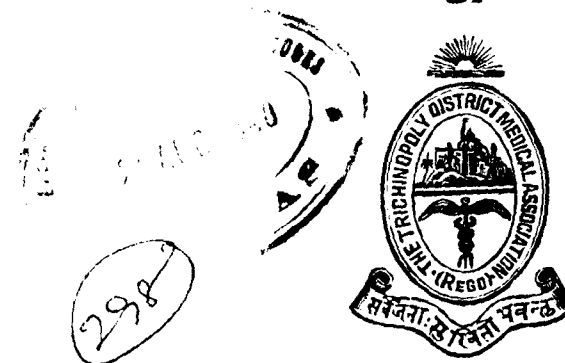


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APRIL

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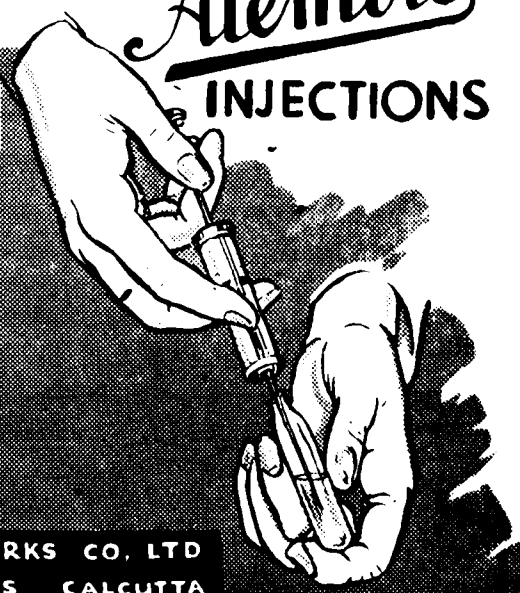
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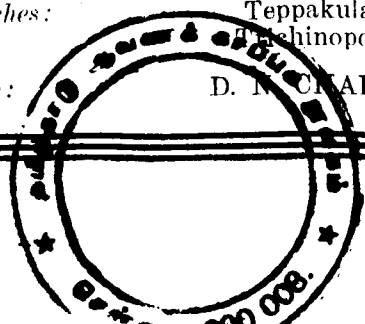
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[No. 4

The use of Procaine hydrochloride as a Therapeutic Agent

TOM OUTLAND, M.D.,

AND

C. R. HANLON, M.D.

Procaine hydrochloride (introduced as novacain), the successor to cocaine, has long enjoyed a vogue as a local anesthetic, and its value is well recognized. Recently its therapeutic value has been realized and many articles have appeared, especially in the foreign literature, attesting its efficiency and emphasizing its clinical potentialities. Our principal interest is in its therapeutic application, especially with regard to traumatic and orthopedic conditions, but after somewhat sketchily reviewing the literature we feel that it might be worth while to call attention to its application in other branches of medicine and surgery.

Procaine hydrochloride is the hydrochloride of para-aminobenzoyl-diethylaminoethanol. The dosage is from one to three times that of cocaine, and its anesthetic and irritant actions are perhaps slightly less. The drug on direct application acts by paralyzing the sensory nerve fibrils without the preceding stimulation, but in higher concentrations it will paralyze all other nerve fibres and indeed all protoplasm. It also causes local vasoconstriction.

The number of different conditions in which it is employed is great. Its therapeutic use is advocated in various syndromes

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in internal medicine, in urology, in eye, ear, nose and throat work, in dental surgery, in general surgery, in obstetrics and even in psychiatry.

Turning to internal medicine, one finds articles advocating procaine hydrochloride in angina pectoris, bronchial asthma, apoplectic shock, intermittent claudication, arteriosclerosis, herpes zoster and other conditions, while in general surgery it has been reported of value in ileus, phantom limb pain, cutaneous cicatrices and certain infectious and inflammatory processes. In urology it has been recommended in acute epididymitis and in many of the complications of gonorrhea. One article advocated its use in puerperal phlebitis. However, it is its use in traumatic and orthopedic conditions in which we are chiefly interested, and it is in this field that we have quite extensively employed procaine hydrochloride therapeutically during the past year.

MECHANISM

Procaine hydrochloride is of value in these conditions, according to Leriche, because it suppresses by means of its local anesthetic action the nerve irritation inaugurated by trauma. There exists a rich nerve supply in the supportive tissues of the human skeleton, especially in the ligaments in the region of an articulation. Following trauma, a violent excitation of this supply occurs with a disturbed vasomotor functional state characterized clinically by muscle spasm, loss of motion, pain and tenderness. By eliminating the pain impulses that emanate in automatic waves from the traumatized area it causes a return of the normal vasomotor tone and for the time being and often permanently normal regulatory impulses are set up.

In brief, following trauma there is a change in the normal vasomotor equilibrium with the development of hyperemia due to vasodilatation. Procaine therapy, by eliminating pain impulses and by virtue of the fact that it is a vasoconstrictor causes a return to a normal vasomotor equilibrium.

FRACTURES

Procaine hydrochloride has been used in fracture work as anesthetic agent for many years, but recently its therapeutic

use has been advocated in specific types of fractures—mainly those in which severe ligamentous injury was primary and the fracture itself of secondary importance. Such injuries include fractures of the transverse processes, chip fractures of the humeral epicondyles, undisplaced fractures of the head of the radius and fractures of the spinous processes of the vertebræ. We have employed procaine hydrochloride in all these conditions with gratifying results, both functionally and economically.

We have observed in our extensive use of local anesthesia in the treatment of fractures in general, and especially Colles fractures, that the patient's postreduction course was much more pain free and was accompanied by an earlier restoration of function as compared to the use of general anesthesia. We had been at a loss to account for this as the anesthetic effect in itself wears off in a few hours, until we studied Leriche's articles in which he points out that anesthesia with procaine hydrochloride re-establishes the disturbed vasomotor equilibrium by removing pain impulses.

Briefly, a few instances will be cited in which procaine hydrochloride was used therapeutically in the treatment of fractures, sometimes accompanied by physical therapy.

Case 1.—A man aged 68 who was in an automobile accident twentyfour hours previous to examination complained of a painful, stiff neck. Examination revealed generalized tenderness from the third to the sixth cervical vertebra with widespread cervical muscles spasm. The head was tilted to the right. X-ray examination revealed fractures of the third, fourth and fifth cervical spinous processes. He received an injection of 2 per cent procaine hydrochloride with immediate relief of pain and prompt disappearance of spasm and tenderness. The tenderness and pain later recurred to a mild extent but finally disappeared almost completely after a second injection three weeks from the date of the injury.

We were interested after treating this patient to read an article by Fritz Schnek in which he recommended treating avulsion fractures of the spinous processes with procaine hydrochloride. Fractures of the spinous processes are difficult, almost impossible, to reduce, let alone to retain in the reduced position until bony union is complete. Experience shows that bony union seldom occurs, the majority healing with pseudarthrosis. The latter causes no trouble worth mentioning. Hence, when

procaine therapy is used pain is allayed and the patient is convinced of the harmlessness of his injury, since all movements are possible as soon as the anesthetic takes effect.

Case 2.—A man aged 27 sustained direct injury to the left elbow twentyfour hours before examination. Clinical and x-ray examinations revealed a small fracture of the head of the radius with no displacement of the fragments. The patient received one injection of procaine hydrochloride with almost complete relief of pain and with a good return to rotation of the forearm, although following injection there was some limitation of complete extension. He was followed closely and fourteen days after his injury had no soreness about the elbow, normal rotation and about 5 degrees of flexion deformity. He was given physical therapy from the outset and kept at his work, which consisted of moderately heavy manual labor.

Several fractures of the transverse processes of the lumbar spine have been treated by this method.

Case 3.—A high school football player with fractures of the second and third right lumbar transverse processes received one injection with complete relief of pain and spasm and return of full motion. This patient several days later participated for several minutes in a football game, against our advice, in order to earn his letter.

It is with fractures of the transverse processes that we feel that procaine therapy is especially valuable, for any other treatment such as braces, corsets, plaster of paris casts or open operation may unwillingly foster neurotic fixations and lead to prolonged disability.

We realize that the recommendation of procainization and activation in fractures of the lumbar transverse processes is at variance with the accepted methods now generally employed. However, in such injuries the essential pathologic process is the associated ligamentous tear, the fracture itself being of secondary importance. Since the ligamentous origin of the psoas major, the quadratus lumborum and the sacrospinalis muscles is extensive, there is little likelihood of further trauma being inflicted by active use of the muscle group after procaine hydrochloride has been used to abolish the pain impulses.

Reduction of these fractures of the transverse processes is difficult to achieve, and the aim of the accepted treatment by casts, braces or bed rest is essentially for the relief of pain. Procaine hydrochloride, in eliminating the pain impulses, permits active mobilization and does away with the undesirable

sequels seen with immobilization such as atrophy, stiffness and the neurotic fixations that are especially common in fractures of the transverse processes.

A fracture of the lateral epicondyle of the humerus was treated by injection of procaine hydrochloride several months ago in a patient admitted with multiple fractures on the lower extremities. One injection was all that was required to permit complete return of function to the affected elbow, with permanent subsidence of pain and muscle spasm and with full immediate return of motion.

Leriche and Froehlich in 1936 published an account of their results of treating certain articular fractures with procaine hydrochloride infiltration and immediate active mobilization. In articular fractures without displacement, or with a displacement not requiring an exact reduction, these authors infiltrated the surrounding ligaments as though there was a sprain as well as the focus of the fracture itself in such a fashion as to block the vasomotor phenomena which create secondary arthritis, thus permitting by suppression of the pain an immediate active mobilization.

Leriche presented three cases in detail in which he had employed procaine therapy and concluded that the method has a wide margin of application in all cases in which there is no absolute necessity for reduction and maintenance of the reduction by apparatus. He writes that it is astounding to see how the immediate restoration of function and the suppression of pain, signs of a post-traumatic vasomotor imbalance, improve the quality of the result and notes that simple surgical good sense is sufficient to indicate the limits of this new manner of obtaining immediate mobilization in fractures. Our observations coincide with his and we have been equally impressed by the results of treatment.

SPRAINS

Procaine hydrochloride also has a wide use in the treatment of sprains. The mechanism again is similar to that mentioned earlier and consists of suppressing the nerve irritation by means of local anesthesia of the ligament.

There are three groups of sprains in which this drug may prove of great value: The first group includes sprains unaccompanied by fractures or ligamentous tears. The former are ruled out by x-ray examination and the latter by abnormal articular laxity. In this group one or two injections may be sufficient to permit normal, painless function of the joint. In the second group, those characterized by pain and muscle atrophy the after-effects of sprains—procaine hydrochloride is often of great benefit. The third group consists "operation sprains" those characterized by pain, tenderness and some interference with function following operations on joints.

In those instances in which a tear of ligament is present, the injection of procaine hydrochloride into the ligament proves itself a diagnostic aid and indicates the need of immobilization as the treatment of choice.

Although sprains may be treated at all stages by injections of procaine hydrochloride, the most prompt and constant results are obtained in those cases in which the injections are performed in the first twenty-four hours.

Case 4.—A truck driver aged 25 years was in an automobile accident the day before he was examined, having been pinned beneath a truck. Weakness in the right upper extremity developed, with much pain in the right shoulder. Examination revealed a very tender area over the acromioclavicular joint with severe pain localized at this joint on motion of the shoulder joint. The x-ray examinations gave negative results. A diagnosis of acromioclavicular ligamentous sprain was made and 2 per cent procaine hydrochloride was injected with considerable immediate relief. When he was seen forty-eight hours later there was excellent movement and no pain on movement. He was advised to return to work.

Case 5.—A man aged 30, a labourer, was placing a piston in an engine by pushing with his feet and bracing with his back. Suddenly he felt his back "give way" and experienced severe pain in the small of the back. He was examined twenty-four hours after the accident and typical signs of sacro-iliac sprain were found on the right side. It was decided to treat this patient conservatively, and accordingly he was placed in traction. For three weeks there was very little change in the physical appearance; the tenderness, limitation of motion and muscle spasm were almost as marked as on admission. At the end of third week procainization was inaugurated, two injections being employed at intervals of four days. The results were most striking especially when compared to the slow progress made under the accepted conservative method of treatment. The patient, after the first injection, became ambulatory and received a second injection only because of a moderate recurrence of symptoms. He has since had no pain.

MUSCLE CONTUSIONS

In addition to fractures and sprains, a third traumatic entity in which excellent results have been obtained is that group labelled muscle contusions or muscle sprains. The mechanism once again consists in restoring a normal vasomotor equilibrium. We have treated among others contusions of the trapezius, deltoid and rhomboid muscles and contusions of the common extensor group of the fore-arm. One or two examples may suffice.

Case 6.—A high school basket ball player was kicked on the right side of the neck with resulting swelling, tenseness and tenderness of the belly of the right trapezius muscle. The injury was a particularly disabling one requiring admission to the hospital. After three injections of procaine hydrochloride there was no longer any tenderness of spasm and very little limitation of motion. When seen several weeks after his discharge from the hospital, he had no symptoms or signs pertaining to the trauma.

Case 7.—A young man was struck across the extensor surface of the right forearm just below the elbow by a falling log. He had immediate complete disability, with exquisite pain, tenderness, loss of function and marked spasm. Although a fracture was suspected the x-ray films were negative and following one injection of 2 per cent procaine hydrochloride into the proximal dorsal surface of the forearm there was complete subsidence of the signs present before injection. When seen one week later there were no residua of the trauma.

TRAUMATIC SYNOVITIS

The treatment of acute traumatic synovitis by procaine hydrochloride has been followed with striking improvement in those instances in which it has been employed. We call to mind in particular two cases of acute traumatic synovitis in which injection of the drug into the joint along with aspiration of the syrupy, bloody fluid was accompanied with complete relief of pain, permanent in these two cases, and with a rapid, early restoration of complete articular function.

BURSAE

In the various inflammations of bursae, often associated with calcification of the bursae or an adjoining tendon, procain therapy has in our series of cases proved an excellent method of obtaining an early often permanent cure. Cases of acute subdeltoid bursitis and subacute subdeltoid bursitis associated with calcification have all been treated by this method.

Case 8.—A woman aged 66 seen in the clinic complained of severe pain in the right shoulder of three days' duration. Previous to the onset of the acute pain she had a dull pain for weeks, being unable to use the shoulder. She was unable to sleep at night because of the intensity of the pain. Examination revealed a point of exquisite tenderness over the greater tuberosity with external rotation and abduction limited and painful. X-ray examinations were negative. The impression was that it was acute subacromial bursitis and the treatment consisted of one injection of 2 per cent procaine hydrochloride at the site of maximum tenderness. The patient obtained almost complete relief. When seen one week later, she stated that she was having only slight occasional pain and was sleeping well. There was no tenderness, and motion was of full range. Her symptoms have not recurred.

Injection of procaine hydrochloride has been carried out in seven cases of calcification of the supraspinatus tendon with marked prompt relief in the majority of cases, although it must be pointed out that needling the calcium deposits, thus relieving the tension, may in itself be sufficient to ease the pain. Two patients with peritrochanteric bursitis with calcification have also been treated in this manner with a prompt disappearance of symptoms.

It has already been stated that in traumatic syndromes procaine hydrochloride, by abolishing the hyperemia due to vasodilation, causes vasoconstriction and thus, in temporarily abolishing the pain impulses from a part, permits the restoration of a normal vasomotor tone. However, there are some conditions, the arthritis and the neuralgias among others, in which the pain is due to hypoxemia induced by spasm of the vasa vasorum and the vasa nervorum. In these instances the result of procainization is a matter of vascular dilatation and lasting hyperemia, but here, as in traumatic conditions, the underlying physiologic process is a restoration of the vasomotor tone to its normal state.

ARTHRITIS

In the field of arthritis, procaine therapy has been employed by many men. Fenz and Falta have in osteo-arthritis infiltrated the musculature and ligaments about affected joints with encouraging results. In hip disease the region of the adductors or of the gluteal musculature is injected. In traumatic arthritis the drug may be of value prophylactically and actively. If,

as Derehe indicates the post-traumatic arthritis follow minor articular trauma, the use of procaine hydrochloride in these conditions namely sprains and contusions, must surely serve as a preventive for the later development of traumatic arthritis. If osteo-arthritis already exists, especially if aggravated by trauma, procaine therapy often proves of definite value, although in this category the responses are not so dramatic as in the acute traumatic conditions.

Case 9.—A man aged 51, recently seen in the clinic, complained of severe pain in the right shoulder and limitation of motion of the right shoulder joint. He had had direct injury to the shoulder several days before admission, and examination revealed exquisite tenderness over the acromio-clavicular joint with severe pain on motion of the upper extremity. X-ray examination revealed osteo-arthritic changes of the acromioclavicular joint and no evidence of fracture. He received several injections of procaine hydrochloride. Following each injection there was almost complete relief of pain and marked return of function, but after several days the pain and loss of motion would return. However after several injections the severe pain gradually subsided and the range of motion increased much more rapidly, we feel, than it ordinarily does in similar cases in which physical therapy, rest or splinting is instituted.

