs (State Institute of Public Health).

In March 1933 she died in meningitis.

Case VII. — Edward. Foreman miner. Aged 33. Admitted Dec. 15th, 1932.

The patient is the youngest of a family of 9, two of whom have died. There is no known case, however, of tuberculosis in the family or among his immediate associates. He was in good health until February 1931. During mining work in Spitzbergen he then suddenly got pains of indefinite character in the stomach. They were worst when he breathed deeply. His stomach became distended through flatulence, and his bowels were costive. He lay in hospital for 6 weeks, and felt well when discharged. Immediately afterwards, in the end of April, 1931, he got pericarditis and pleurisy of the right side, which compelled him to go to bed again. In May he was sent home to Norway, where he was sometimes in bed, sometimes up and about, but feeling ill all the time. In August, 1931, he got pleurisy also of the left side. In September he was sent to a sanatorium for tuberculous cases, from which he was discharged in March 1932. During his stay there he often had aching pains in the lowest part of the lumbar section of the spine. After coming home he began to work, and then the pains in the back came on again, worse than ever before. Repeated roentgenograms of the spinal column yielded negative results, and under the diagnosis of »rheumatism« he was treated with diathermia and massage. The pains in the lumbar section of the spine became steadily worse, however. Finally, in August 1932, there was discovered, clinically and in the roentgenograms, a spondylitis with incipient gibbus in the lowest part of the thoracic column.

He was sent to bed at once, and has remained there since. During this time he has frequently been troubled with meteorism and pains in the stomach, in the same manner as in Spitzbergen in February 1931.

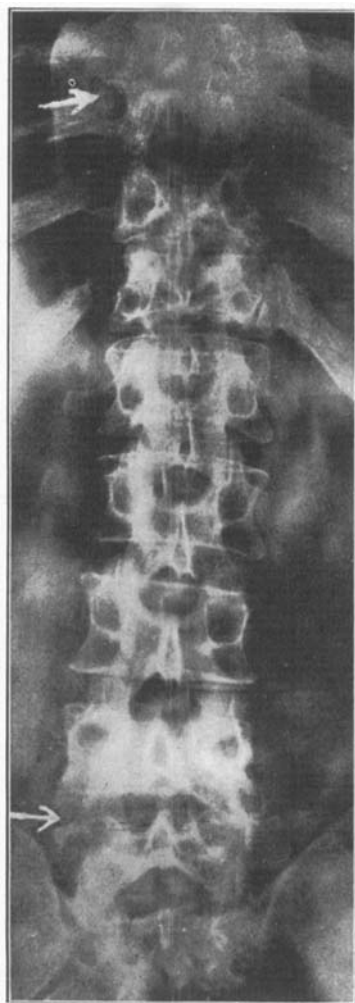
On admission his condition was fairly good. He was free from fever and had no cough. For the time being there were no pains.

Lungs: Weakened respiration and dulled percussion sounds over the left posterior surface. No abnormal sounds.

Heart: Healthy condition.

Abdomen: Large, soft, non-sensitive, with dulled percussion sound on left side. No improvement when lying on right side. No palpable abscess or other obstruction.

Spinal column: There is seen and felt a distinct, but totally indolent gibbus, corresponding to the 9th and 10th thoracic vertebræ. He states



Case 7. Edvard. Front.



Case 7. Edvard. Sag.

that over the 3 lowest lumbar vertebræ there is a distinct tenderness on the slightest pressure, as well as on movement. Mobility tests were therefore not carried out.

Tendon reflexes and sensibility normal.

Roentgen: The 9th and 10th thoracic vertebræ have sunk together into a compact mass. The frontal picture further shows a large, partly calcified paravertebral abscess, the lower boundary of which can be followed down to the level of the 2nd lumbar vertebra. From the sagittal picture it is seen that the destruction chiefly affects the 9th thoracic vertebra. It is further seen that the 4th and 5th lumbar vertebræ are in contact with each other. There is pronounced calcareous atrophy, and the structure is very much blurred. The sagittal picture shows the bottom part of the 4th lumbar vertebra to be destroyed. In front is seen a distinct bow-shaped bridge formation down to the 5th lumbar vertebra. There is no indication of any psoas abscess.

The patient was put in plaster immediately.

The pathogenetic possibilities of which there can be question here are the following:

1. Lymphohematogenic infection;
2. Contact infection (an affected vertebra with attendant cold abscess must in this connection be regarded as forming a »tactic unit«).

