

patients belonging to the marked-jaundiced group.

REFERENCES

- BODANSKY, A. (1937) .. *Amer. J. Clin. Path.* (Tech. Suppl.). **1**, 51.
- HANGER, F. M. (1939) .. *J. Clin. Invest.*, **18**, 261.
- HOAGLAND, C. L., and SHANK, R. E. (1946). *J. Amer. Med. Assoc.*, **130**, 615.
- KUNKEL, H. G., LABBY, D. H., and HOAGLAND, C. L. (1947). *Ann. Intern. Med.*, **27**, 202.
- MACLAGAN, L. (1944) .. *Brit. J. Exper. Path.*, **25**, 234.
- MARTIN, N. H. (1949) .. *Ibid.*, **30**, 231.
- Idem* (1946) .. *Gastroenterology*, **7**, 1.
- MOYER, J. H., and WURL, O. A. (1951). *Amer. J. Med. Sci.*, **221**, 28.
- RICKETTS, W. E., and STERLING, K. (1951). *Ibid.*, **221**, 38.
- SHANK, R. E., and HOAGLAND, C. L. (1946). *J. Biol. Chem.*, **162**, 133.
- VAN DEN BERGH, A. A. H., and GROTEPASS, W. (1934). *Brit. Med. J.*, *i*, 1157.
- VORMANS, L. J., SCUDAMORE, H. H., and KARK, R. M. (1951). *Amer. J. Med. Sci.*, **221**, 140.

CHRONIC BRUCELLOSIS

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THERE is no reference to chronic brucellosis in Indian Medical literature. This is perhaps due to the fact that it is considered to be a rare disease. That it should be so rare in India is surprising considering that Polding (1947) reported that 10 per cent to 50 per cent of aborting Indian cattle in certain rural areas were infected with brucellosis and so long as we have brucellosis among cattle we will have the disease among human beings. The fact however is that even 85 per cent of cases of acute brucellosis are missed, being taken for cases of malaria, typhoid, influenza, rheumatic fever and tuberculosis* and if any case is diagnosed it is after a long illness when the patient has presented the most typical picture of the disease. The illness in a doctor was diagnosed on the

* Hence the 'ravages' of tuberculosis and the sale of tuberculosis seals. Tuberculosis is, in reality, a dying disease. What is more, it started dying long before any measures were taken against it.—EDITOR, *I.M.G.*

153rd day, but hardly a case of chronic brucellosis is diagnosed at all. The reasons for missing the disease are as follows:—

- (1) Most of the acute cases which become chronic are missed.
- (2) The signs and symptoms of the chronic variety are not well known. In fact they are hardly ever known at all to the physicians.
- (3) There is lack of brucellosis mindedness in the physicians.
- (4) There is much too much conservatism and scepticism with regard to the diagnosis of brucellosis among physicians.
- (5) Cases of acute brucellosis are not followed up so that the physician does not get educated about the symptoms of the chronic form.

Signs and symptoms of chronic brucellosis

As has been said above the signs and symptoms can be best appreciated when a few acute cases are followed up. These points will be appreciated from case histories at the end of this paper. The most important signs and symptoms are:—

- (1) Fatigue, tired feeling, specially marked in the legs, and disinclination to be active.
- (2) Physical inefficiency. Patients with chronic brucellosis apparently looking healthy will confess how physically inefficient they feel.
- (3) Aches and pains, pains behind the shoulders, in the lumbar region of the back, in joints and legs.
- (4) Various nerve pains, sciatica, brachial neuritis, feeling of extremities becoming numb and dead when lying in a position for a long time.
- (5) Chronic ill health which is difficult to account for.
- (6) Headache, loss of sleep and depression.
- (7) Feeling of cold in the extremities, even in summer. Some patients may not be able to tolerate the breeze of a fan.
- (8) Some cases run a slight temperature along with the above symptoms.

- (9) Gastro-intestinal symptoms: gastritis, feeling of heaviness in the epigastrium, lower abdominal pain, constipation, seldom diarrhoea, symptoms of chronic appendicitis and cholecystitis. Some cases of brucellosis have been operated upon for appendix. Some cases complain of pain and tenderness in the abdomen and run a slight temperature and are mistaken for cases of abdominal tuberculosis*.
- (10) Such vague symptoms that the patient may be considered to be a neurotic. In fact, some of my patients were labelled as such. Evans (1934) is of the opinion that no case of neurosis should be diagnosed as such unless chronic brucellosis has been excluded. In fact she is of the opinion that the description of neurosis in text books is exactly the description of chronic brucellosis.
- (11) Repeated abortions and still-births in women.
- (12) Chronic osteomyelitis, arthritis, arthralgia and spondylitis of the spine.
- (13) Choroiditis, retinitis optic atrophy and iritis.

