PERSONAL OBSERVATIONS ON THE TREATMENT OF SYPHILIS WITH A BRIEF REPORT OF CASES.*

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It is not our intention to review the bibliography on the use of Salvarsan or "606," the Ehrlich-Hata preparation of arsenic for the treatment of syphilis. This has been carefully reviewed in the form of a publication entitled "The treatment of syphilis with Salvarsan," by Dr. Wilhelm Weshselmann, with an introduction by Professor Paul Ehrlich and translated into English by Alb L. Wolbarst, M. D., of New York, including the English bibliographical references to January 21, 1911, also in a medical symposium published by the Interstate Medical Journal Company.

We, therefore, are limiting our paper to personal observations and results obtained by the use of this new remedy. All are aware of the startling and marvelous results reported.

Since January 1st, 1911, the drug has been on the market available to the general profession, so that we, of course, have not had sufficient time to observe more than the immediate effects from the use of this new remedy. We hope, in a future report, to give results as to its permanent effects. We may not add much that is new, yet we feel justified in making this report on limited observations from the fact that results in its use have in general confirmed the wonderful results previously reported.

The use of the new preparation in syphilis demanded our careful attention regarding its application in given cases.

Under the subjects of indications and con-

tra-indications given by different observers, we accepted and were guided by the following:

Indications:—First, in all cases with primary, secondary and tertiary lesions except those noted under contra-indications.

Second: Cases in which mercury and iodides are not tolerated.

Third: Cases in which the disease remained unchanged even under vigorous anti-syphilitic treatment.

Fourth: Cases giving positive Wasserman reaction, which is indicative of the continued activity of the disease, six weeks after the first injection.

Contra-Indications:—First: Optic nerve involvement, (unless recent syphilitic.)

Second: Acute or chronic parenchymatous nephritis.

Third: Severe involvement of nervous centers, (not recent.)

Fourth: Involvement of the cardio-vascular system, particularly in the aged. Aneurisms or marked arterio-sclerosis where there may be danger of hemorrhage or angina. Under this heading, one case, giving a history of repeated retinal hemorrhages, was refused treatment.

ADMINISTRATION.

Three methods are employed for the administration of Salvarsan, viz: Intravenous, intramuscular and subcutaneous. The first two of these methods were employed by us.

We considered the indications as to the method of administration to be as follows:

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First: For intravenous method. Subjects must be in good or fair physical condition. This applies to all cases with primary, secondary and resistant tertiary lesions. In any malignant cases where there are destructive and mutilating lesions.

Second: Intramuscular. In all cases showing constitutional weakness and cachexia where it is desired that the absorption of the drug should be slow, and in whom the more endo-toxic symptoms are to be avoided.

TECHNIQUE.

It is, of course, to be understood that sterilization cannot be done at any time during or after the process of preparation of the drug has begun, and it is therefore necessary that all apparatus for its preparation and administration be previously sterilized.

The following is a list of apparatus and solutions used:

- Burettes.
- Glass pipettes.
- Glass mortar.
- Glass graduate.
- Cylinder graduate.
- Glass stirring rods.
- Glass hypodermic syringe.
- Rubber tubing.
- Needles for infusion, (in test tube).
- Towels, gauze and operating gowns.
- Normal salt solution (0.85% C. P. sodium chloride in distilled water).
- Normal acetic acid, (glacial acetic 10 c. c., distilled water 166 c. c.).
- Hydrochloric acid, 1% solution.
- Normal sodium hydrate, (sodium hydrate 4 grams, distilled water 100 c. c.).
- Distilled water 1,000 c. c.

Glassware, so far as practicable, is usually sterilized by dry heat at 150 C. for one hour.

Burettes, on account of the length, gowns, etc., by dry steam at 15 pounds pressure for one hour.

All solutions were sterilized in the Arnold steam sterilizer for one hour, counting time after steam was up.

