

Original Articles.

THE MALIGNANCY OF JOINT TUBERCULOSIS, ILLUSTRATED BY A SERIES OF FORTY-SEVEN CASES.¹

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I HAVE chosen this title because I believe that a so-called healed tuberculous bone lesion is a constant menace to its possessor. This conclusion has been reached from a consideration of the following facts:

(a) In our metropolitan communities large numbers of children have been treated during the past thirty years at the children's hospitals.

(b) Our textbooks would lead to the belief that a large proportion get well with certain more or less crippling deformities.

(c) We are coming to recognize errors in the diagnosis of the character of some joint lesions formerly regarded as tuberculous which removes from this category a considerable number of the best results, already doubtless classified among the cured cases. These patients, coming from a station in life that naturally patronize public dispensaries, do not present themselves in the proportion they should among the patrons of clinics for other diseases. They are not much in evidence in the street, in the schools or other public places. They cannot conceal their deformities, as a rule, and a fair inference is that they must either become incapacitated from association with their fellows or else succumb to some other or their old disease.

Obviously, then, we are not to look for these cases in general clinics in numbers sufficiently large from which to draw conclusions.

During the past seven or eight years at the orthopedic clinic of the Carney Hospital a considerable number of adults with tuberculous joint diseases have presented themselves (about 139 cases of Pott's disease, 180 of hip and a lesser number in the smaller joints). By far the greater proportion of these were patients with disease, active from the outset, referred from other clinics where there were no facilities for treatment, or age debarred them from further attendance. A much smaller proportion were primary in adult life and came directly for their first treatment. A very considerable number came to begin treatment a second time, after a greater or lesser interval of health.

It is to this type of the disease that I have ascribed the term malignant. The pathologist recognizes among tumors a variety that manifest a tendency to recurrence after removal, either in the local scar or by metastasis, or both. There are other reasons for the classification of tumors, depending on their morphology, but in a broad, general way the division founded on the above-mentioned phenomenon has gained general acceptance. The pathologist also recognizes certain inflammatory tumors and classifies them under the head of infective granulomata, and in this classification tuberculosis is placed. The recent strife which has been going on over the infective character of

carcinoma is hardly passed and is by no means settled.

I will not attempt to justify this title, then, on pathological, but chiefly on clinical, grounds.

MALIGNANCY OF BONE TUBERCULOSIS.

