REPORT

of

Committee on Thesis

The undersigned, acting as a Committee of the Graduate School, have read the accompanying thesis submitted by Joseph Peter Weyrens for the degree of Master of Science in Surgery. They approve it as a thesis meeting the requirements of the Graduate School of the University of Minnesota, and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science in Surgery.

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June 1920

THE UNIVERSITY OF MINNESOTA

GRADUATE SCHOOL

Report

of

Committee on Examination

This is to certify that we the undersigned, as a committee of the Graduate School, have given Joseph Peter Weyrens final oral examination for the degree of Master of Science in Surgery. We recommend that the degree of Master of Science in Surgery be conferred upon the candidate.

Minneapolis, Minnesota

May 25 1920

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THESIS

PELVIC TUMORS OF CHILDHOOD

Joseph Peter Weyrens

Submitted to the Graduate Faculty of the University of Minnesota in partial fulfillment of the requirements for the Degree of Master of Science in Surgery.

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Introduction.

At any time during the examination of a patient one may find himself face to face with a pathologic condition in the pelvis of a child which may prove to be a tumor. One will also find that when attempting to look literature up on the subject of pelvic tumors that there is a scarcity of athoritative accounts. It has been, therefore, thought well to examine the records of the Mayo Clinic covering a period of five years, from Jan. 1, 1915, to Jan. 1, 1920, as well as the operative records at St. Mary's Hospital for the same period, to determine the facts which pelvic tumors in childhood present to the clinical or surgical examiner and also to determine the status as to the seriousness of such a condition. During these five years there were 234,445 cases registered at the Mayo Clinic. Of these 741 were children who came to operation. Eleven cases of these were for pelvic tumors. which speaks strongly for the rarity of this pathologic condition.

Report of Cases at the Mayo Clinic.

Going over the case records of the eleven cases mentioned above, it was found that they fell into five groups: (1) Ovarian tumors, (2) Bladder tumors, (3) Retroperitoneal tumors, (4) Intestinal tumors and (5) Abscesses.

(1) Ovarian Tumors.

Case 1. (A162686), A.B., female, aet 14, was examined June 15, 1916. She gave a history of periodical pains in the right lower abdominal quadrant for two years. The pains were acute, of short duration and were made worse by walking and being on her feet. Physical examination was negative except for tenderness to pressure over the right lower abdominal quadrant. An exploratory operation at this time was refused. One year later, the patient was suddenly seized with severe pains in the left lower abdomen. Morphin was required for the pain. She was in bed for three days. Physical examination then showed a large pelvic mass the size of a grapefruit, mostly on the left side and center of the pelvis. At operation a large left ovarian cyst which completely filled the pelvis was found. Smaller parovarian cysts were also found on the right side, the largest being the size of a walnut. Left salpingectomy and oophorectomy were done and the parovarian cysts were removed. The subsequent history was uneventful and a letter received from her recently states that she has enjoyed perfect health since the operation.

Case 2. (A202948), M.S., female, aet 15, was examined July 25, 1917. She was an employee of the hospital and suffered with the classical symptoms and signs of acute appendicitis. An appendectomy was done and during the course of the operation a cyst the size of an English walnut was notice on the right ovary. The cyst was not removed. She made an uneventful recovery. A letter written to her recently inquiring about her condition was not answered.

Case 3. (A212409), L.H., female, aet 8, was examined Oct. 30, 1917. The mother had noticed that the child's abdomen was large even in infancy. Two weeks prior to the examination, the abdomen became enlarged fur-

