Staff Meeting Bulletin
Hospitals of the » » »
University of Minnesota

Artificial Fever Therapy

Volume IX | Friday, May 20, 1938 | Number 28

STAFF MEETING BULLETIN
HOSPITALS OF THE . . .
UNIVERSITY OF MINNESOTA

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William A. O'Brien

I. LAST WEEK

Date: May 13, 1938

Place: Nurses' Hall
Recreation Room

Time: 12:15 to 1:30 P.M.

Program: Movie: "Light Waves and Their Uses"

Burns
Carl Lind
C. Burling Roesch
W. P. Ritchie

Present: 106

Discussion: W. P. Ritchie
C. J. Lind
C. B. Roesch
O. H. Wangensteen
Irvine McQuarrie
N. L. Leven
A. D. Hirschfelder
L. Sperling
C. J. Watson
V. J. Hawkins

Gertrude Gunn,
Record Librarian

II. MOVIE

Title: "Boat Builders"
A Walt Disney Mickey Mouse Feature.

Released by: R-K-O

III. AUTHOR

MALCOLM MacDONELL COOK

Was born in Thomasville, Ga. He attended Vanderbilt University and Emory University Medical School where he received the degrees of B.S. and M.D. in 1933. During his medical school years he attended summer school at the University of Minnesota. At that time he was instructor of micro-anatomy in his Alma Mater. He was an intern on Surgery 1933-34, a resident on Surgery 1934-35, and from July 1st, 1935 to Dec. 31st, 1935 he was a resident on Pediatrics. At this time he was sent to Dayton, Ohio for instruction in the technique of fever therapy. For the past two years he has been actively engaged in research in this division, and has also looked after the clinical side.

IV. GOSSIP

The Minnesota Surgical Society is meeting on the campus today. This is a group of younger surgeons from the various sections of the State, who meet at stated intervals for the purpose of discussing their own work. ...The Minnesota Hospital Association is also meeting in Minneapolis today. A few years ago this organization was small and poorly organized. Today it is one of the dominant groups of its kind. Through the development of the Twin City Hospital Service Association (now the Minnesota) the hospitals have learned to work together. A similar insurance plan is being developed by the University for the entire staff... The most interesting development in the hospital field is the recognition of the various specialties in the hospital family. At today's meeting medical technologists, record librarians, hospital dietitians, medical social workers and others will have their sectional meetings as part of the general program...Hospitals are also becoming public health minded. If every patient entering an institution for any reason had a Wassermann test, a tuberculin test, followed by a roentgen ray, blood pressure determination, examination of urine for albumin and sugar, a study of heart for congenital defects or infectious damage, and a thorough search of the skin, oral cavities, breast, pelvis and rectum for signs of malignancy, there would be almost 100% cooperation with the campaigns against syphilis, tuberculosis, heart disease, diabetes, and malignancy.

V. ARTIFICIAL FEVER THERAPY

M. M. Cook

Report of Two Years' Experience with Artificial Fever.[1]

The Fever Therapy Department of the University of Minnesota Hospitals began to function February 25, 1936. Since the opening date 26 months ago, 98 patients have been given a total of 646 artificial fever treatments. There have been no untoward sequellae, no important complications, and no deaths.

The objectives of the Department, since its beginning, have been threefold:

1. Routine treatment of diseases in which the value of fever therapy is well established.

2. Exploration of promising fields for additional conditions amenable to fever therapy.

3. Study of the physiology of fever, and development and improvement of equipment and technique.

1. Routine Treatments

A summary of diseases treated, number of treatments in each group and brief notations as to results will be found in the accompanying table. During the past few years, fever therapy has been accorded a definite place in the treatment of several conditions as discussed in some detail as follows:

(a) Gonococcal Infections

There appear to be certain gonococcal cases which do not respond satisfactorily to conservative treatment, including the newer chemotherapeutic agents. It is in these individuals that artificial fever proves so effective. Gonococcal arthritis is the form most frequently requiring fever therapy but prostatitis, specific pelvic inflammation, intractible urethritis, etc., may require hyperpyrexia when conservative measures fail.

(b) Syphilis

The treatment of choice, in tertiary syphilis (paresis, tabes, etc.) is artificial fever, with or without added chemotherapy. The choice between malarial or mechanical fever appears to be largely a matter of expediency as both have given satisfactory results. Malaria offers the advantage of simplicity, and mass treatment facility while mechanical fever is more readily controlled for selected cases and can be combined with chemotherapy without checking fever. For the primary and secondary manifestations of syphilis artificial fever must be regarded only as an additional agent available in intractible cases or as an emergency resource when the usual chemical agents are contraindicated.

