properly conducted surgical treatment, as contrasted with the methods too frequently seen in practice. The risk of such surgical treatment is negligible. The early improvement in function is striking. Evidence of improvement in 82 per cent of the patients within one month after operation, and of many within a few days, gives strong support to his contention. I believe that Doctor Brown's conclusions are conservative and sound. Adoption of the methods of management which he advocates will do much not only to improve the results in such palsies of peripheral nerves, but also to promote earlier and more complete recovery.

It is a fact that many patients with palsy of the peripheral nerves recover without surgical intervention. If such improvement is early, that is, within a matter of days or two or three weeks, and if satisfactory progress continues, there is, of course, no indication for operative treatment. If, however, the paralysis is stationary or deepens, or if no improvement occurs and atrophy progresses, there is good reason to advise surgical treatment.

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E. W. Rockey, M. D. (330 Medical Arts Building, Portland, Oregon).—I feel that this is a most timely paper, and that the early, careful exploration, with both intrinsic and extrinsic neurolysis, which has been advocated, will save not only unnecessary periods of temporary disability, but will lessen permanent disability as well. Doctor Brown has vividly described the trophic changes which so frequently accompany nerve irritation. These changes are responsible for the poor results obtained when operative interference is long delayed, and has led us to believe that nerve irritation is often of more serious consequence to the patient than complete division of a nerve.

There is another factor, doubtless implied in Doctor Brown's paper but which has not received the stress which it deserves in the discussion of this type of case. This is the factor of pain. We have observed several cases of partial division of a nerve in which there was present not only a trophic change, but a distressing degree of pain. At times there are areas of hyperesthesia, where the slightest touch is painful. The degree of pain and hyperesthesia ranges all the way from mild distress to the severest types of causalgia in which the situation of the patient is tragic. In some cases the pain resembles that seen in spinal cord or thalamic lesions.

We do not know exactly why the pain and trophic changes appear with such frequency in cases of nerve injury, but there is a tendency to ascribe it to lesions of the sympathetic fibers traveling with the somatic sensory and motor fibers. It has been noted that the combination is most prone to appear when the injury involves either the median nerve in the upper extremity, or the tibial nerve in the lower. These nerves are known to contain a richer supply of sympathetic fibers than others supplying the extremities. We do know, however, that if the condition is permitted to persist, then the end-results are destined to be unsatisfactory. The pain and hyperesthesia hinder the use of physiotherapy, and the trophic changes if long continued leave a degree of atrophy, stiffening of the joints and limitation of motion that are difficult or impossible to correct.

Doctor Brown mentions transposing the ulnar nerve anteriorly and putting it into a muscle body. He makes no mention of the use of fat transplants surrounding a nerve where it has to lie in a scar tissue bed. I would like to have him comment on his use of this procedure.

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Carl W. Rand, M. D. (523 West Sixth Street, Los Angeles).—Neurolysis and endoneurolysis are by no means new procedures. I think that it is a fairly common experience for one to dissect out injured peripheral nerves, and free them from their bed of scar tissue. This is usually called external neurolysis, and in itself, in the majority of cases, will suffice to give considerable improvement. If the nerve is indurated to any extent, the sheath is usually opened and held back by traction sutures. If the funiculi are found too closely matted, the injection of warm normal saline or Ringer's solution—as has been described in Doctor Brown's paper—may be used. This undoubtedly tends to break up the finer adhesions. If the simple injection of such a fluid is not sufficient in itself to separate the adhesions, it is very doubtful if mechanical separation should be attempted, as more harm than good may result.

One wonders how much of the improvement is due to simply freeing external scar tissue, or external neurolysis, and how much is due to endoneurolysis. One can readily understand how relief of external pressure on a compressed nerve may be of lasting benefit. It is difficult to believe that even fine adhesions within the funiculi of the nerve would not reform after being freed.

It is a very difficult matter to determine the length of the waiting period between the time of injury and operation. Doctor Brown's shortest period was three weeks; his longest period eleven months. The average period would probably be somewhere in the neighborhood of three to four months. There can be little question as to the advisability of interfering if no improvement has occurred, or if the condition is getting worse after a reasonable waiting period. The cases which are hardest to decide are those where improvement is occurring. This is especially so if the improvement is very slow. In such cases one can never predict what the final result will be.

I was surprised to find what a large percentage of these cases present definite medico-legal aspects. Thirteen of the thirty-four cases were caused by cast pressure, splinting, bandaging, tourniquet, manipulation of joints or diathermy burns, amounting to 38.2 per cent. One cannot but feel that here, as elsewhere in medicine, prophylaxis is the best treatment. More caution, however, in the application of splints, casts, tourniquets, manipulation of joints and diathermy treatment should be emphasized.

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Doctor Brown (Closing).—Doctor Rockey has mentioned the factor of pain in partial lesions of peripheral nerves. We have encountered this on occasion, but in most instances in which pain has been a prominent feature the motor loss has not been of great degree. Relief of pain by neurolysis of the affected part of the nerve in some instances has been possible, but in the type described as causalgia, the result has often been disappointing.

