

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

**Retinal Vessels in
Toxemia of Pregnancy**

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

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during the school year, October to May, inclusive.

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William A. O'Brien, M.D.

I. LAST WEEK

Date: January 27, 1939

Place: Recreation Room
Powell Hall

Time: 12:15 to 1:10 P.M.

Program: Movie: "Moose Hunters"

Announcements

The Clinical Interpretation
of Liver Functions

W. H. Hollinshead
C. J. Watson

Discussion

C. J. Watson
Arthur C. Bachmeyer

Present: 217

Gertrude Gunn,
Record Librarian

* * *

II. MOVIE

Title: "A Criminal is Born"

Released by: M-G-M
"Crime Does Not Pay" Series

* *

III. ANNOUNCEMENTS1. BABY BOY

Warner F. Bowers, II,
son of Dr. and Mrs. Warner F. Bowers,
born January 29 at 6:18 p.m.
Weight 7½ pounds.

Congratulations!

2. FEBRUARY - PEDIATRICS

The Minnesota State Medical Association asks us to consider certain phases of Pediatrics as the Medical and Public Health study subject for the month. The special features will be nutrition and communicable diseases. Students of child health believe that proper nutrition is still the most important single health objective in childhood. Children of families on relief fare well if nutrition is maintained. There is abundant evidence to show that nutritional inadequacies in childhood may produce a lifetime effect. It is assumed that the average mother understands how to feed her family if supplied with sufficient funds for this purpose. National investigations on a large scale show that this is not true. It has been determined that there is a minimum annual expenditure for food which must be maintained. Many families spending more than this minimum fail to satisfy the nutritional needs because of ignorance or indifference in food selection, preparation, and consumption. Maintaining proper nutrition in children is also a disciplinary problem, and well do we know how the average parent fails in this respect. The control of communicable disease is another important issue. Through such measures, the average span of human life has been prolonged to its present 58 - 60 years. The time is past when children should be needlessly exposed in order to have the disease and get it over with. Research in methods of modifying and treating these diseases through the use of human serum is being carried on in our human serum laboratories. At the present time we are having a mild epidemic of measles, but the strange thing is how little use is being made of the service facilities of the human serum laboratory. Immunization against smallpox and diphtheria would be a simple matter if practiced during infancy. Every physician who attends the birth of a child should consider it his duty to do this as such children and their parents become more cooperative when other immunization measures in the pre-school period are suggested.

IV. CHANGES IN THE RETINAL VESSELS
IN TOXEMIA OF PREGNANCY

Robert R. Tracht

For many years the ophthalmologist has been interested in the changes in fundus that are noted in toxemia of pregnancy. This interest has arisen out of the fact that changes in the intraocular circulation are very closely related to the progress of the toxemia. Since the maximum of circulatory change can occur in a relatively short period of time, this disease has given us an opportunity to formulate theories concerning the pathological-physiology of the vascular system that would be otherwise impossible.

It becomes apparent therefore that we must have a classification of the grade of toxemias if we wish to evaluate the eye changes that are seen at the same time. Secondly, we must have a very clear conception of the changes that can take place in the retinal vessels as they progress from the normal to the arterio-sclerotic structure.

Gibson chose the following classification of the toxemias of pregnancy when he compared the eye changes noted in this condition:

1. Inherently normal.
2. Potentially abnormal.
3. Moderately preeclamptic.
4. Dangerously preeclamptic.
5. Eclamptic or convulsive group.

The pathology of the retinal vessels is not so readily set forth, since there is no uniformly accepted theory as to the process by which normal vessels become sclerotic.

A textbook of pathology gives us the following anatomical picture of an artery which has been subjected to a sustained

elevation of blood pressure. "Diffuse hyperplastic sclerosis differs from other forms in two respects; it is diffuse instead of patchy, and is closely related to high blood pressure and therefore associated with cardiac hypertrophy. It affects the intimate vasculature of certain organs and is best seen in the small arteries of the kidney, i.e., the interlobular arteries and the afferent arterioles of the glomeruli. The essential lesion is a proliferation of the sub-endothelial connective tissue of the intima. The new tissue undergoes some fatty change, but there is none of the profound degeneration seen in atheroma, the intimal thickening may be so marked that great narrowing of the lumen is produced ---- A very characteristic change is a splitting and reduplication of the internal elastic lamina, so that it forms many layers instead of a single one. This change is apparently a normal reaction to increased stress. There is a gradual fibrous replacement of the media. The adventitia is not affected.

Diffuse hyperplastic sclerosis appears to be a reaction of the artery to the strain of continued high blood pressure."