Having all apparatus ready, the following

is a brief description of our technique in the preparation of the drug:

After sterilizing the tube containing the Salvarsan, the tube was cut with a sterile file, the powder poured into a sterile glass mortar or 50 c. c. glass graduate, and 10 c. c. of sterile normal salt solution, at 50 C., drawn with a sterile pipette and slowly added to the powder. This is constantly stirred with a sterile glass rod until the powder is completely dissolved. The solution obtained is perfectly clear and has an amber color. We then add from a burette, sterile normal sodium hydrate solution, constantly stirring.

Upon the addition of the sodium hydrate a precipitate is formed of large soft flakes, which reaches a stage, after the addition of about 1.1 c. c., of bright yellow paste. The sodium hydrate is constantly added until this paste goes into solution and is finally completely dissolved, making a bright, clear amber solution. This solution is alkaline in reaction, which may be determined by allowing a drop of it to fall off the glass stirring rod on a bit of red litmus paper. By the slow addition of the sodium hydrate solution, together with the constant stirring, it was found that a minimum of sodium hydrate solution was employed. Where desired for intramuscular injection, it is of course desirable to reduce the alkalinity as much as possible, and for this purpose sterile normal glacial acetic acid or hydrochloric acid, one per cent, is added until the Salvarsan is again precipitated, remaining in suspension as a very fine powder. We find that the use of one-half per cent of phenolphthalein in alcohol as an indicator is of no particular advantage.

After preparing Salvarsan by this method, it is added to a reagent bottle containing normal sterile salt solution at a temperature of 40-50 C., making up a quantity of 300 c. c., which when administered has a temperature of approximately 37.8 C. This is for intravenous injection. When prepared for intramuscular injection, it is diluted to 20, 30, or 40 c. c.

We found a variation in the total amount

of normal sodium hydrate necessary to completely dissolve the Salvarsan. This varied from 3.8 c. c. to 7.1 c. c., averaging 5.2 c. c. We also found a variation in the weight of the Salvarsan, which weighed between 0.57 gram to as much as 0.7 gram, averaging in 33 tubes 0.62 gram. This gives approximately an average of 0.8 c. c. of normal sodium hydrate used per 0.10 gram of Salvarsan. The solution, as obtained, rarely requires the addition of acetic or hydrochloric acid, as the minimum quantity of sodium hydrate has been used. This fact was brought out that by the addition of one or two-tenths c. c. of acid solution, the Salvarsan solution became slightly cloudy, due to the precipitation of the Salvarsan, which did not dissolve on stirring, requiring the addition of an equal amount of sodium hydrate solution to again bring it into a clear solution. We also observed a variation in the color of Salvarsan. The powder, in some tubes, was of a bright yellow color, which upon being shaken down, left the glass container perfectly clear. Other tubes were found to contain a yellowish gray powder and on shaking down seemed to adhere to the glass container. This prompted us to refuse, at first, to purchase and use the last mentioned preparation, believing that the difference in color was due to some deterioration in the drug. We immediately took up the matter with Victor Koechl & Company of New York, who are the sole agents for Salvarsan in the United States. A reply received by them by cable was as follows:

"February 14, 1911.

"Difference in color unavoidable and of no consequence. The Salvarsan in stock was tested by Professor Ehrlich as to action and color and found good."

For intravenous infusion we prefer the use of the veins of the forearm. The skin of the forearm is washed with green soap and water, lathered and shaved. This is followed by an application of tincture of iodine, washed off with alcohol, then with ether, which has a tendency to partly anaesthetise the skin. A tourniquet is then applied about four inches

above the elbow; a large vein selected, preferably the median cephalic, though the anterior radial or ulna vein is used. The puncture is made with the needle directly through the skin into the vein or a small "V" shaped flap is made in the skin exposing the vein, or the vein is dissected up.

About 10 c. c. of blood is allowed to flow, which may be collected for a Wasserman reaction, if desired. A direct-way burette, ca-

FIRST STEP.—DIRECT PUNCTURE OF VEIN, SHOWING BLOOD RUNNING FROM NEEDLE.

capacity 50 c. c. to which a sterile rubber tube is attached at the lower end, with a funnel containing sterile gauze for filtering at the upper end, is now filled with sterile normal salt solution at a temperature of approximately 40 C., and then washed out, refilled with normal salt solution and all air driven out of the tube.