(c) Chorea

It is becoming apparent that artificial fever is the treatment of choice in chorea provided patients with advanced carditis and decompensation are eliminated. The patients tolerate frequent mild treatment surprisingly well and even severe cases have been found to improve rapidly.

(d) Inflammatory and Infectious Eye Conditions

Traumatic and sympathetic ophthalmia, iritis, etc., are indications for fever therapy as either foreign protein injections or mechanical fever.

(e) Arthritis

The effectiveness of fever in arthritis is difficult to evaluate probably because of the many variations

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[1] Study of Fever Therapy at Minnesota has been made possible through the use of 2 Hypertherm Cabinets supplied by Dr. W. M. Simpson and the Kettering Institute for Medical Research.

in the disease. However, the cases in which infection (past or present) seems to play a part, appear in general to respond favorably to fever therapy. There is usually relief of pain and frequently arrest of the destructive process. Of course, fever has no influence on bony changes already present. So-called hypertrophic arthritis, in general, seems to show little, if any, response to hyperpyrexia.

2. Extending fever therapy

To other conditions reveals several diseases which show sufficient promise to warrant further study.

(a) Intractible bronchial asthma has been found to respond favorably to artificial fever if the patient is maintained on an extremely low salt diet before, during, and after the fever. Further study of this point has revealed an apparent relationship between electrolyte metabolism and asthma. This investigation is being continued in the hope that more insight may be gained in the physiology of the asthmatic mechanism.

(b) One case of bronchiectasis, treated with artificial fever, showed such encouraging results that further inquiry into this condition seems warranted.

(c) Nonspecific pelvic inflammatory disease

has been relieved by artificial fever in several cases. In one instance a secondary bowel obstruction subsided satisfactorily. Further work with this condition is suggested.

(d) Meningococci

share with gonococci a marked thermolability. Bacteriological studies, animal experimentation, and clinical observations suggest that hyperpyrexia may prove to be a valuable adjunct to specific therapy in the treatment of the more chronic forms of meningococcic infections.

3. Improvement of Equipment and Technique

This has claimed a generous share of attention.

(a) A practical and inexpensive electrical thermometer has been developed (with cooperation of Drs. Stenstrom and Vigness) which gives continuous indication of the patient's rectal temperature during treatment. This has proved not only a convenience but a valuable safety device as it permits continuous check of the patient's temperature.

(b) The original fever therapy technique utilized cabinet temperatures as high as 140° to 160° F. Successive alterations in the mechanism and controls of the original cabinets have increased the relative humidity available and resulted in lowering operating temperatures to 110° to 115° F. This change has increased the comfort of the patient, lowered the sedative requirements, and has reduced skin complications, uncontrollable temperatures, and vasomotor collapse to the vanishing point. Pulses run lower and salt and fluid balance is more easily maintained. These benefits probably result from avoidance of excessively high skin temperatures.

In general, our attitude toward fever therapy remains essentially unaltered after 2 years' experience. Fever therapy is a vigorous and radical procedure not to be regarded casually or undertaken thoughtlessly. Candidates for fever therapy should be selected from those patients who fail to respond to more simple and conservative measures. When conditions justify it, fever therapy can be carried out with relative ease and safety and the results obtained amply justify the place of fever in the Hospitals' armamentarium.

Condensed Results of Fever Therapy
University of Minnesota Hospitals

Disease	Cases	Treatments	Results
Asthma, bronchial	6	27	5 good result 1 poor result
Arthritis	12		
Infectious 8		125	(5 satisfactory
Hypertrophic 3		20	(3 complete remission
Undulant fever 1		3	(3 no benefit (1 symptomatic relief
Blastomycosis	1	2	1 symptomatic relief
Bronchiectasis	1	5	1 marked improvement
Chorea	12	88	Very satisfactory in every case
Dermatomyositis	1	9	1 relief of joint pains but nothing more
Dermatitis Herpetiformis	1	8	1 no benefit
Diphtheria Carrier	2	19	(1 cleared up (1 remained positive
Atopic Eczema	1	5	1 suggestive improvement
Gonococcal Infections	35		
Arthritis 21		120	(18 satisfactory (3 dismissed - poor cooperation
Urethritis 9		35	9 all cleared up
Prostatitis 2		22	2 all cleared up
Prost. and Urethr. 2		6	2 all cleared up
Epididymitis 1		3	1 cleared up
Malignancy	2		
Pulmonary (?) 1		3	1 no benefit
Osteosarcoma 1		8	1 no benefit
Meningococcic Inf.	1	3	1 recovered completely
Multiple Sclerosis	3	26	3 no benefit

Continued on Page 354.