ther and become hard. There were no other symptoms except that the patient had been tired for the last six months. On examination a thin, tired, hectic looking girl was found. The right side of the pelvis was filled with a firm, lobulated and fixed mass, which extended upwards into the abdomen. The inguinal lymphatic glands were slightly enlarged. There was no edema of the legs. At operation a tumor of the right ovary, the size of a grape fruit was found. Quite a little dark colored ascitic fluid was present. The left ovary seemed to be normal. A specimen removed for microscopic examination was reported as carcinomatous ovarian cyst adenoma (solid type). The tumor was not disturbed further and later the patient received 1750 mg. hours of radium. About two moths later the patient began to complain of occasional attacks of rheumatoid pains in the left hip. Four months later a mass began to develop in the left groin. An exploratory operation wasagain done and it was found that many loops of small intestine were incorporated in an abdominal mass. Some inguinal glands were removed to relieve pressure and the pathologic report on these also was carcinomatous cyst adenoma. The patient died one month later.

Case 4, (A235914), female, aet 13, was examined June 20, 1918. She gave a history of repeated attacks of appendicitis, covering a period of three years. An appendectomy was done and during the course of the operation a small cyst of the right ovary was observed. This was not removed. On Feb. 14, 1920, she reported that she had had no pelvic trouble.

(2) Bladder Tumors.

Case 5, (A142786), E.C., male, aet 2, was examined at the clinic Oct. 10, 1915. He had been well till seven months before when he had an attack of dysuria. The flow of urine would cease. This was attended by much straining. There was no blood, although frequency was marked. An x-ray picture five months before our examination showed a shadow in the bladder region.

An exploratory operation, done elsewhere three weeks before coming to the clinic, revealed a papilloma the size of the end of a thunb. Suprapubic drainage was established and the growth fulgurated. On examination here, the child was found to be noticeably reduced in weight and general health. The urine was draining through the suprapubic wound. An exploratory operation was done, the old sinus dilated a tube was inserted. A specimen was excised for pathologic examination, the report of which was "Burned mucosa and muscles only". Twenty-two milligrams of radium were given for forty-two hours. The patient was passing urine through the suprapubic tube when he left the clinic. A report received two years later stated that his suprapubic sinus was still draining urine.

Case 6, (A229590), D.F., male, aet 27months, was examined April 26, 1918. He had sinesmus when passing urine for four months and was gradually getting worse. He had considerable pain and had to be catheterized for two days before he was examined here. An exploratory operation was performed, a specimen removed for microscopic examination, and a suprapubic drain inserted. Myxomatous polypi of the bladder were found. The bladder was large, had a thick wall and contained about a quart of urine. The tumor involved the right wall near the base and the right side of the urethra, crossing the urethra and forming an obstruction. The patient developed otitis media after operation. This condition became worse and he died on the eighth day after operation. The postmortem showed marked tuberculosis of the kidneys, moderate miliary tuberculosis of the lungs, myxomatous polypi of the bladder, moderate bilateral hydroureters, and marked suppurative, hemorrhagic cystitis.

(3) Retroperitoneal Tumors.

Case 7, (A297816), K.S., male, aet 3, was examined Nov. 24, 1918. Six weeks previous to this date he had been seen by a physician because he had not passed his urine for sixteen hours. A large quantity of urine was re-

moved by catheter. He then complained of frequency until two weeks later, when he again had to be catheterized. From then on he had to be catheterised frequently and was able to pass but a few drops of urine by straining. He had fallen off some in weight and general strength. By abdominal palpation a mass was found in the right side of the pelvis. Upon rectal examination a large fixed mass which extended to the right and above the pelvic brim could be felt. At operation the bladder was found to be distended with urine. Behind and in the region of the prostate gland a hard tumor the size of a large orange could be felt. The mass was extraperitoneal and was enucleated. The pathologic report was myxosarcoma. The child died from exhaustion and recurrence on March 18, 1920.