While the blood is still running from the needle and the salt solution running from the tube, the tube is attached to the needle by means of a slip joint. The tourniquet is removed and the salt solution allowed to run

into the vein. It being observed that the salt solution is running into the vein and not leaking into the tissues around the vein, the Salvarsan solution is now poured into the funnel. The flow is regulated by raising or lowering the burette. After all the Salvarsan solution has been poured into the burette, sterile normal salt solution is poured through the funnel into the burette until all the Salvarsan solution has been forced out and nothing but clear salt solution is running into the vein. Between 75 and 100 c. c. of this salt solution

room, with the patient lying on the table and under the same conditions as for any surgical operation. After the injection, the patient should remain on the table for one-half to one hour before being moved to the bed.

The Salvarsan for intramuscular administration was made up to 20, 30, or 40 c. c., with sterile normal salt solution and given intramuscularly deep into the Gluteal muscle. The total amount is divided and given into each buttock, 10 c. c. at each injection made. For this purpose we use an all glass syringe.

SECOND STEP.—INTRODUCING NORMAL (85%) SALT SOLUTION, BEFORE STARTING SALVARSAN SOLUTION.

THIRD STEP.—INTRODUCING SALVARSAN SOLUTION.

is given before removing the needle. The entire operation requires from seven to fifteen minutes.

On removing the needle the arm is raised, sterile gauze saturated with alcohol is placed over the site of puncture. This stops any bleeding. The puncture is then sealed with collodion and dressed with sterile gauze, fastened down with adhesive plaster. All intravenous injections are made in the 'operating

All patients are put to bed after administration of Salvarsan.

CARE AND OBSERVATION OF PATIENTS.

Our patients are required to remain absolutely at rest in bed from three to five days; a record of their pulse and temperature kept every two to three hours where practicable. All urine is collected and saved during the first forty-eight hours for examination.

It having been found that vomiting frequently follows the intravenous method of

administration of Salvarsan, our patients were not allowed any food during six hours previous to its administration. After its administration they were kept on milk diet for the first twenty-four hours. A mild calomel purge is given, followed by a saline, during the first day. All conditions being favorable, patients are placed on regular diet beginning the second day. It is a notable fact that patients suffering reactions do not appear sick.

Again, others showed secondary rises on the second day, reaching as high as 39 C. However, on the fourth or fifth day, the temperature remained normal in the majority of cases.

Eight injections were made into the Gluteal region, three of which were reinjections. These cases showed no appreciable rise of temperature, the highest recorded being 38.2 C. One injection given in the lumbar region gave a rise to 39.4 C. The temperature in this case showed constant rises for ten days, ranging between 37.2 and 38.8 C.

FOURTH STEP.—INTRODUCING 100 C.C. NORMAL SALT SOLUTION AFTER SALVARSAN.

COMPLETE.—SITE OF PUNCTURE DRESSED WITH COLLODION AND COTTON.

Summarizing the reaction following the administration of this drug, the chief symptoms noted were as follows:

Temperature: Most of the cases of intravenous injections showed a primary rise of temperature ranging from 37.2 C. to 39 C. This rise was only temporary, lasting from three to twelve hours before subsiding to normal. After reaching normal, the temperature varied, in some remaining normal, in others slight daily rises to 38 C. occurred.

Pulse: With the access of fever there would be an acceleration of pulse, but in no case did this exceed 110. Throughout the entire period, the pulse remained about normal, the acceleration being coincident with the rise of temperature.

Respiration: With regard to respiratory symptoms, respiration remained from 14 to 22 per minute. No dyspnoea or symptoms referable to cardiac interference were noted.