SCIATICA

Many authors recommend procainization in sciatica. Various technics of injection have been outlined, some of which consist of injecting the fluid directly into the nerve trunk while others are concerned with epidural deposits. Fenz proved beyond doubt that the effect, which was instant and sometimes lasting, was due to the procaine hydrochloride and not to the large amount of fluid deposited by showing that the same amount of physiologic solution of sodium chloride, without procaine hydrochloride, had no effect whatever.

While the underlying etiologic factors that give rise to the sciatic syndrome are increasing in number each year—the most recent important contribution being concerned with the role of the ruptured nuclear disk—there is still a sufficient number of patients with the idiopathic sciatica to warrant the use of procaine therapy in such cases for the relief of symptoms.

Among the other conditions in which procaine therapy seems to have been of value may be mentioned tennis elbow and painful xiphoid processes. In the latter, a series of injections may be required before lasting relief is obtained,

TECHNIC

The technic of procaine injection is comparatively simple:

1. From 10 to 30 c.c. of 1 or 2 per cent solution of procaine hydrochloride is injected at the site of maximum tenderness. Needless to state, absolutely sterile precautions must be observed. The needles and syringe are those used ordinarily for local anesthesia.

2. Before injection it is best to give the patient orally sodium amytal, usually from $1\frac{1}{2}$ to 3 grains (0.1 to 0.2 g.m.). This is done to prevent procaine re-actions, which are frequently observed but are usually of a harmless nature.

3. After the injection the patient is encouraged to employ immediate active motion. He is generally astonished to find painless motion possible.

4. Repeated infiltrations, at daily intervals if necessary, are carried out if a recurrence of symptoms develops.

5. The patient should be told two things: (a) He should be urged to employ immediate active motion; (b) he should be warned to expect increased pain several hours after injection. This is caused by an increase in the blood supply to the tissues infiltrated with procaine hydrochloride but usually disappears in a short time.

This therapeutic agent which we propose for use in a number of minor traumatic syndromes has widespread use in many of the specialities.

SUMMARY

1. Procaine hydrochloride as a therapeutic agent is valuable in certain acute traumatic syndromes and has widespread use in many of the specialities.

2. The action of the drug is in restoring a normal vasomotor tone by eliminating the pain impulses. In acute traumatic conditions procaine hydrochloride overcomes the hyperemia due to vasodilatation while in the arthritis and neuralgias the spasm of the vasa vasorum and the vasa nervorum, with a

resulting hypoxemia, is abolished. In both instances procaine hydrochloride, by eliminating pain impulses, permits a restoration of a normal vasomotor equilibrium.

3. Procaine therapy is of definite value in fractures not requiring accurate reduction and immobilization. Such fractures include fracture of the lumbar transverse processes, fractures of the vertebral spines, fractures of the head of the radius and fractures of the epicondyle, among others.

4. Ligamentous sprains, muscle contusions or sprains, acute traumatic synovitis and acute bursal episodes are other conditions in which the drug has been used with striking results.

5. Procaine hydrochloride has given encouraging results in certain cases of arthritis and sciatica.

From Jour. A.M.A., Apr. 6, 1940.

The Treatment of the Enteric Fevers.

BY

HARROLD COOKSON, M.D., M.R.C.P.

Physician, Cornelia and East Dorset Hospital, Poole.

The enteric infections comprise typhoid and paratyphoid fevers. The former is due to infection with *Bact. Typhosum* and the latter to infection with *Bact. paratyphosum* A, B or C; in this country paratyphoid infections are most commonly with *Bact. Paratyphosum* B, less frequently with A and only very rarely with C. Typhoid fever proper is the most severe of these infections and the prevalence of epidemics has been greater in the last few years. The mortality in many other acute infections has been considerably reduced by the introduction of new methods of treatment, but that of typhoid fever is still about ten per cent. or more, and its fatality rate is higher than that of most other acute infections commonly occurring in this country. The treatment of the enteric infections can be conveniently considered from four aspects:—(1) prophylactic (2) general, (3) symptomatic, and (4) specific.

PROPHYLACTIC

The patient must be strictly isolated and domiciliary treatment should not be lightly undertaken. If satisfactory accommodation and the services of nurses specially trained in the care of infectious cases are not available in the home, removal to hospital is to be strongly advised. While handling the patient the attendants must wear gowns and wash thoroughly in soap and water afterwards. His bed and personal linen must be soaked in 1 in 20 solution of carbolic acid before being boiled, and crockery, enema syringe, bed-pan, urinal, thermometer, stethoscope and any instrument used on the patient must be efficiently disinfected. Stools and urine may be regarded as more or less pure cultures of the infecting organisms and must be treated with the greatest care. The urine should be mixed with an equal volume and the stools with twice their bulk of 1 in 20 carbolic solution and allowed to stand for several hours before being poured down the drain. If the patient should take a bath the water is afterwards treated with chloride of

lime (1½ lb. to 50 gallons of water) and allowed to stand for half an hour before being discharged, and sponging and washing water should be dealt with on similar lines. Sputum, vomit, discharge from the ear or abscesses, or any other wound which may be present, require disinfection. All these precautions are continued until bacteriological examination of the stools and urine is negative on three consecutive occasions, the specimens being collected at intervals of not less than three or four days.

If bacilluria or positive stool cultures persist for a long time during convalescence, the individual is regarded as a possible chronic carrier. The Vi agglutination test recently suggested as an aid to the detection of true chronic typhoid carriers (Felix, Krikorian and Reitler, 1935; Pijper and Crocker, 1937; Felix, 1938; Bhatnagar, 1938) may prove to be of practical value. Urinary carriers may respond to treatment by urinary antiseptics, such as hexamine, mandelic acid, sulphonamide or one of its derivatives. Whether or not hexamine and sulphonamide are also effective against biliary carriers has not yet been established.

GENERAL TREATMENT

In any acute infection the emphasis on general treatment, in which skilled nursing plays a large part, varies inversely with the value of the specific treatment available, and the potency of the latter in enteric infections is not yet so high as to displace the general treatment from its important position. The patient is nursed in a well-ventilated, barely furnished room, kept at about 60°F., and on a narrow bed with a hair mattress and one pillow. So long as the temperature is raised, one sheet and one blanket are adequate covering. Smooth sheets not only add to comfort but lessen the risk of injury to the skin, which should be rubbed frequently with spirit over the pressure points. The buttocks should be washed and powdered after each bowel action. To prevent cracked lips, vaseline, liquid paraffin, or camphor ice may be applied, and the mouth should be cleaned after each feed. The patient is not allowed out of bed until the temperature has been normal for one to two weeks, depending on the severity of the attack.

The high and prolonged fever makes it necessary to supply large amounts of fluid and to try to maintain nutrition by a diet of adequate calorie value. An increase in temperature of 1°F. raises the basal metabolic rate by about 7 per cent.; in most cases of typhoid fever with temperatures of 102-104°F. the metabolism will be increased by about 30 per cent. With the all-fluid diet as formerly used under-nutrition was inevitable, and it is now believed that a more liberal diet can often be taken with advantage and without increasing the liability to intestinal hæmorrhage. After hæmorrhage from peptic ulcer, for example, there are observations which suggest that immediate feeding with milk in small quantities or even light solids has no harmful effect. The diet to be aimed at for the average adult patient with enteric fever is one containing 3,000 to 4,000 calories (or 30 cal. per lb. body weight) and the fluid intake should amount to four to eight pints daily, though it is not always possible to attain these levels. It is also necessary to see that the diet is balanced not only in regard to protein, fat and carbohydrate, but also in its content of the accessory food factors. Milk or milk substitutes may still form a considerable part of the diet, but in addition the following can usually be given: cream, lactose, butter, egg, toast, biscuits, mashed potato, custard, junket, rice pudding, blancmange, soup, gruel, apple sauce, milk chocolate, and ice-cream. After a preliminary period of twenty-four hours of two-hourly milk feeds, flavoured with tea, coffee or cocoa, the above mentioned additions may be gradually made until an intake of 3,000 or more calories is reached. Table 1 given at the end shows the general lines of such a diet, though adaptation to the individual patient's tastes and condition will be necessary. Between feeds plain water and barley water can be given *ad lib.*, also lemonade or orangeade, or other fruit drinks with added lactose or glucose. Extra vitamins are called for, particularly C, and although the latter will be supplied in fresh fruit-juice drinks, the pure vitamin in solid form should also be given as ascorbic acid 100 mgm. daily in a milk feed. Vitamins A, B and D are conveniently given as some potent fluid preparation. Alcoholic drinks of any kind are contra-indicated unless the patient has been used to considerable quantities. In stuporose patients adequate

feeding by mouth may be impossible and feeding by a tube passed through the nose into the stomach may be attempted. No addition to the diet as outlined is made until the temperature has been normal for a few days, when it is gradually increased. If any symptoms of relapse appear, the diet is at once reduced to the former level.

Hydrotherapy.—In patients with high temperatures, the former rigorous treatment by cold baths and ice packs has now been superseded by more moderate measures, and the tepid sponge is the most satisfactory. If the temperature is accompanied by toxæmia, the limbs, chest, abdomen and back are sponged and dried one by one, using water at about 90° F., and repeating the procedure four-hourly if necessary. The tepid sponge is contra-indicated if there has been intestinal hæmorrhage or if severe meteorism is present, and if phlebitis has occurred the affected limb is not disturbed. Tepid sponging is not contra-indicated by pneumonia.

SYMPTOMATIC TREATMENT

Symptoms referable to almost every organ in the body may occur in the enteric fevers, and it will be possible to mention the treatment of only the more common ones. For *constipation*, which is more frequent than diarrhoea, simple enemas are indicated, and purgatives of any kind must be forbidden. *Diarrhoea* if excessive calls for extensive reduction in the diet; diluted citrated milk may be given and a starch and opium enema, or a gentle colonic wash-out with water. *Meteorism*, resulting from fermentation and poor intestinal tone, is controlled by reducing the carbohydrate intake; counter-irritation to the abdominal wall in the form of turpentine stupes may be applied, but drugs which stimulate motor activity in the intestine, such as pituitrin or eserine, are best avoided, and the so-called intestinal antiseptics are of no value. *Oral sepsis* must be guarded against by frequent cleaning between feeds, stimulation of salivation with diluted lemon-juice, and by keeping the lips soft with some oily preparation. When intestinal hæmorrhage occurs food and fluid are withheld for twenty-four hours, and an injection of morphine is given if the patient is restless. The various proprietary hæmosplastic sera are of questionable

value. After hæmorrhage large doses of vitamin C should be given, either orally or intravenously, 500 mgm. daily by either route, since deficiency of this substance is believed to increase the fragility of the capillaries and to delay the healing of wounds. Severe degrees of vitamin C deficiency were found by Portnoy and Wilkinson (1938) in association with hæmorrhage from peptic ulcer. Intestinal *perforation* demands immediate surgical intervention. The *pain* of pleurisy, which is not uncommon, and that of non-suppurative cholecystitis, which is rare, may be relieved by local hot applications. If *pneumonia* develops, and the hypostatic form is the most frequent, the patient should be propped up and, in the presence of purulent expectoration, a drug of the sulphonamide series may be of some value. A drug of this group should also be considered if *local septic complications* arise, such as otitis, arthritis and superficial and inflammatory foci, but surgical drainage will be called for if a definite abscess forms. For *thrombophlebitis* the limb is raised, bandaged over wool and immobilized. Hexamine has usually been given for *bacilluria* but the condition may be symptomless, and the drug may do more harm than good by irritating the urinary tract with the production of hæmaturia. *Retention of urine*, if not relieved by hot fomentations over the bladder and an enema, is treated by catheterization. *Headache* and *Insomnia* may respond to hydrotherapy, but if not, small doses of bromide and one of the barbiturates may be given. In protracted severe cases with *delirium* an adequate intake of fluid by mouth is generally impossible and it is in such cases that the signs of peripheral *circulatory failure*, especially a rapid and feeble pulse, are likely to appear. For this condition intravenous infusion of glucose saline, by the drip method if possible, are of great value. Drugs cannot be expected to influence this condition to any great extent, but subcutaneous injection of ephedrine ($\frac{1}{2}$ grain) combined with adrenaline (5 minims) or one of the several proprietary substances chemically allied to ephedrine may be more effective in raising blood pressure than those reputed to act by stimulation of the medulla, such as strychnine and coramine. Digitalis is contra-indicated unless there is coincidental heart disease with congestive failure. Injections of suprarenal cortical extract may be used for the asthenia and low blood-pressure of the later stages of the

illness, and good results have been claimed from the routine use of this extract combined with large doses of vitamin C (Najib-Farah, 1938).

Blood transfusion.—Transfusion of blood has a place in treatment under certain conditions. For severe or repeated intestinal hæmorrhage which produces symptoms of shock immediate transfusion is advisable with stored blood of group O. Prolonged cases with severe toxæmia and some anæmia due to repeated small hæmorrhages or to the chronic toxæmia may benefit from blood, preferably from a donor who has been actively immunized by T.A.B. vaccine rather than from a subject convalescent from the disease, and in epidemics it is usually easy to find a suitable donor. A further injection of vaccine into the donor twenty-four hours before withdrawing the blood is recommended by Bower (1938) but usually such delay is inadvisable. If an immunized subject is not available, antityphoid serum should be given along with blood from an ordinary donor. Against transfusion it might be objected that it would increase the tendency to venous thrombosis, to which embolism may be a sequel. In practice this complication is not found to be more frequent in the transfused cases, nor does the increase in the volume of circulating blood aggravate bleeding from the intestine; on the contrary it appears to have a hæmostatic effect (Cookson and Facey, 1937). The blood is citrated and given in amounts of 100-300 c.cm (3-10 oz.) or in larger quantities if the drip method is employed.

SPECIFIC TREATMENT

An ordinary vaccine of *Bact. typhosum* has sometimes been used during the course of an enteric infection, but a good case for its value has not been made out. The use of a vaccine is liable to be followed by a severe reaction and, if the symptoms are already serious, this may be dangerous. Vaccines modified by bacteriophage (Bower, 1938) or by incubation with typhoid convalescent blood (Frawley, 1938), by which methods the organisms are lysed, are held to be superior than the ordinary vaccine, but they appear nevertheless to have similar disadvantages. It is doubtful if these methods produce effects other than those resulting from non-specific protein shock.

Antityphoid serum.—Antisera have been used in many countries for at least thirty years, but until recently these have had little success, a fact which is explained by lack of knowledge of typhoid antigens and antibodies. Without this knowledge the preparation and standardization of a potent serum are not possible. To-day, however, as a result of the intensive investigation of typhoid antigens by Felix and his co-workers, it is known that a virulent strain of the organism produces the two antigens termed Vi and O, and that to be effective an antiserum must contain the two appropriate antibodies. The serum now prepared by the Lister Institute (supplied by Messrs. Allen and Hanburys) contains these antibodies in high concentration as shown by the agglutination titres of 1: 3,000 or more for Vi antibody (against strain Watson) and 1: 120,000 or more for the O antibody (against strain O 901). (Felix and Petrie, 1938). The serum will protect mice against otherwise lethal injections of live *Bact. typhosum* and also against the effects of massive doses of dead organisms, and the several reports so far published on its clinical effects have all been favourable (Felix, 1935; McSweeney, 1935, 1937; Robertson and Yu, 1936; Cookson and Facey, 1937; Albano, 1938; Pijper and Crocker, 1939). One of these reports dealt with a trial in seventy-three patients in 1936, and a beneficial effect on both toxæmia and temperature (see fig. 1) was noted in a significantly high proportion of cases (Cookson and Facey, 1937). Since that time the potency of the serum has been increased considerably, the titre of the O antibody being doubled and that of the Vi antibody more than trebled.

The serum should be given as early as possible in the course of the disease, either intramuscularly or intravenously, diluted with normal saline if the latter route is used. For an adult three or more doses of 33 c.cm. each should be injected at intervals of twenty-four hours. For children smaller doses suffice. The beneficial effect of the serum is usually manifest not later than a day or two after the third injection. If at that time there is still no improvement and the condition of the patient is causing anxiety, it is advisable to give further doses of the serum.

If the patient is known to be allergic or to have received some form of serum previously, desensitization should be carried out by repeated small doses of the serum (0.01, 0.1, 0.2, 0.5 c.cm.) subcutaneously at half-hour intervals, and followed by a similar series of injections intravenously. In severe cases the intravenous route is preferable and serum may be conveniently given in a glucose saline infusion. When in spite of precautions the injection is followed by symptoms of anaphylactic shock, adrenaline 5 minims subcutaneously should be given. In practice anything more severe than a rash as an untoward reaction to the serum is rare. For good results early use of the serum in full doses is advisable; in late cases with severe toxic changes in the viscera and nervous system, this method can only be of relatively small value, though serum is useful at the onset of a relapse. The serum is of no value in the treatment of paratyphoid fever.

Specific prophylactic treatment with vaccine of typhoid contacts is a matter which is still controversial, but such persons may be safely given protection by injection of the antiserum (Fenton and Hay, 1938). The protection thus conferred will, however, last only for a short period (about two weeks.) The dose is 33 c.cm. intramuscularly for an adult and 7-20 c.cm. for children according to age.