Case 8, (A266896), W.C., male, aet 2½, was examined Apr. 9, 1918. The child thrived until nine months old, when there was retention of urine. The catheter had to be used for two days. At one year of age he began to lose in weight and became very fretful. His bowels became very inactive, cathartics and enemas being necessary. There was distention of the abdomen associated with vomiting. He had repeated urinary trouble and had to be catheterized. The catheter was left in place for three days. After that there was no further urinary trouble. In November, 1917, he was explored elsewhere. A tumor was found, which was not removed, but x-ray treatments were given later. On examination at the clinic the abdomen was found to be very much distended and the edges of the ribs turned outwards. Coils of bowel stood out prominently. No actual peristaltic wave was seen nor any definite mass could be felt in the abdomen. One to two inches from the anus one could feel a hard mass which seemed to lie dorsal to the bowel. It was impossible to pass this with the examining finger. At operation a giant colon involving especially the cecum and ascending colon was found. Cecostomy was done and a catheter was inserted. Also a large hard mass causing obstruction was found back of the rectum. A specimen for microscopic examination revealed

a malignant condition, although the exact type of malignancy could not be made out. The patient died on the fifth day of peritonitis.

Case 9, (A275504), H.G.T., female, aet 2½, was examined June 16, 1919. One year previous to this date the patient had bronchitis, at which time the attending physician noticed an enlarged abdomen. This enlargement gradually became more marked, but otherwise the child seemed perfectly well. On examination one could feel a tumor filling the entire pelvis and extending well up into the abdomen. An exploratory operation was done and a large retroperitoneal mass was found. This mass was not removed, but a specimen removed for microscopic examination revealed a fibrosarcoma. Two thousand, nine hundred and fifty milligram hours of radium were given later. The child died on Nov. 13, 1919.

(4) Intestinal Tumors.

Case 10, (A167217), M.K., female, aet 15, was examined July 25, 1916. Two years before coming to the clinic she was suddenly seized with severe pain in the left lower abdominal quadrant associated with nausea and vomiting. Physical examination showed a tumor in the lower abdomen and pelvis. Enemas, cathartics and heat were used and as soon as the bowels moved the pain was relieved. Since that time she had been under weight and pale. At times she had crampy pains in the left lower abdominal quadrant coming on in paroxysms which lasted one to two minutes at a time. At times there was a visible mass and gas rumbled in the bowels. She was always relieved by cathartics. On examination an undernourished anemic patient was found. She had a sausage shaped swelling in the lower left abdominal quadrant showing peristaltic waves. This mass extended well into the pelvis. At operation an intussusception of the jejunum was found, which was caused by an adenoma 20 in. from the duodenum. This adenoma had invaginated into

into 3 ft. of the jejunum below it. The invagination was milked out, the bowel opened, and the ademona removed. The pathologic report was adenoma. Her convalescence was uneventful. She left the hospital on the ninth day and a letter received from her in February, 1920, states that she has been free from trouble of any kind since her operation.

(5) Abscesses.

Case 11, (A244554), G.M., male, aet 15, was examined at the clinic, Sept. 3, 1918. A month before this examination he developed a slight swelling in the left lower abdomen, which gradually became more pronounced. On examination he had a temperature of 101.2. An area the size of the palm of the hand in the lower abdominal wall was indurated. This was incised and half an ounce of pus was evacuated. A microscopic examination of the tissue showed a simple inflammatory reaction. The patient did not do well, the fever remaining up and there still being much tenderness in the pelvis. About seven weeks later a marked mass could be palpated in the left side of the pelvis. A second operation was performed and a tumor mass the size of a child's head was found in the pelvis and lower abodmen. This was entirely extraperitoneal. The mass was made up of a purulent material and a large amount of necrotic tissue with much induration about its wall. This mass was removed and a microscopic specimen was reported as showing an inflammatory reaction only. Free drainage was inserted. The patient died five months later as a result of the infection.

Discussion.

