and since the introduction of the modern adhesive appliances life with an ileostomy is never as much of a handicap as the patient fears.

Summary

Ulcerative colitis is a disease of unknown aetiology characterized by friability of the colonic mucosa leading to ulceration. The clinical course is extremely varied, but is usually characterized by remissions and relapses. The initial attack carries the highest mortality rate. Medical treatment aims at supporting the patient

over an attack until remission occurs. The use of cortisone or ACTH for this purpose is indicated in suitable cases.

Ileostomy and colectomy is indicated for the severe toxic attack which appears likely to be fatal, and for chronic invalidism in the long-standing case.

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TUBERCULOSIS OF THE SPINE

A Reassessment of the Problem and the Results of Conservative Treatment

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In the years 1947 to 1951 there were 224 admissions for tuberculosis of the spine to Heatherwood Orthopaedic Hospital, Ascot. The material for this paper has been collected from their case records to show the present behaviour of the disease when managed along conservative lines.

Spinal caries in England is a much more benign disease than it was 50 years ago. Information about its response to conventional treatment is important in assessing the value of modern surgical and chemotherapeutic measures.

TABLE 1

Patients with active disease of vertebral body ..	192
Patients with quiescent disease	22
Patients with quiescent disease but sinuses ..	7
Patients with disease of spinous process only ..	2
Patients with disease of pedicle only	1
	224

Material

An analysis of the 224 admissions is given in Table 1. The cases to be considered in detail are the 192 with active disease of the vertebral body. These may be divided on clinical grounds into 146 fresh cases without a previous full course of treatment for the spinal lesion, and 46 cases of recurrence. The 192 admissions concern 177 patients, as 13 were admitted twice and one three times in the period under review.

Incidence

The age and sex incidence are set out in Graph 1 and Table 2 respectively. Graph 1 is in keeping

TABLE 2.—SEX INCIDENCE

	Male	Female
Fresh cases	61 (42%)	85 (58%)
Reactivated cases	22 (48%)	24 (52%)
Total	83 (43%)	109 (57%)

with the findings of most modern authorities (e.g. Girdlestone and Somerville, 1952; Dobson, 1951) that tuberculosis of the spine is no longer a disease of childhood but affects mainly young adults.

The incidence of disease at different levels of the spine is shown in Graph 2. Cervical caries 50 years ago was said to occur in about one case in seven (Keetley, 1900). In the present series it forms less than 1 per cent. Two reasons for this are suggested. The diminished frequency of spinal tuberculosis in children may be one factor, for Dobson (1951) has shown that cervical caries is proportionately more common in children than adults. Secondly, the decline may be linked with the improved control of tuberculous cervical lymphadenitis with less chance of local spread of infection to the vertebral column at this level.

Analysis of the fresh cases shows that tuberculosis is progressively more common from the top to the bottom of the spine, although re-activated disease is seen most often at the lower thoracic

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GRAPH I: AGE INCIDENCE

GRAPH II: LEVEL OF DISEASE

TABLE 3.—EXTENT OF DISEASE

	Fresh Cases	Reactivated Cases
One vertebra involved	5	0
Two vertebrae involved	105	12
Three vertebrae involved	21	11
Four vertebrae involved	8	9
Five vertebrae involved	4	6
Six vertebrae involved	1	4
Seven vertebrae involved	1	0
Eight vertebrae involved	0	1
Nine vertebrae involved	0	2
Ten vertebrae involved	0	1

disc disease and perhaps tuberculosis at this level is not always recognized as such.

The extent of the disease is shown in Table 3 which emphasizes the greater extent of the infection in re-activated cases.

All patients were given full constitutional treatment in recumbency on a plaster bed or spiral frame until clinical and radiological evidence of healing was obtained. In 99 cases a course of streptomycin was also given.

Complications

The principal complications noticed in hospital are set out in Table 4. The high incidence of

level. Lumbo-sacral lesions were relatively uncommon. This is a frequent site for degenerative

GRAPH III: PATIENTS WITH PARAPLEGIA

TABLE 4.—COMPLICATIONS

	Fresh Cases	Reactivated Cases	Total
Sinuses	19 (13%)	16 (35%)	35 (18%)
Active tuberculosis elsewhere .. .	19 (13%)	6 (13%)	25 (13%)
Paraplegia .. .	4 (3%)	11 (24%)	15 (8%)
Renal calculus .. .	6 (4%)	3 (7%)	9 (5%)

sinuses and paraplegia in the cases of recurrence is shown.

