



Bulletin of the
**University of Minnesota Hospitals
and
Minnesota Medical Foundation**



**Persistent Sequellae
of Bulbar Poliomyelitis**

BULLETIN OF THE
UNIVERSITY OF MINNESOTA HOSPITALS
and
MINNESOTA MEDICAL FOUNDATION

Volume XX

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Editor

George N. Aagaard, M.D.

Associate Editors

Wallace D. Armstrong, M.D.
Erling S. Platou, M.D.
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Address communications to: Staff Bulletin, 332M University of Minnesota
Hospitals, Minneapolis 14, Minnesota.

I. UNIVERSITY OF MINNESOTA MEDICAL SCHOOL
CALENDAR OF EVENTS

February 13 - 19, 1949

No. 235

Sunday, February 13

9:00 - 11:30 Surgery Grand Rounds; Station 22, U. H.
 Electrolyte Balance in Surgical Patients; Russell Nelson; Rm. M-109,
 U. H.

Monday, February 14

- 8:00 - Fracture Rounds; A. A. Zierold and Staff; Ward A, Minneapolis General Hospital.
- 9:00 - 9:50 Roentgenology-Medicine Conference; L. G. Rigler, C. J. Watson and Staff; Todd Amphitheater, U. H.
- 9:00 - 10:50 Obstetrics and Gynecology Conference; J. L. McKelvey and Staff; M-109, U. H.
- 10:00 - 12:00 Neurology Rounds; A. B. Baker and Staff; Station 50, U. H.
- 11:00 - 11:50 Roentgenology-Medicine Conference; Staff; Veterans Hospital.
- 11:00 - 11:50 Physical Medicine Seminar; E-101, U. H.
- 11:00 - 12:00 Cancer Clinic; K. Stenstrom and A. Kremen; Eustis Amphitheater, U. H.
- 12:00 - 1:00 Physiology Seminar; The Hydrolysis of Conjugated Steroids in Urine; Saul L. Cohen; 214 M. H.
- 12:15 - 1:20 Obstetrics and Gynecology Journal Club; Staff Dining Room, U. H.
- 12:30 - 1:20 Pathology Seminar; Recent Developments in Experimental Diabetes; Bernard Zimmerman; 104 I. A.
- 12:30 - 1:30 Surgery Problem Case Conference; A. A. Zierold, C. Dennis and Staff; Small Class Room, Minneapolis General Hospital.
- 1:30 - 2:30 Surgery Grand Rounds; A. A. Zierold, C. Dennis and Staff; Minneapolis General Hospital.
- 1:30 - 2:30 Pediatric-Neurological Rounds; R. Jensen, A. B. Baker and Staff; U. H.
- *4:00 - 6:00 Kellogg Lecture; Hearing Loss; Lawrence R. Boies; Powell Hall Amphitheater.
- 4:00 - Pediatric Seminar; The Endocrine Control of Carbohydrate Metabolism; Edward Bauer; 6th Floor, Child Psychiatry, U. H.

* Indicates special meeting. All other meetings occur regularly each week at the same time on the same day. Meeting place may vary from week to week for some conferences.

- 5:00 - 5:50 Clinical Medical Pathologic Conference; Todd Amphitheater, U. H.
- 5:00 - 6:00 Urology-Roentgenology Conference; D. Creevy and H. M. Stauffer and Staffs; M-109, U. H.
- *8:00 p.m. Clinical Research Club; Bone Marrow in Pregnancy, Roy Holly; Wound Healing in Anemia and Malnutrition; Y. Sako; Eustis Amphitheater, U.H.