Chemotherapy.—The success attained by sulphonamide and its derivatives in the treatment of acute infections with *B. coli* of the genito-urinary tract and of the portal vein in man, and of *B. coli* septicaemia in animal experimental infections, suggests that these drugs might also be effective in infections of the enteric group, as the organisms concerned are morphologically similar. In mice a single dose of sulphonamide was found to give protection against *Bact. typhosum* and also against *Bact. paratyphosum* B (Buttle *et al.*, 1937), but its precise value in the treatment of human infections, if any, will depend on the results of extensive observation, which are not yet available. Theoretical considerations would suggest that early treatment with this type of drug combined with antiserum might be the most effective method. On the carrier state preliminary reports give promise that the action of sulphonamide and its derivatives

may be of importance. In a case reported by Barer (1937) typhoid bacilluria cleared up following the administration of sulphonamide, though previous treatment with hexamine and with ammonium mandelate had failed to sterilize the urine. This patient, however, was recovering from an attack of typhoid fever, and was not a true chronic carrier. Of greater significance is Bazin's (1938) report of a chronic faecal carrier of *Bact. paratyphosum B*, in whom the liver bile still gave positive cultures after cholecystectomy, but in whom sulphonamide caused the disappearance of the organism from faeces and bile after hexamine had failed.

TABLE I
DIET IN ENTERIC FEVERS
(3,000 Calories)

6 a.m.	Milk, 5 oz.; cream, 1 oz.; lactose, $\frac{1}{2}$ oz.
8 a.m.	Gruel, 7 oz. (e.g. milk, 2 oz.; farex, 1 oz.; butter, 1 teaspoonful; barley water, 5 oz.; sugar or salt to taste); toast, 1 slice; butter, $\frac{1}{2}$ oz.
10 a.m.	Cocoa, 8 oz.
12 noon.	Vegetable cream soup with salt, 8 oz.; egg, 1; toast, 1 slice; butter, $\frac{1}{2}$ oz.; chocolate blancmange, 6 oz.
2 p.m.	Malted milk, 8 oz.
4 p.m.	Milk, 5 oz.; cream, 2 oz.; lactose, $\frac{1}{2}$ oz.
6 p.m.	Milk toast (milk, 4 oz.; cream, 2 oz.; toast, 1 slice; butter, $\frac{1}{2}$ oz.; salt). Toast or bread, 1 slice; butter, $\frac{1}{2}$ oz.; egg, 1; cup custard, 4 oz.
8 p.m.	Egg-nog, 1 glass.
10 p.m.	Milk, 5 oz.; cream, 1 oz.; lactose, $\frac{1}{2}$ oz.

Trichinopoly Municipality

Details of Public Health Activities

At the suggestion of a few friends it has been decided to publish the quarterly statement of vital statistics of Trichinopoly to give readers an idea of the common prevalent diseases. According to the Health Act diseases such as small pox, chicken pox, measles, typhoid, cholera, tuberculosis, diphtheria, meningitis, etc., are notifiable diseases and members are requested to notify the health authorities that they come across such cases. Anti typhoid and anti cholera vaccines will be supplied free of charge on application to the Health Officer, for inoculating contacts and readers are advised to utilise this.

THE EDITOR.

January 1940.

I. Vital Statistics:

Number of births registered	...	...	...	505
Number of deaths registered	...	...	...	508
Number of deaths from fevers	...	...	...	5
Number of deaths from respiratory diseases	...	...	...	116
No. of deaths under one year	...	...	...	120
Infant mortality rate	..	...	...	237.1
Estimated birth rate	...	...	...	42.4
Estimated death rate per mille	...	...	...	42.6
No. of deaths from child birth	...	...	...	6
No. of deaths from alimentary diseases	...	...	...	96

II. Infectious diseases:

	Attack	Death		Attack	Death
Cholera	Nil	Nil	Measles	1	Nil
Small-pox	1	Nil	Tuberculosis	not known	36
Chicken-pox	18	Nil	Pneumonia	Do.	57
Typhoid	4	Nil	Diphtheria	Do.	Nil
No. of anti-cholera inoculation done	...	...	...	...	Nil
No. of anti-typhoid inoculation done	...	...	...	...	Nil
No. of vaccination done:—					
Primary Vaccination	...	...	...	...	563
Re-vaccination	...	...	...	...	1496
Total	...	...	...	...	2059

III. Maternity and Child Welfare :

(1) No of cases visited by Women		(2) No. of houses visited by Health	
Medical Officer.		Visitor	
(a) Labour	—	(a) Infants	223
(b) Anti-natal	9	(b) Pre-School	Nil
(c) Post-natal	128	(c) Ante-natal	43
		(d) Post-natal	Nil
(3) No. of labour cases conducted by Midwives.		...	96

IV. Propaganda :

No. of lectures with magic lantern demonstrations	...	49
No. of lectures without magic lantern demonstration	...	15

V. Food adulteration :

No. of samples taken	...	...	32
No. prosecuted	...	...	Nil
Amount of fine imposed	...	...	Rs. 340
No. of samples reported adulterated	...	...	Nil
Number convicted	...	...	15 (old cases)

VI. Meat Inspection :

	No. passed	No. condemned
(1) Sheep	7166	53
(2) Goats	4115	27
(3) Cows and heifers	391	5
(4) Bulls and bullocks	154	3
(5) Buffaloes	76	2
(6) No. of dogs caught	198.	
(7) No. of dogs destroyed	186.	
(8) No. of dogs released	16.	

VII. General Remarks : Nil.

February 1940

I. Vital Statistics :

Number of births registered	...	...	424
Number of deaths registered	...	...	397
Number of deaths from fever	...	...	7
No. of deaths from respiratory disease	...	...	87
No. of deaths under one year	...	...	81
Infant mortality rate	...	...	1911
Estimated birth rate	...	...	356
Estimated death rate per mille	...	...	333
No. of deaths from child birth	...	...	4
No. of deaths from alimentary diseases	...	...	82

II. Infectious diseases :

	Attack	Death		Attack	Death
Cholera	Nil	Nil	Measles	4	1
Small-pox	7	3	Tuberculosis	not-known	28
Chicken-pox	13	—	Pneumonia	Do.	35
Typhoid	7	1	Diphtheria	Do.	1
No. of anti-cholera inoculation done	...	...	...	...	Nil
No. of anti-typhoid inoculation done	...	...	...	...	Nil

No. of vaccination done :—

Primary Vaccination	...	...	...	589
Re-vaccination	...	...	...	2427
Total	...	...	...	3016

III. Maternity and Child Welfare :

(1) No. of cases visited by Women		(2) No. of houses visited by Health	
Medical Officer		Visitor	
(a) Labour	—	(a) Infants	75
(b) Ante-natal	15	(b) Pre-school	Nil
(c) Post-natal	114	(c) Ante-natal	86
		(d) Post-natal	Nil
(3) No. of labour cases conducted by Midwives		...	99

IV. Propaganda :

No. of lectures with magic lantern demonstration	...	30
No. of lectures without magic lantern demonstration	...	26
Cinema shows	...	25

V. Food adulteration :

No. of samples taken	...	...	20
No. prosecuted	...	...	18
Amount of Fine imposed	...	...	Rs. 140
No. of samples reported adulterated	...	...	18
Number convicted	...	...	5

VI. Meat Inspection :

	No. passed.	No. condemned
(1) Sheep	6400	50
(2) Goats	3085	14
(3) Cows and heifers	351	3
(4) Bulls and Bullocks	115	1
(5) Buffaloes	46	5
(6) No. of dogs caught	19	
(7) No. of dogs destroyed	18	
(8) No. of dogs released	3.	

VII. General Remarks : Nil.

March 1940.

I. Vital Statistics :

No. of births registered	...	...	...	508
Number of deaths registered	...	...	...	332
Number of deaths from fever	...	...	...	4
Number of deaths from respiratory disease	...	...	...	95
Number of deaths under one year	...	...	...	44
Infant mortality rate	...	...	...	86.6
Estimated birth rate	...	...	...	42.7
Estimated death rate	...	...	...	27.9
No. of deaths from child birth	...	...	...	4
No. of deaths from alimentary disease	...	...	...	53

II. Infectious diseases :

	Attack	Death		Attack	Death
Cholera	Nil	Nil	Measles	4	Nil
Small-pox	4	3	Tuberculosis	not known	34
Chicken-pox	22	2	Pneumonia	not known	41
Typhoid	5	5	Diphtheria	Nil	Nil
No. of anti-cholera inoculation done	...	...	...	...	Nil
No. of anti-typhoid inoculation done	...	...	...	...	...
No. of vaccination done :—					
Primary Vaccination	...	...	...	...	636
Re-vaccination	...	...	...	...	1770
Total	...	...	...	...	2406

III. Maternity and Child Welfare :

(1) No. of cases visited by Women Medical Officer	(2) No. of houses visited by Health Visitor
(a) Labour	Nil
(b) Ante-natal	4
(c) Post-natal	95
(a) Infants	...
(b) Pre-school	...
(c) Ante-natal	...
(d) Post-natal	...
(3) + No. of labour cases conducted by Midwives	...

IV. Propaganda :

No. of lectures with magic lantern demonstration	...	43
No. of lectures without magic lantern demonstration	...	17

V. Food adulteration :

No. of samples taken	...	...	...	14
No. prosecuted	...	...	...	10
Amount of fine imposed	...	...	...	Nil
No. of samples reported adulterated	...	...	...	10
Number Convicted	...	...	...	Nil

VI. Meat Inspection .

	No. passed	No. condemned
(1) Sheep	5265	63
(2) Goats	5186	18
(3) Cows and heifers	318	1
(4) Bulls and bullocks	128	8
(5) Buffaloes	63	3
(6) No. of dogs caught	7.	
(7) No. of dogs destroyed	6.	
(8) No. of dogs released	Nil.	

VII. General Remarks : Nil.

R. SUBRAMANIAM,
Health Officer.

The Trichinopoly District Medical Association

(Branch of the Indian Medical Association)

A monthly meeting of the above Association was held at 5 p.m. on Saturday the 20th April 1940, in the Central Hospital, Golden Rock, when, about 30 members were present. Capt. F. A. B. Sheppard M.B.B.S., F.R.C.S., I.M.S., District Medical Officer, Madura, delivered an interesting lecture on "*Surgical Emergencies*." The Association was 'At Home' to the members, Dr. M. Balammal, M.B.B.S. presided.

During the course of his interesting lecture, Capt. Sheppard traced surgical emergencies one by one from head to foot. Referring to the head, he said, apart from treating shock and concussion the commonest surgical emergency was the depressed fracture, for which, he impressed upon the necessity of trephining even in cases of suspicion of depression without waiting for the development of pressure symptoms. Coming to the neck he said the commonest emergency was either a foreign body or diphtheria. Tracheotomy should be resorted to at once. The commonest emergencies of the chest were fracture of the rib or perforating injuries of the chest, which may sometimes involve the heart or mediastinum. Lower down, wounds may injure the abdominal viscera such as liver, spleen, stomach, intestines and even kidneys and an immediate surgical intervention in these cases might save a few per cent of these cases. The other surgical emergency in the abdomen were appendicitis, intestinal obstruction, intussusception and strangulated hernia, which have to be dealt with by laparotomy. Emergencies of the extremities were compound comminuted fractures with bleeding and these have to be dealt with appropriately.

After Capt. Sheppard's lecture, Dr. R. A. Johnson, M.B.B.Ch., D.P.H., District Medical Officer, S.I.Ry., Trichinopoly, gave a talk on '*The Medical Aspect of Chemical Warfare*,' for which, he had undergone a course of training recently at Pachmarhi. He explained the various gases commonly used in modern warfare and their appropriate treatment. He also demonstrated two varieties of civilian gas masks.

After the lectures, the Secretary thanked Capt. Sheppard for his illuminating and interesting talk covering the whole of the human body and hoped that Capt. Sheppard, who is not only a capable surgeon, but also an enthusiastic president of the neighbouring medical association, would address this association as often as possible.

He also thanked Dr. Johnson for the interesting lecture delivered by him.

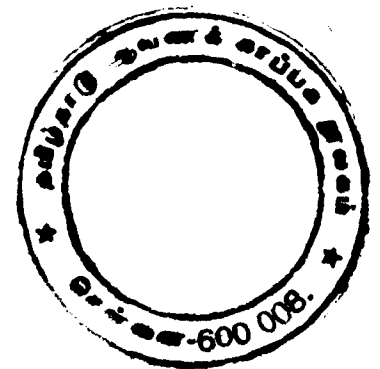
The meeting terminated at a late hour.

P. A. S. RAGHAVAN,
Hony. Secretary.

NOTICE

Members of Medical Profession, who are willing to act as Medical Officer of subsidized Rural Dispensaries in this District in temporary vacancies are kindly requested to send their names to the undersigned.

P. A. S. RAGHAVAN,
Hony. Secretary.



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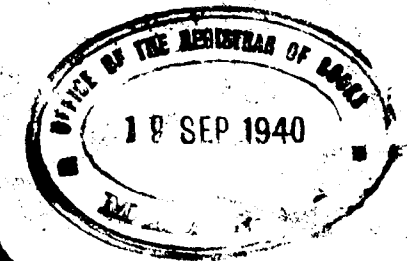
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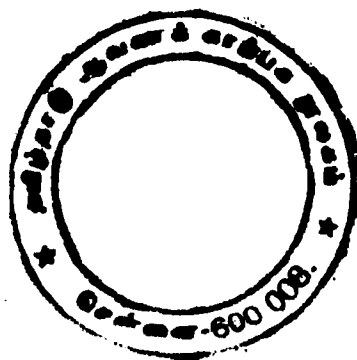
MAY 1940

[No. 5

Vitamin C Therapy In Gingivitis

A report of the results obtained by the administration of vitamin C in the form of pure ascorbic acid powder (Redoxn, Roche) to boys suffering from gingivitis and gingivo-stomatitis at a Royal Naval Training Centre, is given by F. Stanley Roff and A. J. Glazebrook (British Dental Journal, February 15, 1940, 68, 135) Gingivitis is considered by some authors to be a sub-ascorbic state and inflammatory periodontal disease, i.e. acute gingivo-stomatitis and chronic gingivitis as not being due to inefficient dental hygiene or lack of the same, but to vitamin C deficiency. In the reported investigation the ascorbic acid powder was given in doses of 50-75 mgm. per day—25 mgm. being added to the morning cocoa, and 25 mgm. to pasteurized milk taken in the evening. The boys under observation were, however, first saturated by the addition of large doses—200-300 mgm. per day—and then, when saturation was achieved, the dose was reduced to a maintenance level of 50 mgm. per day. Before instituting treatment all the boys were tested for Vitamin C deficiency by the Abbasy-Harris method. The average age of the boys treated was sixteen. It was found that on a daily dosage of 200 mgm. saturation point, as determined by urinary excretion, was not reached until twenty-two doses had been given, thus indicating that the average deficiency of Vitamin C per boy was about 4000 mgm., although some of the vitamin administered in the cocoa and milk did not reach the consumer, and some of ingested dose may have been destroyed or not absorbed in the body. Comparison of a group of 250 treated boys and a control group of 221 untreated showed a gingivitis percentage of 4.9 per cent. in the treated group and 16.3 per cent in the untreated, and it was noted that in the treated group the administration of vitamin C had abolished a condition suggestive of subclinical scurvy.

(From the Practitioner, April 1940.)



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The Use of Vitamin B₁ for the relief of pain in Varicose Ulcers.

ALTON OCHSNER, M.D.

AND

MARVIN C. SMITH, M.D.

Whereas varicose ulcers of the lower extremity are usually accompanied by itching, burning and aching, relatively infrequently is the pain severe. Occasionally, however, patients with varicose ulcers are seen who complain bitterly of pain which is little affected by the usually successful therapeutic methods. Because we have secured such splendid results in these cases by the administration of vitamin B₁, this presentation is made.

For sometime, in the Department of Surgery at Hutchinson Memorial Clinic of Tulane University, all patients with clinical and subclinical avitaminosis, persistent neuritis and painful chronic lesions have been given vitamin B₁ (Thiamin, Betaxin.) It was striking that patients with painful varicose ulcers were relieved shortly after the institution of the vitamin B₁ therapy.

Drieg had previously (1938) reported results obtained with the use of thiamin. Of the thirty-five patients with varicose ulcers treated with thiamin alone, all but five experienced relief of pain. Four of the five had severe venous stasis and induration of the veins and surrounding areas. Pain, stiffness, heaviness and pressure usually were relieved from four to eight days after the institution of the treatment. When treatment was discontinued, the symptoms returned but in milder form. Drieg observed that in twenty-one cases there was a definite decrease in the size of the varicosities in that the veins, even the large ones, became smaller and that this decrease was visible as well as measurable. Merdigner also observed the beneficial effects of thiamin in relieving the symptoms of varicose ulcers but stated that the relief was of only short duration and did not occur in every case. He believed that better results were obtained when the vitamin was administered intravenously. Krieg in reply to Merdinger's report stated that according to his experience small oral doses were effective in relieving symptoms and, in fact,

this method of administration was so satisfactory that the use of intravenous injections had been abandoned.

