

THURSDAY, FEBRUARY 25, 1932.

GENERAL STAFF MEETING  
 UNIVERSITY HOSPITALS  
 UNIVERSITY OF MINNESOTA

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## I. ANNOUNCEMENTS

### 1. Errata.

Last week, February 18, 1932, (20) page 272 should read Minnesota Radiological Society, not Minneapolis Radiological Society. Dr. Diehl's contribution probably requires additional explanation. Routine x-ray studies were made of the chests of students. In addition, history, physical examination and fluoroscopic studies were made independently. If routine x-rays had not been made, how valuable would any of the 3 foregoing methods have been in predicting the positive cases? Taking far advanced, moderately advanced and incipient cases as a group, a combination of history and fluoroscopic examination would have suggested 92% of the requests (positive rays). History and physical examinations only 46%. The moderately advanced and far advanced groups together 87%, the incipient group 95% (combination of history and fluoroscopic).

### 2. People. (If necessary, apologies to Time.)

Surgeon Owen Harding Wangensteen spoke on "Studies in Intestinal Obstruction" before the Academy of Medicine in Milwaukee, February 16, 1932. Chief competition for interest of audience was Pathologist Edward L. Miloslavich's attack on Police Surgeons for delivering to him body of woman from lake for autopsy while supposedly still alive. Spurting blood, cries for help, first aid squad with pulmotor, headlines in paper, competition enough for anyone. As usual all reports indicate that OHW acquitted himself very well.

Internist Frank John Hirschboeck, Duluth, the man with the photographic memory, visited University Hospitals forepart of week. Unable to forget useless and useful facts alike. Frank remembers telephone numbers used in Milwaukee thirty years ago, number of counties in Massachusetts, tonnage of the old Iowa, thousands of medical articles he has read, his visits are a joy to all. Walking encyclopedias supposed to do this are put to shame by his exhibitions. A marvelous memory, ability to coordinate and systematize, a fine teacher, a genial personality, an unusual

interest in fellow humans makes all wish that his visits to our institution were frequent and prolonged.

Edward Sarsfield Murphy, Glendive, Montana, is back for a fellowship in Ophthalmology. After spending six months with us last year, he made his presence so felt in our group that the persistent query, "when is Murphy coming back?" can now be answered officially. Murphy is back, may his tribe increase.

### Discussions:

have been unusually good in the past two meetings. We trust that the precedent has been reestablished and that the front room will continue to interest the back room for many moons to come. We thank those who have made this possible and the audience for its quick reaction.

## II. SUPRARENAL TUMORS:

Few subjects in medicine have so many ramifying interests as this group of new growths which may produce hematuria; loin pain, jaundice, anemia, sex changes, paroxysmal hypertension, proptosis of eyes, peculiar skin infiltrations, unusual and odd tumor deposits. They challenge our knowledge of the development of the urogenital and nervous systems, physiologic concepts of suprarenal function, the practical application of applied experimental surgery in demonstrating organ function.

Robert Hutchinson (Quart. J. of Med. 1, 33-38 (Oct.) 1907) epitomizes the notes of seven hitherto unpublished reports of cases of "Suprarenal Sarcoma in Children with Metastases in the Skull." Three others are found in the literature. The author's follow:

"I wish to direct attention in this paper to what one may describe, for want of a better term, as a definite 'clinical syndrome', occasionally met with in children. I refer to cases of sarcoma of one or other suprarenal with metastases in the bones of the skull."

"All the patients are children, their ages varying from nine months to nearly nine years. Seven are boys, and

three girls."

"In the majority of the cases the first thing noticed was some swelling about the bones of the skull, which in several of them was ascribed to a fall or injury. Following, or sometimes preceding this, proptosis of one or both eyes was observed. In two-thirds of the cases discoloration of the eyelids on one or both sides is reported, and in a few instances this was the first point to attract attention. Anemia is a striking feature in all the cases, the blood changes being those of a profound secondary anemia. Leucocytosis has not been recorded in any case. An abdominal tumor in one or other loin was felt in only five of the cases. The progress of the disease in every instance has been rapid, and the younger the patient the more rapid it appears to have been. Thus the duration of life from the time the earliest signs were observed was, in the oldest child, about six months, and in the youngest of the series only one month. The advance of the growth is marked by progressive exhaustion and anemia, by indications of increased intracranial pressure such as torpor, intense optic neuritis and blindness. The tumors on the head increase in size, often filling up the temporal fossae, and the proptosis becomes excessive, the cornea in some cases becoming ulcerated and destroyed, and the lens escaping from the globe."

