Two Main Considerations

I realize that my views about the doubtful breast are drastic, but if they are right they must be accepted. Two considerations may make their acceptance easier. First, when we come to deal with the treatment of cancer we discuss various alternatives—radical surgery of different types, irradiation in one of its many forms, or a combination of the two methods—in the attempt to find that plan which carries the greatest chance of cure. But we know that in the long run our successes will seldom be more than 60 per cent., and we can never be certain that we shall succeed with any particular patient, however localized the disease may appear to be. With precancerous conditions, on the other hand, we can, by a much more limited removal, guarantee success in 100 per cent. carried to any number of decimals. Returning to my simile of the revolution—and no comparison could better fit cancer where one group of cells combines to attack the corporate body, with the probability that both whole and part will be involved in the eventual ruin—we may compare the usual method employed to deal with such uprisings—to attack the insurgents after revolution has broken out with the much more scientific prophylactic method evolved in Russia, that of exterminating (liquidating is the correct political euphemism) the whole social stratum in which discontent might arise before the first hint of trouble. This method, after all, is the only safe one; it has meant the slaughter in cold blood of some three million innocent people, but it has made Russia safe for communism.

The second consideration is that the operation which is adequate to deal with a precancerous breast is limited, sightly, and far less severe and dangerous than that which will be required when cancer has appeared. It involves the removal of all breast tissue, of the pectoralis fascia in which the main lymphatic channels lie, and preferably of the anterior axillary glands in addition, but not of the muscles or of any more skin than is necessary to fashion flaps that will clothe the chest without redundancy when the breast has been removed. It can be accomplished through a low curved incision placed horizontally, and will leave a scar that is invisible, even in the best night clubs or on the beach at Juan les Pins. We are, however, treating the patient rather than the disease, and we may be forced to local removal of a lump if we realize that she will otherwise fly to some quack remedy. But the ordinary sensible woman will accept the reasonableness of our advice and be content to report for examination at regular intervals, content in the knowledge that we shall recommend more drastic measures only when they are necessary. Should we see any danger sign, such as unilateral alteration in the shape of the breast, or of the orientation or level of the nipple, we must give this advice even though the lump itself remains unchanged.

Conclusion

I have tried to suggest a point of view rather than to lay down rules, as indeed it would be most unfitting for me to do. To us our profession is more than a trade: it is our life, an expression of our humanity. That humanity has three aspects—science, art, religion; we know, we feel, we believe. But the third, which is perhaps the most important of all, which underlies the others, is least often acknowledged. Many writers speak of the science and art of medicine, but none since Sir Thomas Browne has written of the religion of medicine. The three are necessary to a sane and balanced whole; for just as science and religion without art produce the fanatic, art and religion without science the mystic, so science and art unleavened by faith produce the virtuoso, the technical expert. The faith of medicine is expressed in the Hippocratic oath. "The course I adopt shall be for the benefit of my patients, according to my ability and judgement." The welfare of the patient is the end we seek in surgical decision, which thus becomes the surgeon's religion, a faith that must sometimes repudiate science and transcend diagnosis.

CHRONIC MENINGITIS IN WEIL'S DISEASE

BY

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This note describes a case of Weil's disease associated with chronic meningitis, and is of interest not only because the first evidence of meningitis was observed four months from the beginning of the disease, but also because leptospira were recovered from the cerebro-spinal fluid six months and from the urine of the patient eight months after the onset of the illness. The patient was a farm labourer aged 35 years, and his illness is summarized in the following notes.

History of Illness

The patient lived in Ireland until a year ago, when he came to England to work on a farm near Lancaster; his work does not appear to have exposed him in any particular way to the risk of a leptospiral infection, but there were many rats about the farm. Until December, 1935, he had always enjoyed good health.