Tuesday, February 15

- 8:30 - 10:20 Surgery Reading Conference; Small Conference Room, Bldg. I, Veterans Hospital.
- 9:00 - 9:50 Roentgenology Pediatric Conference; L. G. Rigler, I. McQuarrie and Staff; Todd Amphitheater, U. H.
- 10:30 - 11:50 Surgical Pathological Conference; Lyle Hay and Robert Hebbel; Veterans Hospital.
- 12:30 - 1:20 Pathology Conference; Autopsies; Pathology Staff; 102 I. A.
- 1:00 - 2:30 X-ray-Surgery Conference; Auditorium, Ancker Hospital.
- 2:00 - 2:50 Dermatology and Syphilology Conference; H. E. Michelson and Staff; Bldg. III, Veterans Hospital.
- *2:00 - 4:00 Kellogg Lecture; The Applied Physiology of the Respiratory Tract; Anderson C. Hilding, Duluth; Todd Amphitheater, U. H.
- 3:15 - 4:20 Gynecology Chart Conference; J. L. McKelvey and Staff; Station 54, U. H.
- 3:30 - 4:20 Clinical Pathological Conference; Staff; Veterans Hospital.
- 4:00 - 5:00 Pediatric Rounds on Wards; I. McQuarrie and Staff; U. H.
- 4:00 - 5:30 Surgery-Physiology Conference; Neurosurgical Problem; Ernst Gellhorn and William T. Peyton; Eustis Amphitheater, U. H.
- 5:00 - 5:50 Urology-Pathological Conference; C. D. Creevy and Staff; Todd Amphitheater, U. H.
- 5:00 - 6:00 X-ray Conference; Dr. L. G. Rigler and Staff, U. H.; Powell Hall Amphitheater.

Wednesday, February 16

- 8:00 - 8:50 Surgery Journal Club; O. H. Wangenstein and Staff; M-515, U. H.
- 8:30 - 9:30 Clinico-Pathological Conference; Auditorium, Ancker Hospital.
- 8:30 - 10:00 Orthopedic-Roentgenologic Conference; Edward T. Evans; Room 1A7, Veterans Hospital.
- 8:30 - 12:00 Neurology Rehabilitation and Case Conference; A. B. Baker and Joe R. Brown; Veterans Hospital.

- 11:00 - 12:00 Pathology-Medicine-Surgery Conference; O. H. Wangensteen, C. J. Watson and Staff; Todd Amphitheater, U. H.
- 12:00 - 12:50 Radio-Isotope Seminar; Statistical Implications of Particle Measurements; J. C. Wang; Rm. 212 Hospital Court, Temporary Bldg.
- 3:30 - 4:30 Journal Club; Surgery Office, Ancker Hospital.
- 4:00 - 5:00 Infectious Disease Rounds; Main Lecture Room, Minneapolis General Hospital.
- 4:00 - 6:00 Public Health Seminar; Emergency Mobilization of Health Resources; James A. Crabtree, National Security Resources Board, Washington, D.C.; 113 MeS.

Thursday, February 17

- 8:15 - 9:00 Roentgenology-Surgical-Pathology Conference; Craig Freeman and H. M. Stauffer; M-109, U. H.
- 8:30 - 10:20 Surgery Grand Rounds; Lyle Hay and Staff; Veterans Hospital.
- 9:00 - 9:50 Medicine Case Presentation; C. J. Watson and Staff; , -109, U. H.
- 10:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.
- 10:30 - 11:50 Surgery-Radiology Conference; Daniel Fink and Lyle Hay; Veterans Hospital.
- 11:00 - 11:50 Urology Seminar; E-101, U. H.
- 11:00 - 12:00 Cancer Clinic; K. Stenstrom and A. Kremen; Todd Amphitheater, U. H.
- 11:30 - 12:30 Clinical Pathology Conference; Steven Farron, C. Dennis, George Fahr, A. V. Stoesser and Staffs; Large Class Room, Minneapolis General Hospital.
- 12:00 - 1:00 Physiological Chemistry Seminar; The Degradation of L-Lysine in Guinea Pig Liver Homogenate; William Cohen; 214 M. H.
- 1:00 - 1:50 Fracture Conference; A. A. Zierold and Staff; Minneapolis General Hospital.
- 2:00 - 3:00 Errors Conference; A. A. Zierold, C. Dennis and Staff; Large Class Room, Minneapolis General Hospital.
- *2:00 - 4:00 Kellogg Lecture; The Role of Potassium in Health and Its Alterations in Various Disease States; Allan M. Futler, Mass. General Hospital, Boston; Eustis Amphitheater, U. H.
- 4:00 - 5:00 Bacteriology and Immunology Seminar; Sporotrichoses--Report of Two Minnesota Cases; Miss Mary Giblin; 214 M. H.
- 4:30 - 5:20 Ophthalmology Ward Rounds; Erling W. Hansen and Staff; E-534, U. H.
- 5:00 - 6:00 X-ray Seminar; Thoracic Surgery Conference; Drs. Kinsella and Jensen, Todd Amphitheater.