"The post-mortem features are also very constant. In all there was found a sarcoma of the suprarenal, usually consisting of small round cells, situated on the left side in six, and on the right side in four of the cases. The most extensive metastases were found in the bones of the vault and base of the skull, producing the swellings on the head and protrusion of the eyes observed during life."

"Metastases are also met with in the ribs, sternum, and vertebrae, but not, apparently, in the long bones, though these may not always have been carefully examined. Secondary deposits in the internal organs appear to be exceptional. The adjoining kidney has sometimes been involved, but rather, it would seem, by direct extension of the growth than by true secondary deposits. The liver may become similarly invaded when the tumor starts in the right suprarenal, but in one case it was the seat of a small

secondary nodule when the primary growth was on the left side. As a rule, however, the viscera are spared."

### III. CASE REPORT

#### NEUROCYTOMA OF ADRENALS

(Hutchinson's Type).

The case is that of a 2-1/2 year old, white male infant, admitted to University Hospitals on 5-29-30, discharged 6-24-30 (26 days); readmitted 6-26-30, discharged 7-9-30 (13 days); readmitted 8-15-30, discharged 9-7-30 (23 days); readmitted 12-8-30, discharged 12-23-30 (15 days); readmitted 8-10-31, discharged 8-31-31 (21 days). Total stay - 98 days.

#### Tumor

5-5-30 - Patient developed severe abdominal pain. Operated upon under a diagnosis of intussusception. A mass, size of a fist, found attached to left kidney. Abdomen was closed without any further surgical interference. Previous to operation, had attacks of vomiting and mother noted a lump in stomach. Had fever for two days at this time.

#### 10 months old.

5-29-30 - Admitted to University Hospitals. Physical examination reveals a well-developed and nourished, white, male infant, 10 months of age. There is an old scar about 4 inches long on abdomen below umbilicus which is healed. There is a mass on left side fixed posteriorly below umbilicus, up under costal margin in region of spleen.

#### Laboratory

Urine - negative. Blood - Hb. 65%, wbc's 6,700, rbc's 3,400,000, P 22%, L 76%, M 2%. Progress: Patient was put on a 10 month diet. Pulse 100. Temperature normal.

5-30-30 - Urine - no pus, red blood cells or casts.

5-31-30 - X-ray of abdomen - Single plate of abdomen shows no definite evidence of mass. The descending colon may be slightly displaced to left, but this is not entirely definite.

Top Therapy

6-23-30 - Orange juice, twice daily.  
 cod liver oil, 1 dram, twice daily.

chloral hydrate gr. xv (R). 96% skin  
 erythema dose to be given to lesion in  
 five treatments. This was started on  
 this date. Patient vomits some after  
 the x-ray treatments.

6-24-30 - Emesis of 100 c.c. of un-  
 digested food. Discharged.

Reaction?

6-26-30 - Readmitted to University  
 Hospitals. Patient had had series of  
 five deep x-ray treatments. Was dis-  
 charged two days ago. While at home had  
 quite a severe reaction--all food and fluids  
 taken were promptly vomited. The mother  
 was advised to bring patient in to hospi-  
 tal for treatment. Patient is to have chest  
 plates and daily urine examinations. Tem-  
 perature yesterday was 102.8, today 101.4.  
Laboratory: Blood - Hb. 53%, rbc's  
 2,790,000, wbc's 5,400, P 83%, L 17%,  
 slight hypochromasia and anisocytosis.  
 Urine - negative.

Metastases?

6-27-30 - X-ray of chest - (single) -  
 there is a dense shadow involving the  
 region of the right apex and evidently  
 cut from the superior portion of the right  
 hilum. This may represent some enlarged  
 glands or possibly some metastases to the  
 lungs although this is not entirely de-  
 finite. The remainder of both lung fields  
 is clear. Conclusions: Possible enlarged  
 gland, right superior mediastinum. Pos-  
 sible metastases to right upper lobe.  
 Patient sent to deep x-ray. Had an emesis  
 of all of the 10 A.M. feeding. Eye exam-  
 ination - negative. Pulse 130. Temper-  
 ature to 104.

6-29-30 - Medical note: Still regur-  
 gitating but retains part of each feeding.  
 Temperature down to 101. Listless but has  
 better appearance. To continue small  
 feedings at 2 hour intervals. Given reten-  
 tion enema.