Sinuses

Thirty-five patients had sinuses; 25 (71 per cent.) had healed by the time of discharge. Five became dry without the aid of streptomycin. The remainder, and those that stayed open, received various courses of local and systemic streptomycin. Of the 25 dry on leaving hospital, seven have since re-opened and only 18 (51 per cent.) of the original number have remained healed. Streptomycin has therefore not fulfilled its early promise as reported from this hospital by Ahern in 1950. Possibly most of the sinuses irresponsive to streptomycin are prevented from healing by such surgical or mechanical reasons as inadequate drainage, rigid avascular abscess walls or the presence of sequestra.

TABLE 5.—ACTIVE TUBERCULOSIS ELSEWHERE

	Cases
Bone disease other than spine .. .	9
Genito-urinary .. .	6
Pulmonary .. .	4
Miliary and generalized .. .	3
Meningitis .. .	3
Tenosynovitis .. .	1
Cervical lymphadenitis .. .	1

Active Tuberculosis Elsewhere

In 25 patients other active foci of disease were found while in hospital. The distribution of these lesions is given in Table 5. Cases of known open pulmonary tuberculosis were not accepted at

Heatherwood. It is interesting that of the six patients developing generalized or meningeal tuberculosis only one died, and that one before streptomycin was available.

Paraplegia

Of the 15 patients with evidence of partial or complete paraplegia, 13 recovered with purely conservative treatment. One patient refused treatment. The last, with recurrence of symptoms in spite of conservative management, was transferred to the care of Mr. H. J. Seddon at the Royal National Orthopaedic Hospital, where an antero-lateral decompression was performed with restoration of function to the lower limbs. The incidence of paraplegia in relation to the level of disease is shown in Graph 3.

Renal Calculi

The nine patients with evidence of renal stone or grit all passed their calculi down the ureter without operative intervention.

TABLE 6.—RESULTS OF TREATMENT

	Cases
Discharged with disease quiescent .. .	168
Died in hospital .. .	1
Discharged with disease still active .. .	8*

*Of these eight patients, three have since died and three have been re-admitted to hospital.

Results

Eleven patients were transferred to other hospitals for non-medical reasons and four took their own discharge against advice. The results of treatment in the remaining 177 cases are set out in Table 6.

Re-activation of Disease

Of the 168 patients discharged with quiescent disease six have not been seen since. The re-

mainder have been followed up for periods varying from a few months to over five years; 148 were followed up for more than one year, 107 for more than two. In the assessment of spinal tuberculosis these periods are short and give information on only the early prognosis. Already, however, 17 patients have required re-admission for further active bone disease at the original focus. Twelve of these were originally fresh cases as defined above, equivalent to 9.2 per cent. of those discharged quiescent, and five had already had one spell in hospital with re-activated disease (13.5 per cent. of these cases). Two patients with seeming relapse came back within six months of their discharge from hospital and probably represented unhealed rather than recurrent lesions. The tendency to relapse appears to diminish with the passage of time, although never entirely disappearing. Examination of the patients with recurrence admitted during 1947 to 1951 suggests that the first five years are the most critical (Table 7).

The better prognosis of lumbar than of thoracic disease is illustrated by the relative proportion of re-activated cases at each level. Of 49 cases with disease of the tenth thoracic vertebra, 25 (51 per cent.) were recurrent, while of 51 cases with infection of the fourth lumbar vertebra only 10 (19.6 per cent.) had been in hospital before.

TABLE 7.—PATIENTS WITH REACTIVATED DISEASE

<i>Time of Re-admission to Hospital</i>	<i>No. of Patients</i>
First year	13
Second year	7
Third year	5
Fourth year	4
Fifth year	5
Sixth to tenth year	8
Eleventh to twentieth year	3
Over twenty years	1

Discussion

The immediate results of treatment in 95 per cent. of the present series were satisfactory, the fresh cases doing better than those with re-activated disease (98 per cent. healed as opposed to 86 per cent for the latter). The long-term results, however, give no grounds for complacency. Many patients relapsed, about 10 per cent. in the first three years or so and up to 50 per cent. later. The risk of re-activation is probably more than twice as high in disease of the lower thoracic spine as in lumbar caries and is raised in those who have already had one relapse. Re-activated disease has a higher incidence of serious complications and a poorer response to treatment. Its prevention forms the greatest problem in the management of spinal tuberculosis today.