Nervous: In one case, No. 15, an epileptic

No.	Sex	Age	Date	Salvarsan	Asch.	Am.	Am.	Am.	Method	Wasser	Wasser	Spinal	Spinal
				Wgt.	Wgt.	co	co	co	of admin.	before adm.	after adm.	fluid before	fluid after
1	W	21	1911			1.7	2.1	1.34	Intravenous	+	+	-	No symptoms.
2	W	53	Mar. 28			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
3	W	28	Mar. 23			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
4	C	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
5	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
6	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
7	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
8	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
9	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
10	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
11	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
12	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
13	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
14	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
15	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
16	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
17	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
18	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
19	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
20	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
21	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
22	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
23	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
24	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
25	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
26	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
27	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
28	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
29	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
30	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
31	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
32	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
33	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
34	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
35	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
36	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
37	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
38	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
39	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.
40	W	22	Jan. 31			1.7	0.1	3.3	Intramuscular	+	Apr. 11	-	No reaction except headache.

convulsion occurred on the fourth day, this being the only attack he had before or after the administration. Headaches were often complained of. Dizziness was complained of in three cases.

Urine: Urinalyses were made of all cases. The quantity during the first twenty-four hours was usually found to be reduced, the smallest amount collected being 300 c. c. in the case of a boy 17 years old. In most cases it was not below 1000 c. c. Specific gravity was usually increased with the decrease in quantity of urine. Reaction remained acid. Chemical analysis showed no albumen, except a mere trace of albumen was found in one case, which was not an increase in amount of albumen present prior to the administration of Salvarsan. No sugar was found.

Phlebitis: In three cases, given intravenously, Nos. 6, 9 and 10, traumatic phlebitis occurred, which terminated in resolution without suppuration.

Pain: No pain followed the intravenous injection except in the three cases of Phlebitis. This was caused by a slight infiltration of Salvarsan solution into the tissues around the vein, attributed to an accidental movement of the needle. No suppuration followed any of these accidents.

In the cases given intravenously we found the least inconvenience, and therefore, it would seem to be the method of choice.

In intramuscular injections, the pains complained of were variable. The pains were not only referred to the muscles of the buttock, but extended down the thigh and leg.

In one case in which the injection was given into the muscles in the lumbar region, pains were severe and continuous for ten days, and soreness, accompanied with redness and slight induration of the tissues followed. In two cases in which the solution was made up to 40 c. c., no pain followed the injection. One of these cases was a reinjection in the man in whom the lumbar injection was previously used.

Nausea and Vomiting: Out of 36 (includes 2 reinjections) intravenous injections, vom-

iting followed in 18 cases, and nausea without vomiting in 9 cases. No stomach symptoms occurred in the other 9 cases. These symptoms occurred one to three hours after administration. No vomiting occurred in the cases in which the hypodermic intramuscular method was employed.

Vomiting usually followed a chill and did not continue more than three hours.

Chills: Following the administration of Salvarsan, chills were noted in 15 cases, which were of short duration.

Eruptions: In one case, No. 18, urticaria developed on the seventh day, but disappeared after free purging.

The real Jarisch-Herxheimer reaction was not observed in any case.

Deaths: One death, case No. 19, occurred on March 27th, which was twenty-four days after the intramuscular injection. It is only proper to state that the administration of Salvarsan in this case was given as a last resort as the patient was in extremis when treated. However, some improvement was noted during the first week. The death in this case could not possibly have been attributed to the use of Salvarsan.

We herewith submit a table giving the history of each case briefly, together with the results obtained after the use of Salvarsan. It will be seen that of the 40 cases treated there were

1		Primary
20		Secondary
19		Tertiary

Of these, cases Nos. 3, 4, 8, 19, 22, 26, 27 and 32 had organic lesions involving the following organs: Brain, 5 cases; testicle, 1 case; rectum, 1 case; spinal cord, 1 case.

Of the secondary lesions, the following is a summary: Eruption of the skin, macular, papular, pustular, and ulcers; condylomata involving nates, vulva, throat; mucous patches of the mouth; ulcers of the angle of the mouth, nose, tonsils, alopecia, dactylitis, general adenopathy. Of tertiary lesions, in addition to the organic ones mentioned, gumma, inner canthus of the eye, tibiae, posterior

CASE No. 4.

CASE No. 13.

CASE NO. II.

CASE NO. 2.

CASE No. 4.

CASE No. 12.

pharynx, a perforating gumma of the palate, rheumatism, extensive ulcerating gumma of the glans penis.

As will be seen 80 days have elapsed from January 25th, 1911, on which date we first began the use of this drug, to April 15, 1911, inclusive.