Ovarian Tumors. Of the four cases operated on at St. Mary's Hospital for ovarian tumors there was but one case of malignancy, a carcinomatous cyst adenoma. This case made a satisfactory immediate postoperative recovery but two months later evidences of wide-spread involvement became manifest. This lead to a second operation which, on account of the extensive

involvement, was only planned to be palliative. The patient died one month later. Cameron reports a case of malignancy of the ovary, a round cell sarcoma, in a girl of three and one-half years old. Very singular changes had taken place. The abdomen measured 31 in. at the umbilicus and there was considerable ascites. The mammae were enlarged and had a glandular feeling on touching them. The labia pudenda were full and covered with hair, such as is seen in incipient puberty. The tumor was surgically removed and weighed $3\frac{1}{2}$ lbs. but the child died soon afterwards of shock. Rousseau calls attention to the fact that we may have a malignant and a benign ovarian tumor in the same child. He reports the removal of an adherent sarcomatous tumor from the right ovary of a seven year old girl who was operated upon two years before for a dermoid of the left ovary.

Of the three simple cysts of the ovary in our series there was but one of sufficient size to be removed. The other two were noted while operating for other pathologic conditions. The cyst which was removed was the size of a grape fruit and gave no other symptoms except severe pain in the left lower abdominal quadrant a few days before entering the hospital. In contradistinction to the mild symptoms in the case just reported, Hamaker reports the removal of an ovarian cyst from a child seven years old which had a very eventful history. Nine months before operation she began to fail gradually in health, with pain in the left side and a tendency to bend forward in walking. Four months later an enlargement of the abdomen was noticed. Two months before operation, she was unable to lie down because of the dyspnea and pain just below the liver. The tumor could not be made out until 6 pt. of dark fluid were withdrawn. It then felt about the size of a child's head and was apparently growing from the left ovarian region. At operation a large cyst with several daughter cysts

was found. The patient made an uneventful recovery. Doran also reports an interesting case of a pair of ovarian tumors removed from an infant after death which survived its birth only a few minutes. The abdomen contained ascitic fluid and the veins were engorged. Each tumor consisted of a single cyst, the center of the ovary having become necrotic. The lining of the cysts had been destroyed. The tissue in no way resembled sarcoma. Sutchiffe reports a case quite similar to ours in a girl three years of age. She suddenly developed abdominal pains with vomiting. Palpation showed a mass in the lower abdomen and pelvis. A laparotomy was performed and an adenoma of the ovary with a twisted pedicle (four times) was removed. The case recovered. Keen speaks of a case of his, a girl fifteen years of age, which was more like the cases we see in later life. He removed a multilocular cyst weighing 111 lbs. from a child who herself only weighed 68 lbs. There was an uneventful recovery. Winternitz reports four cases of ovarian tumors in children cured by operation. In his series he came to the conclusion that palpation ordinarily differentiates the ovarian growth although appendicitis had been diagnosed in one case.

Besides malignant and cystic ovarian tumors in children, literature makes mention of teratomata which may develop to considerable size in early childhood. Eggenberger presented an eight year old girl at the meeting of the medical society at Basil from whom he had fourteen days before removed an ovarian tumor the size of a man's head. On section this tumor showed areas of mucus, cysts, hair, cartilage, bone and some teeth. The parents had noticed an enlargement for half a year. The tumor grew rapidly and at the time of operation filled the entire pelvis and extended up to the liver. The mass seemed to fluctuate at some points while at others it presented hard nodules. Kelley also reports a case of a dermoid in a girl of eight years of age. She gave a history covering a period of four and one-half months, the symptoms very much simulating an inflammatory condition of the bowels. The tumor was easily palpable and at

operation a dermoid cyst of the left ovary, the size of an orange, was removed. Pieces of cartilage and ossified tissue were found in it. Her convalescence was uneventful. Gardier reports a unique case of a tumor the size of an orange in a four year old girl. The parents had noticed an enlargement of the abdomen for three or four months. For three months previous to the operation there had been meno- and metrorrhagia. Pubic hair had begun to develop and the breasts were enlarged and pigmented. The genitalia showed hyperdevelopment. The tumor was removed and on section it was found that one portion consisted of ovarian tissue while the greater part was renal tissue. A pathologic diagnosis of accessory nephro-ovarian tumor was made.

