MALARIA THERAPY IN TABES DORSALIS.

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UNTIL the brilliant discovery of Wagner von Jareggs, the treatment of neuro-syphilis has always eluded a satisfactory solution. Tabes dorsalis and general paralysis of the insane being very resistant, even to the prolonged treatment by the usual anti-syphilitic measures, various new lines were tried from time to time, but none of the new treatments could be said to have even touched the fringe of the problem. In 1912 Swift and Ellis introduced intrathecal administration of salvarsanized serum, but the results fell short of expectations. Sicord in Paris injected minute doses of neosalvarsan directly into the spinal canal after dilution with aspirated cerebro-spinal fluid. Byrnes tried horse serum mercurialized *in vitro*. Ravaut, Arbeit and Rabean injected intraspinally a hypertonic solution of neosalvarsan mixed with the patient's own serum. Swift, Waller, Haller and others from time to time reported some good results by the intrathecal administration of these anti-syphilitic drugs, but a reliable solution could not be said to have been achieved. Therefore remedies on altogether new lines were introduced. Thus Hilgermann tried spirochætal vaccines and recorded some good results. Jacobs and Heidelberger of the Rockefeller Institute introduced tryparsamide, and though Wolfohn of San Francisco, Solman and Viet of Boston, and others recorded cases showing marked improvement after treatment with tryparsamide, the problem of tabes and general paralysis remained materially unsolved. Then came the discovery of Wagner von Jareggs introducing malarial therapy, which time has proved to be a reliable remedy for general paralysis and to a great extent also for tabes dorsalis.

Observations were carried on by us on 16 cases, 10 of which were treated with the common anti-syphilitic measures only, 5 were treated with malarial therapy and one case by injection of hydrarg. perchloride lotion into the cisterna magna. For a summary of these 16 cases we may refer to Table I. The 6 cases treated by malarial therapy and injection of hydrarg. perchloride lotion into the cisterna magna are given below in some detail.

Case 1.—J. D., aged 50, seaman, was admitted to the hospital on 31st October, 1927, for lightning pains in the right side of the neck and face for the last ten months. He had been infected with syphilis 20 years before. The present complaint first attracted his attention two years ago, when one morning he felt a sudden giddiness and pain while washing his face. Attacks of pain in the lower extremities started suddenly about 18 months previously.

On examination, patches of anæsthesia were noticed on the nose, chest and medial side of the legs and in the urethra. The testicular sensation was markedly diminished, practically absent on the right side. The vibration sense was absent in the lower extremities. Hypotonia, tabetic gait, and Romberg's sign were present. The knee-jerks were very sluggish, ankle jerks lost on the left side, extremely sluggish on the right. Fundi oculi normal. Vision 6|12 in both eyes. Hypermetropic astigmatism present.

The Wassermann reaction of the blood and cerebro-spinal fluid was negative on first examination, but positive after a provocative dose. Lange's colloidal gold reaction shows a tabetic curve. Sugar present, 0.112 per cent. Albumen present, globulin not increased.

For three weeks the patient was treated with drachm doses of potassium iodide and mercury inunctions every day, and a neosalvarsan injection once a week, but no improvement was seen. On 22nd November, 1927, 10 c.c. of blood, containing benign tertian and malignant tertian malarial parasites from a donor was injected intramuscularly. The patient had fever the next day but no parasites were found in his blood. From 30th November, 1927, the patient got fever with rigors, but *P. vivax* was found for the first time on 3rd December, 1927, and *P. falciparum* on 5th December, 1927. On 7th December, 1927, the patient, having shown alarming symptoms, was treated by adequate doses of quinine both parenterally and orally on that day only. Though the symptoms were controlled, the parasites persisted in the blood. From 12th February, 1928, the patient was again given weekly injections of neosalvarsan for six weeks.

Three weeks after the injection of malarial blood, the patient began to show definite signs of improvement. The knee-jerks returned first, then the deep sensation in the testes and the tendo Achillis. The patches of anæsthesia disappeared first on the legs, then on the chest and last on the nose and urethra. The vibration sense was the last to recover; and by the 7th of February, 1928, i.e., in about a week's time after the malarial injection, the patient was clinically cured, though the serological tests remained positive. The patient has been examined from time to time and has not yet shown to this day any return of the signs or symptoms.