7-3-30 - Temperature 103. Preissnitz  
 packs applied.

Better

7-8-30 - Medical note: Is now getting  
 three meals a day and is retaining feedings.  
 He may be taken home but to return in one  
 month for another course of deep x-ray  
 therapy.

7-9-30 - Discharged. Daily urine exam-

inations done but were negative dur-  
 ing this time.

13 months old

8-15-30 - Readmitted to University  
 Hospitals. Came in for further x-ray  
 treatments. Has gotten along well in  
 interval and gained some weight. Takes  
 milk, orange juice and ice cream but  
 no solid foods. Physical examination  
 reveals a well-developed, well-  
 nourished, boy of 13 months. An ab-  
 dominal scar is present. Examination  
 of eyes - negative. Abdomen presents  
 a scar as previously noted, and is  
 somewhat firm. A mass can be pal-  
 pated on left side, extending from  
 costal margin down below umbilicus.  
 It is firm and hard, apparently  
 fixed posteriorly, nodular, seems as  
 large as one's fist. Laboratory:  
 Urine - many wbc's. Blood - Hb. 58%,  
 rbc's 2,950,000, wbc's 6,500, P 65%,  
 L 35%.

Impetigo

Progress: Has some lesions and  
 blisters on feet. Isolated for con-  
 dition of feet and abdomen (impetigo?)

8-18-30 - Painted with gentian vio-  
 let to areas, two times daily. Medical

note: Impetigo seems to be spreading  
 slowly. Several definite blebs  
 present in groin. 140% skin erythema  
 dose to anterior and posterior ab-  
 dominal regions in six treatments,  
 suggested and given.

Same mass

8-22-30 - Sent to x-ray. Emesis of  
 partially digested food. Later on,  
 another emesis of milk and water.

Medical note: Impetigo is still  
 about the same. The mass is the  
 same size. Temperature is normal.  
 Urine - no wbc's or rbc's.

8-25-30 - Patient has another x-ray  
 treatment. Appetite is very poor.  
 Impetigo is fairly well cleared up.  
 Temperature normal. The mass in  
 lower left quadrant is unchanged.  
 Urinalysis negative.

9-7-30 - Discharged.



ver, vomits

12-8-30 - Readmitted to University hospitals. He was readmitted because of fever and vomiting. Blood - Hb. 70%, rbc's 3,680,000, wbc's 6,400, P 79%,

16%, M 5%. Progress: Ice collar is put to neck. Temperature 102. Throat irrigated with warm saline solution.

12-19-30 - Patient coughs some. Given deep x-ray treatment. Emesis of partly digested food.

12-23-30 - Discharged.

1-12-31 - Dispensary. 140% skin erythema dose, anterior and posterior abdomen, in four treatments over a period of eight days, advised and given.

History of Fall

2- -31 - The child fell and injured right side of his face, just lateral to right eye. A swelling remained on side of injury but at the present time has decreased somewhat in size. The right eye became pushed forward in the cavity in exophthalmus.

7-20-31 - Dispensary: Some ecchymosis noticed under the right eye.

How other eye

8-1-31 - Dispensary: Exophthalmos of the right eye developed. Left eye also became ecchymotic at this time.

4 months old

8-10-31 - Readmitted to University hospitals. Physical examination reveals a white, male infant, 2 years of age, appearing to be well-nourished and well-developed. The skin is pale. There is ecchymosis around each eye. Exophthalmos of the right eye is noted. There is so much swelling about the eyes that they are almost shut, especially the left. Pupils are dilated. The glands are not palpable. The abdomen protrudes. On the left side, there is a hard nodular, firm mass which can be palpated. It involves the lower one-half of the left upper quadrant. Laboratory: Urine - negative. Blood - Hb. 60%, wbc's 9,000, rbc's 3,040,000, Hm's 71%, L 29%.

X-ray

The x-ray taken on 8-8-31 of the skull. There is a considerable erosion of the right orbit, especially of the roof and lateral margin. The appearance may be consistent with a metastasis to the bone in this region with secondary erosion. There is some suggestion of

an erosion of the posterior clinoid process also present but this is not so definite. Conclusions: Carcinomatous metastasis to right orbit.

8-19-31 - X-ray of chest - There is no evidence of parenchymal pathology. The appearance previously visualized in the right upper lobe is now no longer present. Conclusions: Negative lung fields. Patient has had a small emesis of curdled milk.

Home

8-20-31 - 120% skin erythema dose to each of right, left and anterior orbit from the dates 8-20-31 to 8-31-31. The eyes are quite swollen.