This description appears to be generally accepted by most pathologists as the final result of arterial hypertension. The process by which the vessels arrive at this state has many theories. Wagener formulated a clinical analysis of the progress of these circulatory changes into:

1. Pre-organic functional or spastic stage - if true sclerosis has not developed.
2. Organic or sclerotic stage, if there was clinical evidence of sclerosis when the toxemia had not been controlled.

Selinger amplified the theory of the pathological-physiology of vessel changes in the toxemias of pregnancy in the following manner:

1. The action of some toxic substance, as yet undetermined, affects the vasomotor nerves directly. This action produces a spastic contraction of the smaller branches of the vascular tree. In toxemia of pregnancy there is a tendency to involve all of the vessels of the body in equal amount. This spastic contraction is due almost entirely to the muscular coat of the vessels - the medial coat.

to the vessels seen in stage two and three and sclerosis to those in stage four.

In order to complete the picture and coordinate the theories the following brief outline is presented:

1. Pre-organic stage

Attenuation Angiospasm	Terminate the disease in this stage and leave no results
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2. Organic Stage

Sclerosis Retinosis	The process is not reverable, and may occur during or after the pregnancy.
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3. Latent Stage - four to twelve years following pregnancy

Sclerosis is progressive.

4. Terminal Stage - may simulate

Chronic nephritis
Malignant hypertension
Hypertensive encephalopathy -
Symptoms depend on the organ involved.

In order to clinically recognize these various stages the following description is given:

Attenuation may be recognized as a uniform narrowing of the arteries.

2. The sustained contraction of the medial coat of the vessel causes a hypertrophy of the muscle fibers. The hypertrophy is not necessarily uniform in its development, and is therefore not progressive in its nature.
3. The spastic contraction of most of the vessels of the body, which is followed by or associated with an hypertrophy of the medial coat, leads to a very marked resistance to the flow of blood in the vessels. This is very marked, and essentially sudden increase in resistance causes the heart to work very much harder, which produces a rather sudden elevation in blood pressure. Since there is a closed circulating system, we would expect to find a rather marked dilation of the veins or a compensatory edema of various parts of the body.
4. As stage three continues, and there is a sustained elevation in blood pressure we find that the musculature coat has reached its maximum compensation by hypertrophy, so that we have the onset of fibrosis. This fibrotic stage, once it is started, is apt to progress to the completed arterio-sclerosis.

This narrowing may reduce the width of the vessel from one-third to three-fourths of its normal caliber. Attenuation is found first over the superior nasal and then over the temporal area of the retina. It generally starts at the periphery of the retina and in mild forms, a fourth of the periphery of the retina may be involved before it is recognized. Attenuation is usually recognised when the diastolic pressure has reached 90 - 95 mm. of mercury. The degree of attenuation can be recognized by its nearness to the optic nerve and by the number of

The name attenuation is used to describe the condition of retinal vessels when seen in stage one and part of stage two.

The name angio-spasm has been applied

vessels involved. Attenuation, once present, persists till the end of pregnancy. The amount of the attenuation may be decreased with treatment, and there is no residual scarring when the pregnancy is completed.

Angiospasm - is a localized, or in rare cases generalized, narrowing of a retinal artery almost to the point of occlusion. This condition may occur in any part of a retinal artery and in severe cases there may be many areas that are involved. These spasms are frequently transitory, being present only for a few seconds or they may exist for days. Angiospasm of the retinal vessels is frequently associated with retinal edema and retinitis. The degree of angiospasm is determined by the number of areas noted in the retina and the period of their duration. The severity of the spasm is also in direct relation to the amount of retinal edema that is present.

Sclerosis - is the same when seen in the toxemia of pregnancy as it is in the aged individual. The onset of this stage of toxemia has been set arbitrarily at the time of first sign of hemorrhages or "cotton-wool" exudates in the retina. The classic signs of sclerosis may be present in the advanced grades of toxemia. They are - right angle crossing of the arteries and veins, interruption of the course of a vein by an artery, saculation of the vein at the distal side of a crossing and also a variation in the caliber of the arteries.

Retinitis - is recognized when hemorrhages, cotton-wool exudates or edema is seen in the retina.

Davis makes the following recommendations in examinations of these patients. The eyes should be examined frequently in a suspected case of toxemia of pregnancy. They should be examined in a dark room and if possible with the pupils dilated. Davis makes the following statement, "I am in agreement with Cannady and O'Hare that it is not possi-

ble to tell from the retinal findings whether the case is one of renal or non-renal disease and that there is no distinctive type of lesion accompanying chronic glomerular nephritis. Also that these cannot be differentiated from hypertension or malignant hypertension by fundus findings."