While it is generally considered that removing a tumor in a child carries with it a considerable risk, this cannot be said of the ovarian type. All of the cases operated on in our series made an uneventful recovery and all benign cases had no further trouble as far as could be learned. However, in cases of malignant ovarian tumors in children, while the immediate risk is not so great, the percentage of those who do not have recurrences is practically nil.

Bladder Tumors. The two bladder cases in our series were both in boys two years of age. Their complaint was dysuria and tenesmus. There was no hematuria in either case. One case had a diagnosis of the bladder polypus made before coming to the clinic and had been fulgurated. For this reason we were unable to confirm this diagnosis. The second case proved to be a papilloma under the microscope. The first case was draining when he left the clinic and a report received two years later stated that he was still doing so. The second case died soon after suprapubic drainage from complications. O'Neil made an extensive study of bladder tumors in the young. He found that bladder tumors only constitute .39 to .76 per cent of tumors as compared to tumors in

other organs. Of these but a very small proportion appear in children. Albarran, in a report of 252 bladder tumor cases, found but six in patients under ten years of age. Judd, in 114 cases, found but one in a patient under ten years of age. In a series of sixty-two cases of tumors of the bladder from the records of the Massachusetts General Hospital there was not a single case which fell in the age of childhood. Concetti, of Rome, in the Archives de Médicine des Enfants, reports a case in a female child of eleven years and discusses forty-one other cases which he was able to collect from the literature. He found that most of them appeared during the first five years of life. In his series there were two during the first year; ten, from one to two years; seven, from two to three years; five from three to four years; and five from four to five years. After that the number fell to not more than one to two a year up to the age of fifteen. Sheffin, in a book entitled, "Die Malignen Geschulste in Kindesalter", analyses twenty-eight cases with bladder tumors, and he finds that of these, twenty occurred from one to four years of age and eight from four to twelve years of age. In an analysis by Munwes of ninety-eight cases of sarcoma of the bladder there were nineteen cases below the age of twenty, and of these, ten were from one to five years, and five from five to ten years.

According to these reports, the great preponderance of bladder tumors in childhood seems to appear early in life. This would seem to be strongly in favor of their embryonic origin. Of great interest in this connection is the work of an American student, Dr. J. Edmund Sweet, at the University of Gissen. He gives an exhaustive study of the literature of the subject of the mixed tumors of the lower end of the uro-genital tract of children. He was able to collect information about twenty-two tumors of the prostate and forty-five tumors of the bladder. These tumors for the most part were reported as

sarcomas, but Sweet finds considerable evidence that they belong to the the group of mixed tumors, and he is inclined to the belief that they arose as fetal inclusions. He finds that the age of the patient at which these tumors develop is about the same in all, but the tumors of the prostate and of the bladder have a greater tendency to produce unfavorable symptoms because of their greater tendency to interfere with the urinary apparatus, and because of their greater malignancy. The primary seat of all of the tumors of the bladder was at the base, some of them about the internal opening of the urethra, others about the ureteral openings. Metastases were not present in any case. The seat of these tumors, exclusively at the base of the bladder, he considered evidence that they could not have been made up of the normal tissue of the bladder wall, for in no case were they found where only bladder-wall tissue was present. Tumors were found with equal frequency in the two sexes. Recently Wilms of Leipzig has also carefully studied another group of mixed tumors of the kidney, vagina, and cervix uteri. He was also of the opinion that these congenital tumors may arise from fetal inclusions. Targett in an article on sarcoma of the bladder in children states that all polypoid growths which are attached to the mucous coat of the bladder and invariably described as mucous polyp, fibrosarcoma, fibromyxoma, myxosarcoma and the like, should be described as sarcoma. The vast majority of primary growths of the bladder in children are polypoid in type, that is, they are rounded elevations of the mucous membrane with a more or less constricted base or pedicle and often arranged in clusters. Their microscopic appearance may differ, also microscopically the proportions of fibrous, cellular or other elements may vary but they are pathologically better considered under one group, as clinically they certainly have one point in common, being almost uniformly fatal. However, Koll reports a case of a child of thirteen months of age, cured of a simple polyp by operation. A case reported