Of ten patients with painful varicose ulcers admitted to the Hutchinson Memorial clinic and treated with vitamin B₁, all but one were definitely relieved and eight had complete subsidence of their symptoms. The length of time before the onset of relief varied from three to eleven days, with an average of five days. In two cases the symptoms completely subsided in four days. In the other six cases, disappearance of the symptoms was more gradual but progressive. In five of the ten cases there was, in addition to the relief of symptoms, definite improvement in the healing of the ulcer, although there had been more or less resistance to therapy prior to the vitamin administration. In two cases the discontinuance of the vitamin resulted in the recurrence of the pain but in a milder form. It was promptly relieved when the vitamin was again administered. One patient who had used sedatives for four years because of pain associated with her varicose ulcer has been completely relieved since the institution of the vitamin therapy. The one patient who had no symptomatic response had a large indurated and infected ulcer of four years' duration.

All the patients were women varying in age from 27 to 75 years. There was no correlation between the age of the patients and the onset of relief.

Patients were instructed as to diets relatively high in vitamin B₁ content, but as there were no means of checking these diets accurately the adequate intake of vitamin B₁ was assured by the administration of thiamin tablets in doses above the daily minimum requirement of 300 international units, or 1 mg.⁵ It is known that vitamin B₁ is stored in the body in small amounts, but until clinical tests are perfected by which the amounts stored can be determined quantitatively the adequate dose necessary for these patients can be determined only by the trial and error method. Rather early in our investigation it became evident that large doses of the vitamin B were necessary to produce the desired results. At the present time investigations are being made concerning the relative values of oral and intravenous administration.

Krieg used daily intramuscular injections of from 5 to 10 mg. of thiamin until improvement was noted, then gave 1 mg. three times a day by mouth for a week, followed by a week's administration of 1 mg. twice daily, and then a week's administration of 1 mg. once daily.

It has been suggested by Goodhart and Jolliffe that the best results in the treatment of alcoholic neuritis were obtained by the use of large daily doses (as much as 50 mg. per day) rather than continued small doses. Weiss has shown that when no clinical improvement resulted from the use of small doses of vitamin B₁ in the treatment of alcoholic neuritis the use of larger doses brought about definite clinical results. These experiences as well as our own suggest that large doses of vitamin B₁ are necessary in order to relieve pain both in alcoholic neuritis and in varicose ulcer. At the present time we believe that at least 5 mg. (1500 units) three times a day should be given patients with painful varicose ulcers, and if the symptoms do not subside within three to four days the dose should be doubled.

Summary of cases of Varicose Ulcers

Treated with Thiamin.

Case	Age	Duration of ulcer	Symptoms	Mg. of Thiamin per day	Onset of relief
1	75	2 weeks	Burning pain	3	5 days
*2	37	8 months	Itching, heaviness	3	11 days
*3	49	10 months	Pain	15	5 days
4	27	2 years	Cramping pain	15	4 days
5	41	3 months	Severe burning	3	5 days
		1 month			
6	65	recurrent	Itching heaviness	30	Some in 4 days
		24 years.			
		2 years			
7	46	recurrent	Pain	3	None
		4 years			
8	61	2 years	Pain	15	7 days
9	37	2 years	Burning pain	15	3 days
10	31	2 months	Severe pain	3	3 days

All patients were women.

*Medication was discontinued temporarily with return of the original symptoms in a milder form. Symptoms ceased when medication was resumed.

There is no contraindication to the giving of large doses over prolonged periods. Experiments on animals have shown that enormous doses can be administered with no ill effects. However, lethal doses have been obtained in experiments on animals.

The explanation for the relief of pain associated with varicose ulcers when large amounts of vitamin B₁ are administered is not simple. Because of the inability to determine quantitatively the amount of vitamin B in the blood, one is unable to demonstrate a vitamin B deficiency. Because of prompt relief of pain following the vitamin administration, it is possible, however, that these patients did have a vitamin B₁ deficiency and that the relief was occasioned by correction of the deficiency. The vitamin deficiency may be due to inadequate supply, inadequate absorption or inadequate utilization of the vitamin diet. On the other hand if the supply is normally adequate, the deficiency may be due to factors which require an abnormal amount to supply the body's needs.

(*Jour. A. M. A. Mar. 16, 1940.*)

The Diagnosis and Treatment of Cardiac Emergencies

BY

JAMES ALEXANDER LYON, M.D.

Among the most alarming of the medical emergencies are those arising from acute conditions within the heart. Immediate treatment is frequently imperative. Fortunately, there are a half dozen drugs used in cardiac emergencies which are now available, in sterile solution in single dose ampules, convenient for immediate hypodermic administration. These drugs belong to the kit of every physician. Their proper administration to achieve an optimum therapeutic effect and the emergency conditions which demand their use should be common knowledge.

CARDIAC ARHYTHMIAS

Probably in no cardiac emergency does death seem more instantly impending than in the Adams-Stokes syndrome. If the ventricles cease to pulsate for as long as eight or ten seconds, cerebral anemia results and the patient suddenly loses consciousness. If the ventricles remain in diastole for more than fifteen seconds, the Adams-Stokes syndrome appears with convulsive seizures accompanying the syncope. The ventricular standstill, if untreated, may continue until sudden death occurs. The diagnosis is not difficult when the patient is seen in an attack. The abnormally slow heart rate, or the absence of the apex beat, and the rapid venous pulsations in the neck due to the uninterrupted auricular action, distinguish it. The syndrome may appear at the onset of complete heart block or when there is a sudden change from partial to complete heart block. It appears occasionally in acute coronary thrombosis when the infarction involves the conduction system. Two such cases have recently come under my observation, one ending fatally.

As an emergency measure in the treatment of a prolonged attack of ventricular standstill, epinephrine hydrochloride (adrenalin chloride) should be injected directly in the heart. A $2\frac{1}{2}$ inch (6 cm.) 22 gage needle may be inserted into the

fourth left interspace about 2.5 cm. from the sternal border. From 0.5 to 1.5 cc. of a 1: 1,000 solution of epinephrine hydrochloride may then be injected into the ventricular wall or cavity. There is some dispute as to whether it is desirable to inject the drug into the region of the sino-auricular node. During the less severe attacks of convulsive syncope or when the attacks are recurring, from 0.25 to 1 cc. of a 1: 1,000 solution of epinephrine should be injected subcutaneously every few hours for as long as is necessary to maintain a heart rate of over 30 beats per minute. The drug stimulates ventricular irritability and shortens the period of diastole. It has an immediate, but not a prolonged, effect. Ephedrine, barium chloride and atropine sulfate have been used to control Adams-Stokes seizures but they have not produced as uniform results as has epinephrine.

A rapid ventricular rate, approaching 200 beats per minute, if prolonged, will at times induce alarming symptoms in persons without organic heart disease. Palpitation, dyspnea, vertigo, syncope and severe precordial pain may result. When a rapid ventricular rate is superimposed on organic heart disease such as mitral stenosis or aortic regurgitation, acute congestive heart failure may supervene and if the ventricular rate is not decreased it may cause death.

If the rapid beating of the ventricles is due to paroxysmal auricular tachycardia originating in the sinus node, the attack may occasionally be terminated by vagus pressure. If this procedure does not immediately reduce the ventricular rate, acetyl-beta-methyl choline hydrochloride (mecholyl) should be administered subcutaneously. The optimum dosage varies with the age and weight of the patients one-sixth to one-third grain (0.01 to 0.02 Gm.) being sufficient for young or light weight patients and one-half to 1 grain (0.03 to 0.06 Gm.) being necessary for elderly or obese persons. In a majority of cases the heart will resume its normal rate within fifteen minutes. If it does not do so within two minutes, the site of the injection may be massaged to hasten absorption. If this is not effective, carotid pressure may be applied while the drug is still active. If the initial dose does not check the rate, a second dose may be administered after the lapse of twenty or

thirty minutes. Because the drug produces marked stimulation of the parasympathetic nerves, the patient, to avoid fainting, should be lying down during and immediately after the injection. Disagreeable symptoms such as flushing, salivation, profuse perspiration, nausea, vomiting and occasionally dyspnea, precordial pain or collapse may accompany the action of the drug. These symptoms, if alarming, can be instantly checked by the intravenous administration of atropin sulfate 1/1000 grain (0.0006 Gm.). The use of the drug is contraindicated in cases of bronchial asthma and in cases of arteriosclerosis with hypotension, angina pectoris or recently healed myocardial infarction. It is usually not effective in cases of tachycardia in which the rapid ventricular action is produced by ectopic stimuli.

In all cases of paroxysmal ventricular tachycardia as well as in those cases of paroxysmal auricular tachycardia in which mechohyl is either contraindicated or not effective, quinidine sulfate should be given orally, from 3 to 6 grains (0.2 to 0.4 Gm.) every two hours for six or more doses. I have frequently given up to 45 grains (3 Gm.) of quinidine sulfate during a twenty four hour period without its having produced untoward effects. However, when massive doses of this drug are to be used it must be fully understood that the patient should first be tested for quinidine idiosyncrasy. If the drug is tolerated, the patient should remain under observation, at rest in bed, during the course of treatment. Electrocardiograms should be taken at intervals in order to note any toxic effect of the quinidine appearing in a prolongation of the conduction time, which would call for the discontinuance of the drug.

In the treatment of paroxysmal auricular fibrillation the use of quinidine sulfate is specifically indicated. Quinidine, unlike mechohyl, does not slow the heart rate by a vagal effect but acts directly on the heart muscle, decreasing its irritability and conductivity and prolonging the period of diastole. Its administration is contraindicated in cases of long standing or permanent auricular fibrillation because of the possibility that with the restoration of normal auricular pulsation portions of mural thrombi might be detached and be carried into the circulation. When the ventricular rate is accelerated in a case of

chronic auricular fibrillation, digitalis should be administered in sufficient amounts to slow the rate.

In paroxysmal auricular fibrillation flutter, digitalis therapy will change the flutter to auricular fibrillation in about 50 per cent of the cases. The withdrawal of the digitalis may then be followed by a spontaneous cessation of the fibrillation. If this procedure is not successful, the administration of quinidine sulfate may restore normal rhythm.

DIGITALIS

The most generally accepted method of digitalis therapy is the oral administration of standardized powdered digitalis leaves in tablets of 1½ grains (0.1 Gm.) As to the value of using digitalis preparations other than the standardized powdered leaf, I am in hearty agreement with Christian's statement: "Tincture of digitalis may be substituted in mouth dosage for the powdered leaves if for any reason that seems desirable; rarely, however, in my experience is that the case; if for no other reason, the convenience of pills and capsules would give a preference to powdered leaves over the tincture; however, it has always seemed to me that the whole leaf has a therapeutic superiority to the alcohol soluble portions present in the tincture At present there is no advantage to be obtained by using any other than Pharmacopœial preparations of digitalis, notwithstanding the many proprietary digitalis preparations that are being offered with great enthusiasm to the medical profession, their dispensers making many claims for their superiority, claims that seem not justified as far as my own clinical experience goes."

The dosage which will secure the digitalization of a patient and thereby produce a therapeutic effect may be roughly computed on the basis of the patient's weight. Provided the patient has not received digitalis within the previous two weeks, the dosage should approximate 1½ grains for every 10 pounds (4.5 Kg.) of body weight, plus 1½ grains for each day during the period of digitalization. That is, if a patient who weighs 150 pounds (68 Kg.) is to be digitalized over a two day period he will receive approximately 25 grains (from 20 to 30 grains

(1 to 2 Gm.). From 12 to 15 grains (.8 to 1 Gm.) may be given in divided dose at 6 or 8 hour intervals during the first twenty-four hours. If the need for rapid digitalization is urgent and the patient has not received digitalis within the previous two weeks he may be given as much as $7\frac{1}{2}$ grains (0.5 Gm.) at four hour intervals for two or three doses, followed by 3 grains at eight hour intervals until the requisite dose has been given. It should be borne in mind, however, that such massive doses of digitalis and rapid digitalization of a patient as have just been outlined are to be resorted to only in emergency cases and then only when the patient can be kept under close observation. In all other cases digitalization should proceed more slowly and cautiously.

The computation of the dosage by body weight is only an approximation. Relatively more digitalis should be given to children, to light weight adults and to patients with a marked degree of decompensation. Children in particular require fairly large doses of the drug to obtain a therapeutic effect. Patients of advanced years usually require less digitalis than their weight would indicate. When edema is present its added weight should not be included in the body weight on which the digitalis dosage is computed; instead, the patient's average weight for the year prior to the onset of the edema may be taken as a basis.

As a patient is not fully digitalized until a state of saturation has been reached, the dosage in emergency cases should be sufficient to produce either a therapeutic effect or early evidence of approaching toxicity. The drug should not be withdrawn, however, solely because of a single spell of vomiting or headache. In cases of congestive heart failure, vomiting may be due to congestion of the gastric mucosa and therefore be a manifestation of the cardiac failure rather than of the toxicity arising from the action of the drug. If vomiting prevents the oral administration of digitalis, equivalent amounts of the drug in solution may be given intravenously until it is tolerated by the oral route.

In order to maintain a patient in a state of therapeutic digitalization it is necessary that he receive daily an amount of the drug equivalent to that which he excretes. This is generally

about $1\frac{1}{2}$ grains daily. If this dose is not effective in slowing the heart rate in a case of rapid ventricular action or in improving the circulation in a case of congestive heart failure, 3 grains may be given every other day and $1\frac{1}{2}$ grains on the alternate days. In rare cases it may be necessary to give 3 grains daily until the heart becomes compensated. It is important that the particular maintenance dose which will achieve the optimum therapeutic effect be determined for each individual patient by both clinical and electrocardiographic observations.

In the presence of a toxic state arising from the overdigitalization of the patient, there will usually be manifested clinically a slowing of the heart to a rate of 60 beats per minute or less, and the appearance of premature contractions producing a coupling of the beats, heard on auscultation. Certain gastrointestinal, ocular and neurologic symptoms may also appear such as nausea, vomiting, dimness of vision, inability to focus the eyes, restlessness and disorientation. The electrocardiogram will show an exaggeration of the T wave deflection associated with a digitalis effect; a prolongation of the PR interval, indicating an auricular-ventricular block; premature ventricular beats occurring in couplets (bigeminy), and, in grave toxic states, the appearance of ventricular paroxysmal tachycardia. It is because the electrocardiogram shows definite evidences of the approach of a state of digitalis intoxication of the myocardium that the administration of the drug should be controlled by frequent electrocardiographic readings. When clinical or electrocardiographic signs of overdigitalization appear, the drug should be withheld for a day or two and its administration resumed in decreased dosage.

Digitalis acts directly on the heart, (1) depressing the function of the sino-auricular and auriculoventricular nodes, (2) contracting the muscle fibres, (3) decreasing the size of the chamber walls, (4) lessening auricular and ventricular irritability, (5) prolonging diastole and (6) increasing the force of systole. The clinical results of digitalis therapy are usually manifested in a slowing of the heart rate and in a general improvement of the circulation. In cases of failing or dilated

hearts the administration of digitalis frequently results in an increase of the cardiac output and the relief of venous congestion. Occasionally, however, fibrosis of the myocardium is so extensive that digitalis cannot restore compensation. When hyperthyroidism is the underlying cause of cardiac dilatation and a rapid ventricular rate, the results of digitalis therapy will be disappointing until the thyroid condition has received appropriate treatment.

CONGESTIVE HEART FAILURE

Acute congestive heart failure is one of the most commonly seen conditions demanding emergency treatment. Cases of organic heart disease such as valvular incompetency and stenosis may remain compensated under a normal regimen: but when the burden of infection, fatigue, excitement, prolonged nervous strain or a rapid ventricular rate is added, congestive heart failure may suddenly appear. If the precipitating factor is not removed, the attack of failure may develop rapidly into an emergency.

In left ventricular failure, dyspnoea, orthopnoea and air hunger appear and increase in severity with the degree of failure. The associated pulmonary congestion may give rise to a productive cough and to hemoptysis. Patients with failure of the left side of the heart are subject to alarming and not infrequently fatal attacks of acute paroxysmal dyspnoea. The attacks, which are usually nocturnal, are marked by extreme dyspnoea and a cough which is productive of profuse frothy blood-tinged sputum. The blood pressure is at first elevated but later falls. As the pulmonary oedema becomes acute, circulatory collapse occurs accompanied by pallor and cyanosis, marked perspiration and a rapid feeble radial pulse. If treatment is delayed death may ensue. The most important emergency measure is the subcutaneous administration of morphine sulfate, one-fourth grain (0.015 Gm.), repeated in fifteen minutes if relief has not been obtained. If the morphine is not effective in abolishing the attack (aminophyllin theophylline with ethyleuediamine), 1/100 grain in 20 cc. of physiologic solution of sodium chloride, should be administered intravenously, slowly during a five minute period. Clinical studies have shown

that the drug causes a decline in the intrathecal and venous pressures with a subsequent diminishing of the dyspnoea. Oxygen when available should be administered promptly. Phlebotomy of from 300 to 500 cc. of venous blood is frequently followed by striking improvement. As to the use of digitalis in acute paroxysmal dyspnoea, Wolferth has recently expressed an opinion which I have long held on the ineffectiveness of digitalis therapy in an acute emergency condition. He states: "I find that many physicians in treating attacks of paroxysmal cardiac dyspnoea are apt to give hypodermic injections of digitalis. The dosage usually employed ranges from 1½ grains to 3 grains. Although . . . digitalis is often useful as a preventive measure it must be given in therapeutically effective dosage. I object to its use during an attack for the following reasons: (1) The dosage is usually too small to be effective; (2) even though enough be given, its action is too slow to combat an emergency, and (3) the use of digitalis may divert attention from more effective measures that should be employed."