Wednesday, February 16

*8:15 p.m. Luthard N. Bergh Memorial Lecture; Certain Aspects of the Physiology of the Extra Hepatic Biliary Tract; Prof. A. C. Ivy, University of Illinois; Museum of Natural History Auditorium.

Friday, February 18

8:30 - 10:00 Neurology Grand Rounds; A. B. Baker and Staff; Station 50, U. H.
 9:00 - 9:50 Medicine Grand Rounds; C. J. Watson and Staff; Todd Amphitheater, U.H.
 10:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.
 10:30 - 11:20 Medicine Grand Rounds; Staff; Veterans Hospital.
 10:30 - 11:50 Otolaryngology Case Studies; L. R. Roies and Staff; Out-Patient Department, U. H.
 11:00 - 12:00 Surgery-Pediatric Conference; C. Dennis, O. S. Wyatt, A. V. Stoesser and Staffs; Minneapolis General Hospital.
 11:30 - 12:50 University of Minnesota Hospitals General Staff Meeting; Localized Myxedema; Harold G. Hurst; Powell Hall Amphitheater.
 12:00 - 1:00 Surgery Clinical Pathological Conference; Clarence Dennis and Staff; Large Classroom, Minneapolis General Hospital.
 1:00 - 1:50 Dermatology and Syphilology; Presentation of Selected Cases of the Week; H. E. Michelson and Staff; W-312, U. H.
 1:00 - 3:00 Pathology-Surgery Conference; Auditorium, Ancker Hospital.
 1:00 - 2:50 Neurosurgery-Roentgenology Conference; W. T. Peyton, Harold O. Peterson and Staff; Todd Amphitheater, U. H.
 4:00 - 5:00 Electrocardiographic Conference; George N. Aagaard; 106 Temp. Bldg., Hospital Court, U. H.

Saturday, February 19

7:45 - 8:50 Orthopedics Conference; Wallace H. Cole and Staff; Station 21, U. H.
 8:30 - 9:30 Surgery Conference; Auditorium, Ancker Hospital.
 8:00 - 9:00 Pediatric Psychiatric Rounds; Reynold Jensen; 6th Floor, West Wing, U.H.
 8:00 - 9:00 Surgery Literature Conference; Clarence Dennis and Staff; Minneapolis General Hospital, Small Classroom.
 9:00 - 9:50 Medicine Case Presentation; C. J. Watson and Staff; E-101, U. H.
 9:00 - 10:30 Pediatric Grand Rounds; I. McQuarrie and Staff; Eustis Amphitheater, U. H.
 9:00 - 11:30 Surgery-Roentgenology Conference; Cecostomy; Charles Rea; Todd Amphitheater, U. H.
 9:00 - 12:00 Psychiatry Conference; Powell Hall Amphitheater.
 10:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.
 10:00 - 12:50 Obstetrics and Gynecology Grand Rounds; J. L. McKelvey and Staff; Station 44, U. H.
 11:00 - 11:50 Urology Seminar; Undescended Testis; David Anderson, E-101, U. H.
 11:00 - 12:00 Anatomy Seminar; The Experimental Production of Ovarian Tumors in Mice, Louis C. Lick; Morphology of Third Nerve, Roger A. Smith; 226 I. A.

II. PERSISTENT SEQUELLAE OF BULBAR POLIOMYELITIS*

Wallace Lueck,
John Galligan,
Wayne LeBien,
James F. Bosma

The prognosis for recovery of cranial nerve involvement following acute bulbar poliomyelitis has generally been considered good. Wilson¹ states, "It should be recognized that there is almost 100 per cent recovery of the pharyngeal muscles if life can be preserved through the first week of the disease." This is in accord with the earlier experience of Durand,² of Shambough, Harrison and Farrell³ and the more recent experience of Green.⁴ Peabody, Draper and Dochez agree with this impression but mention a single patient in whom paralysis of the face and tongue persisted for an unspecified period of time.

Brady and Lenarsky⁶ in 1933 studied 123 patients with cranial nerve lesions due to poliomyelitis. They found that swallowing difficulty was relieved in the majority of their patients within a week. However, they reported 5 patients who were unable to swallow for a period ranging from 21 to 71 days. These patients were later studied at intervals of 3½ to 6 months from the onset of their acute illness, and at this time, these patients continued to have subjective complaints, such as an excess of saliva in the pharynx and a husky or nasal voice. One of these patients continued to have difficulty in swallowing. Four of the 5 patients had physical findings of residual cranial nerve weakness at the end of this observation period.