The results may be summarized as follows:

Cases in which all symptoms complained of have disappeared so that they are apparently well—total 25.

Case number.	No. days between date 606 and date last examination
3	76
5	7
6	12
8	69
9	14
11	14
12	14
13	4
14	42
15	25
16	47
17	10
20	26
21	6
23	8
24	26
26	7
27	7
28	23
29	7
30	10
32	6
33	8

Cases No. 1, 53 days and No. 11, 44 days may be included in this list, but owing to a continued Wasserman will require another treatment.

No. 11 was given a reinjection on Monday, April 17, 1911.

Cases which improved but some symptoms still present—4.

No. 18—45 days—Wasserman developed iritis and cervical glands still palpable (reinjected April 16).

No. 25—26 days—Nodes still present. Ulcer healing—Wasserman negative.

No. 31—7 days—Gumma of head still present, but decreasing.

No. 7—73 days. Wasserman—Gumma inner canthus eye, decreased but still present.

No. 4—78 days—In this case lesion involves

central nervous system—upper cord region. Improving. Wasserman negative.

Cases whose condition improved but in which complications exist—2.

No. 2—79 days—Has malignant growth. Wasserman negative.

No. 22—31 days—Has hemiplegia; apoplectic.

One death occurred in case number 19, which was 24 days after intramuscular injection.

There remain the following cases:

Case 34, treated April 11, pains complained of entirely disappeared.

Case 35, treated April 12, headaches and melancholia, relieved.

Case 36, treated April 12, macular eruption disappeared. Lymph glands markedly reduced. No more pains.

Case 37, treated April 13, headaches have disappeared. Goiter decreased. Feels greatly improved.

Case 38, treated April 13. Vision in left eye good. Iritis in right eye shows no improvement. Eruption disappeared.

The following cases were treated since April 15:

Case 39, treated April 16. Pains in knees and shoulder disappeared. No reaction followed the injection. Nose condition improving.

Case No. 40, treated April 17. This case seen on April 24, showed remarkable improvement. The squamous syphilide involving the back and palm of the hand was entirely healed leaving but a pink spot, also the fissures between the fingers were entirely healed. This condition had lasted since August 1910, so that during that time he was unable to use his hand very much. He is now able to flex his fingers and use the hand freely for any kind of work.

WASSERMAN REACTION AND SPIROCHAETE PALLIDA FINDINGS.

Of the 40 cases, Wasserman reactions were made in 29 cases, before the administration of Salvarsan, and in 11 cases after treatment.

The following results were obtained in the eleven cases:

	Before	After	Days
No. 1	+	+	53
No. 2	+	—	75
No. 3	+	+	32
No. 4	+	—	61
No. 7	++	+	32
No. 8	+	+	46
No. 11	++	+	69
No. 18	++	+	46
No. 22	++	+	42
No. 24	+++	—	41
No. 25	+	—	27
			26
			22

tive cases examined after the administration of salvarsan, the spirochaete findings proved negative in one after 24 hours; one after 48 hours, and one on the third day.

The original Wasserman was used in the above examinations. Spirochaete examinations were made by the India ink method and also by use of Wright's stain.

Remarkable beneficial effects were apparent after the first 24 hours presenting lesions involving the mucous membrane and skin. Pains, enlarged lymphatics, and many other

CASE NO. 3.—REAR VIEW. PICTURE TAKEN FEBRUARY 10, 1911. WEIGHT, 92½ LBS.

CASE NO. 3.—REAR VIEW. PHOTO TAKEN APRIL 15, 1911. WEIGHT, 148 LBS.

CASE NO. 3.—FRONT VIEW. APRIL 15, 1911. 120

This makes 7 cases of the 11 giving negative reactions after treatment.

The Spirochaetae (*pallida*) examinations were made in 12 cases, 8 of which gave positive and 4 negative findings. In 3 of the posi-

symptoms, such as insomnia, headache, anorexia, mental apathy, difficulty in swallowing, etc., were alleviated and in many instances disappeared. As a rule, patients increased in weight, one gaining as much as ten pounds during the first week after administration.