Case 2.—Patient S. D. B., aged 40, complained of inability to walk, and a sensation of treading on soft ground. Sensation to deep pressure and pain was lost. Patches of anæsthesia present on the chest and legs. Argyll-Robertson phenomenon in the pupils. Knee-jerks lost. Vision 6|9 dots both eyes, cannot see small objects properly. Optic atrophy present. Romberg's sign present. Cerebro-spinal fluid—12 cells per c.mm., globulin increased. Wassermann reaction on the blood and cerebro-spinal fluid negative.

For one month the patient was given the usual anti-syphilitic treatment, but no improvement was noticed.

On 27th July, 1924, 5 c.c. of blood, containing malignant tertian malarial parasites from a donor was injected and the patient used to get fever with rigors from 28th July, 1924 to 19th August, 1924. The vision in the right eye improved from 6|9 to 6|6, and the gait was better. Patient was again injected with 4 c.c. of blood with *P. falciparum* on 3rd September, 1924, and he got fever with rigors from 6th September, 1924 to 13th September, 1924. From 14th September, 1924, onwards the temperature was normal. The patches of anæsthesia on the legs disappeared, and there was no longer any sensation of treading on soft ground. Romberg's sign was now absent, the patient being able to stand with eyes closed and feet together. The patient having markedly improved, desired to go home and was discharged on 22nd September, 1924.

Case 3.—Patient, P. A., aged 35, admitted to the hospital for ataxia and gradual dimness of vision. Pupils showed the Argyll-Robertson phenomena. Patches of anæsthesia on the face, chest and feet. Romberg's sign present. Tabetic gait. Knee-jerks and ankle jerks lost. Fundi oculi showed primary optic atrophy. Vision—only moving objects seen. Wassermann reaction on the blood and cerebro-spinal fluid positive.

On 11th April, 1924, the patient was injected with citrated blood containing *P. vivax*, but this had no effect. From 1st August, 1924 to 3rd January, 1925, the patient was put through vigorous anti-syphilitic treatment with potassium iodide mercury, and neosalvarsan injections. He was also given strychnine injections in the temporal

TABLE I.

Cases of Tabes Dorsalis treated by various Astereognosis lines of treatment.

