

SURGICAL INTERVENTIONS ON PARAVERTEBRAL TUBERCULOUS ABSCESES

By

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Tuberculosis of bones and joints is predominantly a destructive process and practically always develops secondary to a primary infection in such locations as the respiratory or alimentary systems. All statistics agree that the most frequent localisations are in the spine, hip and knee in the order given (4, 5).

In children, tuberculosis of the spine commences as an osteomyelitis and in adults, often as a periostitis. In children the process ordinarily begins in the vertebral body near its anterior aspect (1). This characteristic has an anatomical basis. In the young the major artery, a branch of the posterior spinal, enters the central area of the vertebral body, coming in by way of the posterior wall. In the adult, the major vessels to vertebral bodies come from the intercostal and lumbar arteries, and enter anteriorly, branching out subperiosteally (1, 2, 3).

This explains the high incidence in adult tuberculosis of lesions occurring at the anterior aspect of vertebral bodies and discs beneath the periosteum and anterior longitudinal ligament.

Involvement of more than one vertebra, particularly in the dorsal region, is relatively common, 10.5 o/o according to Sanchis-Olmos (5). Multiple involvement with normal vertebra separating sites of destruction is not uncommon.

On the basis of pathologic studies, cold abscesses are found in practically all cases of tuberculous spondylitis. Widely variable in size and distribution, these abscesses become filled with an exudate composed of serum, leucocytes, bone sand, caseated debris, and tubercle bacilli (1).

Tuberculous spondylitis must be considered a serious disease and

the appearance of a paravertebral abscess may contribute to a breakdown of the general resistance against the disease. The patient is not only threatened with fistulas, his whole condition may be problematical and bad.

For a period which lasted years treatment of bony tb. did not show any progress. In 1944, when Waksman and Schatz (6) discovered streptomycin, a new and hopeful era set in. Stimulating early reports as regards tuberculous bone lesions were published, but as time went on many orthopedic surgeons found that the general administration of streptomycin very often failed to bring the process under control. And the effect on threatening or on long standing abscesses was as a rule nil. Even the combined therapy with PAS, streptomycin, and penicillin did not always produce better results (Orell) (7).

Since, judging from the literature, the results of the treatment with antibiotics were not as successful in bone lesions as in many places in the parenchymatous systems, there may be some special pathological conditions in infective bones that have not been taken into consideration.

From Trueta (8) the author learnt that the blood supply sometimes might not be sufficient at the border of and in osteomyelitis to raise the concentration of penicillin to an effective level, if given generally.

If in a bone-abscess the pus was under pressure, the blood pressure, normally low in cancellous bone, was not enough to allow a satisfactory quantity of antibiotics to enter the destroyed tissue. Experience from the treatment of chronic osteomyelitis by penicillin, distributed generally, was equally as unreliable as that obtained from distribution of streptomycin in bony tb. Attempts had been made with local application of penicillin in non-tb lesions with sometimes better effect. By placing streptomycin in the diseased tissue it might therefore be possible to raise the concentration to such an extent that the process would heal up. General supply would be necessary anyhow even if an operation was required to set in the streptomycin locally. The general supply was thought to protect the body against the spread of the infection due to the surgical intervention. Furthermore, if an abscess was of any size, even if the tissue became sterile after the operation, the body might not be able to absorb the necroses and caseated debris, or the presence of the exudate could delay the action of streptomycin.

According to this discussion the therapy of a tuberculous abscess ought to be removal of the pus and the necroses, combined with local and general administration of streptomycin (Orell) (7).

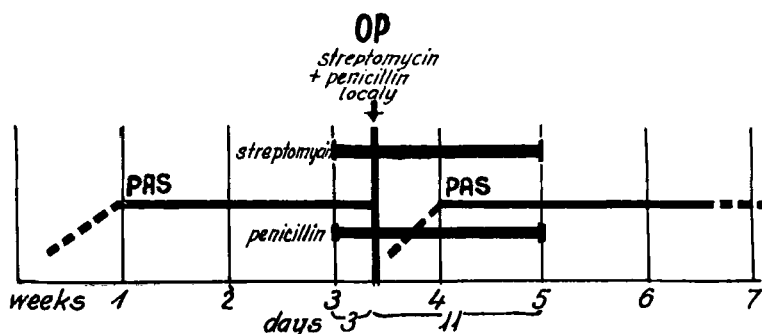


Fig. 1.

The distribution of streptomycin, penicillin and PAS combined with surgical intervention (Orell).

In the following the primary results will be given of an attempt to empty an abscess made on the bases of the discussion above. In this material paravertebral abscesses are presented both from the thoracic and lumbar part of the spine. In accordance with Orell 14 g. PAS 1 g. streptomycin, and 500,000 units penicillin were given preoperatively (see Orell's diagram fig. 1). 14 cases were operated on, 9 lumbar and 5 thoracic. Table I shows the different surgical interventions. The lumbar cases were explored retroperitoneally mostly from a dorsal

TABLE 1
Surgical interventions.