[illegible]

No.	Date Admin.	Date Primary infection	Kind of Treatment received	General Physical condition on date of admission	Syphilis—Symptoms complaints of	Changes noted at End 1st week	End of 2nd week	End of 4th month	Date of last examination
20	March 6, 1910	Feb. 10, 1910	Hg. Salicylate 3 mg.	Good. Wasserman + + + Rapid improvement. S. pallida —	Ulcers and papular eruptions on joints. Papular eruptions on face, neck and back. Swelling of joints, especially of the knee.	Improvement began 3rd day. Eruption disappeared. Ulcers on joints disappeared. 2nd day. Disappeared.	Gained 1 lb.	April 11, 1911, 20 days. All lesions disappeared.	
21	March 14, 1911	Jan. 1911	None	Good	Swelling of joints, especially of the knee.	Swelling of joints, especially of the knee. Disappeared.		March 20, 1911, 6 days. Eruption entirely disappeared.	
22	March 15, 1911	March 15, 1911	Hg. Mifred. Sol. Par—Paralytic. Wasserman + + +	Good. Wasserman + + + S. pallida —	Ulcers and papular eruptions on joints. Papular eruptions on face, neck and back. Swelling of joints, especially of the knee.	Improvement began 3rd day. Eruption disappeared. Ulcers on joints disappeared. 2nd day. Disappeared.		April 15, 1911, 31 days. All lesions disappeared.	
23	March 17, 1911	Nov. 1910	Mif. treatment	Good. Wasserman + + + S. pallida —	Ulcers and papular eruptions on joints. Papular eruptions on face, neck and back. Swelling of joints, especially of the knee.	Improvement began 3rd day. Eruption disappeared. Ulcers on joints disappeared. 2nd day. Disappeared.		March 20, 1911, 8 days. All lesions disappeared.	
24	March 18, 1911	7	7	Anemic—thin. Wasserman + + + S. Pallida +	Ulcer angle of mouth above. Swelling of suppurating lymphatic face and back. Ulcers on joints. Marked pain over them. Ulcer of leg. 10 to 12 cm. extending.	Swelling of suppurating lymphatic face and back. Ulcers on joints. Marked pain over them. Ulcer of leg. 10 to 12 cm. extending.		April 3, 1911, 10 days. Ulcers disappeared. Swelling of suppurating lymphatic face and back. Ulcers on joints. Marked pain over them. Ulcer of leg. 10 to 12 cm. extending.	
25	March 20, 1911	August 1909	Hg. 12 by Hypo—Good. Wasserman + + +	Good. Wasserman + + + S. Pallida —	Large painful gummatous nodes over both thighs. Ulcers on joints. Marked pain over them. Ulcer of leg. 10 to 12 cm. extending.	Swelling of suppurating lymphatic face and back. Ulcers on joints. Marked pain over them. Ulcer of leg. 10 to 12 cm. extending.		April 15, 1911, 20 days. All lesions disappeared.	
26	March 22, 1911	1890	1-2 mos. each yr. Good. Hg.	Good. Wasserman + + + S. Pallida —	Headache. Difficulty of speech, difficulty in swallowing. Ulcers on joints. Marked pain over them. Ulcer of leg. 10 to 12 cm. extending.	Headache. Difficulty of speech, difficulty in swallowing. Ulcers on joints. Marked pain over them. Ulcer of leg. 10 to 12 cm. extending.		April 15, 1911, 20 days. All lesions disappeared.	
27	March 22, 1911	† Vaccination 1899	Hg. & K. L.	Good. Wasserman + + + S. pallida —	Ulcers and papular eruptions on joints. Papular eruptions on face, neck and back. Swelling of joints, especially of the knee.	Improvement began 3rd day. Eruption disappeared. Ulcers on joints disappeared. 2nd day. Disappeared.		April 15, 1911, 20 days. All lesions disappeared.	
28	March 23, 1911	Dental exposure.	Unknown	Good. Wasserman + + + S. pallida —	Ulcers and papular eruptions on joints. Papular eruptions on face, neck and back. Swelling of joints, especially of the knee.	Improvement began 3rd day. Eruption disappeared. Ulcers on joints disappeared. 2nd day. Disappeared.		April 15, 1911, 20 days. All lesions disappeared.	