8-31-31 - Deep x-ray treatment given. Feels fairly comfortable. Discharged.

No biopsy, no necropsy and still the lesions are so characteristic, that a diagnosis is readily made.

Note: A short time later death occurred at home. The family physician was away, no permission for necropsy was obtained. (Necropsy in vivo).

IV. CASE REPORTNEUROCYTOMA OF ADRENALS

(Hutchinson's in Type).

Path. Pearson.

The case is that of a white, female patient (infant), 2-1/2 years of age, admitted to University Hospitals 2-7-32 and died 2-12-32 (5 days).

1- -30 (about) - Child developed a cold with cough which the mother said has persisted with fair intensity until the present time.

Abdominal pain

1- -32 - Patient had the "flu" and began to complain of abdominal pain. This pain was in right side of abdomen. Some relief was obtained by rubbing. Mother noted rigidity of right side but apparently no definite masses. Patient had lost her appetite a week before the abdominal pain was noted.

Jaundice

1-7-32 - Patient began getting jaundiced

which gradually deepened). Bowel movements have been regular but were clay-colored since the onset of the jaundice. Urine has been dark at this time. After a few days, the jaundice subsided and appetite improved. This improvement lasted for three days, but then again the jaundice recurred.

Edema - ecchymosis eyelid

2-1-32 - The mother noted swelling of the ankles which gradually extended to a marked edema of the back. Abdominal distension was also noted. Purpuric spots began to show around the orbits.

Admitted to University Hospitals. Head

2-9-32 - Physical Examination reveals white, female infant, 2 1/2 years of age, who is very quiet and listless and complains when touched. Head - There is an enlarged lymph node on the scalp behind the left ear. Eyes - there is marked ecchymosis around both orbits and marked jaundice of both sclerae. Nose and throat - there is marked jaundice of the palate and mucus membrane; tonsils are swollen and cryptic. Neck - cervical adenopathy is present in both cervical and posterior groups.

Chest - systolic murmur at the apex; dilatation of the veins on the chest wall.

Abdomen - liver is two fingers below the costal margin; mass size of an egg is felt below the xyphoid process; spleen is palpable and somewhat enlarged; dilatation of the abdominal vessels and some purpuric spots on the abdomen and vulvae. Extremities - there is bilateral axillary adenopathy and bilateral inguinal adenopathy present. There is a very marked jaundice all over the body.

Laboratory - Blood - Hb. 34%, rbc's 1,670,000, wbc's 8,850, Pmn's 81%, L 4%, M 7%, normoblasts 5%, myelocytes 2%, metamyelocytes 1%. Blood platelet count, 140,000. Vaginal smears - negative, no GC. Urine - slight cloud of albumen, numerous rbc's, bile pigment present, urobilinogen present, no urobilin.

Progress: Temperature 99.5. Pulse 120. Respirations 50. Turpentine stupes applied to the abdomen for distension. Abdomen is still quite distended.

X-ray of abdomen, chest and skull - There is no evidence of metastasis in the skull or other pathology. There is a distinct distension of the small bowel and of the colon. The liver appears to be somewhat enlarged as shown by its outline on the colon. Some increase in the mediastinal shadow is present in the upper portion of the lungs suggesting mediastinal gland enlargement. Some density in the upper left lobe is also present. This may be due to pressure of the glands. No definite evidence of a mass in the region of the kidneys could be made out. Conclusions: Enlarged liver. Mediastinal gland enlargement. Negative skull.

Sick

2-10-32 - Chloral hydrate gr. x given. Very listless and drowsy. Has a very poor appetite. Has frequent yellowish, soft stools. Respirations and pulse are rapid. Blood - rbc's 2,940,000, wbc's 12,600, Hb. 46%. Stool - 4+ benzidene, no urobilin. Blood chemistry - Van den Bergh - prompt direct reaction, 63.6 mgs. bilirubin. Icterus index - 96 units. Fragility (hemolysis) begins at .50 and complete at .30. Urine - trace of albumen, bilirubin present, no urobilin. Temperature 103.8. Pulse 144. Respirations 60.

END (6 weeks?)