	Register number and year.	Initial.	Age.	Duration of leutic infection.	Precis of signs and symptoms, etc.	Treatment.	Results.	REMARKS.
1	232 1924-25	D. A.	30	11 years	Patches of anæsthesia. Loss of jerks. Astereognosis, etc.	Anti-syphilitic treatment. Fifteen injections of neo-salvarsan.	No improvement in any signs or symptoms.	
2	499 1924-25 4933 1926-27	A. A.	35	10 years	Vision diminished. Moving objects seen. Argyll-Robertson and Romerg's sign +. Stone blind. Paralysed completely.	Injection of 2 c.c. citrated blood containing B. T. parasites. Strychnine injections in temporal regions +. Vigorous anti-syphilitic treatment.	No reaction and no improvement. Vision improved. No other change. No improvement ..	Improvement in vision only temporary. When admitted again a year after, stone blind. Gradually got worse and expired. (Case No. 3 for details.)
3	1191 1924-25	A. A.	30	8 years	Loss of jerks and sensations. Hypotonia and Wassermann test +.	Anti-syphilitic treatment ..	Do. ..	
4	1796 1924-25	S. D. B.	40	14 years	Pupils unequal. Vision diminished. Knee and ankle jerks absent. Romerg's sign present. Patches of anæsthesia.	Anti-syphilitic treatment, and injections of blood containing M. T. malarial parasites.	Improvement in gait and other clinical signs.	When seen again after 3 years, improvement was maintained.
5	2218 1924-25	S. F.	45	20 years	Anæsthesia on legs and nose. Ankle and knee jerks absent.	Anti-syphilitic treatment ..	No change	Very short stay in hospital.
6	2595 1924-25	K. A.	35	12 years	Do. Do.	Do. ..	Do.	Do.
7	4554 1924-25	K. N.	45	15 years	Do. Do. Knee—Charcot's joint.	Do. ..	Do.	
8	4813 1924-25	G. B.	55	30 years	Optic atrophy. Trophic ulcer on scrotum. Jerks lost.	Vigorous anti-syphilitic treatment.	Do.	
9	1326 1926-27	C. T.	55	25 years	Anæsthesia patches. Ankle and knee-jerks absent. Eyeballs, sensation lost.	Anti-syphilitic treatment ..	Do.	
10	1429 1926-27	R. S.	47	18 years	Sudden fracture of tibia with thicken-under periosteum, of fibula, left leg.	Do. ..	.....	Short stay. Patient refused to stay any longer.
11	5386 1926-27	R. P.	29	7 years	Anæsthetic patches on legs and chest. Loss of jerks.	Do. ..	.....	Do. Do.
12	2145 1926-27	M. T.	40	14 years	Do. Do.	Do. ..	No improvement	
13	2706 1927-28	A. A.	45	20 years	Hypotonia. Ataxia. Pins and needles sensations. Vision diminished. Loss of jerks and deep sensation.	Anti-syphilitic treatment. Malarial attack, natural. Two injections of 1|40 gr. H. P. in 5 per cent. sol. in cisterna magna.	Clinically no improvement. Severe reaction, vision not improved.	The natural attack of malaria was of no benefit to the patient in any way. (Case No. 6.)
14	4477 1927-28	J. D.	50	20 years	Lightning pains in neck and face. Left ankle jerk absent. Vibration sense lost. Anæsthesia and hypotonia present.	Anti-syphilitic treatment. Injection of blood containing M. T. malarial parasites.	Marked change. Clinically cured.	When seen again after two years, the improvement was maintained. (Case No. 1.)
15	732 1928-29	J. M.	40	15 years	Patches of anæsthesia. Ataxia and dimness of vision. Ankle and knee-jerk absent.	Anti-syphilitic treatment. Injections of blood with B. T. parasites. Injections of B. T. and M. T. parasites cultured *in vitro*.	No change. No improvement in any signs or symptoms.	(Case No. 4.)
16	1874 1929	B. M.	35	10 years	Do. Do. Argyll-Robertson pupils present.	Anti-syphilitic treatment. Salvarsanized serum intrathecally and injections of B. T. and M. T. parasites cultured *in vitro*.	No change; slight reaction. No improvement in any clinical signs or symptoms.	Still under observation. (Case No. 5.)

regions. From 13th October, 1925, he began to show some improvement in vision, which gradually improved first for light, then for white and other colours, then for figures, etc. When improved as regards his vision, he was discharged at his own request on 25th March, 1926.

On 30th November, 1926, the patient was admitted again, when he was stone blind and unable to walk. All jerks were absent. Testicular and deep sensations were completely lost. The muscular power in both right extremities was more diminished than in the left. He was gradually getting worse. On 11th December, 1926, he showed sudden signs of effusion in the chest, with distension of veins, and the glands on the right side hard and discrete. On 14th December, 1926, two pints of clear fluid were aspirated from the pleural cavity. On 15th December, 1926, the patient suddenly developed hemiplegia with aphasia. Every fortnight 2 to 3 pints of fluid had to be aspirated from the pleural cavity. On 15th March, 1927, the patient showed signs of effusion in the peritoneum and pericardium, and died on 1st April, 1927.

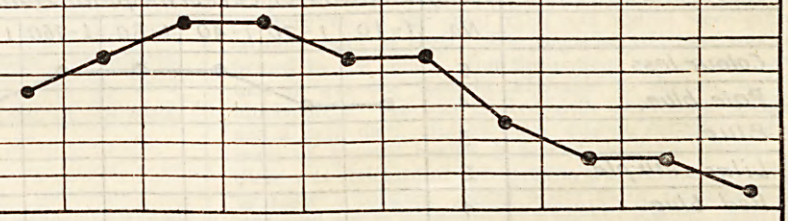
GRAPH 1.

Lange's colloidal gold test on Cerebro-spinal fluid.