He was admitted to a hospital in Lancaster on December 16th, 1935, suffering from a febrile illness which had begun between one and two weeks previously. He was jaundiced, and *Leptospira icterohaemorrhagiae* were found in the urine. Within a week of admission the temperature fell to normal, but there was a further slight rise about the tenth and eleventh days, after which the patient's condition improved and the jaundice gradually disappeared. The attack was apparently typical Weil's disease, but recovery was not complete, and early in January there was a slight irregular fever. He was given an intravenous injection of 0.1 gramme of sodium potassium bismuth tartrate on January 25th, 27th, and 31st, but as this was followed by a severe fever, with a temperature of 103° F. on February 4th, and later by an itching scaly eruption all over the face, trunk, and limbs, no further injections were given. The rash slowly disappeared, but he had a moderately severe and irregular fever until the beginning of March. His temperature then became normal, and he improved sufficiently to be allowed out of bed although he still remained in hospital. Towards the end of March the fever recurred, and early in April, just over four months after the date of his admission, he began to suffer from severe headaches. The headaches were at first relieved by simple remedies and later by lumbar puncture, but finally such measures produced only slight and transient relief. The patient's vision then began to fail, and the temperature was persistently swinging each day between 99° and 101° F., the headache became intense, and the general condition was obviously becoming very serious. The cerebro-spinal fluid was examined on May 14th, and was found to be under increased pressure and to contain an excess of cells; the Lange curve was 0001221000 and the Kahn reaction negative.

The cause of the meningitic reaction was not determined, and as the patient's condition was steadily deteriorating he was transferred to the Liverpool Royal Infirmary, where he was first seen by me on May 20th.

General Examination

He was lying curled up on his left side, with the bedclothes drawn over his head. There was no jaundice, but he was pale, with flushed cheeks, and extremely wasted and weak. Cerebration was slow.

Cardiovascular System.—Heart: rhythm regular, 80 per minute; apex beat in fifth space within nipple line; heart sounds faint, with soft systolic bruit at all areas. Blood pressure 120/78 mm. of Hg. No evidence of haemorrhages into skin or mucous membranes, but the left fundus oculi showed generalized oedema of the retina, with haemorrhages near the disk; the right fundus was not seen (*vide infra*).

Respiratory System.—Respirations, 18 per minute; chest movements symmetrical; percussion normal, fremitus and resonance normal, breath sounds normal, and no adventitious sounds. There was a little cough, but the scanty sputum showed nothing of significance.

Alimentary System.—Some redness of the fauces, but otherwise nothing of moment.

Genito-urinary System.—Apparently normal, excepting for slight phimosis. Urine: clear, acid, no albumin, no sugar, centrifuged deposit consisted of amorphous urates with very occasional leucocytes; no organisms seen in ordinary examination or by dark-ground illumination.

Central Nervous System.—Cerebration depressed; severe persistent headache; rigidity of neck. Generalized weakness, but no obvious objective motor or sensory disturbances, and no evidence of any cranial nerve lesion. (The vision was poor, but there was gross damage to the media of the right eye, and definite oedema of the left retina. The right pupil was fixed by adhesions, and therefore reacted poorly to light. (*Vide infra.*) Knee-jerks feeble, but present and symmetrical; plantar reflexes flexor.

The liver was not apparently enlarged, but the spleen was palpable one and a half inches below the costal margin, and there were small palpable glands in the neck, axillae, and groins.

These findings suggested a generalized infection with meningitic involvement, and the following further examinations were therefore carried out.

Cerebro-spinal Fluid.—Appearance: very faintly opalescent; fibrinous clot on standing. Pressure: 250 to 280 mm. of water. Protein: moderate increase. Chlorides: 613 mg. per 100 c.cm. Sugar: normal. Non-protein nitrogen: 15 mg. per 100 c.cm. Cells: 173 per c.mm. (60 per cent. polymorphs, 30 per cent. lymphocytes, and 10 per cent. large degenerated cells). Wassermann reaction: negative in all dilutions. Cultures remained sterile at 37° C. for three days.

Blood.—Erythrocytes: 2,400,000 per c.mm. Halometer reading: 7.4μ. Haemoglobin: 45 per cent. Colour index: 0.9. Leucocytes: 7,500 per c.mm. Films: erythrocytes normal excepting for slight basophilia and polychromasia. Leucocytes normal in appearance and relative proportions. No parasites seen. Van den Bergh reaction: direct negative, indirect less than 0.5 units. Non-protein nitrogen: 40 mg. per 100 c.cm. Agglutination: completely negative with *B. typhosus* O and H, *B. paratyphosus* A and B, and with *B. melitensis* and *B. abortus*. Cultures: remained sterile at 37° C. for three days. Wassermann reaction negative.

