Osseous Tuberculosis
with Concurrent Pulmonary Lesions

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With the discovery of streptomycin by Waksman in 1943, a new era in treatment of tuberculosis made its entrance. Glowing reports of its effectiveness in pulmonary and other types of the disease led us first to conclude that it would wipe out tuberculosis. But the effectiveness in bone and joint tuberculosis was minimal. True, it appeared to slow down the rate of destruction, but it did not reverse the destructive process, nor bring cure to the many involvements of spinal, sacroiliac and peripheral joint tuberculosis. Disappointment was the lot of the orthopedic surgeon, and reliance upon the old rules of treatment was the usual course of procedure.

To briefly paint the background of this previously accepted and undisputed therapeutic regimen, we should recall that arrest of the disease was based upon the evidence that skeletal tuberculosis was almost always a joint region involvement and practically never a destruction of the shafts of long bones. Principles were based on the fact that if motion could be stopped, the disease would become quiescent, and if fusion with complete obliteration of the joint secured, by whatever means, then cure of the disease was possible. Only with the absolutely fused joint was this to be attained. Only the ingenuity of the physician limited the various methods of using splinting, frames, casts, traction, and braces. Improvement required years of patient care. The subsequent surgical procedures of bone grafting, osteotomy etc., to secure solid bony arthrodesis and good functional positions, then became the final problem. The existence of cold abscesses was looked upon with alarm, and aspiration, to relieve the internal tension, and prevent its breaking through the skin, was resorted to, because the formation of a draining sinus with subsequent secondary pyogenic infection was felt to be the cause of the almost invariably fatal "amyloid disease." The statement that "draining the tuberculous abscess frequently signs the patient's death warrant" was quoted in many texts of bone and joint tuberculosis.

This generally was the status of the treatment of osseous forms of tuberculosis in 1946, 10 years ago, when this reported study was begun. The decision to depart radically from these accepted tenets of treatment was based upon the following theoretical thinking:

1. An analysis of reported success and failures of streptomycin of various forms of tuberculosis revealed the success to be largely related to location of lesions as to adequacy of physiologic drainage. For example, laryngotracheo bronchial lesions—with surface drainage easily attained, responded rapidly in comparison with interstitial fibrotic lesions in the pulmonary tis-

sues. Involvement of kidney, pelvis, ureter and bladder was far more favorably affected than cortical kidney lesions, etc.

2. Lesions which tended to be surrounded by relatively avascular tissues, such as scar masses or large necrotic masses and abscesses, often failed to be favorably affected. This was felt to be a result of inadequacy of blood supply to carry the antibiotic to the active lesion.

In October, 1946 treatment was begun in a series of cases, now totaling 142 patients, representing 194 operations. In a few a single lesion required more than one surgical procedure to secure complete drainage of the lesion. In others, more than one lesion was present, and required multiple surgical procedures. Almost every joint area of the body was represented, including the entire spine, sacroiliac joints, ribs, sternum, and peripheral joints. The principles of therapy gradually devolved themselves to essentially those accepted for many years as basic in the treatment of pyogenic osteomyelitis. The keynote has been the adequate drainage of the entire lesion coupled with antituberculosis drugs. Adequately large incisions and thorough removal of all pus, necrotic and caseous material, loose fragments and sequestra from the region of bone destruction is essential. Gauze packing is placed tightly from the base of the lesion outwards to the skin, and any suturing of the wound is avoided. The lesion and its cold abscess thus becomes converted, after removal of the packing in 12 to 14 days, into a wide funnel shaped, freely draining sinus. No further packing is done. The freely bleeding, granulation tissue lined sinus is allowed to spontaneously close under the influence of the antibiotic and antituberculosis drugs. The healthy healing tract gradually becomes smaller and smaller and closure of the skin is attained in periods varying from a few weeks to a few months in practically all cases. Undue prolongation of the healing is evidence of inadequate removal of dead tissue or bone, and repeating the surgery or approaching through another area may be indicated.

Splinting or immobilization postoperatively is not done, except in the rare cases that may have unusual pain until packing is removed. No attempt to obtain fusion in peripheral joints is made, and the patient is encouraged in active motion from the beginning. In weight bearing joints, weight bearing, first with crutches, is allowed as tolerated by the patient. General supportive measures to improve nutrition and anemia are carried out, and the patient is maintained on streptomycin, para-aminosalicylic acid and isonicotinic acid hydrazide combinations until long after the sinus is closed. In the early series, a plan of maintenance on streptomycin for 50 per cent of the time beyond that required for complete closure of the sinus was followed. In more recent years, the patient has been taken off streptomycin and placed on isonicotinic acid hydrazide and maintained for a year or more, despite closure and x-ray evidence of healing.