No.	Sex	Age	Disease	Onset	Duration	Treatment	Alleged	Excavation
1	M	41	Pott's	1 1/2 yrs.	trill 12	Braces	No	21 yrs later
2	M	30	Hip (R)	12 yrs.		do	Yes	3 yrs "
3	M	27	T.A. (L)	17 yrs.	5 yrs.	Plaster Splint	Yes	5 yrs "
4	M	33	Hip (L)	2 yrs.	5 yrs.	Smaller Crutches	Yes	21 yrs "
5	M	27	T.A.	19 yrs.	1 1/2 yrs.	Plaster	Yes	6 1/2 yrs "
6	F	50	Pott's	19 yrs.	15 yrs.	Braces	Yes	6 yrs "
7	F	54	T.A. (L)	3 1/2 yrs.	2 yrs.	None	Yes	17 yrs "
8	M	25	Pott's	5 yrs.		Desultory	Yes	10 yrs
9	F	41	Hip (D)	5 yrs.		Splints, claudication	Yes	3 yr interval
10	F	26	Hip	23 yrs		None	Yes	15 yrs later
11	M	18	Pott's	2 yrs.	6 yrs.	Bed Braces	No	10 yrs "
12	M	18	Pott's	Early years.		None	No	11 yrs "
13	M	22	Hip (D)	17 yrs	6 mos.	Crutches	No	4 1/2 yrs "
14	M	21	Hip (D)	2 1/2 yrs		Child Hosp.	Yes	12 yrs "
15	M	19	Hip (D)	1 1/2 yr.		Apparatus	Yes	10 yrs "
16	F	25	T.A.	8 yrs.	5 yrs.	Apparatus	No	9 yrs "
17	M	26	Hip	3 yrs.	3 yrs.	—	Yes	18 yrs "
18	M	39	Hip	Fistula	15 yrs.	—	No	12 yrs "
19	M	17	Pott's	15 mos.	13 1/2 yrs.	Ch. Hosp.	Yes	3 yrs "
20	M	47	Caries	unlike	Infancy 13 yrs.	—	Yes	30 yrs "
21	M	23	Pott's	4 yrs.	6 yrs.	Apparatus	Yes	9 yrs "
22	M	27	Pott's	22 yrs		Apparatus	Yes	4 yrs "
23	F	26	Hip	13 yrs	13 yrs	None	Yes	13 yrs "
24	M	22	Hip	4 yrs	10 yrs	None	Yes	8 yrs "
25	M	20	Pott's Hip	7 yrs		Apparatus	No	9 yrs "
26	M	40	Hip	15 yrs		No apparatus	No	28 yrs "
27	F	19	Hip	Several yrs ago		do	Yes	Several years
28	F	28	Pott's	3 yrs		Apparatus early	No	24 yrs later
29	M	21	Caries	Small boy		No apparatus	Yes	19 yrs "
30	F	16	Pott's	Infancy		do	Yes	12 years "
31	M	16	Pott's	6 yrs		Apparatus		8 years "
32	M	41	Hip	11 yrs		Crutches only	Yes	25 yrs "
33	F	35	T.A.	9 yrs		Apparatus	Yes	20 yrs "
34	F	28	Pott's	5 yrs		No apparatus	Yes	14 yrs "
35	M	35	Hip	5 yrs		None adequate	Yes	20 yrs "
36	M	28	T.A.	11 yrs		do	Yes	10 yrs "
37	F	22	Hip	Small child		Apparatus	Yes	17 yrs "
38	F	22	Hip	10 yrs		do	Yes	7 yrs "
39	F	21	Hip	Hip 14 yrs Ankle wrist 8-10-12		No apparatus	Yes	
40	M	24	T.A.	* As a child		Plaster	Yes	4 yrs "
41	M	16	T.A. (R)	7 yrs	6 mos	Not stated	No	8 1/2 yrs "
42	F	17	T.A.	7 yrs		Child Hosp.	Yes	9 1/2 yrs "
43	M	31	Pott's	7 yrs		Child Hosp. (6 yrs)	Yes	24 yrs "
44	F	25	T.A.	17 yrs		Not Stated	No	7 yrs "
45	F	20	Shoulder (B)	Hip at 3 yrs		Apparatus	Yes (hip)	17 yrs "
46	M	27	Pott's	6 mos.		Apparatus (to B)	Yes	9 yrs "
47	F	48	Pott's	18 yrs		Braces & Jacket	No	22 yrs "

* Sirin Tuberculosis of the wrist.

Barker and Croft, writing in the *British Medical Journal*, have already drawn attention to this tend-

¹ Cases reported before the American Orthopedic Association in June, 1902.

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ency to late recurrence in bone tuberculosis. Our orthopedic textbooks have compiled numerous collections of statistics regarding the prognosis in the various joint lesions. One of the conclusions drawn from these is that once convalescence is well established in childhood (and by convalescence is meant abscesses healed, spasm disappeared, general health restored and apparatus discarded) the patient is cured, and that though some deformity may remain, causing more or less discomfort, the particular bone lesion for which treatment was undergone is practically well. The percentage of recovery during the first decade is said to be 65%, with an increasing ratio of bad results for the succeeding decades. The period of time covered by the observations upon which these percentages were based in no cases exceeded eight years, and in one series of 39 cases only eight were over four years. In my series of 47 cases the average interval which elapsed between the end of the treatment of the initial diseases and its recrudescence was $12\frac{1}{2}$ years, that is, $4\frac{1}{2}$ years in excess of the maximum period at which statistics were obtained in the textbooks. It would appear, then, that had the statistics upon which these prognoses were made been procured after a longer interval the percentage of recovery would need to be modified, or else we are dealing with a more severe type of disease in this community. This last possibility is partly offset by the fact that into these percentages enter some of the cases treated here at our own Children's Hospital, many of which figure in both statistics.