Lumbar abscesses

Dorsal retroperitoneal exploration of the lateral and ventral parts of the involved vertebral bodies. The pus and caseated debris is evacuated and the abscess walls wiped. Local application of 1 gr. streptomycin and 500,000 units of penicillin.

4 cases

Ventral retroperitoneal exploration of the abscess and the tbc. process.

5 cases

Thoracic abscesses

Costo-transversectomy. In all cases the approach was unilateral at the distal end of the abscess. The costo-transversal joint together with 3 cm. of the dorsal parts of the rib was removed. In 3 cases 2 ribs were taken, in 1 case, 3 ribs.

4 cases

Intercostal approach. In 1 case the abscess could be emptied by an incision between two ribs.

1 case

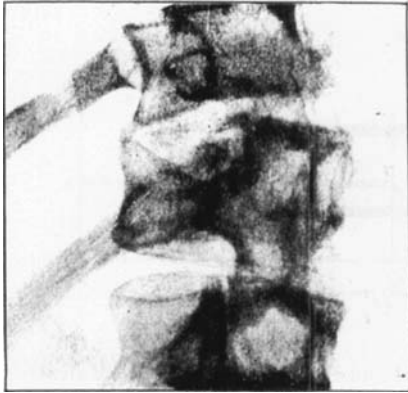


Fig. 2.

Tuberculous cavity in the XIIth thoracic vertebra with a sequester.

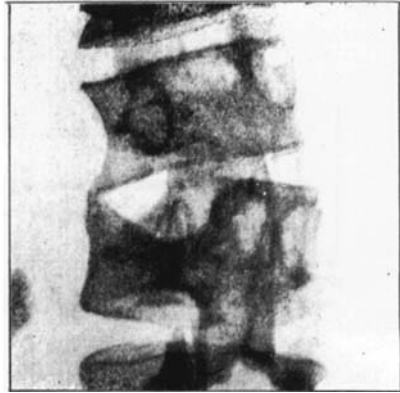


Fig. 3.

Tuberculous process in the XIIth thoracic vertebra, "cleaned" by surgical intervention. Same case as in fig. 2. In order to reach the diseased interspace, costotransversectomy is performed.

incision, the thoracical by costo-transversectomies. In the latter the costo-transversal joint was removed together with 3 cm of the posterior part of the rib at the distal border of the abscess (seen on the X-ray). In 3 cases two ribs and joints were taken, in one operated case, three interspaces were removed. This procedure is simple. The patient must be put under general anaesthesia and under breathing control by intubation to avoid risk, in case the pleura should be injured. The pus and the caseated debris were aspirated and the abscess walls wiped, care being taken not to injure the abscess membrane. The latter was considered to be valuable since it might possess a reacting power. If possible the tuberculous process in the vertebra was cleaned, sequestras and necrotic tissue being taken out. The intention was always to attack the bone lesion, but that was not possible in every intervention. Fig. 3 shows a "cleaned" vertebra. It was thought to be of importance to stop all bleeding, thus avoiding haematomas. Locally 1 g. streptomycin and 500,000 units penicillin were placed in the wound in powder form. Then the wound was stitched up.

In tables 2 and 3 the sex and age distribution are presented, as well as the vertebrae where the tbc. process was localized. The table also shows if and where other tuberculous changes were registered. Amongst the *lumbar* cases 4 were women and 5, men; the youngest patient was 21, the oldest, 57 years of age. 7 out of 9 had tbc. in the lungs or in the pleura. The *thoracical* operations were performed on 1

TABLE 2
Lumbar paravertebral abscesses.

Case no	Sex	Age of operation	Diseased vertebrae	Other systems affected by tb.				
				Pleura	Lungs	Kidneys	Joints	Other
1	K	27	L. I—L. II	0	0	0	0	0
2	M	31	L. IV—L. V	+	+	0	0	0
3	K	26	L. IV—L. V	+	0	0	0	0
4	M	21	L. I—L. II	0	0	0	0	0
5	M	21	Th. XI—XII	0	+	0	+	+
6	K	44	L. IV—L. V	0	+	0	0	0
7	M	24	L. II—L. III	0	+	0	0	0
8	K	24	L. V—S. I	0	+	0	0	0
9	M	57	L. I—L. II	0	+	0	+	0

TABLE 3
Thoracical paravertebral abscesses.