When right ventricular failure is predominant there are dyspnoea, marked fatigue, gastric and abdominal flatulence, nausea, venous engorgement, enlargement and tenderness of the liver, ascites, edema of the extremities and at times anasarca and hydrothorax. When a rapid elimination of the edema is necessary salyrgan, 1 cc. of a 10 per cent solution, should be injected intravenously, with or without the oral administration of ammonium chloride, 22½ grains (1.5 Gm.) four times daily, in enteric coated capsules of 7½ grains. The initial dose of salyrgan may be repeated after the lapse of from two to three days, when, if needed, the dose may be doubled. If large accumulations of transudates are present in the thoracic or peritoneal cavities, it may be necessary to give the patient prompt relief by aspirating the fluid, in which case a thoracentesis or an abdominal paracentesis should be carried out. The Karell diet should be instituted at once. Oxygen should be administered as an emergency measure, and morphine sulfate should be given freely to relieve the patient of dyspnoea and nervousness. The slow intravenous administration of from 50 to 100 cc. of a hypertonic solution of dextrose, of 50 per cent

concentration, has value in some cases in that it aids the failing heart muscle in replenishing lost glycogen. Absolute bed rest should be maintained. Patients, even children, find an upright or semirecumbent position more comfortable than recumbency, as pressure from the engorged liver is less distressing. The use of a cardiac bed, when available, is of value.

The extreme cases of failure involving either the left or the right side or both sides of the heart when the circulation is gravely embarrassed, the patient must be given immediate relief. Strophanthin should be administered intravenously, 1/100 grain, provided the patient has not been properly digitalized as evidenced by an electrocardiogram. If the patient has been taking small doses of digitalis during the preceding fourteen days, the dose of strophanthin must be regulated accordingly. Strophanthin exerts an action on the heart similar to that produced by digitalis; but unlike digitalis leaves, it acts almost at once. Its full effect is produced in about one hour and is prolonged for from twelve to twenty-four hours. The initial dose of strophanthin may be followed by two subsequent doses at intervals of from eight to twelve hours. When possible an electrocardiogram should be taken to determine the degree of digitalis effect. After the acute stage has subsided the patient may be put on the oral administration of powdered digitalis leaves.

The oedema of nephritic origin is sometimes confused with the edema arising from cardiac conditions. Within the month three patients with marked edema have come under my observation. All three patients had had prolonged digitalis therapy with no abatement of their symptoms. A carefully taken history and laboratory tests showed glomerulonephritis to be the underlying disease in each case. One patient had been taking bromides for months and had marked bromide dermatitis complicated by multiple ulcerations of the lower extremities.

A discussion of congestive heart failure should not be closed, I believe, without making clear the distinction between cardiac failure and a failure of the peripheral circulation. Peripheral failure produces the symptoms and signs of collapse and shock, including pallor, perspiration, cold clammy skin, weak heart

sounds, rapid thready pulse and low blood pressure. These phenomena are seen occasionally in surgical cases, in severe hemorrhage, in dehydration, in coronary thrombosis, in arterial embolism and in other conditions which for any reason produce a sudden decrease in the volume of the circulating blood or a sudden collapse of the vascular bed. In certain of these cases the heart itself may be entirely normal in its capacity to function properly, but the vascular system fails to return a normal volume of blood to the heart.

CIRCULATORY FAILURE

The circulatory failure may require either of two kinds of treatment, depending on the factor which has produced the collapse. If a sudden decrease in the blood volume from hemorrhage or dehydration has been the precipitating factor, a transfusion of whole blood or the intravenous administration of small doses of 20 per cent dextrose solution or of salt solution is beneficial. If, however, depression of the central nervous system has been a contribution factor in the production of the shock through loss of vascular tone, drugs which act on the central nervous system should be administered such as hot coffee, brandy, strychnine sulfate one-sixtieth to one-fortieth grain (0.001 to 0.0015 Gm.) subcutaneously, or intravenously if a more prompt response is desired. These drugs, as well, as nikethamide (coramine), metrazol, theobromine, camphor and aminophyllin, have at times been regarded as cardiac stimulants, but it is now generally accepted that their value lies in the effect which they produce on the peripheral vascular system or on the respiratory center, secondarily to a primary effect on the central nervous system. White has pointed out that although caffeine has an important stimulating effect on the nervous system and vasomotor centre and nikethamide and aminophyllin often stimulate and regulate a depressed centre, they are not known to have a direct effect on the action of the myocardium. None of these drugs, therefore, should be substituted for digitalis in the treatment of congestive heart failure. Digitalis, however, is not known to exert a direct effect on the vascular system and therefore should not be administered in circulatory failure. It should be clearly understood by surgeons as well as by clinicians that

digitalis therapy not only has no value in collapse or surgical shock but may even do harm in that it slows the heart rate. Much of the confusion concerning the results of digitalis therapy in coronary thrombosis has, I believe, come from an attempt to institute digitalization while vascular collapse was a predominant factor in the clinical picture. In the presence of shock associated with low venous pressure the use of digitalis is contraindicated.

CORONARY THROMBOSIS

The syndrome of acute coronary thrombosis is too well known to be discussed in detail. If pain is present, its continued intensity and prolonged duration and the ineffectiveness of the nitrites to control it, will differentiate it from the pain of angina pectoris. Pain may be absent in coronary thrombosis, and intense dyspnoea may be the striking symptom. Peripheral vascular failure with signs and symptoms of collapse and shock may be present without pain or dyspnoea. On even a tentative diagnosis of coronary occlusion, the patient should be put at complete rest in bed. If within twenty-four or thirty-six hours signs of infarction appear, such as a rise in temperature, an elevation of the leukocyte count and a pericardial friction rub, the patient should remain at rest for several weeks. The important drug in the emergency treatment of acute coronary thrombosis is morphine sulfate, which should be given promptly and in sufficient amounts to quiet the patient and to relieve him of pain. From one fourth to one half grain may be given subcutaneously and the dose repeated if necessary. If there is cyanosis, rapid heart action, dyspnoea, orthopnoea or other signs of myocardial anorexia, oxygen in concentrations of from 50 to 80 per cent should be administered by means of a tent. When dyspnoea is persistent or when vomiting is producing dehydration, the intravenous administration of a hypertonic solution of dextrose, from 50 to 100 cc. of 50 per cent solution, should be carried out slowly and cautiously and repeated once or twice daily as needed. Caffeine with sodium benzoate, 7½ grains, may be given intravenously if there is circulatory collapse or shock. The intracardiac or subcutaneous injection of epinephrine should be resorted to in the rare instances in which the Adams-Stokes syndrome complicates coronary occlusion. Quinidine sulfate should be given orally when there is a

rapid ventricular rate, but the drug should be administered guardedly. The use of mechohyl is contraindicated in the presence of coronary disease. Digitalis therapy has no place in the treatment of coronary thrombosis, except when auricular flutter or chronic auricular fibrillation is present with a rapid ventricular rate or when congestive heart failure has supervened. It should be borne in mind that massive doses of digitalis are not well tolerated during the healing stage of myocardial infarction. It should also be borne in mind that in an occasional heart there are extensive areas of coronary sclerosis myocardial degeneration and massive infarction which leave no cardiac muscle for drugs to act on.

PERICARDITIS

A cardiac emergency occasionally arises in cases of acute pericarditis when a rapid accumulation of fluid in the pericardial sac causes marked cardiac compression. The forms of acute pericarditis in which effusions may accumulate in sufficient amounts to impede the action of the heart are (1) purulent pericarditis, secondary to a pyogenic infection such as empyema pneumonia, an intrathoracic abscess or septicaemia; (2) fibrinous pericarditis, associated with the rheumatic and other nonpurulent infections, and (3) tuberculous pericarditis, seen only when tuberculosis is present elsewhere in the body. As the cardiac compression develops, the force of the ventricular contractions is diminished and signs of circulatory embarrassment appear. The venous pressure increases and the veins of the neck appear dilated and engorged. The arterial pressure falls and the pulse volume is diminished. The heart sounds become distant and faint. The area of cardiac dullness is increased, usually to the right and to the left. A roentgenogram of the heart will show a globular contour with a bulging of both lower angles. Extensive pericardial effusion of rheumatic origin frequently gives rise to dyspnea, orthopnea, cyanosis and precordial pain. Ewart's sign due to compression of the left lung, may appear at the angle of the left scapula as dullness, bronchial breathing and bronchophony. A to and fro friction rub may sometimes be heard over the base of the heart. A rapidly accumulating pericardial effusion is generally

accompanied by an exacerbation of the symptoms of the primary infection.

Treatment should be directed both to the relief of the cardiac compression and to the control of the underlying condition, whatever the infection may be which is responsible for the acute pericarditis. If pain is present and severe, morphine sulfate from one-eighth to one-fourth grain (0.008 to 0.016 Gm.) should be administered subcutaneously. If the pain is not severe, codeine, the salicylates or the bromides may be given. When pericardial effusion is accompanied by marked circulatory embarrassment, pericardiocentesis promptly carried out may be a life-saving measure. The aspiration of even a relatively small amount of the fluid will often relieve the patient of his distress.

A favourable site for the puncture is in the fifth interspace at a point 1 or 2 cm. within the left border of cardiac dulness, as determined by percussion or by a roentgenogram. Local anesthesia of the site is desirable. An aspirating needle of medium caliber is inserted backward and inward, slowly penetrating to a depth of from 3 to 5 cm., with suction applied frequently to obtain fluid. If no fluid can be aspirated, the needle should be tilted at various angles, partially withdrawn, or completely withdrawn and inserted elsewhere. In children or young adults a safe and convenient site for the puncture is the left posterior part of the chest wall in the seventh or eighth interspace at a point in the midscapular line. The patient's left arm should be raised. The needle will have to be inserted to a depth of from 5 to 8 cm. It is usually not necessary to repeat the pericardiocentesis. Occasionally, however, with rheumatic patients the fluid must be aspirated every few days for a limited period and with tuberculous patients every week or two for a much longer time.

During pericardiocentesis of a patient with purulent effusion it is sometimes necessary, if the pus is thick to substitute a trocar or a needle of larger caliber for the aspirating needle with which the procedure was begun. When pus is discovered during the course of a pericardiocentesis, it is imperative that the pericardium be drained at its base. As

recovery depends on instituting drainage early in the course of purulent pericarditis, an explanatory pericardiocentesis should be carried out when pericardial effusion is suspected in cases of pyogenic infections. However, before these measures are resorted to in cases in which cardiac compression has not yet developed and the infectious process is largely restricted to the pericardium, sodium cacodylate from 5 to 8 grains (0.1 to 0.5 gm.) in sterile solution should be injected intravenously. This dose with an additional 2 or 3 grains (0.1 to 0.2 Gm.) a day should be repeated daily for three or four successive days. If a definite cessation or subsidence of the effusion does not occur, a pericardiocentesis should then be resorted to.

In cases of pericardial effusion arising from a non-pyogenic infection, when the circulation is not gravely embarrassed, a delay of thirty-six or forty-eight hours will in many instances show a spontaneous subsidence of the effusion coincidental with an abatement of the underlying infection. This spontaneous improvement is frequently seen in cases of rheumatic pericarditis. Pericardiocentesis in these cases should therefore be restricted to those patients whose cardiac compression has resulted in marked circulatory embarrassment.

EMBOLISM

The emergencies arising from arterial embolism within the systemic circulation are inextricably related to cardiac conditions, as the formation of the emboli occurs in the chambers of the heart. Two predisposing factors in related sequence usually contribute to the presence of systemic arterial emboli. The first is a slowing of the blood stream within the heart chambers, due to mitral stenosis, long standing auricular fibrillation, or dilatation and functional failure of the myocardium. The resulting stasis favors the formation of mural thrombi. The second contributing factor is the subsequent restoration of normal rhythm or myocardial function, which results in more forcible contractions of the chamber walls, a breaking up of the mural thrombi and the expulsion of the detached portions into the systemic circulation. The ultimate destination of the emboli, according to clinical experience, will be lodgment within the spleen, kidneys or other parenchymal viscera, within the brain,

the intestinal walls or the myocardium through the coronary circulation, or in the arteries of the extremities.

Pulmonary emboli may arise in either of two ways. They may be detached from mural thrombi within the right auricle or ventricle whence they will inevitably be propelled into the pulmonary circuit unless there exists a congenital patency of the auricular or ventricular septum, in which case they may enter the left side of the heart and subsequently the systemic circulation. However, in the majority of cases pulmonary emboli originate in thrombosed veins, usually the larger veins of the thigh or pelvis, which often are apparently free from evidences of concomitant phlebitis. It is thought that three factors play a part in the formation of a thrombus within a vein; (1) damage to the vascular wall, (2) an increase in the coagulability of the blood and (3) a decrease in the velocity of the venous blood flow. Pulmonary embolism is not infrequent in cases of heart failure and of chronic invalidism among the older age groups when venous pressure and prolonged circulation time are present. It also occurs as a postoperative or puerperal accident.

Embolic deposits within the parenchymal organs cause areas of infarction. The spleen, kidneys and lungs tolerate one or more infarctions if they are not massive, and a restitution of approximately normal function not uncommonly occurs. The brain, if vital regions are not involved, will also tolerate small areas of infarction. In the emergency treatment of embolic deposits in the parenchymal organs absolute rest in bed and the complete relief of pain are of prime importance. Morphine sulfate from one-fourth to one-half grain should be given subcutaneously and repeated if necessary. In pulmonary infarction the patient should be placed in an oxygen tent. Supplying him with an adequate amount of oxygen not only will lessen the strain on the circulation but will add materially to his comfort and ease difficult respiration. Shock and collapse, which invariably accompany all forms of massive arterial occlusion and multiple embolic deposits, should receive appropriate therapy, as previously outlined in the discussion of the treatment of peripheral vascular failure.

Embolic occlusion of the arteries of the extremities and of the intestine results in the development of gangrene. It is in these cases that early diagnosis and prompt surgical intervention are of the utmost importance in saving the patient's life. When embolic occlusion involves the extremities there is frequently an associated spasm of contiguous arteries. If untreated, the spasm may extend the area of gangrene. The intravenous injection of papaverine hydrochloride or one-half grain will frequently abolish the associated spasm. The extremity which is affected should be kept warm but should not have direct heat applied to it. When only a small artery is involved, the development of a collateral circulation may prevent the development of gangrene. Unfortunately, subsequent emboli frequently appear in the circulation to further endanger the life of the patient.

SUMMARY

In the treatment of the cardiac emergencies, the time element is often of inestimable importance. The proper drug if administered promptly will frequently give immediate relief and may in some cases be a means of saving the patient's life. It is advisable for every physician when confronted by a cardiac emergency to have certain drugs available for instant use.

(Journ. A. M. A., 9th March, 1940.)