Spinal Fusion

A successfully arthrodesed tuberculous knee or hip is safe. An arthrodesed spine is not. This was well shown by Dobson (1951). Twenty-five of the present patients had an operation for spinal fusion at some time in their treatment. These were selected cases with a fairly high risk of re-activation. In seven (28 per cent.) further active disease has followed the operation.

Streptomycin

Of the 99 cases who were treated with streptomycin, 35 were selected cases thought at the time to be most likely to benefit from the drug. From early 1950 supplies were sufficient for the administration of a routine course to all patients on admission. One gram of streptomycin sulphate was given daily by intramuscular injection for 120 days. Para-amino salicylic acid (P.A.S.) also was employed in most instances, 20 g. daily, six days a week, for the same period.

Forty-three fresh cases of tuberculous spinal disease in which this routine therapy was given have been examined in detail and compared with a control series of 50 cases in which treatment was given during 1947 and 1948. All but three of the patients receiving streptomycin were given P.A.S. also. The details are set out in Table 8. The morbidity of the two series was remarkably similar except in the presence of active extraspinal foci of tuberculosis. These were very much less common in the treated than in the control cases.

TABLE 8.—STREPTOMYCIN TREATMENT

	<i>Controls</i>	<i>Streptomycin Treated</i>
Number of patients		
M.: F.	19 : 31	18 : 25
Average age	26.4 years	24.2 years
Stay in hospital	17.1 months	16.5 months
Sinuses	6 (12%)	5 (11%)
Active T.B. elsewhere	9 (18%)	2 (4%)
Paraplegia	1 (2%)	2 (4%)
Died	1 (2%)	0
Average follow-up	46 months	20 months
Reactivated	7 cases (3 not followed up)	1 case (1 not followed up)

The mortality of tuberculosis of the spine has been materially decreased by the use of streptomycin, which is of such value in the treatment of complicating miliary and meningeal tuberculosis. The mortality of the whole 192 admissions here reviewed was 2.1 per cent., a figure comparing favourably with series based on patients treated in pre-antibiotic days. Seddon (1935) found a mortality of 12 per cent. in the first five years in his patients which, although not closely comparable with the present series, were drawn from and

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treated in the South of England along largely conservative lines. There has been a general steady decline in the mortality from tuberculosis of bone for many years (Registrar General, 1948-49) with which the present series conforms, but to which is perhaps added the beneficial effect of chemotherapy:

It is still too early to assess fully the value of streptomycin in preventing relapse. It has not eliminated this feature of the disease but does appear to have made it less common.

Conclusions

Spinal caries is no longer the 'very terrible, life-destroying, figure-spoiling, happiness-undermining disease' Keetley (1900) described, but still presents many problems in treatment. Successful care demands a long stay in hospital and carries with it no guarantee against relapse. Sinuses and deformity still occur and paralysis and death are the occasional outcome. Chemotherapy, used as described above, has lowered the mortality and had a limited effect on the morbidity. Surgery has an established role in the management of some cases of paraplegia and in the stabilizing of the mechanically unsound spine. It is sometimes indicated in the treatment of sinuses not responding to rest and chemotherapy.

Treves in 1884 suggested the value of evacuating paravertebral collections of pus and necrotic tissue to promote early and sound healing of the disease. Seventy years later this aspect of treatment is being re-examined in conjunction with the use of active chemotherapeutic drugs (Wilkinson, 1953).

Constitutional methods of treatment remain of

first importance while the value of these procedures is further investigated. It remains desirable that all cases of spinal caries be managed in long-stay orthopaedic centres where full facilities for the general treatment of the disease exist. It is only thus that this difficult but disappearing disease can be effectively studied and the value of the newer forms of treatment established.

Summary

In 192 recent cases of spinal caries reviewed, the disease is shown to be one of young adults and progressively more common from the top to the bottom of the spine. With constitutional treatment in recumbency healing was achieved in 95 per cent. of cases. The death rate was 2.1 per cent. The value of streptomycin is assessed by comparison of a control and treated series.

Acknowledgment

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