Case no	Sex	Age of operation	Diseased vertebrae	Other systems affected by tb.				
				Pleura	Lungs	Kidneys	Joints	Other
10	M	70	Th. VII—VIII	+	+	0	+	+
11	M	29	Th. VIII—XI	+	+	0	0	0
12	F	24	Th. VI—XII	0	0	0	0	0
13	M	55	Th. XI—XII	0	+	0	0	0
14	M	23	Th. XI—XII	+	+	0	0	0

woman and 4 men, the youngest, 23 years old, the oldest, 70. In these 5 patients, tb. in the lungs and pleura was found in 4 cases.

All the operations were performed because the X-rays showed progressing abscesses. 10 of the patients had been under observation more than one year before the surgical intervention. 6 had been observed 2 years or longer. Tables 4 and 5 allow a valuation in this respect. 6 patients had already been operated on by osteosyntheses, but showed, in spite of that—as sometimes is seen—, increasing shadows from an abscess.

The condition immediately before the operation was in many cases grave. 8 patients had continuous fever. 12 an increased sedimentation rate, 9 were fatigued and in a bad general condition, 5 had fistulas. It may be said about this material that the patients could expect a long stay in hospital and an uncertain future if conservative treatment was the only therapy. Tables 6 and 7 show conditions before surgical measures.

TABLE 4
Lumbar cases.

Case no	History of spinal disease The approx. age of the spondylitis	Osteosyntheses		The probable age of the abscess (minimum figures)	Is the abscess stationary or increasing?
		not performed	performed		
1	24 months		+	1 month	increasing
2	31 "		+	8 "	"
3	48 "		+	8 "	"
4	12 "		+	8 "	"
5	1 "	+		1 "	"
6	120 "		+	2 "	"
7	26 "	+		11 "	"
8	6 "	+		2 "	"
9	120 "	+		712 "	unchanged

TABLE 5
Thoracical cases.

Case no	History of spinal disease The approx. age of the spondylitis	Osteosyntheses		The probable age of the abscess (minimum figures)	Is the abscess stationary or increasing?
		not performed	performed		
10	712 months	+		not known	increasing
11	16 "	+		3 month	"
12	7 "	+		7 "	"
13	13 "	+		13 "	"
14	22 "		+	22 "	"

All except one improved after the operation. This one, a man of 70, died two months later from miliary tb. Before the operation, he was in a hopeless state, with continuous high fever and a sedimentation rate of 100 mm. He had been receiving streptomycin for a long time and was probably resistant to antibiotics. All the other patients recovered very soon. They got rid of their temperature, —10 within a week, and only 1 had fever for one month after. During the time this material has been followed up the patients have shown good general condition. The sedimentation rate came down, in many cases to normal levels. 9 healed primarily, 4 had temporary fistulas which closed very soon, mostly in a few weeks.

Tables 6 and 7 show the conditions before and after the operations. It must be stressed that the times of observation have been very short. Only 10 patients have been followed up for 3 months or longer. Thus

TABLE 6
Lumbar abscesses.

Case no	Situation before operation				Condition after operation				Primarily healing	Secondarily healing	Time during which the patient has been followed-up
	Fever	Sedimentation rate	Fistula	General conditions	Fever	Sedimentation rate	Fistula	General conditions			
1	—	30	0	Good	1 days	10	0	Good	+		8 month
2	—	25	+	Tired	8 „	8	0	„	+		5 „
3	+	45	0	Bad	5 „	30	0	„	+		3 „
4	—	5	0	Good	4 „	10	0	„	+		6 „
5	—	9	0	Good	3 „	5	0	„	+		4 „
6	—	24	+	Good	1 month	6	(+)	„		+	3 „
7	+	50	+	Bad	12 days	23	0	„		+	4 „
8	+	50	0	Bad	1 „	12	0	„	+		3 „
9	—	16	+	Good	6 „	—	0	„	+		1 „

TABLE 7
Thoracical abscesses.

Case no	Situation before operation				Conditions after operation				Primarily healing	Secondarily healing	Time during which the patient has been followed-up
	Fever	Sedimentation rate	Fistula	General conditions	Fever	Sedimentation rate	Fistula	General conditions			
10	+	100	0	Bad	After temporary recovery dead from miliary tb.						
11	+	38	+	„	5 days	11	0	Good		+	6 months
12	+	108	0	„	2 days	36	0	„		+	5 „
13	+	47	0	Tired	7 days	10	0	„	+		2 „
14	+	60	0	Bad	15 days	12	0	„	+		2 „

it is not possible to say if this treatment will be of any value in the long run. But it is clear that the patients' general condition improved.

With this type of surgery it was possible to compare the X-rays with real conditions. The films had in all instances shown abscess, but this could only be found in 11 cases at the operation. 3 explorations gave another explanation of the X-ray changes. The tightness was due to remnants from already healed abscesses. These findings show that it is not always possible to judge from the film whether the patient has an abscess or not—but mostly the X-ray tells the truth. Tables 8 and 9 show the X-ray findings. In 9 cases out of 12 the abscess was gone or had diminished after operation.