Frequency

The frequency of chronic brucellosis is ten cases of chronic to one of acute brucellosis in America (Ed. J. A. M. A., 1947). In my series there were 3.5 cases of chronic brucellosis to every one case of acute brucellosis. This low number of cases of chronic brucellosis is due to three reasons.

1. All the chronic cases are not referred to the laboratory for diagnostic tests.
2. Evans (1938) has stated that 46 per cent of the cases of chronic brucellosis are seronegative. Griggs (1942) reported agglutination test to be negative in more than half of his cases and unquestionably positive in less than 20 per cent. Only such cases as were sero-positive were included in this series to be quite definite that they were cases of brucellosis. Except case No. 10 which was sero-negative.

3. Cases of acute brucellosis were collected for a period of one year while those of chronic brucellosis were collected for six months.

The frequency can be judged from the accompanying tables. All the sera that were received in the laboratory for the Kahn test were also put up for brucellosis. These sera were divided into two groups. Sera which were sent for this test on account of gynaecological conditions (abortions and still births), Table I, and sera which were sent for conditions other than gynaecological, Table II.

It is worth while to point out that in chronic brucellosis the serum shows agglutinins in low titres only and it is a mistake to exclude brucellosis because of agglutinins found in low titres particularly when symptoms of chronic brucellosis are present. Harris (1935) is of the opinion that low agglutination titres 1:10, 1:20 or 1:40, are as significant in patients with a clinical picture of undulant fever as is agglutination in dilutions of 1:80 to 1:2500. The overall frequency is however shown by the Table III.

In a series of 2116 Kahn sera Gray (1933) found 13 per cent to be completely or partially positive in a dilution of 1 in 30 for brucellosis. Cruickshank and Baber reported by Beattie (1938) found 2.4 per cent of Kahn sera to react in a titre of 1 in 20 or higher while 30 per cent in my series showed agglutination in 1 in 20 or above.

A few significant conclusions can be drawn from the three tables.

(1) Forty-three per cent of all patients whose blood was tested for Kahn showed agglutinins in their blood for brucellosis in 1 in 10.

(2) Thirty per cent patients with conditions other than gynaecological showed agglutinins in their blood, while sixty-two per cent of women with complaints of abortions and still-births showed agglutinins in their blood in the same dilution.

It is the opinion of Harris (1950) that agglutinins do not appear without infection, although some people with agglutinins in their sera may show no clinical illness. Agglutinins may be the result of past infection, or people with agglutinins may later on develop symptoms of the disease.

* See footnote on previous page for the inflative trends in tuberculosis.—Editor, *I.M.G.*

If from Table II some cases who gave a positive agglutination test and who could be attributed to chronic brucellosis (such as those with arthritis, synovitis, osteomyelitis chronic abdomen, iritis, choroiditis, optic-atrophy facial paralysis, paraplegia, hemiplegia and paresis of lower extremities in all of whom Kahn was negative) were taken out, then the percentages in Tables I and II will show significant difference *i.e.* many more cases of abortion in which serum is sent for Kahn show agglutinins for brucellosis than others in which Kahn is asked for other conditions. The gynaecological implications of brucellosis are therefore significant and will be treated in a separate paper.

Diagnosis

The diagnosis of chronic brucellosis is difficult and is based on the following considerations:—

- (1) History of past infection. In this connection it is important to note that: (a) The patient may not remember the acute attack or may not attach importance to a fever from which he suffered long ago. (b) The acute attack may have been taken for typhoid, malaria, influenza and tuberculosis. This is so in 85 per cent of cases. (c) The acute attack may have been of a short duration and atypical in character. (d) The disease may have started as chronic brucellosis from the beginning with symptoms enumerated above and a very slight rise of temperature.
- (2) Agglutination test. According to Evans (1938) agglutinins are found in only 54 per cent of cases. They are found in low titres but along with the history and symptoms they are of importance.
- (3) The total leucocytic count may be normal or show leucopenia with relative lymphocytosis. There is slight anæmia.
- (4) The skin test. 0.1 cc. of dead emulsion of brucella containing 500,000 organisms is injected intradermally and the reaction, that is, induration and redness are noted, or 0.1 cc. of M.B.P. is similarly injected. M.B.P. is a product of endoproteins of the 3 species of *Brucella i.e.* *melitensis*, *bovine* and *porcine* and its use is advocated by Castaneda (1952). The skin test

should be very carefully employed as chronic cases may become acute after this test. One case who showed moderate reaction and who had symptoms of chronic brucellosis relapsed into an acute phase. Four years previously she had acute brucellosis. The importance of the skin test is that it shows present or past infection. It does not tell about the activity of the disease. The intradermal test should be employed after 2 or 3 agglutination tests on the patients blood have been done for fear of production of agglutinins after this test.