2-12-32 - Entire body seems to be very tender. Massive hot packs applied to abdomen. Rectal tube inserted. Has involuntary defecation. Child expels a great deal of flatus. Temperature now down to 98 (R). Pulse is imperceptible. Breathing seems quite labored. Medical note: 1:40 P.M. - child breathes with difficulty. Quality of pulse is less good, rate 104. Is lying on face with knees doubled up under her. She cries when touched and is very irritable. Heart tones are good, rate regular; chest appears clear. Abdomen is greatly distended as before; tympanitic on percussion. Bile colored nasal discharge. 4:30 P.M. - child is quite restless. Cheyne-Stokes respirations. 4:45 P.M. - metrazol 1 c.c. given. Respirations are very labored. 4:50 P.M. - patient expired.

**Autopsy:** The body is that of a well-developed, poorly nourished, white female, 1 1/2 years of age, measuring 68 cm. in length and weighing approximately 11000 grams. Rigor is present. Hypostasis is bluish and posterior. There is edema of the lower extremities. There is a very marked, generalized jaundice, 4+. The pupils measure 3.0 mm. each and are regular. There is ecchymoses above both eyes and some small petechial hemorrhages over the abdomen. The abdomen is very much distended. The external genitalia are normal; no evidence of any hermaphroditism present; no secondary sex characteristics present.

The PERITONEAL CAVITY is opened and is found to contain 500 c.c. of bloody, bile-tinged fluid. There is a large mass brought in view which pushes the stomach somewhat downward and forward and which is retroperitoneal, and measures 15.0 cm. in its transverse diameter. (This mass will be described in detail later).

The diaphragm is at the 4th rib on the left, 5th rib on the right. There is gaseous distension of the stomach and intestine. The APPENDIX is subcecal and free.

Each of the PLEURAL CAVITIES contain about 100 c.c. of bile-stained fluid, and there seems to be a few flakes of fibrin on the right. The PERICARDIAL SAC contains a minimal amount of fluid.

The HEART weighs 50 grams. The valve edges are free and normal. The chambers are normal. There is no congenital anomaly in the heart itself. The ROOT OF THE AORTA is normal.

Each of the lungs weighs 195 grams. There is a little congestion in the right upper portion, otherwise the lungs are air-containing and show no evidence of any terminal infection of any kind. They are palpated and examined carefully for any tumor nodules but none can be found in the lung substance itself.

The SPLEEN weighs 30 grams. The capsule is wrinkled and grayish; on cut surface, the pulp is grayish-red and the trabeculae are prominent.

The LIVER, abdominal mass, both ADRENALS and KIDNEYS are removed en masse and then

dissected out later. The GALL-BLADDER, part of the duodenum and AORTA are also removed in this mass.

The first thing noted is the gall-bladder and ducts. The GALL-BLADDER is dilated. Both the cystic and hepatic ducts are dilated. The cystic duct measures 0.5 cm. in diameter, common duct 0.75 cm. in diameter. The bifurcation took place at the head of the pancreas and as the common duct passes through the head of the pancreas at about 0.5 cm. from the junction of the common to the cystic duct, there is a constriction from tumor tissue and the wall itself seems to be infiltrated with this tissue, especially on its posterior aspect for about the space of 0.5 cm. It is also compressed at this point. Below this, as it courses through the head of the pancreas, the duct is very much smaller.

The PANCREAS is next inspected, dissected out, and found to measure 11.5 cm. from the tail to the head. Its outer aspect is firmly adherent to the tumorous mass, especially on its inferior and posterior portions. The anterior portion is rather free from any tumor involvement. Superiorly and especially near the head, the pancreas is adherent to the mass on the right side measuring 3.0 cm. in diameter. The pancreas is then bisected and at the site of the attachment of the mass near the head of the pancreas is diffusely hemorrhagic and seems to be uniformly infiltrated with a tumor which is rather firm. The midportion on the superior surface, there is a tumorous mass incorporated into the pancreas which is 2.75 cm. in diameter. The interior of the pancreas at this point is soft and infiltrated with an ochre colored, soft mass. There is also some necrosis present. The tail is free from any intrinsic involvement grossly.

The LEFT ADRENAL is examined and found to lie quite free at the usual site. It measures 4 x 3 x .1 cm. and the cortex is rather pale and fibrous. The medulla is absent or nearly so throughout. As far as one can see, there seems to be no involvement of the adrenal on the left. On the RIGHT side, the tip of the adrenal is found normal.

As one tries to dissect this out, it is found that the cortex seems to be of normal texture and measures about 0.5 cm. in thickness. However, the whole gland blends into the surrounding mass of tissue. The tumorous mass, itself, can be described as being in the midline and tending more to the left.

