



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

Posterior Pituitary
Extract in Urology

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William A. O'Brien, M.D.

I. UNIVERSITY OF MINNESOTA MEDICAL SCHOOL
CALENDAR OF EVENTS
 No. 56 January 29, February 3

Monday, January 29, 1945

- 9:00 - 10:00 Roentgenology-Medicine Conference; L. G. Rigler; C. J. Watson and Staff; Todd Amphitheater; U. H.
- 9:00 - 11:00 Obstetrics and Gynecology Conference; J. L. McKelvey and Staff; Interns Quarters, U. H.
- 12:30 - 1:30 Pathology Seminar; Encephalitis of the Equine Type; Carl Eklund; 104 I.A.
- 8:00 - Special Medical School Lecture - The Hemopoietic Substances in Liver and Yeast; J. J. Pfiffner, 15 McS.

Tuesday, January 30

- 9:00 - 10:00 Roentgenology-Pediatrics Conference; L. G. Rigler, I. McQuarrie and Staff; Eustis Amphitheater, U. H.
- 11:00 - 12:00 Urology Conference; C. D. Creevy and Staff; Main 515, U. H.
- 12:30 - 1:30 Pathology Conference; Autopsies; Pathology Staff; 104 I. A.
- 12:30 - 1:30 Physiology-Pharmacology Seminar; Drug Fastness; H. N. Wright; 214 M. H.
- 4:00 - 5:00 Physiological Pathology of Surgical Diseases; Physiology and Surgery Staffs; Todd Amphitheater, U. H.
- 4:30 - 5:30 Obstetrics and Gynecology Conference; J. L. McKelvey and Staff; Station 54, U. H.
- 4:00 Changing Concepts of Functional Uterine Bleeding; E. C. Hamblen, Duke University Medical School; Todd Amphitheater.
- 4:00 - 5:00 Pediatrics Grand Rounds; I. McQuarrie and Staff; W-205 U. H.
- 4:30 - 5:30 Ophthalmology Ward Rounds; Erling Hansen and Staff; E-534, U. H.
- 5:00 - 6:00 Roentgen Diagnosis Conference; Leslie Anderson, K. W. Stenstrom; 515 U. H.

Wednesday, January 31

- 9:00 - 11:00 Neuropsychiatry Seminar; J. C. McKinley and Staff; Station 60, Lounge, U. H.
- 11:00 - 12:00 Pathology-Medicine-Surgery Conference; Chronic Glomerulo Nephritis; E. T. Bell, C. J. Watson, O. H. Wangensteen and Staff; Todd Amphitheater, U. H.
- 12:30 - 1:30 Pediatrics Seminar; The Anticoagulants Effective In Vitro with Special Reference to Heparin and Dicumerol; Dr. Booth; W-205 U.H.

- 12:30 - 1:30 Physiological Chemistry Literature Review; Staff; 116 M. H.
- 4:30 - 5:30 Neurophysiology Seminar; The Maturation of Excitability of the Motor Cortex; J. F. Bosma, 214 M. H.

Thursday, February 1

- 9:00 - 10:00 Medicine Case Presentation; C. J. Watson and Staff; Todd Amphitheater, U. H.
- 4:00 - 5:00 Pediatric Journal Club; Review of Current Literature; Staff, W-205 U.H.
- 4:30 - 5:30 Ophthalmology Ward Rounds; Erling Hansen and Staff; E-534, U. H.
- 5:00 - 6:00 Roentgenology Seminar; Review of Recent Radiological Literature; Staff; M-515 U. H.
- 4:30 - 5:30 Bacteriology Seminar; Antibodies in the Allergic States; A. V. Stoesser; 214 M. H.

Friday, February 2

- 9:00 - 10:00 Medicine Grand Rounds; C. J. Watson and Staff; Todd Amphitheater, U.H.
- 10:00 - 12:00 Medicine Ward Rounds; C. J. Watson and Staff; E-214 U. H.
- 10:30 - 12:30 Otolaryngology Case Studies; L. R. Boies and Staff; Out-Patient Otolaryngology Department, U. H.
- 11:45 - 1:15 University of Minnesota Hospitals General Staff Meeting; Ulcerative Colitis in Children--A Psychiatric Evaluation; R. A. Jensen, Olive Lundgren; Powell Hall Recreation Room.
- 1:30 - 2:30 Medicine Case Presentation; C. J. Watson and Staff; Eustis Amphitheater.
- 1:00 - 2:30 Dermatology and Syphilology; Presentation of Selected Cases of the Week; Henry E. Michelson and Staff; W-306 U. H.
- 1:30 - 3:00 Roentgenology-Neurosurgery Conference; H. O. Peterson, W. T. Peyton and Staff; Todd Amphitheater, U. H.