by Shattuck is of interest in this connection, being the bladder of a two year old child, showing multiple polypi which were histologically composed of striated muscle. The case was thought to be congenital. However, most authors seem to agree that these cases are potentiallly, if not pathologically, malignant. Steinmetz reports a neoplasm in the bladder of a boy two and three-fourths years old. For two to three weeks he had to be catheterized. One came up against an obstacle. The tumor was the size of an apple and could be made out on palpation. The child died and at autopsy one found a tumor, hypertrophied bladder, dilated ureters and a perivesical abscess. The pathologic diagnosis was spindle and round cell sarcoma. In twenty-six cases he found it to be the rule to have sarcomas or myosarcomas. Most often the tumor was multiple. Hematuria was comparatively rare while the first and most important symptom is frequency and dysuria . He found the course generally to be very rapid and the prognosis very bad. In his series fifteen operations were done - seven girls and eight boys. All but one died soon after operation or of recurrence. Phocus in Le Progres Medical discusses a case of vesical tumor in a boy six and one-half years old. He was operated on but there was recurrence one month later. He had several operations after/but that he finally died of pyelonephritis. He gathered twenty-five cases of bladder tumors in children from the literature. Adding to this five cases of Albarran's, he has in all thirty cases. He finds that benign bladder tumors are quite frequent but not so much so as the malignant ones. He concludes that hematuria is not of as much value as/a diagnostic measure as in grown up people. He finds that in girls the tumor works its way through the urethra into the vagina as a natural tendency, while in boys the bladder enlarges in toto so that on examination one gets the impression of a filled bladder which however does not reduce in size on passing the catheter. Of twelve operations on girls, ten died. The two who survived had benign tumors. Of seven boys

operated on, five died. Also the two boys who survived had benign tumors. Death usually comes rapidly.

Retroperitoneal Tumors. There were three retroperitoneal tumors in our series. All of them were sarcomas and only in one case was it possible to remove the growth. In the two other cases exploratory operations were done but it was impossible to remove the mass. One died from recurrence four months after the operation, one died five months after operation from the direct effects of the inoperable tumor and the third one died of peritonitis on the fifth day after operation. Campbell reports a case in the British Medical Journal quite difference from ours. He removed a cystic retroperitoneal tumor from a female child seven months old. At four months the mother began to notice a swelling of the abdomen which gradually increased. Periodic attacks of colicky pain also occurred. The nutrition was good. The cyst was tapped and then was enucleated from the subperitoneal tissue. There was no pedicle. The peritoneum was attached to the wound in such a way that the cavity could be packed. There was an uneventful recovery. The child went home in a fortnight and five months after operation was in good health. The tumor was a cyst containing ten ounces of yellow fluid and a solid portion in which a mass of cartilage and a piece of bone lay embedded. The tumor weighed three pounds. This is one of the youngest cases on record from which a retroperitoneal tumor has been removed with success. Kay also reports a case of a four year old boy who suddenly was unable to pass his urine. He was catheterized and on examination a pelvic tumor was found. The case was explored and a retroperitoneal tumor 10 by 5 cm. was found which had undergone cystic degeneration. The pathologic report was fibromyoma. The convalescence was uneventful.

It then seems that retroperitoneal tumors which are of a

malignant type are a very serious matter as it is almost impossible to remove the neoplasm thoroughly enough to prevent recurrence. Besides, the operation itself carries with it a considerable risk. In cases of benign retroperitoneal tumors the outlook for permanent cure is very good indeed.