Of the approximately 400 patients having bulbar poliomyelitis seen in Minneapolis during the 1946 Minnesota Epidemic, 50 patients with little or no

*The term "bulbar poliomyelitis" as here employed refers to poliomyelitic involvement of the cranial nerves.

evidence of spinal nerve involvement were interviewed and examined to determine residual impairments. These patients were examined from 15 to 17 months following the onset of their acute poliomyelitis. Twenty-nine patients were seen after an interval of 15 months, 19 patients after 16 months and 2 patients after 17 months.

The patients varied in age from 1½ years to 38 years at the onset of their illness. Thirty-four (68 per cent) of the patients were in the pediatric age group of 16 years or less. The hospital stay of these patients during the acute phase of their disease varied from 1 to 8 weeks. Tracheotomy was performed in none of these patients.

No patients evidencing paralysis of the extra-ocular muscles or of the tongue were found in this series. The most common impairment of function was that of the pharynx, which occurred during the acute stage of the disease in 47 of these 50 patients. Eleven of these had complete inability to swallow either solid or liquid foods for periods of 1 to 7 days. The most troublesome symptoms were those incident to swallowing solid foods. These symptoms included choking, gagging, gulping, regurgitation and a necessity for chewing food very completely and swallowing it slowly and in small amounts. Twenty-eight (56 per cent) of the patients studied reported persistence of difficulty in swallowing solids during the period of which this inquiry was made. Difficulty in swallowing liquids was noted in 40 of the 50 patients during their acute illness. Thirty-three of these patients had regurgitation of liquids through the nose in this stage of their illness. Nasal regurgitation was the most persistent difficulty associated with swallowing liquids. This difficulty was manifested in these patients particularly when drinking while bending forward, as at a drinking fountain. Nasal regurgitation while in the upright position was found in 5 of the 16 patients who continued to manifest this difficulty at the time of

this follow-up examination.

When the ability to swallow liquids without nasal regurgitation was recovered, this recovery occurred relatively quickly. This ability was recovered within 5 months of the acute illness in 23 of the 40 involved patients. In the same period, only 18 of the 47 patients who originally had difficulty in swallowing solids had recovered this particular ability. Though there was obviously a tendency toward improvement in these two aspects of swallowing, no close correlation of this improvement could be distinguished.

There was a high incidence of "nasal voice" observed in both the acute stage of the disease and as a persistent sequel. This was noted in 45 of the 50 patients during their acute illness and in 16 of these patients at the time of this "follow-up" examination. The occurrence of this impairment was not apparently correlated with that of nasal regurgitation of fluids.

At the occasion of this follow-up visit, the act of swallowing was observed in these patients. The greater than normal effort required in swallowing was indicated commonly by an associated forward-thrusting of the head, which was in some instances combined with turning or tilting of the head to the side.

On gross inspection of the pharynx at the time of the "follow-up" examination, distinct paralysis of the palate was observed in 28 patients (56 per cent). This paralysis was manifested by an asymmetry of elevation of the soft palate with phonation, by lateralward deviation of the uvula with phonation, or by a combination of these two deficits. This finding of paralysis of the palate was noted in 16 of the 28 patients who continued to have difficulty in swallowing solids. It was also noted in all 16 patients having nasal regurgitation of liquids and in 13 of the 16 patients who continued to have nasal voice.

Paralysis of the palate was noted in

3 patients who had no residual impairment of swallowing and no nasal speech at the time of follow-up examination. Conversely, 11 of the patients having definite symptoms of impairment of function of the pharynx had no visible paralysis of the soft palate. An incidental observation was that the gag reflex was diminished or absent unilaterally or bilaterally in a few of these patients having residual impairment.

Twenty of these bulbar poliomyelitis patients of the 1946 Minnesota Epidemic having persistent impairment of function of the pharynx were recalled 24 to 30 months after their acute illness. In the interval between the initial and the second "follow-up" examinations there was continued improvement in swallowing ability in some of the children of the series. In the adults, however, improvement was absent or slight.