It may at once be stated that the former possibility will generally be the most likely one; and if clinical or roentgenologic grounds exist for assuming that the patient has suffered from a lung infection, extremely weighty reasons must be supplied before this point of view can be abandoned.

Keeping only to the thoracic and lumbar sections of the spine, which, in my 7 cases, are the only ones involved, we must bear in mind the abundant supply of arterial blood from the 9 pairs of intercostal arteries and the 4 or 5 pairs of lumbar arteries, all of which issue directly from the posterior wall of the aorta descendens and aorta abdominalis. When we further take into account the well developed network of lymphatic vessels in the intervertebral cartilages, the probability of a lym-

phohematogenic origin of the multiple spondylitis will be obvious.

The diffusion of the infection takes place from the hilus or from the mesenterial glands to several separate vertebræ, either simultaneously or at different times; but it may, of course, also take place secondarily, in the same manner, from the once infected vertebra to others. What occurs in each individual case cannot be determined.

In order for multiple foci to arise by contact infection through a cold abscess, that abscess must, after having passed by one or more healthy vertebræ, make its way through the strong ligaments which surround the spinal column on all sides. It is clear that these ligaments offer a strong obstacle to the progress of the abscess by this path. Moreover, a number of conditions must be present before we can assume with a certain degree of probability that a focus in one vertebra has arisen secondarily from another vertebra through a cold abscess. First of all, the presence of the abscess must be positively demonstrated. Next, the new focus must have made its appearance at a point to which it is probable that an abscess from the first focus would make its way. Finally, there must be a certain difference in age between the two foci. *Taking all things into consideration we must therefore regard the lymphohematogenic diffusion as the most probable and most frequent, and contact infection through a cold abscess as being of extremely rare occurrence.*

To establish the fact that two foci really exist separated from each other by sound — that is, by non-tuberculous — vertebræ, may be very difficult. If a tuberculous process in a vertebra breaks through the hyaline cartilage, upwards or downwards, thereby injuring the intervertebral cartilages, and especially their pulpy nuclei, there will, according to the investigations made by *Keyes* and *Comperes*, develop secondary changes in the neighbouring vertebræ. With the means at present at our disposal we cannot in the individual case decide whether these changes are really of secondary nature or are directly due to the tuberculosis.

In all my 7 cases there exists the possibility of hæmatogenic diffusion from the lungs or hilus glands.

- Case I. Healed-up affection of the apex and enlarged hilus glands.
 - Case II. Considerably enlarged, partly calcified hilus glands.
 - Case III. The roentgenograms shows remains of interlobary pleuritis of the left side, as well as large hilus glands.
 - Case IV. Active pulmonary tuberculosis.
 - Case V. The patient had previously had both pleurisy and pulmonary tuberculosis.
 - Case VI. The roentgenograms show large hilus glands, as well as diffused patches in both lungs.
 - Case VII. Bilateral pleurisy and considerably enlarged hilus glands.
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Clinically it is impossible, however, to furnish complete proof respecting the pathogenesis in each individual case. We must reckon always with greater or lesser degrees of probability. In considering the 7 cases here reported it may be of importance to investigate also the possibility of contact-infection.

In that respect, case 1 presents interesting details. The patient entered the hospital with an affection of the 10th, 11th and 12th thoracic, as well as of the 1st lumbar vertebra. These vertebræ had become fused together into one block, and the roentgenograms showed, besides, a paravertebral, partially calcified abscess-shadow. She was at once laid in plaster, but *8 months later there developed focus no. 2*. This appeared precisely at the point where a cold abscess under those conditions — the patient lying on her back in a bed of plaster — would naturally stop, namely, at the bottom of the dorsal curve, that is to say, on a level with the 6th and 7th thoracic vertebræ. From this point the abscess continued its progress, but now directly backwards, following the law of gravity. The ligament on the anterior aspect of the spine the vertebræ and intervertebral cartilage are attacked, and the abscess forms a fistula

through the skin just above the spinous processes of the newly attacked vertebrae.

The roentgenogram (Fig. 2) shows the two foci distinctly. While the sagittal picture may perhaps indicate a secondary change in the 9th thoracic vertebra, yet there cannot, either clinically or roentgenologically, be detected anything pathologic in the 8th. Thus there is at least *one* sound vertebra intervening between the affected parts of the column. I cannot prove that the patient's lesion has developed in this manner, but in this case I regard contact-infection as more probable than lymphohematogenic infection.