Condensed Results of Fever Therapy
University of Minnesota Hospitals (Cont.)

Disease	Cases	Treatment	Results
Ophthalmological Cases	6		
G.C.Conjunctivitis	1	1	1 satisfactory
G.C.Iridocyclitis	1	8	1 recovery
Interstitial Keratitis	2	14	(2 fair improvement, (both advanced cases
Luetic Uveitis	1	1	1 satisfactory
Traumatic Ophthalmia	1	4	1 recovered
Syphilis	7		
Paresis	5	37	(1 juvenile poor (2 satisfactory (2 still under treatment
Tabes	1	7	1 satisfactory
C.N.S.	1	2	1 discharged - poor cooperation
Pelvic Inflammation	5	25	5 all satisfactory
Undulant Encephalitis	1	5	1 very little benefit
Pulmonary Osteoarthropathy	1	5	1 no benefit
TOTAL	98 Cases	646 Treatments	

Addenda

A brief word of appreciation is due the two nurses of the Fever Therapy Department, Miss Eva Adamson, R.N., and Miss Margaret Orthober, R.N. They are responsible for the actual management of the patient during treatment. Their efficiency, dependability and loyalty have contributed largely to the efficiency, safety, and success of the department.

M.M.C.

Physical Therapy Note

Through the efforts of Dean Diehl and the newly appointed Physical Therapy Committee, the excellent service of the Physical Therapy Department is being further extended. Dr. M. M. Cook is available to follow patients throughout the course of treatment, to evaluate progress, and to record results in available form. Any problems pertaining to physical therapy should be referred to him and every effort will be made to cooperate in finding a solution.

It will be helpful if all requests for physical therapy include sufficient data on the case to (1) establish the diagnosis, (2) indicate type and location of treatment, (3) and suggest criteria for results.

One problem under investigation at present is the use of ultraviolet light in healing of chronic ulcers and wounds. Reference of all such patients to physical therapy will be appreciated.

Owing to the limited personnel, it is impossible to give more than a few ultraviolet light treatments on the wards each week. It will help greatly if all such patients, who can be moved, are sent down to Physical Therapy. Treatment requires only 60 seconds for each area so the patient can be returned immediately. When bedside treatment on the ward is absolutely essential, arrangements should be made with Dr. Cook, who will make every effort to see that the procedure is carried through.

K.W.S.

VI. RABIES

The reason for this summary is twenty-one cases of proven rabies in dogs in Minneapolis, with the danger of human infection.

Rabies was described by Aristotle, Celsus, Galen and by writers during the Middle Ages. In 1804 it was known that the saliva was the infectious agent. In 1881 Pasteur proved the presence of the virus in the central nervous system and successfully reproduced the disease by inoculation of this material. Prophylactic measures were developed in 1884.

There are many synonyms (lyssa, hydrophobia, Wasserscheu, Wut, Tollwut, and LaRage). The disease occurs in all countries, climates and seasons of the year. Because of control measures it does not exist in Australia, and has not been known in the Scandinavian countries for over 50 years. It can best be controlled in insular or peninsular countries through quarantine. At one time it was very common in England. Eradication nearly followed enforcement of the muzzling law. When the law was relaxed, it immediately returned. Since the law has been enforced rabies has again disappeared. Minnesota has been free for about 20 years.

State Department of Health records show that 26 persons have died of this disease in Minnesota. The first record is in 1894, the last in 1921. During part of this time, the State Department of Health had a Pasteur Institute which was discontinued when prophylactic administration became available to all physicians. While the disease is still confined to animals, the veterinary laboratories of the Farm School conduct the examinations. When humans are involved, State Department of Health laboratories determine the cause of death in animals and man.

The cause is a filterable virus. It enters the body through a bite or rarely when the saliva comes in contact with an open wound or with the mucosa of the lips or nose. The virus is disseminated along the nerve trunks, passing along the efferent nerves from the brain to the salivary glands. The Negri bodies are positive indication that the disease is present. They may be absent. Animal inoculation is always done as an additional precaution. The virus has been demonstrated in nearly all the organs except the liver, spleen, blood and muscle.