Urine obtained by catheter remained sterile in culture at 37° C. for two days, and the faeces were chemically and bacteriologically normal.

The heart and lungs appeared normal on *x*-ray examination, and there was no *x*-ray evidence of any abnormality in the skull.

Mr. McKie Reid, the ophthalmic surgeon, examined the eyes, and reported: "Right eye: pupil irregularly bound down with exudates of an old iritis; organizing vitreous haemorrhage present; fundus details not seen. Left eye: pupil reacts normally; media clear; slight generalized juxtapapillary oedema of retina; striate haemorrhages near disk along superior temporal vein."

Diagnosis

When the results of the various examinations were obtained it was thought that the most probable diagnosis was that of tuberculous meningitis, although the duration of the meningitis and the high percentage of polymorphonuclear cells in the cerebro-spinal fluid two months from the onset gave rise to doubts as to the correctness of this view. The possibility of the meningitic infection being due to *Leptospira icterohaemorrhagiae* was discussed, but without conviction, because although meningitis is a well-known complication of the acute stage of Weil's disease so far as was known it had never been described as occurring so long after the onset of the disease, while, furthermore, the total duration of a leptospiral infection in man was considered to be very much shorter than the duration of this patient's illness. However, in view of the doubt about the diagnosis, and the failure to demonstrate any organisms in the cerebro-spinal fluid, a second lumbar puncture was performed on May 25th. The fluid obtained on this occasion was immediately centrifuged at high speed and a sample of the deposit carefully examined microscopically, both in the ordinary way and by dark-ground illumination, but no organisms were seen.

The greater part of the deposit, suspended in a few cubic centimetres of the supernatant fluid, was then inoculated into two healthy guinea-pigs, which were isolated and carefully observed. On June 4th one of the guinea-pigs was obviously ill, and *L. icterohaemorrhagiae* were discovered in its blood. This animal died on the following day, and at post-mortem examination presented signs of Weil's disease, typical of a guinea-pig inoculated directly from man.

The tissues were jaundiced, and showed small scattered haemorrhages. Macroscopically the liver was not grossly abnormal, but microscopically it presented areas of fatty degeneration and necrosis. Haemorrhages were found in the kidneys, and the urine was rich in leptospira. The adrenals were enormously enlarged and haemorrhagic. The spleen and lymphatic glands were slightly enlarged, and the lungs showed irregular haemorrhagic areas. Leptospira were demonstrated in the organs by silver impregnation, and I am indebted to Dr. A. J. Walker for the preparation of these sections.

Before the death of this animal its blood was inoculated into further guinea-pigs and into medium consisting of five parts physiological saline and one part rabbit serum, and heated to 56° C. for thirty minutes. The strain has since been maintained by culture in this medium at 30° C., and for a time it was also maintained by passage through guinea-pigs. The guinea-pig of the sixth passage, however, became spontaneously cured, and further animals inoculated with this guinea-pig's blood, while it still showed leptospira, failed to become infected. The strain appeared, therefore, to be only moderately virulent for guinea-pigs and, in fact, the second of the two animals inoculated directly from the patient's cerebro-spinal fluid showed no signs of infection during an observation period of more than six weeks.

Further Investigations

In view of the results obtained above, the patient's cerebro-spinal fluid, blood, and urine were further examined on June 6th. In no instance were leptospira found directly by the microscope, and animals and cultures inoculated from the cerebro-spinal fluid and blood remained negative over an observation period of several weeks. Two guinea-pigs, however, inoculated with the deposit obtained by high-speed centrifugation of the patient's urine became infected and died of typical Weil's disease ten days later.

Samples of the patient's cerebro-spinal fluid and blood serum were then sent to Major H. C. Brown and Dr.