Case II and Case IV present no reliable data for assuming the presence of a spondylitic abscess. In Case III and Case VII there are undoubtedly paravertebral abscesses around the focus in the thoracic vertebra, but the anamnesis speaks for a more or less simultaneous appearance of the two foci. *Case V* and *Case VI* there are spondylitic abscesses, but do we not know for certain in what order of time the different foci arose. Especially as regards the patient in the latter case it must be remembered that, in addition to the 3 foci in the spine, there was also an involvement of the lungs, the urinary ducts, the skin and the left ankle, as well as of the glands of the neck. This general multiplicity speaks of course very definitely for a hematogenic diffusion of the infection.

In connection with this latter case (no. VI) I would also mention that the paravertebral abscess in the patient's thorax was *first* discovered in the thoracogram, where it revealed itself as a pear-shaped, somewhat dense shadow behind the shadow of the heart.

The hospital has recently had the opportunity of diagnosing in this manner spondylitis in two cases in which the patient had never had pains in the back, and in which the clinical examination of the spine had given a negative result — an observation which may be of practical significance.

The 7 cases here reported afford a very good illustration of how a spondylitis may arise without the slightest subjective symptoms. Even a gibbus may form without the patient's knowl-

edge. Common for all the 7 cases are pains and stiffness around the lower focus, while the upper focus (or foci) presented no symptoms — none, at least, of which the patients themselves were aware. It is therefore very important both in clinical and in roentgenological examinations of the spinal column to bear in mind the possibility of multiple spondylitis. We shall not find this condition without looking especially for it. None of the cases here reported presented symptoms from the medulla spinalis.

In conclusion I beg to offer my respectful thanks to Chief Physician H. Sundt, M.D., for permitting me to use the material available in the hospital.

SUMMARY

The author points out how the existing literature seems to indicate that the occurrence of multiplex tubercular spondylitis is more frequent now than formerly, and describes 7 such cases from the Coastal Hospital of Stavern (Norway). In 6 of these, two tubercular foci, and in 1 of them three, existed in the spinal column, separated by healthy vertebræ. In cases of this character, lymphohematogenic infection must seem to be the most likely. Contact infection from sinking abscesses is very rare. Nevertheless, in one of the cases described by the author the latter pathogenesis seems probable. A notable feature, worthy of attention, was the fact that in all the 7 cases the subjective symptoms were localised only to the lower focus. None of the cases showed symptoms from the medulla spinalis.

RÉSUMÉ

Les rapports donnés dans la littérature semblent indiquer que la spondylitis tuberculosa multiplex apparaît maintenant plus souvent qu'autrefois. L'auteur rend compte de 7 cas traités dans l'Hôpital Marin de Stavern. Dans 6 cas, la colonne verté-

brale présentait 2 foyers — dans 1 cas, 3 foyers — séparés par des vertèbres saines.

Chez les malades en question, il faut regarder l'infection lympho-hématogène comme la plus probable. L'infection par contact, partant d'un abcès froid, est extrêmement rare. Cependant il paraît probable que dans un des cas décrits la pathogénie est cette dernière.

L'auteur fait remarquer que chez tous ces malades les symptômes subjectifs se localisaient uniquement au foyer caudal.

Dans aucun de ces cas on n'a constaté des symptômes partant de la moelle épinière.

ZUSAMMENFASSUNG

Es wird besprochen auf welche Weise die vorliegende Literatur darauf hindeuten könnte dass spondylitis tuberculosa multiplex jetzt häufiger als früher auftritt. 7 Fälle aus dem Küstensanatorium bei Stavern werden referiert 6 von diesen hatten 2 und einer 3 von gesunden Wirbeln getrennte tuberkulöse Foci in der Columna.

Der lympho-hämatogene Infektionsweg muss bei diesen Fällen als der wahrscheinlichste angesehen werden. Kontaktinfektion von einem Senkungsabsces ausgehend kommt äusserst selten vor. In einem der referierten Fälle muss man es einstweilen als wahrscheinlich ansehen, dass die Patogenese die letztgenannte ist. Es ist auffallend, dass die subjektiven Symptome in allen 7 Fällen nur an den caudalen Focus lokalisiert waren.

Keiner der Fälle wiess Symptome der Medulla spinalis auf.

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