Saturday, February 3

- 8:00 - 9:00 Surgery Journal Club. O. H. Wangensteen and Staff, M-515 U. H.
- 9:00 - 10:00 Pediatrics Grand Rounds; I. McQuarrie and Staff, Eustis Amphitheater, U. H.
- 9:15 - 10:30 Surgery-Roentgenology Conference; O. H. Wangensteen, L. G. Rigler and Staff, Todd Amphitheater, U. H.
- 9:00 - 10:00 Medicine Case Presentation; C. J. Watson and Staff, M-515 U. H.
- 10:00 - 12:00 Medicine Ward Rounds; C. J. Watson and Staff; E-221 U. H.
- 11:30 - 12:30 Anatomy Seminar; Emptying of Stomach in Patients with duodenal Ulcer; E. A. Boyden, Immunity in Poliomyelitis; V. S. Bodin; 226 I. A.

II. POSTERIOR PITUITARY EXTRACT:
USES IN UROLOGICAL DIAGNOSIS
AND TREATMENT

Edgar A. Webb

Posterior pituitary extract is used in testing renal tubular function, urography, and as an hemostatic agent in transurethral prostatic surgery. The antidiuretic and pressor properties of the drug make it valuable in these procedures.

Extracts of the posterior lobe of the pituitary gland contain three active principles; an oxytocic factor, a pressor or smooth muscle stimulating factor and an antidiuretic factor. It has not yet been possible to extract these principles in pure form. The antidiuretic factor cannot be separated from the oxytocic or pressor factor but there are commercially available preparations which contain proportionately larger amounts of the oxytocic factor or pressor factor. Pitressin (N.N.R.), for example, contains ten units of pressor activity and less than one-half a unit of oxytocic factor per cc.

The antidiuretic principle is probably a hormone. The site of action of this principle is in the tubular epithelial cells of the loop of Henle. Water diuresis is inhibited by small doses of posterior pituitary extract. It is to be noted, however, that posterior pituitary extract doesn't increase the capacity of the tubular cells to do osmotic work because when the cells are concentrating to maximum physiological ability, addition of the extract doesn't produce a greater concentration of the urine. Absence of this principle produces diabetes insipidus which is characterized by polyuria resulting from an inability of the renal tubules to reabsorb a normal percentage of the glomerular filtrate. Hypophysectomy likewise produces diabetes insipidus. Clinical and experimental diabetes insipidus are both controlled by administration of posterior pituitary extract.

The pressor principle stimulates all smooth muscle, causing constriction of the arterioles and capillaries. The large and small bowel are stimulated to increased motility and emptying.

Application of the known antidiuretic action of posterior pituitary extract to test renal tubular function has been made. Recently published observations indicate that the test is simple, efficient and compares favorably with the accepted routine clinical tests, particularly the eighteen hour "short" concentration test. Its chief advantages in comparison with the latter test are: no water restriction or special preparation is required; the test is short, only three hours necessary for its completion. Administration of posterior pituitary extract hypodermically causes an increase in the specific gravity of the urine provided that the renal tubular cells are not already concentrating the urine to the maximum. The degree to which the specific gravity of the urine is raised depends upon the dose of the drug, tubular function and the electrolyte and non-electrolyte pattern in the urine. Satisfactory results are obtained when 0.5 cc. of posterior pituitary extract is administered subcutaneously and urine specimens collected at hourly intervals for three hours.

Sodeman and Engelhardt reported observations on the effect of posterior pituitary extract on the specific gravity of the urine of fifteen normal subjects. They concluded that when water diuresis was inhibited by water restriction that the addition of posterior pituitary extract had little or no effect in elevating the specific gravity; water diuresis is inhibited by posterior pituitary extract as demonstrated by failure of diuresis to occur despite a large fluid intake prior to administration of the drug; regardless of the preparation of the patient, the administration of posterior pituitary extract maintained the specific gravity of the urine at levels diagnostic of adequate tubular function; and that in all normal subjects

studied the results were similar and in each instance specific gravity values were equal to or exceeded by those obtained by the standard test with water restriction.