It has been the commonly accepted belief that the danger from tuberculous bone disease lay chiefly in the liability of its extension to the viscera, that is, its metastasis, and in a certain proportion of the cases this is true. This feeling has not found expression in our ideas of treatment, for if it had, radical removal of the focus would have been tried earlier. In this series of cases, 38 of the recurrences were at the seat of the old disease alone; 5 were both local and elsewhere, whereas only 4 were purely metastatic. These four metastases were either pulmonary, in the genito-urinary tract, or elsewhere in the osseous system.

Traumatism has been directly associated with the relapse in about 25% of the cases. I have been a little disappointed in looking up the statistics not to find it more frequent, for my preconceived clinical impressions were that it would be more constantly associated. I had felt that this would be true because of the way in which repair takes place in bone tuberculosis. The process is analogous to that in the lung; namely, organization of the granulation tissue thrown out about the point of infection. Thus the bacilli become encapsulated, but, owing to their tenacity of life, they remain pathogenic for indefinite periods, and all that is needed to permit them to resume their activities is some violence causing a rupture of this protective wall of granulation, or a lowering of the resistance of the tissues to such a degree that the bacilli can break through. It matters little which cause operates to bring this about; the result is the same.

Two recent operations upon old tuberculous knees have emphasized this method of repair. In one case an excision was done for deformity, and

in the other, the joint was opened for acute symptoms in a relapsing case. In the first, the disease had been in the internal condyle, and, on opening the joint, there were no signs of the old disease except for a thin shell of bone over a cavity in the internal condyle, which was lined with well-organized granulation tissue, and contained about one-half ounce of fluid, which was quite clear, except for a few old flocculi. A similar condition prevailed in the second case, except that here there were two cavities, one in the tibia, and one in the femur. In the last case, which had been quiescent for five years, and the patient had used the joint freely at her work as a mill hand, the disease had become quite active, and the synovial membrane about the old encapsulation was freshly infected, having all the appearances of being a new process.

In these cases it was perfectly obvious that direct violence from the outside or even from the use of the limb, stiff as it was, would be very liable to disrupt the sac enclosing the old focus. In fact, the conditions which surround an adult who has a stiff hip or knee, or an ankylosed spine, the result of tuberculous disease, must be very favorable indeed if the wear and tear of life and the trauma of ordinary use, leaving out of consideration the unusual and accidental traumata to which we are all liable, does not stir up the old process, even after many years of latency. The existence of deformity immensely aggravates the liability to recrudescence, as the strain at the site of the old disease is very much greater under such circumstances. A slight trauma can exert great force when communicated to a diseased joint through a limb ankylosed in a bad position, and I feel confident that it is in this manner that most of the relapses are caused.

To revert to the textbooks, we find them in practical accord as to the difference in the prognosis among children and adults. Fewer and fewer cases recover, the later in life the disease manifests itself. This is due to two principal causes, I believe. In the first place, the existence of deformities, which is the rule, and among which we may include ankylosis and shortening (for they operate in the same way), not only puts the diseased joint to a disadvantage but injures the general health of the individual as well. In the second place, adult tissues have not the resistive or reparative power that the same tissues have in the growing period of life. They will not withstand from without or within what they would in earlier years, neither will they as firmly wall off a process that becomes active from any cause.

As the cases have been observed at the clinic, however, the ones in which the disease ran its acute course in childhood and relapsed in adult life did less well, as a rule, than those coming for treatment for the first time early in adult life. Such patients, however, should not be compared with those forming the subject of this paper, for we have not the necessary data on the primary adult cases who have apparently recovered upon which to base the comparison.

Treatment. — The treatment of tuberculous joint disease is undergoing considerable modification.

The tendency is toward more and more complete fixation in childhood, in recognition of the fact that

deformities can thus be prevented more readily and healing of the local process can be more firmly established, the accomplishment of either of which means less likelihood of relapse.

Operations in adults are undertaken earlier and more radically because it is found that excision gives greater immunity from extension of the disease locally or systemically, even though the ensuing functional result may be less satisfactory than ankylosis in a good position might be.

Such facts as this table shows should lead us, it seems to me, to regard joint tuberculosis in childhood in a more serious light than we have been in the habit of doing. Conservatism has given such apparently good results, during the average period that cases are under observation, that we have been content to rest our treatment upon fixation in some form, with surgical interference as a last resort. Now that there is a wider knowledge of the symptomatology of joint disease among the profession, diagnoses are made much earlier than formerly.