An analysis of the 194 operations performed lead to this general conclusion:

1. Following adequate surgical drainage and drug therapy, destruction has been found to cease. Serial x-ray films and follow-up of cases for up
to 10 years reveals progressive healing, and no reactivation of the bone lesions to occur, clinically, symptomatically or by x-ray study.

2. The operated lesion will heal and remain healed, although other lesions have been known to develop or progress, even during the period of streptomycin and isonicotinic acid hydrazide administration.

3. A good functional range of painless motion has been attained in peripheral joints, and in the few cases where arthrodesis was required, fusion occurred rapidly.

4. Secondary infection has not been a problem.

Our patients ranged from 11 months to 79 years of age. Of the 142 treated, only 10 are known to have died, and of these only one death is related to the surgery performed, occurring in an elderly woman with dorsal spine involvement and partial paraplegia, who fell out of bed at night three days postoperatively, sustaining a severe laceration of the scalp and dying suddenly the next morning.

Five died from seven to 42 months following surgery of bone lesions, but death was due to far advanced pulmonary tuberculosis and the bone lesions were apparently healed.

Two died from metastatic carcinoma, one from an automobile accident and one in the electric chair, convicted of murder.

Of the 142 patients, 52 had active concomitant pulmonary tuberculosis, and these represent an analytical study of particular interest to this group. If we divide these 52 cases into two five year periods, there is this occurrence: 28 between September, 1946 and September, 1951 and 24 between October, 1951 and the present. The comparative incidence of concurrent osseous lesions is thus found to be essentially the same, with no tendency for its presence to be lessened by our changed therapeutic regimen of the past 10 years.

Although accurate figures are not obtainable for comparison, it is our definite impression that this incidence of bone lesions was not found or treated prior to the onset of this study. The explanation probably lies in a few factors:

1. Careful attention to complaints of patients referable to the musculoskeletal system, with orthopedic and x-ray examinations done routinely. Many early lesions were diagnosed which we feel would otherwise be missed.

2. Increased recovery rate and longevity of the patient with pulmonary lesions has allowed for the higher percentage of rate of diagnosis of bone lesions, particularly since bone lesions are known to progress if unoperated, despite drug administration.

Effect of Treatment

The presence of even far advanced pulmonary tuberculosis and poor general condition of the patient has not interfered with surgical attack of active bone lesions. Both lesions are actively treated concurrently, and in general one can expect a definite improvement in the patient's condition to occur, as evidenced by weight gain, increased feeling of well being and more rapid
clearing of the pulmonary lesion as evidenced by x-ray, negative sputums, etc. Although this does not always occur, the improved condition has often resulted so rapidly as to be beyond the realm of coincidence.

This approach to the problem of the osseous lesion has coincided well with the tendency to treating the pulmonary lesion in a more ambulatory manner with lessened hospitalization.

**RESUMEN**

Una teoría radicalmente opuesta a las otras en el tratamiento de las lesiones óseas se ha presentado. Habiéndose llevado a cabo el tratamiento de acuerdo con ella en 194 lesiones generalmente no seleccionadas en cuanto a la edad de los enfermos, ubicación en el cuerpo, estado de evolución de la lesión ósea o pulmonar o las condiciones generales. Los enfermos se han seguido observando hasta por 10 años y no presentan tendencia a la recurrencia, falta de la curación o progreso de la destrucción ósea por la infección.

Los enfermos con lesiones pulmonares se han beneficiado grandemente en general por este tratamiento radical de la lesión ósea según lo demuestran la limpieza de la afección pulmonar, la mejoría del estado general y el decrecimiento de la mortalidad.

**RESUME**

L'auteur présente une théorie radicalement opposée aux idées en cours sur le traitement des lésions osseuses. Elle a été appliquée dans 194 cas, généralement sans tenir compte ni de l'âge du malade, ni de la localisation, ni du stade de la lésion osseuse ou des altérations pulmonaires, ni de l'état général du malade. Les malades ont été suivis pendant plus de 10 ans, et ne présentent aucune tendance à la rechute, à l'arrêt de la guérison, ou à la progression de la destruction osseuse par l'infection.

Les malades atteints de lésions pulmonaires ont tiré en général un grand bénéfice de ce traitement radical de la lésion osseuse, mis en évidence par le nettoyage plus rapide de l'état pulmonaire, l'amélioration du bien-être général, et la décroissance de la mortalité.

**ZUSAMMENFASSUNG**


Patienten mit pulmonalen Herden haben im Allgemeinen erheblichen Nutzen gezogen aus dieser radikalen Behandlung des Knochenherdes, wie sich an der rascheren Rückbildung der pulmonalen Veränderungen, der Besserung im Allgemeinbefinden und der Abnahme der Mortalität zeigte.