No.	Date of Admission.	Date of Discharge from Hospital.	Kind of Treatment Received.	General Condition on Admission.	Syphilitic Complications.	Changes noted at end of 1st week.	End of 2nd week.	End of 1st month.	Date of last examination.
29	March 31	1903	Mixed treatment of Salvarsan and potassium iodide.	Good. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			7 days.
30	April 3	Jan. 1911	More or less local treatment with Salvarsan.	Good. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			April 13, 1911.—20 days after admission. No change noted.
31	April 6	Jan. 1910	At H. H. Springs under Hg.	Good. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			7 days.
32	April 7	1904	Hg. & M.T.	Good. W. 224.524. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			6 days.
33	April 7		Hg. & K.I.	Fair. Weight 128. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			5 days.
34	April 11.	1905	Hg. & K.I.	Good. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			April 25, 1911. 14 days after admission. No change noted.
35	April 12.	1905	Hg. & K.I.	Good. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			April 29, 1911. 14 days after admission. No change noted.
36	April 12	1910	None	Good. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			April 29, 1911. 14 days after admission. No change noted.
37	April 13.	1905	Hg. & K.I.	Good. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			April 29, 1911. 14 days after admission. No change noted.
38	April 13.	Jan. 1911.	K.I. & Hg.	Good. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			April 29, 1911. 14 days after admission. No change noted.
39	April 16	25 years ago.	Hg. & K.I.	Good. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			April 29, 1911. 14 days after admission. No change noted.
40	April 17	20 yrs. ago.	Hg.	Good. Wassermann 11.	Isolated, painless, indurated, gumma, about size of walnut, on left side of nose, about 1/2 inch in diameter. No pain, no fever, no suppuration.	Scarcely any change noted. Gumma slightly decreased in size.			April 29, 1911. 14 days after admission. No change noted.

The lesions which proved most resistant to salvarsan have been in cases with general adenopathy, periosteal gumma, and hemiplegia. Spinal (involvement) myelitis.

The following is a brief summary of the

Second: That its preparation and administration should be guarded by the most careful aseptic technique.

Third: That it should never be given outside a hospital or sanitarium.

CASE No. 17.—SHOWING CONDYLOMATA. THESE CONDYLOMATA DISAPPEARED FOURTEEN DAYS AFTER ADMINISTRATION OF "606."

CASE No. 21. SHOWING ERUPTION ON ABDOMEN AND THIGHS.

time noted for the complete disappearance of different forms of lesions:

Primary lesions	4 days
Mucous patches	1 to 5 days
Macular eruptions	2 to 4 days
Papular eruptions	7 days
Pustular eruptions	7 to 14 days
Ulcers of the skin and penis	1 to 4 weeks
Ulcers of the nose and mouth	2 to 5 days
Ulcers of the throat	2 to 5 days
Ulcer of the rectum	5 days
Condylomata	7 to 14 days
Adenopathy (in some)	4 weeks
Dactylitis (inflammatory)	2 months

CONCLUSIONS.

First: That salvarsan is unquestionably a specific for syphilis, and the most valuable adjunct to our armamentarium in the treatment of syphilis, and should be employed whenever indicated.

Fourth: That the drug should be freshly prepared immediately before administration. The salvarsan for intravenous infusion must be perfectly clear. Normal salt solution should always be given immediately before and after the salvarsan solution in intravenous injections.

Fifth: That a preliminary examination should always be made including, heart, lungs, eyes (by a competent oculist), urine analysis, weight, and, when practicable, Wasserman reaction and spirochaete examination.

Sixth: That a positive Wasserman reaction is an unquestionable indication of the activity of the spirochaete pallida. With this in mind it does not seem possible that an in-

dividual will not evince some manifestation within a year, and under these circumstances, knowing the beneficial effects of this remedy, we would advise, all conditions being favorable, that this treatment be used.

Seventh: We do not advise the use of salvarsan in suspicious primary lesions, unless a positive Wasserman is found or the spirochaete pallida is demonstrated microscopically. Of course, where the clinical course of the disease is clear after the primary lesions,

quicker than by any other form of treatment. This makes the drug a most valuable prophylactic agent in controlling the spread of syphilis.