The use of fat in the formation of a new bed for nerves has been advocated by many surgeons. We feel that the transplants of fat frequently are absorbed rapidly and do not give the protection that has been claimed for them. We always make an attempt to remove the nerve from an old scarred bed into adjacent muscle or subcutaneous tissues to prevent further constriction, in so far as possible.

TREATMENT OF TRICHOMONAS VAGINITIS*

By S. M. Gospe, M. D.
San Francisco

Discussion *by H. N. Shaw, M. D., Los Angeles; Henry A. Stephenson, M. D., San Francisco.*

THE treatment of the vaginitis associated with the trichomonas vaginalis (Donne) is as varied as any nonspecific method of therapy can be. To add another type of treatment which offers nothing new is inexcusable; on the other hand, a régime which offers quick symptomatic relief, and a good number of cures which can be ob-

* A report from the Woman's Clinic, Outpatient Department, University of California Hospital.

TABLE 1.—*Results of the First Follow-Up*

Period	Positive	Negative
1-2 weeks	2	21
3-4 weeks	5	10
5-6 weeks	2	2
7-8 weeks	0	2
9-10 weeks	0	3
11-16 weeks	1	2
17-30 weeks	1	2
31-50 weeks	0	1
	10	41

tained in a simple effective manner of administration, is worthy of consideration.

At the University of California Hospital, 4—carbamino phenyl arsonic acid (Carbarsone—Lilly),[1,2,3] had been shown to have a definite clinical value in the treatment of intestinal amebiasis. A clinical study was then undertaken to discover the effect of this protozoacide upon the trichomonas vaginalis, and upon the vaginitis associated with it.

MATERIALS AND METHODS

Vaginal suppositories containing 2 per cent carbarsone in a cocoa butter or boroglycerin base were used. Suppositories were inserted into the vagina after retiring, a course consisting of nightly treatment for two weeks. One bicarbonate of soda douche was allowed each week. In some cases two or three such courses were given without signs of local or general reaction.

Diagnoses were all made by the fresh smear diluted in Ringer's solution. Smears were taken at each visit to the clinic, varying from every two weeks during the first four to six weeks, then after each menstrual period for several months. Treatment was stopped after patient showed, clinically and microscopically, normal findings.

Fifty-one patients were seen at least twice; thirty-five of these were followed more satisfactorily. The first follow-up examination showed that forty-one (82.4 per cent) of the fifty-one patients returned with normal smears and clinical improvement.

These forty-one patients noted that the discharge decreased, and the tenderness in the vaginal canal either completely disappeared or was greatly relieved within the first week of treatment.

The patients who returned with a positive smear were given a second course of treatment. Eight of these returned for reëxamination. Five of these had smears devoid of trichomonas, increasing the ratio of improved patients to forty-six (90.2 per cent).

Five patients in this series were pregnant. Of these, two were completely relieved and three showed symptomatic relief while under treatment with recurrences soon after the treatment was stopped.

Fifty-two per cent of the patients who were followed closely remained free of symptoms and trichomonas during the entire period of observation (from two to eight months), while 11 per cent were entirely unaffected by the treatment. The remainder (37 per cent) had recurrences which responded to treatment. Some of these had recurrences of the vaginitis after treatment was suspended.

COMMENT

Our initial findings made us feel enthusiastic about the effect of the substance upon the trichomonas vaginalis vaginitis, but later follow-up studies showed a large number of recurrences which, it is true, were easily amenable to further treatment.

The favorable points in this method of treatment are:

1. It is a simple, painless, stainless method.
2. Eighty per cent of patients were relieved subjectively and objectively of the vaginitis after one course of treatment.
3. Recurrences are easily treated by repeated courses of therapy.

University of California Hospital.

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DISCUSSION

H. N. SHAW, M. D. (901 Pacific Mutual Building, Los Angeles).—There have been numerous articles in the recent literature on treatment of trichomonas vaginitis. Many of the methods are rather complicated, and cause an irritation more troublesome than the inflammation they are meant to cure. For this reason, Doctor Gospe's method should be extremely valuable. It apparently causes no discomfort, and can be used by the patients at home.

The question of recurrences is difficult, because the source of the original infection has not been definitely determined. Various theories have been advanced, the most probable being that the infection comes from the intestinal tract. If this be true, it would prove impossible to prevent reinfections, which in the ordinary follow-up would be classed as recurrences.

While our main object is to cure a disease, it should be done as economically as possible for the patient. The day of "pot-boiler" treatments is over. Doctor Gospe's method is particularly commendable because, by using the suppositories at home, the patient gets adequate treatment at a minimum cost.

HENRY A. STEPHENSON, M. D. (490 Post Street, San Francisco).—The treatment of vaginitis, associated with trichomonas vaginalis, is a very live topic. The methods used in the past have not given uniformly satisfactory results, so that any new method should be welcome. We have had very little experience with the procedure outlined by Doctor Gospe. The results as reported by him seem so good that the method should be tried.

In our treatment in the past, we have had best results from using acetyl-amino-oxyphenol arsenic acid, as suggested by Gellhorn of St. Louis in 1933. The dosage is somewhat larger than that of carbarsone as employed by Doctor Gospe. Our success with this drug leads us to give our hearty approval to the use of some form of arsonic acid.