Trichinopoly Municipality

Details of Public Health Activities during April 1940

I. Vital Statistics :

Number of births registered	...	...	...	550
Number of deaths registered	...	...	...	334
Number of deaths from fever	...	...	...	4
Number of deaths from respiratory disease	...	...	...	96
Number of deaths under one year	...	...	...	66
Estimated birth rate	...	...	...	46.2
Estimated death rate per mile	...	...	...	28.1
Number of deaths from child birth	...	...	...	11
Number of deaths from Alimentary disease	...	...	...	44
Infant Mortality rate	...	...	...	120.0

II. Infectious diseases :

	Attack.	Death.		Attack.	Death.
Cholera	Nil	Nil	Measles	2	Nil
Small-pox	5	..	Tuberculosis	not known	29
Chickenpox	7	..	Pneumonia	not known	43
Typhoid	5	5	Diphtheria	Nil	Nil
No. of anti-cholera inoculation done	...	...	...	...	Nil
No. of anti-typhoid inoculation done	...	...	...	...	120

No. of vaccination done :

Primary Vaccination	...	...	...	514
Re-vaccination	...	...	...	2020
Total				2534

III. Maternity and Child Welfare :

(1) No. of cases visited by Women Medical Officer.	} on leave	(2) No. of houses visited by Health Visitor.	
(a) Labour		(a) Infants	35
(b) Ante-natal		(b) Pre-school	Nil
(c) Post-natal		(c) Ante-natal	31
		(d) Post-natal	131
(3) No. of labour cases conducted by Midwives			152

IV. Propaganda :

No. of lectures with magic lantern demonstration	...	53
No. of lectures without magic lantern demonstration	...	3

MAY, 1940

MISCELLANY

113

V. Food adulteration :

No. of samples taken	...	...	...	21
No. prosecuted	...	...	...	1
Amount of fine imposed	...	...	...	Rs. 260
No. of samples reported adulterated	...	...	...	1
Number Convicted.	...	...	...	17 (old cases)

VI. Meat Inspection :

	No. passed	No. condemned
(1) Sheep	2930	31
(2) Goats	7350	24
(3) Cows and heifers	318	1
(4) Bulls and Bullocks	133	6
(5) Buffaloes	519	3
(6) No. of dogs caught	1	
(7) No. of dogs destroyed	1	
(8) No. of dogs released	Nil	

VII. General Remarks : Nil.

K. P. THOMAS,
Health Officer.

The Trichinopoly District Medical Association

(Branch of the Indian Medical Association)

TEPPAKULAM, TRICHINOPOLY

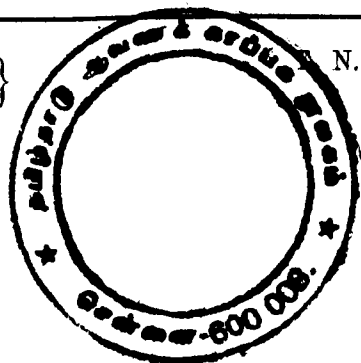
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(1-12-39 to 29-2-40)

RECEIPTS			EXPENDITURE		
	Rs.	A. P.		Rs.	A. P.
OPENING BALANCE:			Clerk's Salary ...	48	0 0
Cash on hand (1-12-1939)	9	15 9	Office Rent ...	15	0 0
Cash with the Trinity Bank Ltd. ...	397	9 9	Printing & Stationery ...	47	15 3
Members' Subscription.	220	8 0	Postage & Telegrams ...	28	0 3
Advertisement Charges.	94	4 0	Miscellany Printing ...	161	9 3
Contribution received for the Annual Gathering 1940 ...	231	0 0	I. M. A. Subscription ...	30	0 0
			Annual Gathering Exps. ...	158	2 5
			Monthly meeting Exps. ...	41	7 0
			Audit fees for 1939 ...	25	0 0
			Fixed deposit with the Trinity Bank Ltd. ...	200	0 0
			Miscellaneous Exps. ...	3	6 0
			Bank commission on cheques ...	1	2 0
			CLOSING BALANCE:		
			Cash on hand ...	5	5 6
			Cash with the Trinity Bank Ltd. ...	208	5 10
			Less cheques unrealised ...	20	0 0
				188	5 10
TOTAL ...	953	5 6	TOTAL ...	953	5 6

TRICHINOPOLY,
1st March 1940.

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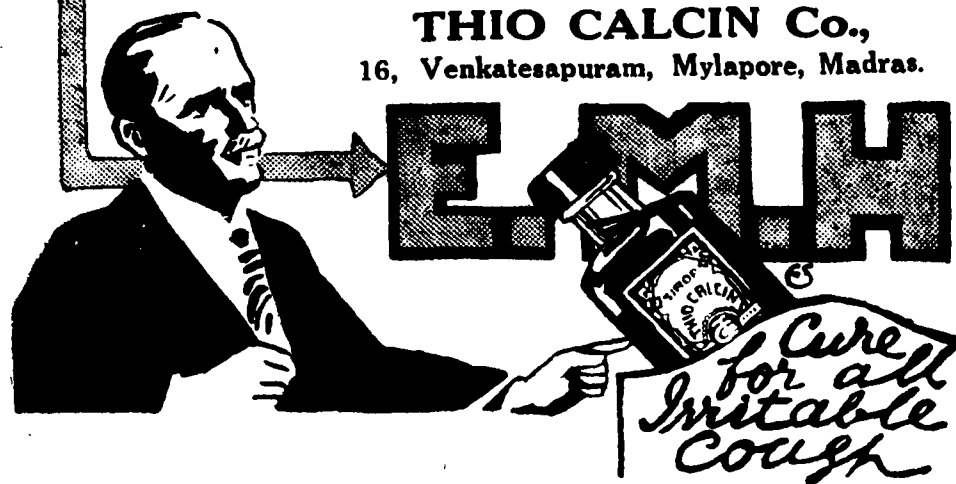
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359

THE MISCELLANY

OF



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JUNE

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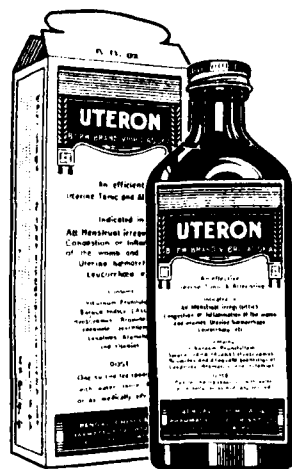
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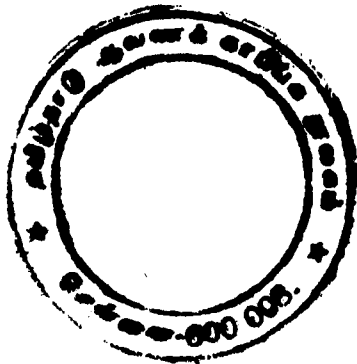
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Vol. VII]

JUNE 1940

[No. 6

The Sulphapyridine (M. & B. 693)

Treatment of Pneumonia in Children

BY

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AND

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THE majority of patients had lobar pneumonia (seventy-nine of the ninety-three), distributed from 2 months to 13 years of age. There were twenty-nine patients under 2 years with lobar pneumonia and fifty over 2 years. All of the eleven patients with broncho-pneumonia were under 2 years of age.

Sulphapyridine was given by mouth, in most cases crushed and mixed with cereal, apple sauce or fruit juice. It was usually given shortly after a meal to minimize the possibility of nausea or vomiting. In the early cases 0.2 gm. per kilogramme of body-weight ($1\frac{1}{2}$ grains per pound) was given on the first day, and half this amount on the subsequent days. We soon found that equally prompt defervescence was observed with three-fourths of this dosage in children over 2 years. The infants, however, seemed to require the original dosage, and this was continued for them. No child received more than 4.5 gm. a day, and the average total amount given to a child was 5.48 gm. The average total dosage for an infant under 2 years was 3.99 gm.

Half of the patients were treated for only two days and 75 per cent for not more than three days. The average duration of treatment was 2.6 days. It is our experience that if sulphapyridine affects the course of the pneumonia it does so within eighteen to thirty-six hours. In the first few cases treated it was given for from five to six days after the crisis, but the prompt fall of temperature after the drug is begun led us to shorten the time of administration. In the larger part of this series the drug was continued for only eighteen to twenty-four hours after the crisis. No definite recurrences of pneumonia have been noted. Five patients had subsequent short rises of temperature, probably not true relapses of pneumonia.

Blood sulphapyridine determinations were done on many but not on all patients. The concentration was found to vary widely with the same dosage of drug, from less than 1 mg. to 12 mg. per hundred cubic centimeters. Three patients whose concentration was 0.8 mgm. per hundred cubic centimetres had a crisis completed within eighteen hours after the drug was given. The average blood sulphapyridine determination was from 2 to 4 mg. per hundred cubic centimetres, and with this level in most cases prompt crisis was noted.

Unfavourable Reactions

The most frequent reaction was vomiting, usually of only one or two doses occurring in 15 per cent of the patients. This symptom was never severe enough to require stopping the drug. Vomiting can be greatly reduced by giving the sulphapyridine with food or directly after meals, a precaution which is often neglected in hospital practice. None of the patients became cyanotic from the drug, although several were cyanotic when it was first given. Extreme restlessness and delirium were observed in four patients one of whom had a blood sulphapyridine concentration of 12 mg. per hundred cubic centimetres, the highest in our series. This baby had a peculiar agitated expression and constantly threw himself about. His extreme restlessness required the use of restraints to prevent falling out of bed. This agitated restlessness is not a part of any pneumonia picture. All four of these patients presented an alarming state; they had a peculiar intense pallor, although

they were not anaemic. They were improved by sedatives, (phenobarbital), by a large amount of fluids and by discontinuing the drug for one or two doses. Two of these babies were placed in oxygen tents without improvement of the nervous symptoms. A transient mild haematuria was observed in one patient. This child had received only 0.12 gm. per kilogramme of sulphapyridine; haematuria appeared on the third day of treatment and cleared within a few days. It must be pointed out that haematuria occasionally occurs in pneumonia without the use of the sulphapyridine. No other toxic symptoms were observed.

Results

The prompt and consistent precipitation of crisis following the oral administration of sulphapyridine has been reported by many observers, and our experience is no different. This reaction occurred within eighteen to twenty-four hours in sixty-nine of the seventy-nine patients with lobar pneumonia. Of course, it is possible that the drop in temperature of some of the patients coincided with the normal crisis, but such an explanation cannot account for all the reactions, particularly in those treated very early in the disease. Many of the patients treated on the eighth to the eleventh day were actually ill with type XIV pneumonia, in which the average duration is from eight to fourteen days.

It has been stated that, although sulphapyridine provokes a crisis, the disease runs its course, and the consolidation does not resolve sooner than it would have done if untreated. This suggestion is contrary to our experience. The x-ray shadows and the physical signs begin to clear at once just as they do after a normal crisis.

The three patients with lobar pneumonia who failed to show the typical response to sulphapyridine were all infants under 2 years of age, all severely ill. It is possible that the sustained temperatures in the first one of these patients was a febrile evidence of sulphapyridine intolerance or intoxication, since this baby had other signs of reaction, namely extreme restlessness, delirium, pallor and marked anorexia. His blood sulphapyridine determination was 12 mg. per hundred cubic

centimetres. The second patient is remarkable only because he required forty-eight hours' therapy to produce a crisis. The third baby had pneumonia three times previously at Bellevue Hospital some of these a typical pneumonia. We cannot explain his unusual reaction to sulphapyridine.

In five cases of lobar pneumonia although the usual reaction occurred after sulphapyridine, secondary short febrile rises occurred. It has been suggested that the bacteriostatic action of sulphapyridine may produce improvement for a short time and then be followed by a relapse. There were only five patients whose temperature charts might be so interpreted. Only one of these cases clinically appeared like a pneumonia during the second temperature rise which yielded promptly to renewed treatment. The dosage of sulphapyridine was probably inadequate in case 5, but readministration of the drug was followed by prompt crisis. The other three patients had no new signs of pneumonia. One of these received no more drug, and the fever subsided just as promptly as in the cases in which it was given, so that it is not certain that any patients had true relapses. Short febrile episodes are often seen in hospital patients from insignificant causes. These three patients may all have had transient fever not associated with pneumonia. Roentgenograms in all five cases showed clearing pneumonias and no new consolidation. It is noteworthy that four of the five patients had pneumococcus type XIV pneumonia, a disease known for its severity. It is suggested also that the type XIV pneumonia may require a somewhat greater dosage than the other pneumococcic pneumonias.

In eleven cases of true broncho-pneumonia we have failed to observe the same dramatic, prompt response to sulphapyridine seen in cases of lobar pneumonia. The temperature of the patients with broncho-pneumonia remained elevated, and they seemed only slightly improved. Our series of this form of pneumonia this year is small however. Four of the eleven patients died, approximately the average mortality rate for broncho-pneumonia during the past eight years. A much longer time will be needed to evaluate sulphapyridine therapy in this form of pneumonia. Kahn reports no effect on broncho-pneumonia is his experience at the Willard Parker Hospital.

One patient clinically thought to have broncho-pneumonia died and at autopsy was found to have lobular pneumonia, probably from aspiration. The walls of the bronchi were normal. This 6½ months old baby was admitted to the hospital for a diarrhoea from which he was recovering when he developed pneumonia. Type XIX pneumococcus was found. The baby was treated promptly with sulphapyridine but died within thirty-six hours after the onset of the pneumonia.

There was one death among the seventy-nine patients with lobar pneumonia. This severely ill 16 months old baby died suddenly on the third day after admission to the hospital. A roentgenogram taken the day before death showed a pyopneumothorax (not diagnosed clinically) which was probably responsible for the death. No autopsy was obtained.

Only one patient developed empyema, an infant with type I lobar pneumonia. He developed physical signs, and a roentgenogram indicated suppurative pleurisy. On pleural tap 2 c.c of thick pus was removed, from which type I pneumococcus was cultured. No further pus was ever found and the patient promptly recovered. This abortive course of empyema has been rarely encountered in our many years of observation of empyema, especially that following type I pneumonia.

Pneumococcic bacteremia was found in only one patient, a boy of 8 years, with type I lobar pneumonia. His defervescence occurred within eighteen hours in the typical manner. The drug was cut off after thirty-six hours and the report of the blood stream invasion was obtained after the drug had been discontinued. Even with this small amount of therapy, the blood stream was sterile. As a precaution the drug was readministered for twenty-four hours. The blood cultures were sterile after several days' treatment with sulphapyridine, and the patient recovered.

Comment

The consistent prompt crisis observed in our patients with lobar pneumonia following the oral use of sulphapyridine is convincing to us that the drug is very efficacious in treating pneumococcic pneumonia (and perhaps also that due to the

streptococcus). But the value of a therapeutic agent in pneumonia cannot be established in one season's time, since pneumococci are known to vary in their distribution and virulence from year to year. It may be that results will be less good in more serious epidemics.

In the present season we have had a lower percentage of type I pneumonia (10.9 per cent for the present year as compared to 17.8 per cent average for the past six years). There were probably more mild cases this season than usual, although many patients were very severely ill.

The failure of broncho-pneumonia to respond favourably to sulphapyridine may be explained on the basis of aetiology, since the bacteriology is variable and often no pneumococci are found. If a filtrable virus is the etiologic agent of broncho-pneumonia as has been suggested by various workers and by some experimental work with animals, the explanation for the different reactions these patients to the drug is probably indicated. Sulphapyridine has not been especially useful for diseases due to filtrable viruses.

For the older child sulphapyridine may well be the answer to the treatment of lobar pneumonia in the great majority of cases. In this age group (2 to 13 years) pneumonia is a milder disease with a much lower incidence of bacteremia and deaths than in adults. Even though the death rate in children may not be greatly affected, since it is already low, the shortening of the disease and the avoidance of complications justify the use of the drug. There may always be some patients who will require specific anti-pneumococcus serum therapy as well as the bacteriostatic agent sulphapyridine. Infants who are debilitated, chronically ill or anaemic and who may be unable to produce their own immune bodies may need specific serum as well as sulphapyridine. The necessity for obtaining a pneumococcus typing, preferably before chemotherapy is given, is clear. If sulphapyridine is not effective in the usual time from eighteen to twenty-four hours, specific serum may be given without delay if typing has already been done. In comparing results from different clinics with sulphapyridine in pneumonia, it is important to compare the results with reference to the

types of pneumococci. It is known that the duration severity and fatality of pneumonia is directly associated with pneumococcus types.

We wish to reiterate that it is not necessary to continue sulphapyridine for many days in the fear of a relapse. In this series the drug was given only 2.6 days on an average. If the few early cases are excluded, this time drops to 2.3 days. The average total amount was 3.99 gm. for infants under 2 years and 5.48 gm. for patients 2 years of age and over. The largest amount given to any patient was 13.25 gm. Sulphapyridine may be a poisonous drug in some cases, as is indicated by the reports of cyanosis, haematuria, leukopenia, delirium, liver damage and even death associated with the use of the drug. We believe that sulphapyridine should be given no longer than is necessary to effect a crisis and should be stopped very soon thereafter. To continue medication longer is unfair to the patient, just as it is with any drug having a cumulative poisonous action. The fact that we have observed no true relapses and have had no toxic symptoms of importance indicates the value of a wider trial of the small dose and short administration. Others have produced a crisis by one day's treatment and even by a single large dose.

Results

1. From January to July 1939, ninety-three patients were treated with sulphapyridine; seventy-nine with lobar pneumonia, eleven with broncho-pneumonia, one with lobular pneumonia and two whose pneumonia was classified as 'subacute pneumonia.'

2. In broncho-pneumonia there was no apparent effect on the course in any of the eleven patients, four of whom did not survive.

3. In uncomplicated pneumonia with small dosage, for two or three days only, a crisis occurred within eighteen to twenty-four hours in seventy-four of the seventy-nine cases. In the five other cases crisis occurred in forty-eight hours. One death occurred from pyopneumothorax. The short duration of therapy is emphasized not only because of its success but also because of the very few untoward reactions observed.

(From I. M. G., May, 1940.)

Sulfanilamide in the Treatment of Chancroid

BY

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Since Sulfanilamide was first found to be of value in hemolytic streptococcal infections, the question of ascertaining its action in infections caused by the hemophilic streptobacillus of Ducrey suggested itself.

Previous to the present writing, reports on this subject, all of which have been encouraging, have come from three British clinics and one from American group. Since we have available a large hospitalized venereal service, it is felt that our experiences are worthy of record.