Intestinal Tumors. There was but one tumor of this class in our series. The patient had suffered with symptoms of intestinal obstruction for two years. A mass was found in the left side of the pelvis which at operation proved to be an intussuscepted jejunum which intussusception was caused by an adenoma. Resection of the tumor was successful and the patient writes in February, 1920, that she is well and has had no further trouble since her operation. Holt in discussing intussusception as a symptom of intestinal tumor says it is one of the most important for diagnosis because of its frequency and its peculiar character. It is present early in the disease. He was able to collect and tabulate 188 cases of intussusception in children under ten years of age as follows:

	SEAT OF INTUSSUSCEPTION.					
SEAT OF TUMOR	Ileo-cecal	Ileo-colic	Colic	Enteric	Not Stated	Total
Region of cecum	-	3	-	1	7	11
Region of ascending colon	1	-	-	-	12	13
Region of transverse colon	3	-	-	-	13	16
Region of descending colon	3	-	-	-	18	21
Region of sigmoid flexure	4	-	1	-	8	13
Rectum	25	1	7	-	28	61
Protruding from anus	9	-	1	-	12	22
Umbilical region	-	-	-	1	-	1
Movable	-	-	-	1	2	3
Site unknown	1	-	-	-	-	1
TOTAL	46	4	9	3	100	162
No tumor felt	10	2	-	1	13	26

It is therefore seen that in his series a tumor was made cut during life in eighty-six per cent of the cases of intussusception and in the great majority of these it was discovered at the first careful examination. It will be noted that in one-half of the cases the tumor was either felt in the rectum or protuded from the anus and that in over two-thirds it had advanced as far as the descending colon or beyond. The tumor may reach the pelvic region in a surprisingly short time, even when the invagination begins at the ileocecal valve. In one of his cases it was felt in the rectum in less than twelve hours from the onset. The usual description, "sausage shaped", is accurate when the invagination is large, the tumor then being from 4 to 6 in. long and about an inch and one-half in diameter. During an attack of pain or manipulation, the tumor may become more prominent and may be distinctly erectile. By rectal examination the tumor feels like the os uteri, the central opening being the apex of the intussusception. Pfaundler and Schlossmann in discussing tumors of the lower bowel in children are of the opinion that most of those found in the rectum are polypi. In their experience they usually found such polypi to adhere to the sacral wall of the rectum near the anus as tumors the size of a pea to that of a cherry. At first they have a broad base but by the movements of the gut and the passage of the stools this is soon drawn out to a long pedicle which will often even permit the velvety red round polypus to appear outside the anus during defecation. The structure of these polypi is almost always that of the true adenomata of the mucous membrane, rarely did they find a fibrous admixture or base in children. According to the structure, they are tender, soft and easily injured, with rich vascularization, which explains the bleeding. These polypi are more common on the sacral wall of the rectum, where they are frequently found in numbers. In the ampula especially, they may be found in clusters, their size varying from that of a grain of rice to that of a cherry, and

even larger. Closely related, histologically, are those tumors in which the whole large intestine contains polypi. According to Piechand, heredity plays some role in this condition. Power reports a case of a pelvic cyst in a girl two years of age, which was explored but not removed on account of adhesions. The child died two days after operation. At autopsy the condition was found to be a simple cyst which originated from the wall of the rectum. Psaltoff discusses an interesting case. His patient was a twelve year old girl who for four year had pains in the lower abdomen every ten days which lasted a few hours at a time. Sometimes she had fever and vomiting. In the right iliac fossa there was a sausage-like tumor. At operation a very much enlarged ileum was found, with thick walls and much inflammation. The bowel was three times its natural size, There were 794 fruit seeds of all kinds in the enlargement. The history of the case showed that these seeds had been lodged in the intestinal tract for four years.