These patients were then compared with a series of 14 patients having pharyngeal disability persisting as a sequel of bulbar poliomyelitis in other years. Of this latter comparison group, one patient had poliomyelitis in 1924, 2 in 1943, 1 in 1944 and 10 in 1948 (these patients were seen 3 to 6 months after their acute illness). The diminishing degree of recovery with passage of time which was noted in the group initially studied was found to apply also to the latter group. Those who had had their impairment since 1924, 1943 or 1944, had noted no recent change in their condition. Those who had had bulbar poliomyelitis in 1948 reported they were still improving, though at a diminishing rate. And, again, those children having this disease in 1948 demonstrated more improvement than did the corresponding adults.

On further examination of the pharynx at this time, additional procedures of examination, including cinematographic analysis, were employed. By these more accurate means it was possible to determine the impairment of function in the individual pharynx more accurately and to compare these impairments in this group of patients. It was then noted that there

was more paresis of the pharyngeal constrictor muscle than had previously been noted. This was manifested during phonation by a sideward motion of the posterior pharyngeal wall toward the more normal side and by a persistent cavity in the lateral pharyngeal space on the paresed side. This paresis of the pharyngeal constrictor was commonly coincident with a paresis of varying degrees of severity of the ipsilateral palato-pharyngeus muscle. This combination of specific impairments was that which was noted most commonly in those patients studied and was generally proportionate in degree to their disability.

Summary and Conclusion

"Follow-up" studies of patients having bulbar poliomyelitis has demonstrated an unexpected persistence of disability in function of the musculature of the face and pharynx.

Further study of the disability of the pharynx, particularly by cinematographic analysis, made possible more specific identification of this disability.

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4. Green, W. T.
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III. MEDICAL SCHOOL NEWS

Coming Events

Feb. 16 - Luthard N. Bergh Memorial Lecture; Prof. A. C. Ivy; "Certain Aspects of the Physiology of the Extra Hepatic Biliary Tract"; 8:15 p.m.; Museum of Natural History Auditorium.

Mar. 2 - Clarence M. Jackson Lecture-ship; Dr. E. T. Bell; "Pathology of Diabetes"; 8:15 p.m.; Museum of Natural History Auditorium.

Mr. 3 - George Chase Christian Lecture; Dr. Ira T. Nathanson; "Hormonal Alteration of Advanced Cancer of the Breast"; 8:00 p.m.; Medical Sciences Amphitheater.

* * * *

Minnesota Medical Foundation News

The Luthard N. Bergh Memorial Lecture will be presented in the Museum of Natural History Auditorium at 8:15 p.m., Wednesday, February 16. This lecture will be presented by Professor A. C. Ivy, Vice-President of the Chicago Professional Colleges, University of Illinois. Dr. Ivy's subject will be "Certain Aspects of the Physiology of the Extra Hepatic Biliary Tract."

Kellogg Foundation Lectures

The following lectures will be given during the week of February 14. All medical students, interns, nurses, technicians, dietitians, and physicians are cordially invited to attend these lectures. A special invitation is extended to University Fellows.

Dr. Lawrence R. Boies	"Hearing Loss"	4:00-6:00 p.m., Mon., Feb. 14 Powell Hall Amphitheater.
Dr. Anderson C. Hilding Duluth	"The Applied Physiology of the Respiratory Tract"	2:00-4:00 p.m., Tues., Feb. 15 Todd Amphitheater, U. H.
Dr. Allan M. Butler Mass. General Hospital, Boston.	"The Role of Potassium in Health and Its Alterations in Various Disease States"	2:00-4:00 p.m., Thurs., Feb. 17 Eustis Amphitheater, U. H.

Dr. Ivy, before assuming his present position in administration at the University of Illinois, was world famous for his many contributions to physiology. The Luthard N. Bergh Memorial Lecture has been made possible by a gift to the Minnesota Medical Foundation from Dr. George S. Bergh, Clinical Associate Professor of Surgery of the University and son of the late Dr. Luthard N. Bergh.

* * * *

Litzenberg Memorial Fund

Gifts are already coming in from throughout our state in response to the Minnesota Medical Foundation announcement regarding the Jennings C. Litzenberg Memorial Fund. The Foundation recently mailed letters to all physicians practicing in Minnesota, telling them of plans to honor the late Dr. Jennings C. Litzenberg, beloved Professor of Obstetrics and Gynecology. It was felt that many of his former students and colleagues would wish to contribute to this project which will honor him. The response to date has been encouraging to the officers of the Foundation and the drive is being continued.