More refined methods are now in our possession for examining joints and determining the character of their lesions, so that we can not only determine with certainty that we are dealing with tuberculosis but where in the joint the lesion is situated; I refer, of course, to the use of tuberculin and the x-ray. In view of these facts I think we are justified in exploring articulations that we otherwise should leave alone, in order to eradicate, if possible, a disease which, if left to heal under prolonged treatment, is a source of constant danger to the individual. This, however, is a field to be approached not rashly, but with conservative radicalism, and I feel confident that with proper care in selection good results will follow.

The cases which heal and relapse should be treated much more energetically than is customary. This is desirable because their tendency is to do badly and because the onset of the recrudescence represents a time when the process is active in the smallest possible area of the joint, the bulk of the active disease being walled off from the rest of the joint and therefore much more amenable to operative removal even than at the very outset of the disease. Exploratory incisions and careful dissections in these cases will oftentimes effectively get rid of disease with much less mutilation than an excision. The climatic treatment for joint tuberculosis as well as for the pulmonary form is being more and more used. It is not necessary to go to the pulmonary resorts to secure this. It can be obtained at home by removing the patient into the open air. This has been carried out in tents, with most gratifying results in the hands of McKenzie and Galloway in Toronto. In the treatment of septic conditions, the value of this sort of treatment has been long recognized. The bad results in tuberculosis of any form are due to superimposed septic infections, virtually a septicemia, and therefore we have all the more reason for urging the open-air treatment, which gives such good results in septic cases.

CONCLUSIONS.

(1) Tuberculous disease tends to recur after apparent cure in a considerable proportion of cases.

(2) This recurrence is most commonly a local one. Metastases are not common.

(3) Trauma, direct or indirect, is frequently associated with the recurrence. Indirect trauma is probably the exciting cause of the recurrences, especially where partial ankylosis or deformity exists.

(4) Patients who have suffered from bone and joint tuberculosis should be cautioned that they are not well when symptoms have ceased and that reasonable care must be exercised to avoid recrudescences.

(5) Deformity and shortening should be corrected as far and as accurately as possible to lessen the chance of recrudescence.

(6) Mechanical treatment, especially fixation, should be used in the acute conditions in childhood. Exploratory interference, where discretion is used, with a view to removal of isolated foci, is *advisable* in many cases in children, and is to be *urged* in the majority of the recrudescences, if seen early. Recognition of the fact that patients with hip disease, Pott's disease and tumor albus have tuberculosis just as much as if they had phthisis, and should be treated accordingly, must be insisted upon.

The following table presents in perhaps a more graphic manner the observations upon which this paper is based. Its principal facts are epitomized as follows:

STATISTICS.

Total cases, 47.

Twenty-nine males, eighteen females.

Thirty cases treated with apparatus.

Pott's disease	16
Hip disease	17
Tumor albus	10
Hum	1
Ankle	2
Shoulder	1
Abscess occurred in 33 cases.	

Average age at time of exacerbation, twenty-eight years.

Average duration of quiescence in forty-five of these cases, twelve and one-half years.

THE IMPORTANCE OF INCREASED HOSPITAL ACCOMMODATIONS FOR THE TREATMENT OF MEASLES.

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THE idea is quite prevalent in the community that measles is a comparatively mild disease, and that treatment in hospital is not necessary. It is the object of this paper to show that while this opinion may be true to a certain extent, it is not true in the majority of cases where adults are attacked with this disease. It is not to be supposed that an epidemic of measles can be limited to such an extent as is possible with some of the other infectious diseases, but it is certainly true that many lives may be saved and much suffering prevented by having sufficient hospital facilities for the treatment of all applicants ill with this disease. Measles is the most infectious of all diseases, and it is infectious to a certain extent from the time that a patient commences to cough. This infectious stage may exist for a week or ten days before there is any eruption, or before it is possible to make a diagnosis. Koplik's sign is of the greatest assistance in making an early diagnosis, and it sometimes can be seen, if a careful examination is made of the mu-