Tenth: That further observations will be necessary to determine the permanency of the effects of this treatment.

We have to acknowledge our appreciation and extend our thanks to the following members of the profession for referring cases to us:

CASE NO. 21. SHOWING ERUPTION ON BACK, BUTTOCKS AND THIGHS.

the administration of this remedy need not be delayed.

Eighth: It should be given in all cases where eye lesions do not involve the fundus oculi where a danger of optic atrophy may advance and be attributed to the use of this drug.

Ninth: That active lesions such as primary sores, mucous patches, condylomata, etc., are rendered non-infective by this treatment

Doctors Rhett Goode, Seale Harris, W. G. Ward, O. L. Crampton, R. A. Wright, A. E. Maumenee, H. P. Cole, J. T. England, G. E. Gavin, L. W. Roe, W. C. Jones, S. Toulmin Gaines and J. J. Peterson, all of Mobile, and Dr. C. M. Hartzog of Seminary, Mississippi; Dr. Brown, surgeon U. S. Army, Fort Morgan, Alabama, and Dr. Tom Savage of Jefferson, Alabama.

To Dr. H. T. Inge, for supplying the his-

tory of case No. 13, to whom we administered salvarsan at Dr. Inges' special request. To Dr. Eugene Thames, resident physician City Hospital, who took a special care and interest in the cases sent to the City Hospital. To Drs. R. A. Wright, E. A. Maumenee, W. C. Jones and J. C. O'Gwynn, for the interest taken in making the eye examinations of our cases. To Dr. Haley, Bacteriologist, Medical

Department of the University of Alabama, who determined the presence of arsenic in the urine of one case. We have also to acknowledge our appreciation for the assistance rendered by Pharmacist F. J. Herty, U. S. P. H., & M. H. S., who made several examinations and analysis of urine to determine the presence of arsenic; also for making careful determinations of the weight of salvarsan and for the typewriting of part of this paper.

END-RESULTS OF SURGICAL OPERATIONS ON NERVOUS WOMEN.*

By S. T. RUCKER, M.D.,
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Medical and surgical procedures sometimes become a fad, their importance is over-estimated, and the pendulum of appropriation swings too far. When this occurs the wise and conservative ones will retrench, the evidence will be analyzed and estimated, and if the procedure possesses virtue, it will find its rightful place as a therapeutic endeavor.

The ovary, appendix and retro-displaced uterus have each had their conflict with surgery. Lives have been saved, ovaries and appendices have been lost.

The retro-displaced uterus has been court-martialed and punished by suspension, or shortening the round ligament, only to drop back into the same naughty ways. Now that peace is about to be restored where former conflicts raged, the movable kidney is raising a disturbance, and has thrown down the gauntlet.

Many nervous phenomena that will not permit of a definite interpretation will be attributed to the movable kidney, and nephropexy will be done.

After studying carefully the results of operations on nervous women, I am persuaded that even where a pathological lesion exists, the end-results, in a majority of cases, are unsatisfactory for two reasons: First, as a rule

the lesion is incidental to, and not the cause of the nervous symptoms. Second, there is already a psychic instability and depreciated nerve force, which renders the patient a poor subject for an operation. I find a better plan is to endeavor to improve the general health and restore nervous strength to the patient by isolation, rest and other appropriate treatment, when the needed operation can be done with better results.

In selected cases, where the symptoms are urgent and an operation is undertaken, care should be taken to protect the nervous system from physical and psychical shock, and avoid increasing the nervous disorder.

I get patients who have had abdominal operations done with the hope or promise that it will relieve some vague abdominal pain or obscure nervous suffering. Instead of relief, they get an undesirable ventral scar, and perhaps peritoneal adhesions in addition to the nervous affection.

A female patient 25 years old, sent to me from Arkansas, had petit mal of five years' duration. Her physical condition was good, but there was poor memory, mental apathy and epileptic vertigo spells that came on at frequent intervals. Two years previous to my seeing her she was told that her nervous trou-

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