It is important to remember the incubation period. In man it may be 10 days to 1 or more years. The average time is 50 to 60 days. In dogs it is usually between 15 and 30 days but may be as short as 8 days or as long as a year or more. In a practical way the following rule is recommended by all authorities. If a dog bites someone, and the dog does not show signs of rabies, it should be confined for 14 days. If nothing develops, both the dog and the person who has been bitten are free of the disease.

Dogs account for 90% of the human cases. Skunks, cats, wolves and some other animals make up the other 10%. Rabies occurs in dogs, wolves, jackals, foxes, hyenas, cats, skunks, cattle, sheep, goats, and swine. In a South American epidemic in cattle and horses, bats were thought to be the responsible agent.

The character of the wound and its location are of importance. It is estimated that only 10 to 15% of all persons bitten by a rabid animal will develop rabies (no immunization done). Recovery is said to be unknown. If the bite is on the face and head, 60 to 70% will develop the disease. On the hands 15 to 20%, and through the clothing 1%. The mortality of properly treated and immunized cases is less than 1 per 1000. Deep lacerating wounds are most serious as a large number of nerve fibers are involved.

All dog bites should be mechanically cleansed and cauterized with pure carbolic acid followed immediately by 95% alcohol. Fuming nitric acid is also very effective. The State Department of Health recommends using a small pipette to get the nitric acid into the

wound followed by carbolic and alcohol. This method, while effective, does not completely protect but apparently prolongs the incubation period. The saliva of the infected animal may contain the virus from 4 to 6 days before symptoms develop. It is not believed that such bites are as serious as those which occur after the clinical disease is present.

In dogs the disease assumes two forms: the furious and the dumb. It is interesting to note that the first rabid dog discovered in Minneapolis had dumb rabies. It was the dog of a physician who insisted on a diagnosis from several veterinarians (he did not receive very much encouragement). In the furious type, the first symptom is altered disposition. The gentle dog becomes morose, hides, and refuses food, or the animal may become excessively friendly and stay at his master's side. Contrary to popular belief, rabid dogs may bite their masters (State Department of Health record). 12 to 48 hours later the dog becomes restless and agitated. It seems under a strange compulsion but will still obey commands. There are short periods of rest. Irritation over restraint and attacks of strangers without warning are noted.

As the disease progresses, the dog barks and snarls, frequently at an imaginary object. On the farm, it may run amuck, biting the stock, including the chickens. (Personal experience of Miss Eva Dawalt). If the animal is housed, it becomes destructive. If free, it runs long distances, biting animals and individuals as it goes along. It strikes and passes but does not seek quarrels. It continues to wander until paralysis supervenes when it comes home to die. One such animal that I saw last week was spent and worn, covered with blood, saliva, and dirt, and unable to swallow.

The dumb form is fairly common (20%). The initial stages of the disease are absent and, as the paralysis develops, this is the variety often mistaken for a bone in the throat. Paralysis may begin in any muscle or group. The dog cannot close his mouth as the tongue hangs out, and saliva flows in profuse amounts.

In man, the disease usually has a prodrome of mental depression, sense of danger, insomnia, and wild dreams. As in the dog, the patient becomes restless. The skin is hyperesthetic and very sensitive to air. There is also sensitivity to sight and sound. The patient is usually aware of his condition and at times may become frantic. He does not bark. (only in hysteria). The noise in his throat may be confusing. He also has an excessive flow of saliva. Hydrophobia is due to interference with swallowing, probably of central origin. As soon as a glass of water is put to the lips, the spasm comes on. Death may occur from exhaustion during convulsions. There is also a paralytic form similar to dumb rabies.

The Pasteur treatment should be given to all cases known to be bitten by rabid animals or when the animal has not been captured. The immunity starts about 2 weeks after treatment and lasts a variable period of time. Inoculations of dogs with 1 injection has its supporters and opponents. The quarrel over the muzzle seems to be misdirected. Veterinarians insist that any well muzzled dog cannot be allowed to run for any length of time. The best method is to allow the dog to run for a time with his muzzle on and then to tie him up in the house or yard or put him in a pen. It is believed that the disease was introduced into Minneapolis through tourists' dogs. The Pasteur treatment is given once a day for 14 days and is practically free from reactions and complications.

References:

Cecil Textbook of Medicine, 1938

Rosenau: Preventive Medicine and Hygiene, 1935

State Department of Health Records