Sulfanilamide has been used in the treatment of chancroid at the Cleveland City Hospital since July 1937. This report covers a series of thirty-seven cases, which were very carefully selected and were considered suitable for this study. For comparison there is also presented, as a control group, a series of sixty similar cases, most of which were seen before July 1937, and which were treated by other methods.

Criteria for selection of cases

No patients were induced if the diagnosis was purely clinical.

All patients with buboes and with positive Frei and chancroidal intracutaneous test were eliminated unless there was a history and or a scar of a previous bubo to account for the positive Frei test, and also unless a tissue smear was positive for *Bacillus heamophilus* of Ducrey.

Also eliminated from the reported series were all cases of chancroid complicated by early infectious syphilis. This was done because even though dark field examination was negative the possibility still remained that part of the lesion could be

unrecognized chancre which might heal rapidly as a result of specific anti-syphilitic therapy and thus invalidate the reported results.

In order to compare our results with those of previous authors, our cases are divided into those with and without buboes. The latter group has been further divided into cases with lesions on the glans penis and those with lesions on other dermal structures. This division was made because lesions on the glans heal much more slowly than those in other locations. Whether or not the buboes were ruptured made considerable difference in the time required for healing in the control group, so cases with bubo in the treated series were again classified as those with ruptured and those with unruptured buboes.

Dosage

Various daily doses were used and evaluated. The average for the total group was 46 grains (3 Gm.) a day. The total dose varied between 280 and 950 grains (18 and 62 gm.) and averaged 642 grains (42 gm.) per patient. After the initial dose of from 3 to 4 gm. the maintenance dose was determined by the clinical response and of course by the weight and age of the patient. Toxic symptoms such as dermatitis, purpura and cyanosis were carefully watched for, and total blood count frequently done and blood sulfanilamide determinations were frequently done (at least twice a week) in order to guide the maintenance dosage. It becomes apparent that a high maintenance dosage is of the utmost importance. The least desirable combination is a low initial and a low maintenance dose. The next least desirable is a high initial and low maintenance dose. The low initial and high maintenance combination is more desirable, while the high initial and high maintenance combination is the most desirable if proper precautions, such as blood study and alkalization, are taken to avoid toxic reactions.

The results observed, according to the previously mentioned various types of lesions, are incorporated in the chart and are self explanatory. The graph indicated days required for healing in each instance and does not represent the total period of hospitalization.

It is noteworthy that the duration of the disease before admission to the hospital varied between two and 365 days and averaged for the control group thirty-five days and for the treated group thirty-two days.

The diagnostic period varied between one and twenty-seven days and averaged two days for the control group and slightly more than five days for the group treated with sulphanilamide. This longer diagnostic period for the latter group indicates that more careful study was made of them in order to be sure they were proper cases for evaluation of the action of the drug. In order to observe the results further, the treated patients were hospitalized for an average of more than six days after complete healing had occurred and they were dismissed for further observation as outpatients.

Results

The results observed in this hospital compare favourably with those reported elsewhere as "dramatic" or "all healing within two weeks." Including all the various types of lesions, the average period of time required for healing in the control group was slightly more than thirty-two days. For the sulfanilamide treated group, this time varied from seven to twenty-three days and averaged 15.7 days in comparison.

Chancroidal ulcers situated elsewhere than on the glans penis respond best to treatment.

Chancroidal bubo, unruptured, is next most responsive.

There is little difference in the response to sulfanilamide of chancroidal bubo ruptured, and of ulceration of the glans penis, but the latter lesion is slightly less responsive.

Conclusions

Sulfanilamide has well known toxic possibilities and therefore should not be used in a routine manner for chancroid without careful control. This drug is efficient, even in resistant cases, and if carefully controlled can be used with gratifying results.

(*Journ. A. M. A., March 16, 1940*)

Preservative Effect of Creosote on Hydnocarpus Oil

BY

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Introduction

It is a well known fact that hydnocarpus oil on keeping tends to become irritant and give rise to pain on injection. Lowe and De (1937) have shown that the presence of air, light, moisture and foreign impurities encourages oxidation which is responsible for the irritant properties of the oil. Efforts have been made to prevent the development of the irritant properties in the oil by using fresh seeds for expressing the oil and by proper storage, and the use of preservatives has also been suggested. Creosote has long been used in preparations used for injections in leprosy but exactly why is not clear. The present investigation was undertaken to find out whether creosote acts as a preservative to hydnocarpus oil.

Source and nature of creosote.

Creosote is obtained by the fractional distillation of coal tar and beech tar. It is only the beech-wood creosote that is used in medicine, because the creosote distilled from coal tar is highly poisonous. Beech-wood creosote distils chiefly between 200° to 270° C. It is a nearly colourless liquid with a strong characteristic odour and a specific gravity between 1.080 and 1.087. It consists of a mixture of phenoloid compounds, the two chief constituents being guaiacol and cresol, phenol being present in very small amount.

The use of creosote in medicine

Creosote is a powerful antiseptic, similar in action to carbolic acid. It has been used in the treatment of pulmonary tuberculosis and chronic bronchitis, etc., but its efficacy in such conditions is doubtful. It has an irritant action on the mucous

membranes and it is supposed to have some local anaesthetic action when given by injection.

The use of creosote in leprosy

Therapeutic action. Hansen and Looft (1895) state that creosote had been used by Dr. Hjort in 1938 and later by Danielessen in the treatment of leprosy without any beneficial result. Muir (1921) used a mixture containing creosote, camphor, ethyl esters of hydnocarpus oil and olive oil (E. C. C. O mixture) and found it to be painless on injection and more efficacious than the preparation which had previously been used. Later the camphor and olive oil were omitted from the mixture but the creosote was retained. Samson and Linkako (1923) reported that mixture of creosote and ethyl esters was more efficacious than the plain esters. Wade (1925) observed that addition of creosote to plain esters reduced local irritation and produced better results.

Antiseptic Action. Rogers and Muir (1925) tested the antiseptic properties of combinations of ethyl of hydnocarpus oil with various antiseptics including creosote. They found that the addition of creosote, even up to 12% failed to have any antiseptic action when tested on cultures of staphylococcus and anthrax bacillus, but they believed that the addition of creosote to the esters increased its therapeutic effect. Since then creosoted (4%) hydnocarpus oil and its esters have been largely used in India in the treatment of leprosy.

Preservative action. Basu and Mazumdar (1939) have shown that addition of 4% of creosote or 0.02% of hydroquinine acts as an anti-oxidant and have suggested that creosote or hydroquinine can be used to preserve the oil against 'auto-oxidation'. Their work was, however, done under artificial conditions, as the experiments were carried out on the samples of oil kept at 99°C. for a period of five hours and exposed constantly to a current of air. The purpose of the present investigation was to find if the addition of creosote helped to preserve the oil under the usual conditions of storage.

The present work

The experiments were carried on two different specimens of oil which differed to some extent in their chemical and

physical properties. Each specimen was divided into two portions, 4% creosote was added to one portion and not to the other portion. The creosoted and the uncreosoted portions were then distributed into an equal number of bottles, 4 ozs. of the oil in each bottle. The creosoted and the uncreosoted portions were then exposed to similar combinations of light, air, moisture, etc. The first specimen of the oil was exposed to four different combinations—sunlight, sunlight and air, laboratory light and air, darkness without air—for 9 months. The second light and darkness, with and without air, moisture and foreign matter—for one year. The bottles from which air was excluded were filled with oil to the top and were securely corked, the other bottles had an air space above the surface of the oil. Moisture and foreign matter were introduced into the bottles by adding a few drops of water and some dust particles.

At the beginning of the experiments the degree of acidity, the peroxide value and the specific rotation were determined for both the specimens of the oils under test. At the end of the experiments all these tests were repeated with all the different portions of the oils; in addition some of these tests were repeated at intervals during the period of observation.

The results may be summarised as follows:—

The acid value

The acid value of the uncreosoted oil increased by storage under all the conditions mentioned. Exposure to sun and air has given rise to the highest increase and storage in the dark without air to the lowest increase in acidity.

Even in the creosoted oil the acid value rose but the rise has been slightly lower than in uncreosoted oils.

The peroxide value

The first specimen of oil had a relatively high peroxide value to begin with. There was a fall in this value in the uncreosoted samples of this oil stored without air, whether the oil was kept exposed to sun or not. In the uncreosoted samples kept in contact with air there was a marked increase in

the peroxide value, whether the oil was exposed to sun or to laboratory light.

The second specimen of oil had a low value to begin with and under none of the conditions of storage did it rise markedly.

The addition of creosote to the first specimen prevented to a great extent the marked rise in the peroxide value. In the second specimen the small rise in the peroxide value was slightly reduced.

Specific rotation

In both specimens of uncreosoted oil there was a fall in specific rotation under all the different conditions of storage. Exposure to air and foreign matter produced the most marked fall.

The addition of creosote to the first specimen of oil reduced the fall in specific rotation caused by storage under the different conditions. In two of the four samples, however, the difference was slight. In the second specimen of oil, however, the addition of creosote produced no apparent effect. In four of the six sets of conditions of storage, the fall was slightly more marked in the creosoted oil than in the non-creosoted oil. In the other two sets of conditions, however, the creosoted oil showed slightly less fall than the non-creosoted oils.

Conclusions

The results summarised above suggest that creosote may act as an anti-oxidant when hydnocarpus oil with a comparatively high peroxide value is stored under conditions which accelerate oxidation, i.e., when it is kept exposed to air, light and foreign impurities. Obtaining a supply of really good oil and its proper storage are, however, much more important than the addition of creosote to it.

(From *Leprosy in India*, Vol. XII, No. 2.)

The Sterility of the Syringe

If you suggest to the practitioner and the hospital nurse that his or her method of sterilizing syringes and needles is inadequate and that probably on every occasion that they give an injection, they introduce living bacteria, they either express great indignation that you should accuse them of what in their opinion amounts to little short of malpraxis, or the superior tolerance of one who knows better and proceed to describe in detail the methods that they have employed *with uniform success* for many years.

They firmly believe that the methods they employ are above reproach, or, they would not, we hope, use them, and when occasionally an intramuscular quinine injection suppurates, they blame the patient for contaminating the puncture, or imagine rather vaguely that the tissue-destroying action of the drug formed a necrotic focus into which pyogenic organism circulating in the blood had found their way. Yet, nine times out of ten the methods they employ are grossly inadequate, and probably in ninety-nine times out of a hundred they are short of the ideal and they are only saved from disaster by the fact that the tissues of the body have remarkable bactericidal powers, even when they are damaged by such drugs as quinine or emetine.

It is extraordinary how much faith is placed in alcohol as a disinfectant, when in fact in most circumstances it is not only a very poor one, but may be an actual medium for the spread of pathogenic organisms, as was recently shown by a Swiss worker who collected 13 samples of alcohol from different university clinics in Berne and grew Bacteria from 12 of them, in one instance isolating *Clostridium Welchii*. Even non-sporing organisms are not killed readily by means of strong alcohol, about fifty per cent alcohol in most circumstances being much more efficacious, but in the presence of serum or pus strong alcohol in particular produces a relatively impenetrable coating of coagulated protein, inside which the most delicate organism may remain alive for a considerable time.

An interesting result of an editorial discussion of the subject in the *British Medical Journal* has been the number of correspondents it has brought out into the open, who have then proceeded to display the inadequacy of the methods on which they rely, sometimes claiming to have 'invented' them or to offer ridiculous suggestions, such as that syringes should be sterilized by ultra-violet radiation.

It is easier to be critically destructive than constructive and, whilst in a modern hospital there is no possible excuse for anything short of the employment of syringes scrupulously sterile in all their parts, there may be circumstances in private practice where a thousand to one chance has to be taken, and it is far better for the practitioner to know and face this fact than to bluff himself that his methods are perfect. The most satisfactory method of sterilizing syringes, other than by efficient autoclaving which will not always be possible, is by a combination of heat and antiseptics, that is, by boiling for 10 to 15 minutes in 0.5 per cent carbolic acid solution and drying the inside of the syringe and needle with ether. This takes time and when a practitioner has many calls to make with a high percentage of injections to be given, such a procedure at each house will be well nigh impossible, but, if the syringe is never used for anything but the injection of sterile solutions intramuscularly or intradermally, it should be sufficient if the body of the syringe is sterilized effectively at the beginning of the day, kept in 70 per cent spirit, handled only with surgically clean hands, and the needles attached only with flamed forceps. The needles can be kept separately in sterilized test tubes or other suitable containers from which they must be removed with sterilized forceps, and each used only once during the day.

The syringe or needle is not of course the only source of contamination of a sterile inoculum; a fruitful source is the rubber cap of the bottle in which it is contained. A casual wipe over with spirit or iodine is all that this usually gets, though such a procedure is quite inadequate if the cap is at all badly contaminated. However, a swab soaked in 5 per cent carbolic acid or other equally strong antiseptic and left

in contact with the cap for 10 to 15 minutes that is being spent in sterilizing the syringe should be efficient.

Another source is the patient's skin: the methods usually adopted—tincture of iodine application followed by thorough swabbing with spirit, or the reverse procedure—will only sterilize the surface. Fortunately the organisms likely to be found in the sebaceous glands or hair follicles are non-athogenic, at any rate to the individual in whom they occur, and the only real danger lies in subclinical foci of infection from which organisms may be carried deeper into the individual inoculated, or they may contaminate the needle so that if this is not properly sterilized before use again the infection will be transferred to another individual.

This brings us back to the fact that, even if the body of the syringe is treated as we have suggested above, a fresh needle which has been effectively autoclaved or boiled in carbolic acid solution since it was last used must be attached for each patient.

We would like to add that practitioner, however busy he may be, should attempt to exercise a little more discipline in his bag than we are afraid is the usual practice; if possible he should keep sterile and septic bags, or at least have a rigid division, so that at the end of the day his 'sterile' syringes, rubber-capped vaccine bottles and cotton-wool are not mixed up with pus smears, blood specimens and even faeces tubes, and finally let him not forget that a hundred successful inoculations are no indication that *his* methods were aseptic, nor are a thousand such any guarantee that on the next occasion he will not inoculate living spores of *Clostridium Welchii*.

(From I. M. G., May 1940)

Some Landmarks in Surface Anatomy

The following landmarks are of importance:—

- (1) The uppermost spinous process which can be easily seen is the seventh cervical; the twelfth rib is a guide to the corresponding dorsal spine.
- (2) The highest part of the iliac crest is on a level with the upper edge of the 4th lumbar vertebra.
- (3) The spinal cord is shorter than the spinal canal, therefore the spinal roots have to travel some distance before emerging from the intervertebral foramina.
- (4) The length of the intraspinal course of the roots increases progressively from above downwards.

The following show approximately the relationship of the spinal cord segments to vertebral bodies:—

- (1) The cervical enlargement corresponds to the 4th-7th cervical vertebrae.
- (2) The 6th dorsal segment corresponds to the 3rd dorsal vertebra.
- (3) The lumbar segments correspond to the 10th, 11th and 12th dorsal vertebrae.
- (4) The sacral segments correspond to the 1st lumbar vertebra; below this level lie the roots of the cauda equina.

(Practitioner, April 1940.)

Treatment of Acute Gonorrheal Urethritis

To evaluate four different methods of treating acute anterior gonorrheal urethritis, Morse and Hirsch treated twenty-five cases by each method: sulfanilamide, sulfanilamide and anterior injections of silver protein, anterior irrigations with silver protein preceded by potassium permanganate irrigations, and daily anterior irrigations with a suspension of colloidal silver. All the patients were seen within five days from the onset of discharge before having any previous treatment and only initial infections were selected. The dosage of sulfanilamide of the first group of patients was 80 Gm. For the first two days 5.33 Gm. was given each day in four divided doses, 4 Gm. for the following two days and then 2.66 Gm. until the entire amount had been taken. The average duration of the disease in these cases was 39.1 days with extremes of from nine to ninety three days. From the standpoint of complications, 56 per cent had none. Arthritis or epididymitis did not develop in any patient. Prostatitis developed in 8 per cent and the infection extended into the posterior urethra in 36 per cent. The average duration of the disease in the second group was fifty-one days. The extremes were sixteen and ninety-three days. There were no complications in 32 per cent of the cases, the infection in 52 per cent extended to the posterior urethra, epididymitis developed in 12 per cent and prostatitis developed in 4 per cent. The average duration of the disease of the third group of patients was fifty-one days with extremes of from thirty-eight to eighty-two days. The incidence of complications in this group was significantly higher. In only 30 per cent of the cases was the infection kept localized to the anterior urethra. In 20 per cent the only complication was a posterior urethritis, but in 50 per cent epididymitis or prostatitis developed. The average duration of the disease of the remaining twenty-five patients treated by daily anterior irrigations of suspension of colloidal silver was 46.9 days, with extremes of eighteen and ninety-six days. Of these cases 64 per cent remained uncomplicated for the duration of the disease; in 24 per cent the disease extended into the posterior urethra and in 4 per cent prostatitis, epididymitis, arthritis developed. The authors' conclusions are that sulfanilamide without supplementary silver irrigations gave the most satisfactory results and that a colloidal suspension of metallic silver is preferable to protein silver preparations in cases in which the use of silver is desirable.