J. C. Broom, who very kindly examined the serological reaction of these fluids with various strains of leptospira possessed by them. Their preliminary report stated that both the patient's serum and cerebro-spinal fluid were completely negative by agglutination test with their following strains of leptospira, "Jackson," *canicola*, "dog IX," and by adhesion test with their strain "Rachmat." A further supply of serum was sent to them, together with subinoculated guinea-pigs and cultures obtained from the animal infected directly from the patient's cerebro-spinal fluid. The results of their subsequent tests were as follows:

Agglutination Tests

Serum	Strain	Agglutination with Serum in Titre of					
		1 in 10	1 in 30	1 in 100	1 in 300	1 in 1,000	1 in 3,000
Patient's ...	Patient's	Trace	0	0	0	0	0
„ ...	"Jackson"	0	0	0	0	0	0
Known positive	Patient's	Trace	+	+	+	+	Trace
„ „	"Jackson"	0	+	+	+	+	Trace

Adhesion Tests

Serum	Strain	Adhesion with Serum in Titre of 1 in 20
Patient's	Patient's	Weakly +
„	"Jackson"	0
Known positive ...	Patient's	+
„ „ ...	"Jackson"	+

Professor Schüffner, who was in London at the time, very kindly interested himself in the matter, and on his return to Amsterdam tested the patient's serum against various strains of leptospira, with the following agglutination results:

Jackson, English strain	+ 1:10
Schermerhorn, Dutch strain	+ 1:30
Wijnberg, Dutch strain	0
Schermerhorn, formalin	0
Wijnberg, formalin	0
Weil Berlijn, German strain	0
Swart van Tienen, Indian strain	0
Rachmat, Indian strain	0
Salinem, Indian strain	0
Hebdomadis B, Japanese strain	0
Moskou, Russian strain of mud fever	0
Hond Utrecht IV, Dutch dog strain	0
Allarie, Dutch dog strain, formalinized	0
Hond HC, Indian dog strain	0
Waz, water spirochaete	0

These results show that, while the patient's leptospira were agglutinated by Major Brown's known immune serum, the patient's own serum had only a feeble action against his own leptospira, and, apart from slight action against the "Jackson" and "Schermerhorn" strains, no action against a number of strains of leptospira. The practically complete absence of specific agglutinins from the patient's serum was remarkable in view of the long duration of the disease, and it seems not unreasonable to assume that the chronicity of the illness must have been associated with an infecting strain of low virulence and with a feeble immune-body response by the host.

Treatment

Although repeated lumbar punctures and reduction of the pressure of the cerebro-spinal fluid, together with intravenous hypertonic saline, produced temporary remissions of the headache, the irregular fever continued and the patient's condition was deteriorating.

A quantity of antileptospiral horse serum was therefore obtained. This serum agglutinated the patient's leptospira at a titre of 1 in 300, with a trace of agglutination at a titre of 1 in 1,000. On June 17th 15 c.cm. of cerebro-spinal fluid were removed and were replaced by 10 c.cm. of this serum. During the next twenty-four hours the patient had an exacerbation of symptoms, with very severe headache and vomiting. He then improved considerably, and his temperature was normal for a week, but on the eighth day the temperature rose, and he had a severe attack of serum sickness, with generalized urticaria, oedema, and joint pains lasting some days. His nervous symptoms, however, were definitely alleviated, the headache completely disappeared, and he became mentally bright and alert; his general condition also improved. The only other treatment given at this time was a course of pil. ferri, 15 grains thrice daily, for the anaemia.

On July 15th the cerebro-spinal fluid was again examined. The pressure was 120 mm. of water; there was an increase of protein, and, although quite clear, the fluid contained 330 red cells per c.mm., but nevertheless the white cells were only 2 per c.mm.; the chlorides were 689 mg. per 100 c.cm., and the sugar 40 mg. per 100 c.cm. The fluid was inoculated into guinea-pigs and culture medium, but no leptospira were recovered. The blood and urine were also examined directly and by inoculation into guinea-pigs and medium, but no organisms were demonstrated. Nevertheless the patient continued to run a slight irregular temperature, and he occasionally complained of pain in the left side of the abdomen. Furthermore urine examined on July 23rd contained leptospira, as one of the two guinea-pigs inoculated on this day with the centrifuged deposit died of Weil's disease twelve days later.