Patient:- Mr. J.D. Aged. 50., Case no 1. Reg no. 4477.

On admission and before commencement of any treatment. 3. 11. 1927.

Colour reactions.	Colour No.	Dilutions of cerebro-spinal fluid with 0.4 per cent Nacl. 1-10	1-20	1-40	1-80	1-160	1-320	1-640	1-1280	1-2560	1-5220
Colourless	5										
Pale blue	4										
Blue	3										
Lilac-purple	2										
Red-blue	1										
No change	0										



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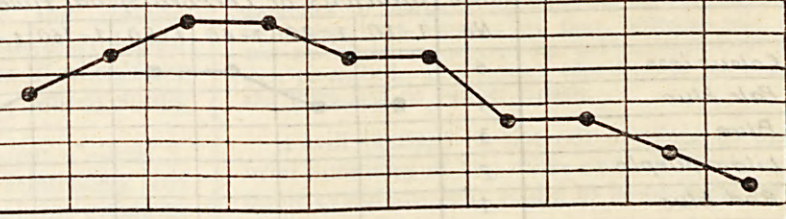
After Malaria treatment and when the patient was clinically cured. 10.2.28.

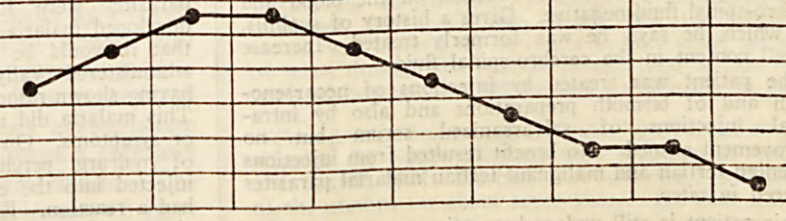
Colour reactions.	Colour No.	Dilutions of cerebro-spinal fluid with 0.4 per cent NaCl. 1- 10	1- 20	1- 40	1- 80	1- 160	1- 320	1- 640	1- 1280	1- 2560	1- 5120
Colourless	5										
Pail blue	4										
Blue	3										
Lilac purple	2										
Red blue	1										
No Change.	0										



Expressed in figures. - 3455442210.

After a full course of anti-syphilitic treatment, and before discharge. 10.4.28

Colour reactions	Colour No	Dilutions of cerebro-spinal fluid with 0.4 per cent NaCl 1-10	1-20	1-40	1-80	1-160	1-320	1-640	1-1280	1-2560	1-5120
Colourless	5										
Pale blue	4										
Blue	3										
Lilac-purple	2										
Red blue	1										
No Change.	0										



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Case 4.—Patient, J. M., aged 40, admitted for ataxia and dimness of vision. Romberg's sign present. Gait tabetic. Sensations slightly impaired on the legs. Knee-jerks and ankle jerks absent. Fundi oculi showed primary optic atrophy. Wassermann reaction in blood and cerebro-spinal fluid, positive.

No improvement noticed after treatment by neo-arsenobillon and bismuth injections. On 20th May, 1929, 10 c.c. of blood containing *P. vivax* from a patient injected intramuscularly, but without any result. On 31st May, 1929, a culture of 48 hours old benign tertian malarial parasites was injected intramuscularly, and on 19th July, 1929, a culture of 72 hours old malignant tertian malarial parasites was also injected, but absolutely without any effect. Even after six weeks the patient has as yet shown no improvement.

GRAPH 2.

Lange's colloidal gold test on cerebro-spinal fluid.

Patient:- A.A. Chinese Carpenter, Aged 45, case no. 6. Reg. No 2706.

On admission and before commencement of treatment. 18.7.1927.

Colour reactions.	Colour No	Dilutions of cerebro-spinal fluid with 0.4 percent NaCl.									
		1-10	1-20	1-40	1-80	1-160	1-320	1-640	1-1280	1-2560	1-5120
Colour less.	5										
Pale blue.	4										
Blue.	3										
Lilac-purple.	2										
Red blue.	1										
No change.	0										

Expressed in figures:- 4455543220.