*From Military Surgeon, Washington, D.C.
January 1940.*

The Investigation and Treatment of Dyspareunia

BY

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Far more frequently than is generally understood intercourse produces in women not sexual pleasure but pain. Dyspareunia is a symptom present, but often not voluntarily complained of, in a considerable proportion of women who seek advice on account of some pelvic trouble. For instance, out of four gynaecological patients recently examined at a hospital clinic one morning, dyspareunia was a symptom in three. Not one volunteered a statement of pain on coitus. But when a routine examination had led to the conclusion that most probably pain on coitus did exist—when the examining finger in the vagina evidently produced pain—and the woman was interrogated, each of these three patients admitted to having pain when sexual intercourse was attempted. The condition not only causes physical distress, but is likely to be the cause of much domestic unhappiness.

In a modern novel (*Butchers' Drum*, by Neil Gunn) there is a description of the misery produced by such a condition which I fancy might be applied to a considerable number of married couples up and down the land. A Highland eviction had taken place. The wife of one of the crofters had been prematurely confined. "Her body had gone wrong ever since Rob's child had been still-born: legacy of the eviction might Rob went away, professedly to look after the crops behind the mill, but she knew that actually he went . . . where with some wild spirits he distilled whiskey and lived a riotous life. He had no interest at all in their new holding . . . And all that, she felt, had arisen because she had failed him with the child and then had become unfit for him. . . . Anyway, she knew quite definitely or fatally that he would never come back to her now and live as they had lived . . .

Her trouble frequently brought upon her extreme despondency, especially after a period of seeming to drag her body behind her, with its burning centre of pain at the root of her spine 'There's no trouble in all the world,' her foster-mother told her, 'for making a person feel down-hearted like yours.'"

Dyspareunia may be primary—the marriage may never have been properly consummated—or it may be secondary to some pathological condition arising after the marriage.

PRIMARY DYSPAREUNIA

The number of instances in which marriage is not consummated is certainly greater than many practitioners realize. I have come across many scores of these "married spinsters," during years of practice, when investigating some gynaecological complaint. The story is that after marriage attempts at coitus were unsuccessful and were soon abandoned. Hardly ever had a doctor been consulted in the matter.

A woman was sent to me; she had been married for 10 years and had recently discovered that her husband was keeping a mistress. She then for the first time consulted her doctor and informed him that the marriage had never been consummated. She expressed indignant surprise when I informed her that legally she was not really married at all, and that her husband at any time could obtain a degree of nullity of marriage. I explained how by means of a minor surgical operation normal coitus would be possible. But she decided that after her husband's "infidelity" she could never let him sleep with her and therefore she declined to have anything done.

Occasionally a doctor fails to realize the importance of having the condition put right. A year ago I saw a woman who had been married for 15 years and had been treated on many occasions for "neurotic" symptoms. She developed a "grumbling appendix," and when I essayed to make a vaginal examination to exclude pelvic trouble I found an unruptured hymen. The patient then explained that on one occasion a year or two after her marriage she had plucked up courage to tell her doctor that proper intercourse had not taken place.

The doctor hadn't bothered about it and she hadn't cared to mention it again. I dealt with the vaginal condition when I had removed the appendix and strongly urged the couple to begin to live a normal married life. But the wife argued that she and her husband had become accustomed to the present manner of living and that she was now 40, and if she become pregnant the labour might be difficult and dangerous. And so this couple have agreed to be just "good companions" for the remainder of their lives. How different things might have been had the doctor helped the shy young bride to tell what was troubling her, and how much treatment for "neurosis" might have been rendered unnecessary had normal marriage relations been made possible as they so easily might have been.

I have heard the view expressed that when a difficulty occurs at the outset of married life, it is because the wife is frigid. This most certainly is not true where the difficulty is overcome at an early stage before vaginismus had become a complication. A normal state can almost be guaranteed to follow appropriate treatment so that coitus, instead of an act associated with physical and mental distress becomes, the French phrase, "le grand plaisir."

TREATMENT

If soon after marriage it is discovered that an unruptured hymen or hymenal tags are making normal coitus either not possible or only painfully possible. It may be sufficient, with full anaesthesia, digitally to dilate the vaginal entrance until two fingers can be introduced without setting up any sense of spasm. But, should advice not be sought until months or even years have passed, during which repeated unsuccessful attempts at coitus have been made, something more than simple digital stretching of the vaginal will be necessary. Vaginismus will be set up by every attempt to stretch the vaginal entrance. The muscles which surround the lower part of the vagina will go into spasm even before the finger enters the vagina. An antero-posterior incision is made from the posterior margin of the vagina and carried backwards towards the anus for about $1\frac{1}{2}$ in. The incision is deepened until the circular muscle fibres at the back of the vagina are exposed and these

are divided to a depth of at least $\frac{1}{2}$ in. The vagina is next freely dilated with the fingers until it is possible to pass three fingers well up towards the cervix uteri. The vertical incision is then sutured horizontally. Since the presence of a tender scar must if possible be avoided, the edges of the incision should be carefully approximated with a continuous catgut stitch.

In this region catgut rapidly softens and dissolves; therefore it is well to prevent early gaping of the wound by inserting fairly deeply two or three silkworm gut stitches.

It is essential to keep in touch with the patient until the cure is complete; to advise that coitus shall be attempted fairly soon (say, six weeks after operation). That the patient's buttocks should be raised on a pillow and that a $\frac{1}{2}$ gr. cocaine suppository be introduced into the vaginal entrance 20 to 30 minutes prior to coitus being attempted. Her previous experience will have led the patient to think of coitus as a painful and distressing ordeal; the mere anticipation of pain is likely to set up a vaginismus. But by carrying out the suggested treatment in detail it ought to be possible to establish a normal married life, even after years of ineffectual attempts have elapsed.

SECONDARY DYSPAREUNIA

A majority of patients suffering from dyspareunia have developed it as a consequence of some pathological condition of the genital organs. Almost any inflammatory lesion of any of the genitalia is liable to interfere with normal coitus.

VULVAL PAIN

It is important to discover just where pain is felt during intercourse. Vulval conditions likely to give rise to dyspareunia include urethral caruncle; the soreness produced by an irritating vaginal discharge; the tender scar left after suture of a torn perineum.

UTERUS

Very occasionally an eroded uterine cervix is the cause of dyspareunia. But an erosion is more likely to cause this symptom by the discharge from it producing a hypersensitive

state of the vaginal mucous membrane. Considerable degrees of prolapse may exist without interfering with normal coitus; of course usually the prolapse becomes reduced when the patient lies down. Retro-displacements of the uterus cause dyspareunia only if the uterus is abnormally tender.

Rob's wife is an example of a not uncommon type of secondly dyspareunia, in which an abortion or a labour has been complicated by (perhaps quitemild sepsis). A heavy sagging, tender uterus is associated with irritating vaginal discharge and persistent backache and pelvic pain, so that, quite apart from dyspareunia, the patient is a semi-invalid, constantly in misery. All sorts of minor treatment is advised in such case: the woman is only likely to be restored to health when the womb (useless for procreative purposes) has been removed, leaving one or both ovaries, of course.

ADNEXA

By far the most frequent seat of acquired dyspareunia lies in the ovaries and tubes. Quite healthy ovaries, if prolapsed into Douglas's pouch, may be pressed upon during coitus and produce dyspareunia.

Salpingitis (with or without gross inflammation of the ovaries) is nearly always associated with pain on coitus, especially when adhesions anchor the ovaries and prevent them from freely moving away to avoid contact with the penis.

ENDOMETRIOMA

Dyspareunia is an early symptom in many cases of endometriosis. Not only is an ovary in which a patch of endometrial tissue has become embedded almost certain to be painful and tender, but, if there should be endometrial deposit anywhere in the pelvis where during coitus the penis can come into contact with it, then dyspareunia will result.

TREATMENT

Treatment in these cases resolves itself into rectifying whatever lesion is causing the symptom. I would emphasize the fact that this symptom is not likely to be spontaneously

complained of; that nevertheless it is a quite common symptom in many conditions of pelvic disease, and one which has consequences more serious than most painful states; that it may permanently ruin domestic happiness; that in fact "there's no trouble like it for making a person feel down-hearted." In a great majority of cases it depends on some cause which is amenable to treatment; and to clear up this symptom is likely to revolutionize what has been a miserable existence into a condition of healthy happy life.

Clinical Journal, June 1940.

Proceedings of the Joint meeting of the Madura, Ramnad,
Tinnevely and Trichinopoly District Medical Associations
held on the 25th May 1940 at Kodaikanal Hills.

A joint meeting of the Madura, Ramnad, Tinnevely and Trichinopoly District Medical Associations was held on the 25th May '40 at the Missionary Union Hall, Kodaikanal Hills.

Nearly 70 doctors from the Districts attended the meeting. Among the guests there were some prominent members of the profession from Madras.

The meeting commenced at 2-30 P.M. Capt. F. A. B. Sheppard, I. M. S., President of the Madura Medical Association was voted to the chair. In a short speech the President welcomed the guests. Then the minutes of the previous meeting was adopted.

The first lecture was by Dr. A. S. Mannadi Nair, Professor of Bio-Chemistry, Madras Medical College, on "DIETETIC TREATMENT OF DISEASES".

Then Rao Bahadur Dr. A. Lakshmanaswami Mudaliar, Principal, Madras Medical College, delivered a very interesting lecture on "MALIGNANT DISEASE OF THE FEMALE GENITAL TRACT". At the end of each lecture there was an interesting discussion.

At this stage the guests adjourned for "TEA", which was provided by Dr. R. K. Chettur, of Kodaikanal on a very lavish scale.

Reassembling after Tea Dr. R. K. Chettur demonstrated the following cases of Surgical Emergencies operated by him at the Hospital.

1. A case of Strangulated Umbilical Hernia.
2. A case of Volvulus.
3. A case of Intussusception.

There was some interesting discussion on all these cases as regards the surgical procedure.

This was followed by a lecture on "CLINICAL UTILISATION OF BLOOD STUDIES", by Dr. V. Iravatham of Trichinopoly.

Then Dr. T. H. Somervell of Neyyoor delivered a very interesting lecture on "CANCER AND RADIUM".

The chairman in his concluding speech thanked the lecturers for their very interesting lectures. He also thanked the guests for their kindly gracing the occasion with their presence.

The secretary of the Madura Medical Association proposed a hearty vote of thanks to Dr. R. K. Chettur, the Municipal Commissioner, Kodaikanal, the Health Officer, Kodai Municipality who spared no pains to look to the comforts of the guests, the Kodaikanal Missionary union for their kindly permitting the use of their hall for holding the conference.

The meeting came to a close at 6-30 P. M. At night there was a Dinner at which many members of the profession were present.

The next day (26th) after Chota Hazri in the morning the party went round the Ten-Mile route visiting the Pillar Rocks, the Moir's point and lastly the Observatory where the Director Dr. Narayana and his assistants took the members round and explained to them the working of the various apparatuses there.

The party returned from the Hills the same evening.

P. A. S. RAGHAVAN,

Secretary.

Trichinopoly Municipality

Details of Public Health Activities during May 1940

I. Vital Statistics :

Number of births registered	...	...	...	530
Number of deaths registered	...	...	...	337
Number of deaths from fever	...	...	...	5
Number of deaths from respiratory disease	...	...	...	94
Number of deaths under one year	...	...	...	71
Estimated birth rate	...	...	...	44.5
Estimated death rate per mille	...	...	...	28.2
Number of deaths from child birth	...	...	...	7
Number of deaths from Alimentary disease	...	...	...	48
Infant Mortality rate	...	...	...	133.9

II. Infectious diseases :

	Attack.	Death.		Attack.	Death.
Cholera	Nil	Nil	Measles	7	Nil
Small-pox	32	13	Tuberculosis	} not known	35
Chickenpox	17	Nil	Pneumonia		
Typhoid	4	2	Diphtheria	Nil	Nil
No. of anti-cholera inoculation done	...	...	...	...	Nil
No. of anti-typhoid inoculation done	...	...	...	...	30

No. of vaccination done :

Primary Vaccination	...	...	...	1264
Re-vaccination	...	...	...	7426
Total				8690

III. Maternity and Child Welfare :

(1) No. of cases visited by Women Medical Officer.	} leave on	(2) No. of houses visited by Health Visitor.
(a) Labour		(a) Infants ... 80
(b) Ante-natal	} Nil	(b) Pre-school ... 5
(c) Post-natal		(c) Ante-natal ... 25
		(d) Post-natal ... 138
(3) No. of labour cases conducted by Midwives		... 138

1940

MISCELLANY

143

IV. Propaganda :

No. of lectures with magic lantern demonstration	...	58
No. of lectures without magic lantern demonstration	...	30

V. Food adulteration :

No. of samples taken	...	...	...	22
No. prosecuted	...	...	...	4
Amount of fine imposed	...	...	...	Rs. 35
No. of samples reported adulterated	...	...	...	4
Number Convicted.	...	...	...	3

VI. Meat Inspection :

	No. passed	No. condemned
(1) Sheep	2237	26
(2) Goats	8426	69
(3) Cows and heifers	368	7
(4) Bulls and Bullocks	103	11
(5) Buffaloes	65	6
(6) No. of dogs caught	8	
(7) No. of dogs destroyed	8	
(8) No. of dogs released	1	

VII. General Remarks : Nil.

K. P. THOMAS,
Health Officer.

The Trichinopoly District Medical Association

(Branch of the Indian Medical Association)

TEPPAKULAM, TRICHINOPOLY

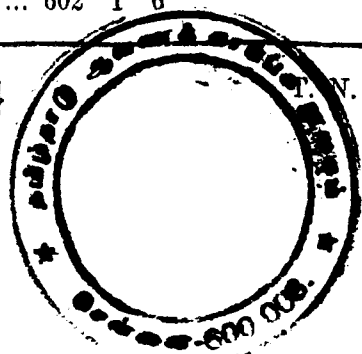
Quarterly Statement of Account for the period
1-3-40 to 31-5-40

RECEIPTS				EXPENDITURE			
	Rs.	A.	P.		Rs.	A.	P.
Cash on hand	5	5	6	Clerk's Salary	54	0	0
Bank Balance	188	5	10	Office Rent	15	0	0
By Fixed deposit with				Miscellany Ptg. charges	60	3	10
Trinity Bank Ltd.	200	0	0	Postage & Telegrams	11	4	9
Members' Subsn.	159	0	0	Printing & Stationery	10	15	5
Advt. charges recd.	22	0	0	Monthly meeting Exps.	8	10	6
Donation to the building	20	0	0	Annual Gathering Exps.	15	0	0
Interest recd. from Bank	6	14	2	I. M. A. subscription	15	0	0
Miscellaneous receipt	0	8	0	Miscellaneous exps.	3	10	0
				Bank commission on			
				cheque	0	2	0
				Cash on hand	14	15	3
				By Bank Fixed deposit	200	0	0
				Bank balance on			
				31-5-40	193	3	9
TOTAL ...	602	1	6	TOTAL ...	602	1	6

TRICHINOPOLY,
1-6-40.

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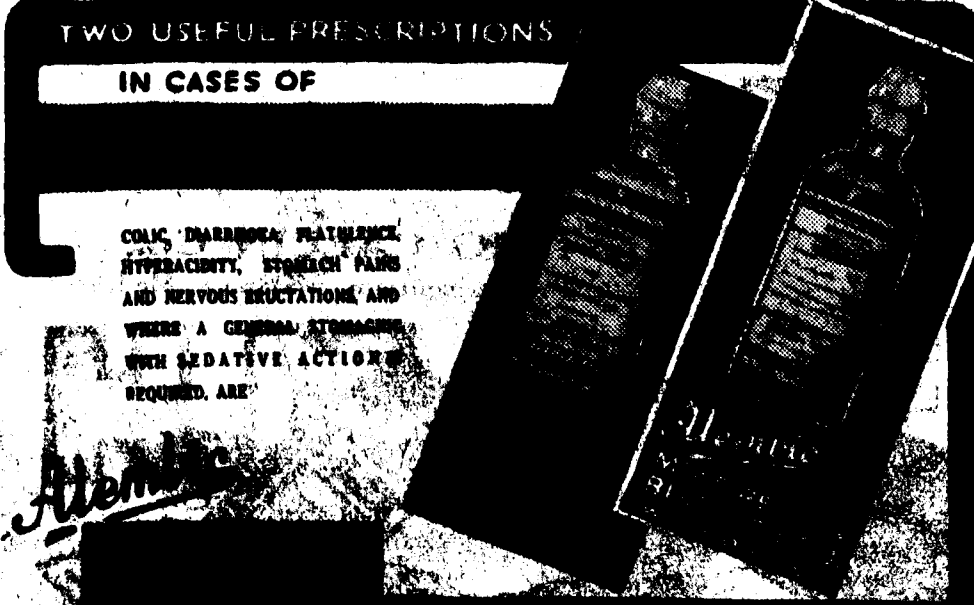
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