- (5) The opsonocytophagic test was not employed by me in my cases, but it is said to be useful in diagnosis and in judging the amount of immunity.
- (6) Culture. A positive culture settles the diagnosis, but very few chronic cases yield a positive culture.
- (7) Harris (1950) adds that favourable response to vaccine treatment is of diagnostic importance.
- (8) Diagnosis is also achieved by a process of exclusion of other diseases.

Prognosis

Brucellosis is not a self limiting disease (Harris 1950). It is prolonged; the physical inefficiency, pains, aches, and the chronic nature of the disease produce great mental depression in the patient.

General treatment

Complete rest in bed is not essential. Patient should however regulate his period of work and rest. Undue exertion or work involving fatigue should be avoided. Vitamins, tonics and high calorific diet are adjuncts to treatment.

Forty cases were treated by M.B.P. and 14 by Kasauli vaccine.

Treatment by M.B.P.

Cases are treated after performing the skin test by subcutaneous injections of M.B.P. The treatment is not started until the skin reaction has subsided. The first dose is 0.25 cc. or less according to the severity of the skin reaction. Then injections are given twice a week gradually increasing the dose and adjusting it

in such a way that there is no reaction to injections. Out of the 40 cases so treated 13 improved very much, 13 were 50 per cent better, in 8 the treatment was incomplete, 5 did not improve at all, and one relapsed into an acute phase. Thus 66 per cent of the treated cases were benefited.

Treatment by Kasauli vaccine

The vaccine is issued in 2 courses, each course consisting of 4 injections. The doses are marked I, II, III, and IV for each course. The first dose of the first course contains 5 million killed bacteria. The dose is increased by 5 million so that the last dose of the first course contains 20 million bacteria. The injections are given subcutaneously at intervals of 7 to 10 days according to the severity of local and general reaction of the previous injection.

The first dose of the second course consists of 30 million dead bacteria, the dose is increased by 10 million bacteria but the last dose of this course contains 75 million bacteria.

There is sometimes local pain, swelling and tenderness after the injections. This local reaction subsides in a day or two. The general reaction consists of a little rise of temperature, aches, pains, headache, and the neuralgias, if present, become worse.

The patient gradually feels better, and stronger. He is relieved of his aches, pains, and slight temperature. The arthralgias and neuralgias are cured. Out of 14 cases, treated by Kasauli vaccine one was relieved completely. This case had been diagnosed to be suffering from neurosis and he returned to active duty. Eleven cases were relieved partially, one case did not feel better at all, and one case did not complete the treatment. With M.B.P. patients feel better as long as they are having injections or some time after having injections. They have to be treated again when they relapse. With Kasauli vaccine relapses are less. Some cases had to be given 2 courses of vaccine.

Typical Cases

1. *G.D.*—A forty years old labourer complained of severe pains down the legs, the pains started at 5 P.M. and lasted the whole night, patient sweated at night and could not go to sleep due to the severity of the pains. He was forced to give up this manual work for 2 months.

There was a history of typhoid like fever one year previously. Agglutination test for brucellosis was positive up to 1/80. Skin test was negative. He responded specifically to injections of M.B.P.; after 4 injections he was 75 per cent better, only the pain in the right lower quadrant of the abdomen remained. With 4 more injections he was quite cured of his symptom and returned to his work.

2. *Miss J.*—A thirty years old lady complained of feeling tired, disinclination for work or exertion with a desire to keep lying down the whole day. She had aches, tenderness of the whole body, pains in the heels and pains in the small joints of the fingers with a daily rise of temperature to 99—100F. Four years previously while she was in Ferozpur district of the Punjab, she suffered from what she thought was chronic malaria. Physical examination showed a plump well fed individual who was depressed and who suffered from loss of morale to some extent due to her chronic illness. No other physical finding was detectable. She complained of headache sometimes and loss of sleep. Her agglutination test was positive up to 1/80, skin test was also positive. She responded to M.B.P. and after 8 injections was 75 per cent better and she returned to her job of a teacher.