Subsequently the same authors reported additional observations in twenty normal subjects and fifteen patients with various degrees of renal impairment. The observations on the normal subjects were again consistent with their series abstracted above. In various degrees of impairment of renal function, ranging from markedly to slightly impaired, the posterior pituitary extract concentration test reflected accurately the degree of impairment as compared with the eighteen hour concentration test. As tubular function becomes impaired and the concentrating ability reduced, there is a striking parallelism between results obtained by the two tests. In the presence of diuresis of edema fluid associated with congestive heart failure, the posterior pituitary extract concentration test gives an index of the concentrating ability of the kidneys which cannot be obtained by the usual concentration tests. "Ceiling" values for the concentrating ability of the kidney are not attained after posterior pituitary extract. The concentration tests now in use give various values for specific gravity depending upon the degree of water restriction. In normal subjects higher values are obtained at times by prolonged periods of water restriction than with posterior pituitary extract. Under similar conditions with periods of water restriction up to sixteen or eighteen hours the latter is not true. Satisfactory results were obtained when there was no special preparation of the patient prior to the administration of posterior pituitary extract.

This author carried out a series of posterior pituitary extract concentration tests on patients with hypertension who were candidates for splanchnicectomy. The routine pre-operative studies in this group of patients included determinations of renal function as indicated by the blood nonprotein nitrogen level, urea clearance, eighteen hour concentration test and urography.

The posterior pituitary extract test was carried out in the following manner. The patient was instructed to void -- this specimen was marked #1 and saved. He then drank two glasses of water and 0.5 cc. of surgical posterior pituitary extract was administered subcutaneously. Urine specimens were then collected at hourly intervals for the next three hours. The specific gravity of the four specimens was obtained by measuring it in a small urinometer. Interpretation of the results was made on the following basis. Specific gravities of 1020 or higher by the short concentration test are in the normal range; gravities between 1015 and 1020 show moderate impairment of tubular function; values below 1015 show marked impairment.

Urea clearance values from 75-125% show normal function. Values from 50-75% moderate impairment and below 50% progressively severe impairment with uremic levels between 5-10%. Blood non-protein nitrogen levels to 35 mg.% are considered normal. It is known that patients who fail to concentrate above 1.015 by the short concentration test will not excrete a high enough concentration of Diodrast for satisfactory urography.

Posterior pituitary extract is a great aid in obtaining satisfactory urograms because of its action on the small and large bowel resulting in reduction of gas shadows to a minimum and because the antidiuretic action permits the formation of a concentrated urine. When organic iodides are injected for purposes of urography, it is desirable that these substances appear in the collecting system of the kidney in as concentrated a form as possible. The most satisfactory urograms are obtained when efficient catharsis is employed to remove as much of the fecal mass as possible; when water is restricted for sixteen to eighteen hours before the urogram is made, and when 1 cc. of posterior pituitary extract (Pitressin) is given hypodermically an hour before the x-rays are made. The patient should be given an opportunity

to expel all the gas possible before the urogram is made.

In this clinic and in other teaching centers where a large amount of transurethral surgery is performed, the use of an hemostatic solution of Pitressin and epinephrine in saline has proved most effective. The operative blood loss is greatly reduced, the resection of larger amounts of tissue in a shorter period of operation is rendered possible. Spot coagulation of capsular bleeders is possible because the bleeding vessels stand out prominently on the blanched surface of the prostatic capsule. This minimizes the amount of electro-coagulation required to control bleeding, thus reducing infarction and subsequent postoperative slough with late postoperative hemorrhage. In 1944 in this clinic 239 patients underwent transurethral prostatic surgery. Pitressin was used in 60 cases. The average amount of tissue removed in this latter group was 61.8 grams. The average operative blood loss was 250 cc. The average postoperative blood loss was 90 cc. There were three deaths in this group. This series compares favorably with comparable series reported elsewhere. The average amount of tissue removed exceeds by 20 grams the average amount of tissue removed in a similar series where Pitressin was not employed. With larger glands a blood loss of 10 cc. per gram of tissue removed is not considered excessive. The tremendous reduction in operative blood loss is readily apparent after the use of Pitressin.