Also on July 23rd, in view of the persistent pyrexia, 20 c.cm. of the antileptospiral horse serum were administered intramuscularly. Although this injection was preceded by a series of small graduated doses in an endeavour to desensitize the patient it was followed within a few hours by a sharp reaction, with a temperature of 103° F., a rigor, and vomiting. In view of the agglutination titre of this serum against the patient's strain it seemed quite likely that this dose would prove insufficient, and I suggested, therefore, before going on holiday, that it might be necessary to obtain more serum. The patient was also ordered campolon, 4 c.cm. intramuscularly on alternate days, and ostocalcium tablets, 21 grains thrice daily by mouth. These preparations were continued for about a fortnight, but no further serum was given, as at the end of this period the patient's general condition had so much improved that he was allowed out of bed. Although there were subsequently a few mild febrile oscillations, never higher than 100° F., the general progress continued, and at the beginning of September the patient was looking and feeling very well. The temperature had become normal, the spleen was only just palpable, the vision had improved remarkably, and the urine, by repeated tests, was apparently free from leptospira. Convalescence was interrupted by a short febrile attack associated with a small interlobar pleural effusion at the right base, but no evidence was obtained that this was due to leptospira.

Discussion

The two outstanding features of interest in this case are the long duration of the infection and the late onset of meningitic symptoms. Usually Weil's disease takes the form of a febrile illness of abrupt onset, with a primary pyrexia lasting about seven to ten days, followed by a secondary rise of temperature of a few days' duration during the third week. Jaundice may or may not be

present, and as the illness progresses large numbers of leptospira are usually to be found in the urine. Although convalescence is frequently slow, the fever and spirochaeturia are rarely much prolonged beyond the fifth or sixth week.

Garnier and Reilly (1917) have, however, observed a certain number of cases where the febrile attacks were abnormally prolonged, and they record two cases where leptospira were recovered from the urine up to 100 and 103 days respectively. In the first of these cases there was a series of febrile relapses over a period of more than three months, and leptospira were recovered from the urine on the occasion of each relapse, and for the last time on the hundredth day. During the course of this illness the liver and spleen became definitely enlarged, and there was slight but persistent jaundice, so that the authors remarked that this hepato-splenic form of Weil's disease resembled what had been described as Hanot's disease. In their second case jaundice was slight, and had disappeared by the twenty-seventh day, but successive attacks of fever continued until the sixty-second day. Leptospira were still found, however, up to the hundred-and-third day, by which time the patient was definitely convalescent. Although this patient could hardly be classed as a "carrier" in the usual sense of the term, it is not without interest to note that the parasites persisted in the urine for a month after the patient had become afebrile.

As already stated, usually by the early part of the second month the urine in Weil's disease is free from leptospira, and only rarely do the organisms persist to the end of this month, so that the duration of infection in the two cases quoted is exceptional. The case recorded in the present note is remarkable, then, for the extraordinarily long duration of the infection; the patient was ill and febrile for between eight and nine months, and leptospira were demonstrated in the urine more than thirty-three weeks from the onset of the disease.

The other interesting feature of the case concerns the late onset of the symptoms of meningeal invasion and the recovery of the organism from the cerebro-spinal fluid practically six months from the beginning of the illness.

Although meningitis is a well-known complication of Weil's disease it almost invariably occurs during the early acute stage of the illness. Costa and Troisier (1917), reviewing a series of such cases and summarizing the dominant features, state that leptospiral meningitis is of abrupt onset, that it arises during the acute stage of the general infection, that the meningeal symptoms undergo remission and relapse in harmony with the course of the general infection, that the evolution of the meningitis is always favourable, that the prognosis is dictated solely by the general condition of the patient, that the meningeal infection leaves no sequel, and that normal function is completely recovered. Furthermore, these authors draw attention to an important point when they add that in those cases where jaundice is absent the meningeal symptoms may completely dominate the clinical picture. In this latter connexion it may be remarked that a number of cases of meningitis with acute onset, relatively short benign course, and no apparent epidemiological relationship to any known infectious meningeal disease, have been described from time to time under a variety of names, and are often referred to as examples of acute aseptic meningitis. In these cases the cerebro-spinal fluid shows an increase of pressure and a polymorphonuclear or lymphocytic pleocytosis, but is sterile on culture. It may not be without interest that five of a number of such cases in Paris, described by Laubry and Foy (1910), Laubry and Parvu (1910), and Guillain and Richet (1910), were associated with jaundice, and that Rist (1910), in discussion, remarked that there were simultaneously in Paris many cases of benign infectious jaundice. It must be admitted that the few animals, including guinea-pigs, inoculated with cerebro-spinal fluid from a number of the cases of meningitis remained quite well, and although at this time the causal organism of Weil's disease had not been recognized, the occurrence of Weil's disease in them would hardly have been overlooked. It is to be remembered that even guinea-pigs often prove refractory to inoculation with leptospira. Investigation of suspected cases must embrace, if necessary, repeated examination of the cerebro-spinal fluid. The urine should likewise be examined, and it is worth noting that a greater measure of success may often be obtained if it is first rendered alkaline by treating the patient with alkalis. In addition, the results of agglutination tests with the patient's serum are of considerable value.