There is a mass in the midline between the two KIDNEYS and surrounding the aorta which is 6 x 5 x 2 cm. This is brownish-red and soft and vascular, giving the impression of the medulla of the adrenals.

Attached to this is a mass extending posterior to the pancreas and incorporates the right adrenal and is attached firmly to the right lobe of the LIVER by a lobe-like process, measuring 6 x 3 x 3 cm. The structure and texture of this is variegated in places. There are small, irregular, whitish, fibrous masses from 1/4 to 1/2 cm. in diameter. In other places, there are round, ochre-colored, soft areas 3/4 cm. in diameter surrounded by a thin, fibrous capsule. In other areas, there is a softening and brick-red, yellowish, thick fluid which exudes. 1 cm. from its attachment to the liver, the mass is firmer and seems as if the liver had infiltrated into the substance of the tumor at this point and interspersed between these strands of greenish lung tissue where exists this fibrous, white tissue and also ochre-colored, soft spots.

The KIDNEYS measure 8 x 4 cm. and show fetal lobulations. The vessels are traced out and found to be normal. No tumor emboli are present. The ureters are diverted somewhat laterally by this mass. The inferior vena cava is constricted by the mass.

The GASTRO-INTESTINAL TRACT is normal.

The uterus and ovaries are removed and found to be of normal size. There is no evidence of any tumor infiltration or any other pathology present.

There are large lymph nodes in the root of the mesentery which are sectioned and found to be homogenous, and whitish and crusty in appearance. There are also some mediastinal nodes present about 1 cm. in diameter at the bifurcation of the trachea which are then removed (being soft and rather hemorrhagic.) Another node is

present along the aorta which is found to be of the same consistency. There is a tumor of the scalp in the occipital region about 2 cm. in diameter which is removed but found to be attached to the galea aponeurotica at this point, (rather soft and hemorrhagic in consistency). There is another node about 2 cm. in diameter above the bifurcation of the carotid in the superficial lymphatic chains along the sternomastoid. This is removed and found to be somewhat soft and of an ochre color.

The HEAD is then opened. The dura is found to be firmly adherent to the wall of the cranium, especially in the occipital region. This had to be torn apart and a very unusual picture is presented upon inspection of the dura. On the outer portion of the dura and uniformly all over the wall of the skull, there are small tumor masses which are red and soft in consistence and slightly raised. They also infiltrate into the substance of the dura itself. Some of these rounded areas are matted together giving it a somewhat serpiginous character. The brain is then removed and sectioned. No evidence of any pathology can be found intrinsically in the brain itself. The dura is also torn off from the base and similar lesions are found but not quite as numerous. The orbits are inspected and a similar extension of this tumorous process is present within the orbital dura itself. As yet, there is no erosion of the bony part of the skull itself, although there seems to be a thinning out in places of the wall of the skull although this is not very definite. The various bones are inspected as to ribs and sternum but no gross evidence of any metastasis can be found.

#### DIAGNOSIS:

1. Neurocytoma of the right adrenal (Hutchinson's type)
2. Metastasis to mediastinal nodes.
3. Metastasis to dura.
4. Enlarged mesenteric nodes.
5. Metastasis to orbital dura.
6. Obstruction of common bile duct.
7. Generalized jaundice, +4.
8. Constriction of inferior vena cava.
9. Ascites.
10. Hydrothorax, bilateral
11. Peripheral edema.
12. Emaciation.
13. Ecchymosis of the eyelids.
14. Generalized adenopathy.
15. Extension of tumor into right lobe of liver.



Sections show a large number of round cells like a sarcoma and many fibrils. The latter are arranged in longitudinal bundles and are also seen in cross section. There is a tendency to rosette formation. A patch of ganglion cells and fibers is also present.

## V. ABSTRACTS: SUPRARENAL TUMORS

Abstr. Pearson.

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### 2. Classification (Developmental):

#### 1. Cortex

- a. Adenom (33% of adults)
- b. adrenal carcinoma (hypernephroma)

#### 2. Medulla

- a. sympathogonioma (neuroblastoma)
- b. sympathoblastoma (neurocytoma)
- c. ganglioneuroma (less malignant)
- d. paraganglioma (phaeochromocytoma)

Note: Mixed forms are described (Wahl).