That posterior pituitary extract is a valuable adjunct to the urological armamentarium is without question. It is useful in estimating renal tubular function, in preparation for urography and for controlling blood loss and facilitating removal of large amounts of tissue in transurethral prostatic surgery.

References

1. Sodeman, W. A. and Engelhardt, Hugh T. A Renal Concentration Test Employing Posterior Pituitary Extract: Response of Normal Subjects. Proc.Soc.Exper.Biol. & Med., 46: 688-691 (April) '41.
2. Sodeman, W. A. and Engelhardt, Hugh T. A Renal Concentration Test Employing Posterior Pituitary Injection. Jour.A.M.A. 122: 1070-1072 (Aug.14) '43.
3. Wall, Harry C., Lt. A Renal Concentration Test Using Solution of Posterior Pituitary. Arch.Int.Med., 71: 454-459 (April) '43.
4. Goodman, L., and Gilman, A. The Pharmacological Basis of Therapeutics. New York, The MacMillan Co., '41.

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III. GOSSIP

Medical Director Joseph Mountin, United States Public Health Service, spoke to the Senior Medical students on "Collectivism" as a Means of Supplying Medical Service. Dr. Mountin who hails from Wisconsin has spent his entire professional life in the service, and is now engaged in state development programs. He gave a provocative talk on the various methods of payment for medical service and the need for service in under-privileged areas. Some of the young men felt that they might be sent to outlying districts under government orders at some time in the future, but Dr. Mountin hoped that the good folks would deserve something better than a steady diet of recent graduates. He asked them all to be objective in their studies of a sick society as they would be objective in the study of a sick man. Dr. Mountin returned from India just in time to fill his assignment here....On the same evening the Freshman medical class invited their teachers to sit in with them for a discussion of Trends in Medicine lead by Haven Emerson and Roland Vaile. Everyone took part, either as an active participant or a good listener. The meeting broke up at a late hour with the belief that much had been accomplished, but that further meetings were necessary. Some Medical Schools are appointing men to chairs in Social Medicine, chiefly in England. The new concept of medicine as a social function has concentrated thinking in this field....At the Center for Continuation Study at the course in Hospital Administrators, an entire day was devoted to the subject of Medical Care Trends. Discussants were Joseph Lohman, Basil MacLean, Joseph Mountin, and Haven Emerson. On Thursday Dr. E. M. Bluestone, Medical Director and Administrator, Montefiore Hospital for Chronic Diseases, New York, spoke to the medical seniors on Chronic Disease Care. Montefiore which means flower mountain, is a haven for those who suffer from irreversible disorders. These patients have problems like acute disease patients, and a number of these problems can be solved, even though cure is not obtained. I can still recall the early reports from this institution on the treatment of bone metastasis in carcinoma of the breast. In a group of women who had been hospitalized

for some time and who had been suffering extreme pain, relief was obtained, and the description of this ward before and after treatment had been started is a classic. Other problems of patients with chronic disease will respond to care when research and clinical interest is directed their way. Physicians of the future will not scorn patients who are "old chronics" for these patients will form the bulk of our practice. Our institutions will have to be modernized in order to care for them properly. The incidence of the chronic, disabling disease is on the increase and money for investigation is needed....Dr. E. L. Tuohy in our state has pioneered in focussing attention on the changes which have occurred in our practice. For some time he has been studying causes of death in his clinic patients, and he has found that national trends have caught up with them. In 1900 in Duluth, 24% of the deaths in all patients occurred in the first year of life and only 4% after 75 years of age. In 1937, only 5% of the deaths occurred in the first year of life and 25% after 75 years of age. The greatest number of invalids are to be found in sufferers from nervous and mental disease, heart disease, tuberculosis, arteriosclerosis, hypertension, diabetes, asthma, cancer and other diseases of the female organs. Arthritis remains as one of our great problems. It is seldom if ever, the cause of death, but as a cause of disability it is great. At the University of Michigan, a special research project on the study of arthritis has been going for some time. The prominent role which arthritis plays in our outpatient service is not entirely due to the interest which we have displayed in the subject, but also to the fact that there are so many sufferers with this disease. Minnesota for many years has been the only state in the union in which cancer deaths in males have exceeded females. Our cancer problem is different in other ways for we find many disorders of the lymphatic organs as a cause of disability and death. Some day chronic diseases will be considered just as "good" teaching material as "acute" cases are today.....