After two injections of H.P. lotion in Cisterna Magna, and a natural attack of Malaria (B.T. and M.T. mixed infection) and a full anti-syphilitic treatment. 9.11.1927

Colour reactions	Colour No.	Dilutions of cerebro-spinal fluid with 0.4 percent NaCl.									
		1-10	1-20	1-40	1-80	1-160	1-320	1-640	1-1280	1-2560	1-5120
Colour less	5										
Pale blue	4										
Blue	3										
Lilac-purple	2										
Red blue	1										
No change.	0										

Expressed in figures:- 4455543120

Case 5.—Patient, B. M., aged 35, was admitted for ataxia and dimness of vision. Patches of anæsthesia and hypotonia present, also Romberg's sign and commencing optic atrophy. Wassermann reaction on the blood and cerebro-spinal fluid negative. Gives a history of syphilis, for which, he says, he was formerly treated. Increase of cell content in the cerebro-spinal fluid.

The patient was treated by injections of neoarseno-billon and of bismuth preparations and also by intra-thecal injections of salvarsanized serum but no improvement ensued. No benefit resulted from injections of benign tertian and malignant tertian malarial parasites cultured *in vitro*.

This patient is still under observation.

Case 6.—Patient, A. A., aged 45, a Chinese carpenter sought admission to hospital for ataxia of one year's duration with gradual onset. He had occasional sensation of pins and needles in the feet. Gradual diminution of vision. Argyll-Robertson pupils seen in both eyes. Cutaneous sensations diminished on the inner side of the feet and legs. Deep sensations lost in the calf muscles, eyeballs and testicles. Romberg's sign present. Gait tabetic. Knee-jerks and ankle jerks absent. Hypotonia and incoordination present. Wassermann reaction on blood and cerebro-spinal fluid, positive. Lange's colloidal gold reactions shows a tabetic curve.

The patient was given six neoarsenobillon and two silver salvarsan injections, mercury inunctions and potassium iodide orally, but no improvement was seen. On 2nd September, 1927, he had a slight rise of temperature but no malarial parasites were found in blood. On 4th September, 1927, 1|40 gr. of hydrarg. perchloride in 5 per cent. solution was injected into the cisterna magna, and the patient had a severe reaction. On 6th September, 1927, the patient had a sharp rise of temperature to 105°F. when benign and malignant tertian malarial parasites were found in his blood. This naturally-developed malaria was not immediately checked, hoping that it would be beneficial to him. But quinine was administered orally on 9th September, 1927, the patient having shown rather severe symptoms of malaria that day. This malaria did not give any relief to his tabetic signs or symptoms. On 25th September, 1927, again, 1|40 gr. of hydrarg. perchloride in 5 per cent. solution was injected into the cisterna magna, and the patient again had a reaction. Examinations on 1st October, 1927, and also on 18th October, 1927, did not reveal any improvement in vision. Examination on 7th November, 1927, showed no improvement in any of the patient's clinical signs or symptoms.

SUMMARY.

(1) Patients in Bombay appear to have acquired a certain amount of resistance to malaria infection, and hence cannot be infected by injections of blood from persons containing *P. vivax*.

(2) In our cases, injections of malarial parasites cultured *in vitro* produced no improvement of any kind.

(3) Malaria acquired in the natural way, while in the hospital, did not improve one patient's condition.

(4) In order to induce malaria and secure its therapeutic advantage, the patients had to be injected with fresh blood containing *P. falciparum*.

(5) Treatment by the usual anti-syphilitic measures did not result in any clinical improvement.

(6) Lange's colloidal gold reaction was not materially influenced either by the anti-syphilitic measures or other malaria therapy (*vide* graphs 1 and 2).

(7) Injections of hydrarg. perchloride lotion into the cisterna magna in one case did not improve the patient's vision or any other symptom.

(8) Effusion into the pleural cavity in case 3, developed suddenly without the patient showing any symptoms at all.

CONCLUSIONS.

Malaria therapy is beneficial in cases of tabes dorsalis, particularly the early ones. But in malaria-infected countries like India, where the patients have to be infected with *P. falciparum*, the problem becomes a difficult one. As some of these cases are likely to show severe signs of cerebral malaria, necessitating a constant and alert watch, and prompt treatment, the importance and responsibility of this line of treatment, can never be over-emphasized. As the malaria therapy does not influence the positive serological findings, it seems imperative that it should be supplemented by the usual anti-syphilitic measures.