### 3. Symptoms:

a1. adenoma: none

a2. adrenal carcinoma: Very malignant tumor of adults with local extension and generalized metastases. Resembles so called "hypernephroma" of kidney with exception of bone tumors (may be local) complaints are severe pain (more intense than kidney tumors) radiation to chest and shoulder, fever (57% Israel) ptosis, right angle pelvis in pyelogram, peculiar pigmentation, gastric disturbances, constipation and x-ray shadow of new growth.

a3. Other adrenal tumors may give this picture. In children cortical tumors cause pubertas precox, reversion of sexual characteristics in females (breasts atrophy, hair and voice changes, menses stop, clitoris grows). Changes occur if tumor develops before puberty, in adult females before menopause, (never after) and in adult males. Females become masculine, the converse rarely occurs.

Thomas and Exley report a suprarenal carcinoma (hypernephroma) in a woman 62 years old, who complained of severe pain in left upper abdomen and chest, palpable mass, urinary disturbance and attacks of vomiting. Barium enema showed tumor to be posterior to bowel. Pyelogram demonstrated marked right angle deformity. The tumor was removed with some difficulty. Apparently, local invasion had taken place. Death occurred but no autopsy was obtained. The history and pelvic deformity are characteristic of this type of tumor.

A recent case in a female in our hospital with sex changes proved to be independant of the adrenals (in the retroperitoneal space).

a4. Neuroblastoma, neurocytoma:

Hutchinson's syndrome, Peppers (chiefly to liver) and form with small or large tumor and severe anemia have been described.

Right sided tumors usually go first to right orbit and left to left. An anatomical explanation has been offered.

These tumors usually occur in the young (2-3) in both sexes, are highly malignant and very fatal. The metastases to the

head apparently go to the soft tissues first and secondarily to the bones. There has probably been some confusion with chloromata in the past. They were once called sarcomata.

a 5. Ganglioneuromata: are highly differentiated tumors (as a rule) differing little from similar tumors in the sympathetic. They are found usually in young females and vary from a plum to the adult head in size. Frequently they are symptomless.

a6. Paragangliomata: are rare tumors of chromaffin cells. They may cause hypertension. They are frequently small and symptomless and are usually unilateral. The tendency for many of the foregoing to be bilateral is striking. They also occur in the sympathetic system.

a7. A case of paroxysmal Hypertension is reported by the Porters. Male, 39 years of age, had attacks lasting a few minutes when he became very sick, had a peculiar color and felt sick to his stomach. Most of the attacks occurred while he was in bed. He learned accidentally that by leaning forward and slightly to the left (tumor was on the right) he could reproduce the syndrome. Starting with a blood pressure of 110 systolic, it would rapidly rise within 90 seconds to over 200. The pulse would drop down to 55 and the beat would become so forcible that the bed would shake. The attacks would last 3 to 4 minutes and then in 10 to 15 minutes afterward everything would be all right. A tumor of the chromaffin tissue was suspected and exploratory operation done. An encapsulated growth was found which Ewing called an adrenal carcinoma. From the description it resembled cortical tissue. Oppenheimer and Fishberg reported hypertension in a five year old child (systolic over 220) in a cortical tumor with sex changes. Note: These observations would be confusing if we did not know that many of them are mixed tumors (cortex and medulla) and also that it has been suspected that adrenalin may be formed in the cortex and distributed by the medulla.

4. Burch collected 25 cases of intra-orbital metastatic carcinoma from the literature (usually from breast) and reported a case from suprarenals in an adult (exclusive of neuroblastoma of the adrenals in children). During the same period 125 tumors in the globe (4 from suprarenal) were found. In 5 of 32 adult cases the suprarenal tumor was responsible. In many of these tumors only a complete necropsy will reveal the origin.

#### VI. MASSIVE UNATTACHED RETROPERITONEAL TUMORS.

The occurrence of retroperitoneal neoplasms arising independently of the adult urogenital organs has, to date, eluded scientific explanation. Until about 1880, these tumors were diagnosed as sarcoma or pancreatic cyst and dismissed without further consideration or study. Howship, in 1871, had observed a composite tumor possessing certain characteristics similar to dermoid teratomas commonly found in the ovary. Occasionally, authors of case reports have added to the diversity of histologic features that may be associated with these neoplasms. These now include glomeruli, renal tubules, rete structures, bone, hair, sweat glands, fat, smooth muscle, uterine mucosa and chorion epithelium.

The authors have studied 17 cases of unattached retroperitoneal tumors and, having correlated their observations with the available information obtained from the literature, They believe that there is a general explanation for the genesis of these tumors; namely, that they arise from remnants of the embryonal urogenital apparatus. It would also account for the fact that, with few exceptions, well established tumors found in the adult urogenital organs have been found free retroperitoneally.