It is, of course, not suggested that cases of acute aseptic meningitis are necessarily examples of Weil's disease, but in the presence of any meningitis of unknown origin it would seem useful to consider the possibility of leptospiral infection. This is emphasized because the fact that a leptospiral infection may have no other clinical manifestation than that of a pure meningitis seems to require wider recognition, as is apparent from the following quotation taken from a recent paper by Mollaret and Erber (1935) dealing with the diagnosis of this syndrome.

"Incidément nous soulignerons la fréquence relative de cette affection. Pour la dernière saison épidémique de la spirochétose, nos examens à l'Institut Pasteur nous donnent un total d'une vingtaine de cas probables de formes meningées pures. Une telle maladie exige donc d'être mieux connue et peut-être spécialement, à l'étranger. En effet, lors d'un séjour à Londres, en juillet-août 1935, l'un d'entre nous a pu constater que de tels faits paraissaient absolument inconnus des cliniciens anglais. D'autre part, à l'Institut Wellcome le Dr. Brown, qui effectue practiquement pour la Grande-Bretagne la totalité des recherches sérologiques concernant la spirochétose ictéro-hémorragique, n'avait jamais eu l'opportunité d'étudier un cas de ce genre.

"En Allemagne, aucune mention correspondante ne figure dans le grand traité de Bumke et Foerster (1935)."

Marie and Gabriel (1935), describing what they call an epidemic of spirochaetal meningitis in children, state that there was no certain clinical sign indicating the spirochaetal nature of the disease, which was only detected by sero-diagnostic tests and by infecting guinea-pigs from the urine of one of the patients. Schüffner and Walch-Sorgdrager (1936), recording their observations on twenty-five cases of Weil's disease with meningeal symptoms, point out that meningitis occurred in 12 per cent. of the cases without jaundice, and they add that in meningitis of obscure origin the possibility of Weil's disease should be considered. Troisier, Bariéty, and Macrez (1935) have described a simple febrile form of leptospirosis without jaundice, haemorrhages, or any meningitic syndrome; and Kourilsky and Mamou (1935) have recorded forms without jaundice, but with symptoms suggesting influenza.

Typical Weil's disease is now being more widely recognized in England and elsewhere, and it may well be that atypical forms will be found with increasing frequency as clinicians keep in mind their possibilities. Among the number of authors who have discussed the meningitis of Weil's disease there seems to be general agreement that the nervous involvement is an acute disease, and that, where there is a typical attack of Weil's disease, the meningitis accompanies the acute phase of the general infection.

While it is possible that in the case recorded in the present communication leptospira may have invaded the meninges during the typical stage of the infection, there was no nervous involvement of sufficient degree to attract any attention. The present case differs from those previously recorded in that the first manifestations of meningitis occurred more than four months after the onset of the illness. The only other record having any resemblance to this appears to be one given by Davidson and Smith (1936), who investigated an outbreak of Weil's disease in Aberdeen. They state that:

"An interesting type of meningitis occurred in Case 32, six weeks after all signs of spirochaetal infection had passed. The patient was discharged from the City Hospital on 1.8.35, and was admitted to the wards of the professor of medicine, Royal Infirmary, Aberdeen, on 9.9.35 suffering from headache and great stiffness of the neck. Kernig's sign was present. The optic disks were swollen (2 D) and the edges blurred. No haemorrhages or exudates were seen. Lumbar puncture revealed a turbid fluid, under pressure (265 mm.). Examination of the cerebro-spinal fluid revealed large numbers of cells, mostly polymorphonuclear leucocytes. Sugar 0.018 mg. per cent. Chlorides 657 mg. per cent. Total protein 50 mg. per cent. No organisms could be seen in the stained films or cultivated from the cerebro-spinal fluid. It was believed that the most likely diagnosis was a mild attack of meningococcal meningitis. Accordingly, the daily removal of cerebro-spinal fluid was made and intrathecal injections of anti-meningococcal serum were given. The temperature remained elevated (100° to 102° F.) for twenty-three days; papilloedema gradually subsided, and the patient was discharged from hospital apparently cured. She was seen by one of the writers two months afterwards, when she was in perfect health, and no signs of central nervous system disease were present. The cause of this aseptic meningitis was never established, nor could any definite conclusions be drawn in regard to its connexion with the preceding attack of leptospiral infection."