3. *M.K.*—A thirty years old lady complained of pain in the legs, weak state of health, severe pain in the lumbar region, of four year's duration. Four years previously while she was in Poona she had a fever of 6 months' duration and was later on admitted to a Bombay hospital for pain in the lower abdomen, she was diagnosed to be a case of chronic salpingitis and underwent an abdominal operation. Agglutinins were present up to 1/20. She relapsed after a skin test which showed a moderate reaction persisting for 7 days with M.B.P. In spite of warning to her physician, she was treated during the relapse as a case of malaria and later of typhoid fever.

4. *S.*—A twenty years old lady, complained of low grade fever of 20 days' duration, feeling tired, headache, backache and pain in the abdomen. Spleen and liver were not palpable. Agglutination test was positive up to 1/80, total leucocyte count was 5950, differential leucocyte count was polymorphonuclear leucocytes 39 per cent, lymphocytes 57 per cent, monocytes one

per cent, eosinophits 3 per cent. She was treated at first with 8 injections of M.B.P., but there was no significant improvement. Then she was treated by Kasauli vaccine, she felt better after the treatment.

5. *Mrs. Sahni.*—A twenty-seven years old lady complained of a weak state of health, back-ache and pain in the lower abdomen. Agglutination test was positive up to 1/80.

6. *Dr. J. M.*—A veterinary surgeon suffered from acute brucellosis in September, 1952. He was cured with aureomycin. He gradually improved in health. His titre of agglutinins in one year had fallen from 1/640 to 1/80. He complained of slight pain in the wrist. This case is mentioned because he is likely to be taken for rheumatism if he presents himself in any out-patient department with the complaint of slight wrist pain, and if his profession was not kept in mind and the history of his illness not enquired into. It is worthwhile pointing out here that his acute illness was variously diagnosed as malaria, typhoid, influenza and rheumatism.

7. *S. D.*—Complained of pain in the back, headache, pains in the whole body, weakness and feeling tired with 16 days' low temperature and tenderness in the abdomen. She was admitted as a case of chronic abdomen. Her total leucocyte count was 4500 per cent, differential leucocyte count was polymorphonuclear leucocytes 33 per cent, lymphocytes 60 per cent, monocytes 3 per cent and eosinophits 4 per cent. She had agglutinins upto 1/4G.

8. *M. L.*—A 21 years old young man was admitted with the complaints of extreme weakness, feeling of heaviness in the abdomen, pain in the back, bad taste in the mouth, loss of appetite, loss of sleep, and palpitation. He was taken for a case of neurosis. Physical examination showed a young man of spare build, who looked neuresthenic and slightly anæmic, and who had slight abdominal tenderness. His total leucocytic count was 5,400 and the differential count was polymorphonuclear leucocytes 65 per cent, lymphocytes 33 per cent, eosinophits 2 per cent, red blood-cell count was 4.1 million and hæmoglobin was 12.5 gm. per cent. He was also treated for general debility and pains with injections of liver extract and berin, but he showed no improvement and was labelled as a case of neuresthenia. His agglutination test for

brucellosis was positive up to 1/80. He was given a complete course of Kasauli malta fever vaccine consisting of 8 injections. He improved gradually. The appetite returned and so did strength and activity. After the course he was very happy and returned to his strenuous duties of a village of hawker, going from village to village.

9. *P.*—A twenty-six years old lady complained of such severe pains in the legs that she could not sleep at night. She also had lumbar pain, light-headedness, and generalised pain in the body and in joints. She had 3 still-born macerated children one after the other. She was positive up to a dilution of 1/80 for brucellosis. She was put on M.B.P. Soon after starting the treatment, her pains became very much less and she could sleep comfortably at night. Kahn test was negative.

10. *B. D.*—A fifty years old lady complained of severe neuralgia of the left arm of 10-12 years' duration and neuritis of the right arm of six months' duration. She had to tie, both her arms tightly with her 'dopatta' at night. She also complained of general weakness and pains in her feet and epigastrium. Ten years previously she had suffered from a continuous fever of 10 days' duration, this fever later on became undulant and she suffered for one year. Her agglutination test for brucellosis was negative, but on the strength of her complaints and history she was treated with injections of M.B.P. She was completely relieved of her neuralgias after 8 injections. She also felt stronger.

11. *L.*—A twenty-six years old lady wife of a tonga driver living in a rural area, complained of pain and swelling of the left knee. She also complained of pains in the other joints and low grade fever for 2 months. She had history of sciatica 22 days previously. Physical examination showed that the left knee was swollen, and there was wasting of the muscles of the thigh, she looked anæmic, the spleen and liver were palpable 2 fingers below the costal margin. E.S.R. was 60 mm. (1st hour Westergren). Total leucocytic count was 11,150. Differential count was polymorphonuclear leucocytes 65 per cent, lymphocytes 24 per cent monocytes 3 per cent, eosinophits 8 per cent. Red blood-cell count was 4.21 million and hæmoglobin was 10.9

* Scarf.—EDITOR, I.M.G.