We are very much obliged to Lieut.-Colonel S. S. Vazifdar, M.R.C.S., I.M.S., Superintendent and Senior Physician, Sir J. J. Hospital, for giving us facilities to carry out these observations.

THE INDICATIONS FOR SUPRAPUBIC CYSTOTOMY.

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SINCE the introduction of litholapaxy by Bigelow, and its modifications in India by Freyer, the suprapubic operation has fallen largely into disuse. Litholapaxy in hands accustomed to it is no doubt an excellent operation. But in *mofussil* towns of Bengal where one comes across stone cases only occasionally it is not always a safe and desirable operation even in expert hands. The instruments too are likely to deteriorate. I have seen a case of perforation of bladder in the hands of a very capable operator when he was operating with an old lithotrite. Of course immediate suprapubic lithotomy was done and the patient made an uninterrupted recovery. On the other hand, suprapubic cystotomy is very easy to do, requires no special instruments, can be done in ordinary *mofussil* towns by surgeons of ordinary skill, complete removal of stone or any other foreign body is ensured, and the condition of the bladder wall can be definitely ascertained. Of course the convalescence is a little prolonged. The operation can also be undertaken with less danger in debilitated patients with cystitis, the type of cases we meet with in the *mofussil*.

The following case will illustrate this:—

Case 1.—A Hindu male, aged about 46, came to the outdoor department of the Comilla Hospital with the distinctive gait of pain in the lower abdomen. He was very emaciated, weak and anæmic. He gave a history of gonorrhœa. He said that about seven months before he had retention of urine for which a soft catheter was passed by a private medical practitioner, but as it was an old catheter a fragment of it was left behind. A few days after, he said, the broken fragment came out with the flow of urine. Burning during micturation and frequency of urination began shortly after that. On examination of the chest râles and ronchi were present on both sides of chest. The suspicion of stone was confirmed by the sound. But the patient was so very weak that it was not thought advisable to operate on him immediately. He was treated with urotropine, laxatives and a milk diet. But as there was no definite improvement of general health, it was decided to operate. As there was stricture of the urethra, the urethra was dilated by Lister's bougies. About 6 ounces of sterilized saline was then put in by means of a metal catheter. After the usual median incision the recti muscles were separated and the posterior layer of fascia was carefully incised. The subperitonial fat was then pushed up, and with it the reflection of peritoneum; the bladder, recognized by its muscular fibres and bluish grey colour, was then fixed by two sutures high up, and was incised. Two horse-shoe shaped stones were removed by stone forceps and the bladder was drained by a syphon arrangement.

The patient was much relieved, but the bronchitis was definitely increased and he began to expectorate large quantities of purulent sputum. A mixture of oil of eucalyptus, tinct. benzoini co., tinct. belladona and rum, and an inhalation of creosote and eucalyptus oil were then prescribed. In a week's time he was much better and there was no further trouble.

It will perhaps be not out of place to give a brief summary of two other cases in which suprapubic cystotomy was found to be of great service to me.

Case 2.—I was called in to see a respectable retired pleader of the local Bar, aged about 70 years, for retention of urine. I found the case to be one of enlarged prostate and relieved the bladder. A month later (13th August, 1928), I was again called in and was told that instruments had been passed before my arrival without any success. As there was much bleeding on the slightest attempt to pass a prostatic catheter I advised him to come into hospital for suprapubic cystotomy, which I carried out immediately. Drainage of the bladder was continued for about one month. As the abdominal wound was healing up he began to pass small quantities of urine through the natural passage and by the fourth week of September 1928, he had no difficulty in passing urine.

Case 3.—A Hindu, head constable, aged about 40 years, attended the Sadar Hospital with retention of urine on 17th March, 1928. He had been suffering from stricture of the urethra for about seven years. He gave a history of retention of urine on one occasion two years previously. On the present occasion instruments were tried by several private practitioners without any success. I found on examination that several false passages had