#### Presentation of Material.

Information concerning tumors of the urogenital apparatus is widely scattered in the medical literature of the world. It is found in articles usually comprising single case reports. Some authors

have chosen to interpret the pathogenesis of their peculiar case, while others have contented themselves with the report of an unusual case. More attention has been given the subject in Germany than in all other countries combined. Only 4 references to this group of tumors were found in the American medical literature. A natural division of the material is immediately apparent. Similar to tumors in the adult urogenital organs, the tumors from their remnants are both solid and cystic.

#### Unattached Cystic Tumors of the Urogenital Apparatus

It is natural that this type of tumor should be recognized first, because hair and well formed bone are easily identified grossly and the granous greasy material of epithelial cysts is very characteristic.

It seems logical to conclude, now that these cysts are mesonephric rather than ovarian in origin. This is the reaction of those who have studied this subject most thoroughly, and the idea of accessory ovarian has disappeared from the recent medical literature.

#### Unattached Solid Tumors of the Urogenital Apparatus

In 1901, Goebel described a tumor in the left upper quadrant which, on section, presented a typical suprarenal appearance. The suprarenal was present on the side of the tumor and it was uninvolved. They interpreted the origin from suprarenal rests because the cells resembled those of the suprarenal. Today, similar tumors found in the kidney would be diagnosed renal cell carcinomas. Chorio-epithelioma-like tumors have been reported several times without relationship to pregnancy, sex or fecundation. Clarke has recently reviewed the theories relating to the histo-genesis of tumors containing endometrial-like tissue. He, as well as other authors cited by him, are satisfied that not all tumors made of endometrial-like tissue have their origin in implantation or bits of endometrium as described by Sampson.

#### Unattached Tumors of the Embryonal Urogenital Apparatus which form the Basis of this Contribution.

The authors present 17 cases which they have had the opportunity of studying. 16 of the tumors were quite independent of the adult genito-urinary organs. In two

instances there was invasion of the kidney which was obviously secondary to a much larger and older tumor of the urogenital fold.

One must look further than the cells which compose the adult urogenital organ to account for the heterogeneous neoplasms found in these adult organs. They have found that tumors arising within these organs are similar to tumors encountered along the course of development of the embryonal urogenital apparatus. The inference can easily be drawn that, during the formation of the adult urogenital organs, bits of this embryonal tissue are included or attached that later may give rise to neoplasms. This concept is supported by extraneous dissimilar nests of cells found within and around these organs during the routine examination of surgical and postmortem specimens.

#### Points of Practical Interest About Individual Tumors of this Series.

The massive undifferentiated epithelial tumors, embryomas, have a natural history very similar to a metastasis from the testicle. They become very large, degenerate and metastasize by invading veins. They are soft, friable tumors. Ureters are surrounded and occluded, leading to anuria, as found in one of their cases. They at times respond well to roentgen treatment.

They have not as yet observed any solid tumors from the pronephros. The solid tumors of the mesonephros, the metanephros and the suprarenal may be considered as a family. The natural history of these tumors is similar to suprarenal cell carcinoma and renal cell carcinoma of the adult kidney. They are likely to be yellowish. Necrosis is frequently a prominent feature in them. They manifest a great tendency to invade veins and grow along them as tumor thrombi. By the time they are diagnosed they usually have metastasized. The appearance is typically that of adult suprarenal cortical cells in cases of suprarenal cell tumors. They may or may not be suprarenal medullary cells or excessive suprarenal cortical function. The mesonephric tumors have suprarenal-like cells. There is an alveolar arrangement of cells or there is mixed alveolar and suprarenal-like histology.

times there is an attempt at glomerulus formation. Tumors of the metanephros are likely to spring from the caudad portion of the nephrogenic cord. They may invade the bladder and kidney. The appearance is, at times, very like that of adult renal tubules. Calcification and ossification occur more particularly in the suprarenal and mesonephric tumors.

Conclusions:

1. Seventeen retroperitoneal tumors which were not attached to adult urogenital organs are reported.
2. All tumors reported are similar to tumors which arise in the adult urogenital organs.
3. Retroperitoneal tumors collected from the literature, integrated with the material described in this paper, have shown that almost all tumors which occur in adult urogenital organs may occur free along the course of development of the urogenital apparatus.
4. The concept that they rise from remnants of urogenital apparatus is the most logical explanation of their histogenesis.

Note: This probably explains our case with sex changes and no tumor of suprarenals.