TABLE I

One hundred and twenty-six sera tested for Gynaecological conditions

Negative for Brucellosis	Positive for Brucellosis in various titres.				Kahn positive.
	1/10 or above	1/20 or above	1/40 or above	1/80 or above	
48=38%	78=62%	635=0%	23=26%	4=3.1%	1=0.83%

TABLE II

One hundred and seventy sera tested for all other conditions

Negative for Brucellosis.	Positive for Brucellosis in various titres.				Kahn positive.
	1/10 or above	1/20 or above	1/40 or above	1/80 or higher	
128=70%	52=30%	28=16%	10=6%	4=2.3%	7=4.1%

TABLE III

Total number of sera (296) tested for all conditions

Negative for Brucellosis	Brucellosis positive in various titres.				Kahn positive.
	1/10 or above	1/20 or above	1/40 or above	1/80 or higher.	
16=57%	130=43%	91=30%	33=11%	8=3%	8=2.97%

gm. per cent. Agglutination test for brucellosis was positive upto 1/20. X'ray of the knee did not show any tubercular lesions. Kahn test was negative.

12. *S. B.*—A destitute 40 years old woman was admitted with the complaint of severe pain in her right foot of one month's duration, before this she had pain in her right knee for six months, and also pain in the whole body, and particularly in the back, neck and abdomen. She felt very weak and complained that she felt cold more than usual. On further questioning she complained of severe pains in the lower ribs. Physical examination revealed, a weak individual who was obviously in pain. She could not put her right foot on the ground. There was no obvious swelling of the foot, but it was very tender. Her agglutination test for brucellosis was positive up to a dilution of 1/160. She was treated with salicylates and locally ichtyol belladonna was applied, but with no relief to her. She was then given injections of M.B.P. The pain in the foot gradually became less, she had better appetite and more strength and was later on able to walk normally.

Summary

Chronic brucellosis is at present not usually recognised as a disease. The reasons why it is missed are described. The signs and symptoms of the disease are dealt with in detail. The most important symptoms are feeling tired, pains and aches, chronic ill health, arthralgias, pain in abdomen and various types of neuritis. The disease is sometimes taken for neuresthenia. It is also one of the causes of repeated abortions and still-births in women. The diagnostic criteria are described. More than 50 per cent of the chronic cases do not have any agglutinins in their sera, and the positive ones have them in low titres. Treatment of brucellosis by Kasauli vaccine and M.B.P. is discussed and a few case histories are given.

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REFERENCES

- BEATTIE, C. P. (1938) .. *J. Hyg.*, **38**,
 CASTANEDA, M. RUIZ W.H.O./Bruc/46.
 (1952).
 EDITORIAL (1947) .. *J. Amer. Med. Assoc.*, **134**,
 876.
 EVANS, ALICE C. (1934). *Ibid.*, **103**, 665.
Idem (1938). *Pub. Health Rep.*, **53**, 1507.
 GRAY, J. D. A. (1933) .. *J. Amer. Med. Assoc.*, **100**,
 738. Abstracted from *J. Bact.*, **25**, 415.
 GRIGGS, J. F. (1942) .. *North West Med. Seattle*,
41, 11, 389.
 HARRIS, H. J. (1935) .. *J. Amer. Med. Assoc.*, **104**,
 596. Abstracted from
New York State J. Med.,
34, 1017.
Idem (1950) .. *Brucellosis—Undulant fever.*
Clinical and Subclinical.
 Paul B. Hoeber, Inc.,
 New York.

A Mirror of Hospital Practice

UNUSUAL FOREIGN BODY IN ABDOMEN

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ON the 6th June, 1946, a woman aged about 25 years came to the dispensary with a small abscess—like swelling in the epigastric region 2" below the costal margin, a little right of the mid-line. She was a widow of good physique.

On examination I found that the swelling was fluctuating and was about to burst. Her temperature was normal. I opened it and a serous fluid mixed with a little pus came out. It was dressed with sulphur drugs and she was advised to come daily for dressing. My compounder used to dress it daily.

On the 4th day *i.e.* on the 9th June while the compounder removed the dressing, he was astonished to find a dead round worm in the dressing. He at once called me to see it. I was simply puzzled at the sight of it. The absurdity of a round worm to come out from an abscess wound of the abdominal wall com-

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