To compare the fundus findings with the various grades of toxemias we would expect the following:

In the inherently normal case the fundus would be normal or at the most show a very mild grade of attenuation. This attenuation is probably due to the fact that the eye signs are present in advance of the recognition of symptoms. When first seen the potentially abnormal pregnancy may give a picture of rather advanced grades of attenuation. This same advanced degree of attenuation usually is present in moderately preeclamptic states but there is also associated with this a very definite angiospasm of some of the larger vessels. There may be mild evidence of arterio-sclerosis in this stage of toxemia also. In the dangerously preeclamptic toxemias angiospasm is a very common finding and is associated with advanced grades of sclerosis with retinitis. In rare cases there may even be a detachment of the retina. In the eclamptic states the eye findings are the same as those in the dangerously preeclamptic condition. The diagnosis in this group of cases seldom depends on the eye findings as there are many gross symptoms present.

The questions that always arise are - what is the treatment, and what is the prognosis. Cases with attenuation will probably respond to conservative therapy. When there is a definite accentuation (widening) of the arterial reflex or when the attenuation is seen very early in the pregnancy the toxemia is more serious. In this condition the pregnancy is more difficult to control and is more apt to develop complications

and sequelae. If angio-spasm is present we try to continue the pregnancy as long as possible without the development of sclerosis or retinosis. When a retinosis does develop associated with an elevated blood pressure, the patient is dangerously ill and it is advisable to terminate the pregnancy. This is done to prevent unnecessary damage to the vascular, visual, and nervous system of the mother and to prevent a fetal fatality. The latent stage may become evident at from four to twelve years following the pregnancy. This is due to the progress of the sclerosis involving more of the arterial tree. As the arterio-sclerosis advances the symptoms become more evident. This stage then advances to a stage which sooner or later ends fatally in cerebral, renal or cardiac death.

* * *

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V. GOSSIP

The Health Service staff will have an old-fashioned sleigh ride party Sunday evening, February 5 at Eaton's Ranch. Director, Ruth Boynton, is calling her flock for a touch of the old time winter spirit. In order to sell them on the idea she tells of how they used to do it back in LaCrosse in the good old days. Modern youth, perturbed by the slowness of horses pulling sleds, has quickened the tempo by hitching the contraption to tractors. Ruth guarantees that all the old-fashioned customs will be preserved. Everyone is urged to dress warmly in order to avoid cold feet and what not...The Medical Record Librarians left Wednesday nite for their homes after a stimulating three-day stay at the Center for Continuation Study. If they carry out all the suggestions they received, the record problems of over 80 hospitals from Maine to Oregon and from Minnesota to Texas will be solved. On Monday they had Associate Director Malcolm T. MacEachern of the American College of Surgeons as one of their guest speakers. Dr. MacEachern was our guest at a luncheon meeting on Monday. He is a very entertaining visitor, as he always brings news from the outside hospital world. In his travels he meets many interesting people. He confided in us that he liked to come to Minnesota and California. A group of his friends in a California hospital include a physician who writes detective tales. The author has found sufficient material in Mac's visits to use the various members of the hospital staff as characters in his novels. In one of the stories a murder occurs just as Dr. MacEachern is making an inspection of a hospital. From then on Dr. MacEachern changes his role of hospital inspector to detective. Little Miss MacEachern, Mac's pride and joy, picked up one of these novels and immediately identified her father as the detective. There were some things that the author had added which the child did not believe entirely characteristic of her sire. I wonder. In another trip to California, Dr. MacEachern was accompanied by a group of hospital administrators on their way to a convention. As a practical joke, they spread news

about the train that Dr. MacEachern was a psychopathic patient on his way to a sanitarium. The woman in the party was the nurse, two of the men were attendants, and the third was a physician. Whenever Dr. MacEachern walked up and down the train, one of them accompanied him. In the observation car he became involved in an argument with an old lady over the merits of Christian Science. The argument was accompanied by a great deal of sound and fury. During the dinner hour, the "Doctor" called the old lady aside and told her that Mac was a psychopath and they feared for her safety unless she agreed with everything he said. In the afternoon she sought out the "patient" and brought up the Christian Science discussion again. Mac was dumbfounded to learn that since morning she had completely changed her views, as everything he said against the cult was now all right. Mac also has a nervous habit of tearing up paper. The other passengers were advised to supply him with paper whenever they were near him. With so many newspapers constantly on hand, there was a great deal of ripping and tearing going on in the many days on the train. A kindly woman came up to him and told him not to worry, that everything would be all right, and as she departed she invoked the Lord's blessing upon him. Mac said that never had he received such consideration in travel. As he left the train, the crowd separated to let him pass. Some of his friends were waiting at the station, and, as they rushed up to take him to their car, his fellow travelers were certain that at last they were safe. He was not informed of the joke until just before the train arrived in California. - After which various staff members told of practical jokes, - but not so good.... A discussion of the new government plan to erect 500 rural hospitals here and there and a discussion of the limitation of staff privileges in all hospitals to specially trained and qualified men resulted in a technical knockout for all sides.....