Evacuation of tuberculous pus has been tried before and often found to be dangerous if made by large incisions. The combination of

TABLE 8
*X-ray observations as regard to the abscess.
 Lumbar cases.*

Case no	Abscess found at the operation, according to the x-ray	No abscess	X-ray after the operation		
			Unchanged	Decreased abscess	No abscess could be seen
1	+				+
2	+				+
3		+		+	
4		+	+		
5	+			+	
6	+		+		
7	+			+	
8	+			+	
9	+		Not yet x-rayed after the operation		

TABLE 9
*X-ray observations with regard to the abscess.
 Thoracical cases.*

Case no	Abscess found at the operation, according to the x-ray	No abscess	X-ray after the operation		
			Unchanged	Decreased abscess	No abscess could be seen
10	+		Not x-rayed because of death		
11	+			+	
12	+				+
13		+		+	
14	+		+		

local and general supply of antibiotics seems to make it possible to clean abscesses—thus eliminating an immediately dangerous situation for the patient. Although in this material the abscesses dealt with were localized paravertebral, close to the pleura, peritoneum and large vessels, it was possible to remove the pus and the caseated debris without complications.

SUMMARY

Paravertebral abscesses were opened and emptied in 14 cases, 9 lumbar, 5 thoracic, by means of surgical intervention. Before the operation the patients were given $\frac{1}{2}$ gr. streptomycin twice daily, and also 14 gr. PAS and 500,000 units of penicillin for 2 to 3 days. At operation 1-2 gr. of streptomycin and 500,000 units of penicillin were placed locally in the abscess in powder form. After the operation the

patients were given streptomycin for 14 days; PAS and penicillin were also employed during the same time. Then the PAS treatment was continued for some months. The results with respect to general condition, temperature and SR were favourable and the radiological changes shown by the former abscesses disappeared in most cases.

RESUME

On a opéré et éloigné, par interventions chirurgicales, des abcès tuberculeux paravertébraux dans 14 cas, dont 9 lombaires et 5 thoraciques. Avant l'opération, les sujets ont reçu de la streptomycine à raison d'un demi-gramme deux fois par jour, 14 g. de PAS et 500,000 unités de pénicilline pendant 2 ou 3 jours. Pendant l'opération, 1-2 g. de streptomycine et 500,000 unités de pénicilline ont été placés sous forme de poudre localement dans l'abcès. Après l'opération, on a administré aux sujets de la streptomycine pendant 14 jours et en même temps du PAS et de la pénicilline. Ensuite, on a continué le traitement au PAS pendant plusieurs mois. Les résultats ont été bons en ce qui concerne les conditions générales, la température, le degré de sédimentation, et les changements radiographiques des anciens abcès ont disparu en majeure partie.

ZUSAMMENFASSUNG

Paravertebral tuberkulöse Abscesse sind in 14 Fällen, lumbale in 9 und thorakale in 5 Fällen mittels chirurgischen Eingriffe geöffnet und entfernt worden. Vor der Operation erhielten die Patienten 1/2 gr. Streptomycin zwei mal täglich ebenso wie 14 gr. PAS und 500,000 Einheiten Penicillin während 2 bis 3 Tagen. Bei der Operation wurden 1—2 gr. Streptomycin und 500,000 Einheiten Penicillin in Puderform local in den Abscess gegeben. Nach der Operation erhielten die Patienten während 14 Tagen Streptomycin und gleichzeitig PAS und Penicillin. Darauf wurde die Behandlung mit PAS während einiger Monate fortgesetzt. Die Resultate bezüglich Allgemeinzustand, Temperatur und Blutsenkungsgeschwindigkeit waren günstig und in den meisten Fällen verschwanden die Roentgenveränderungen der früheren Abscesse.

RESUMEN

Se han operado y alejado, por intervenciones quirúrgicas, abscesos tuberculosos paravertebrales en 14 casos, 9 de ellos lumbares y 5 torá-

cicos. Antes de la operación, los tratados han recibido estreptomycin a razón de medio gramo dos veces al día, 14 g. de PAS y 500,000 unidades de penicilina durante 2 o 3 días. Durante la operación han sido aplicados localmente en el absceso, en forma de polvo, 1-2 g. de estreptomycin y 500,000 unidades de penicilina. Después de la operación se ha administrado estreptomycin durante 14 días y al mismo tiempo PAS y penicilina. Más tarde se ha continuado el tratamiento de PAS durante varios meses. Los resultados han sido buenos en lo que concierne a las condiciones generales, la temperatura, la velocidad de sedimentación y los cambios radiográficos de los antiguos abscesos han desaparecido en la mayor parte.

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