In this case the meningitis did not arise until six weeks after the patient had apparently recovered from the attack of Weil's disease. Nevertheless, her cerebro-spinal fluid was not inconsistent with a leptospiral infection in that there was an increase of pressure, a polymorphonuclear pleocytosis, an increase in protein, and diminution in chloride, while no organisms were found in stained films or by culture. A tuberculous infection was unlikely, since two months later the patient was found to have made a perfect recovery.

The case recorded in the present communication differs, however, from this Aberdeen case in the following particulars. First, the present case arose during the course of an extraordinarily chronic but nevertheless active attack of Weil's disease, and there was no asymptomatic interval or period of apparent recovery between the primary attack and the onset of meningeal symptoms. Secondly, the nervous involvement progressed steadily over a period of two months and, until specific treatment was instituted, showed no sign of improvement or of remission.

In conclusion, this case demonstrates that Weil's disease may be a much more chronic infection than hitherto considered, and it shows an interesting and possibly significant fact in that the patient's urine contained leptospira thirty-three weeks from the onset of the disease. It also reveals that meningitis of a progressive type may arise at a late stage, in the present instance months after the typical manifestations of Weil's disease had subsided and the jaundice had long disappeared. Finally, there is the anomalous finding that the patient's serum possessed practically no power of agglutinating the specific organism.

Summary

1. A prolonged case of Weil's disease associated with meningitis of a progressive type is described.

2. No sign of meningitis was recorded during the early typical stage of the disease, which was accompanied by jaundice, and the first evidence of meningeal invasion was only observed four months after the beginning of the illness.

3. Although the patient had apparently had an attack of visceral Weil's disease in December, 1935, and was still infected months later, it is to be noted that both his serum and cerebro-spinal fluid possessed practically no agglutinating power against the infecting organism and against various other strains of leptospira.

4. The diagnosis was made by demonstrating the organism in the cerebro-spinal fluid and urine by guinea-pig inoculation.

5. Leptospira were recovered from the cerebro-spinal fluid and from the urine up to twenty-five and thirty-three weeks respectively from the onset of the disease.

6. Until an anti-leptospiral serum was administered the illness was apparently steadily progressive.

7. The meningitic manifestations of Weil's disease are discussed, and since the disease may occur without jaundice attention is particularly drawn to the necessity for considering this infection in any obscure case of meningitis. Indeed, since Weil's disease may fail to present any specific syndrome its possibility should be borne in mind in any case of obscure pyrexia.

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C. D. Bartels (*Hospitalstidende*, September 15th, 1936, p. 2) reviews his experience of 230 cases of hypertrophy of the prostate. Seven cases of cancer were found in the group of ninety-one patients on whom prostatectomy was performed. In none of these cases was the diagnosis of cancer made before the operation. There were altogether eighteen cases of cancer among the author's prostatic patients, and in as many as three of them the cancer developed a considerable time—one, six, and twelve years respectively—after the prostatectomy. In none of these three cases had a histological examination of the removed prostate shown any sign of cancer at the time of operation. With regard to operative treatment, the author insists that to ignore the findings of functional renal tests is to court disaster, but he tempers this warning with the reservation that no one functional test is sufficient as a guide to operation, and that a single unsatisfactory report of a functional test should not warrant forthwith the stamping of a case as inoperable, seeing that the renal disease of prostatics is eminently curable and can disappear under treatment with a catheter or cystotomy. In the preparation of the patient for an operation it is important not only to relieve the back pressure on the kidneys but also to allow plenty of time for the adequate regeneration of the tubular epithelium. And this may take weeks and months, and in some cases even years.