From the surgical standpoint, pelvic tumors in children which are intestinal, offer good surgical prospects. Generally the condition of the child is good and in those cases where intestinal resection is indicated, the surgical risk and prospects of ultimate cure compares favorably with that of a similar condition in the adult. Those tumors which can be removed directly per rectum offer, of course, a very high percentage of cures.

Pelvic Abscesses. There was but one case in our series which fell in this class. The patient was a boy fifteen years old who apparently had a chronic infection in the left groin which eventually formed a tumor mass in the left side of the pelvis of considerable size. Drainage and removing the necrotic material was of no avail and he died several months later as a result of the infection. Willard in his work, "Surgery of Childhood", calls attention to the pelvic masses which may appear in the

pelves of children due to tuberculosis of the spine, pus working its way down within the sheath of the psoas muscle and thus forming a sausage shaped pelvic tumor. Lamois discusses pelvic adenitis in children which is of interest in this connection. He finds that the deep lymphatic glands suffer enlargement as well as, and sometimes simultaneously with, the neighboring inguinal ones. Deep and careful palpation should be made for this development, the patients thighs being flexed and the mouth open. The tumors will be found in one or both fossae as hard bodies, somewhat movable and separate from one another. In some cases the feel of the tumor is soft instead of hard. If periadenitis also be present, the isolation of the individual glands will be more difficult, perhaps impossible. The results attending this development may be constipation and pain and edema from pressure upon the contiguous nerves and vessels. The hardness usually lasts a long time and may terminate by suppuration with more or fewer fistulous openings into the inguinal region. Only general treatment is advised for this condition.

Pelvic tumors in children in the form of abscesses are generally chronic conditions, and while surgery may offer much relief and probably prolong life, the outlook for ultimate cure is generally not very good.

Literature makes mention of several pelvic tumors in children which arose in the prostate. Tordens reports a case of enlargement over the pelvic area in a boy nine months old. Soon after the enlargement was noticed, micturition became difficult and painful. A mass could be palpated in the pelvis which extended well up towards the navel. The child died eighteen days later. At autopsy a tumor weighing 1370 gm. was found. It originated from the left lobe of the prostate. The right lobe of the prostate also showed some degeneration. The ureters, and pelves of the kidneys were dilated. Pathologically the tumor was a fibrosarcoma. Wind also reports a case in the Jährbuch für Kinderheilkunde of a boy five and one-half years old, poorly nourished and rachitic.

He suffered from dysuria and frequency. He had to be catheterized frequently and also had frequent defecation. By rectum one could feel a tumor of the prostate the size of a walnut. Death came on account of pneumonia. Autopsy showed bilateral hydronephrosis, papillomatous excrescences in the trigone and a tumor the size of an apple in the right lobe of the prostate. The pathologic report was small cell sarcoma. Soussini, in the Archives de Médécine des Enfants, discusses a case of a boy four and one-half years old, who first suffered from difficulty in micturition, the onset of which was insiduous. He also had colicky pains in the hypogastrium. A fortnight later there was complete urinary retention. Ascending infection occurred on account of repeated catheterization and death ensued. At autopsy they found a tumor the size of a mandarin orange surrounding the prostatic urethra, purulent cystitis, and a slight degree of pyelonephritis. The tumor was microscopically a fibrosarcoma with myxomatous degeneration. McCreig reports an interesting case of tumor of the prostate in a boy four years old. The child suffered from dysuria and frequency three weeks before examination. The bladder was distended. After catheterization a distinct mass was felt in the bladder region. The patient died ten days later. At autopsy a tumor of the prostate was found, which microscopically proved to be a rhabdomyosarcoma. McCreig made a careful search of the literature and found this type of tumor to be extremely rare. He found but three similar cases reported - one at the age of nine months, one at the age of four years, and one in a man twenty-six years old. These three cases had been reported by Socin and Burkhardt.

Tumors of the Uterus. In our series we did not have any tumors falling in this class. However, such cases are found in the literature. Ganghofner observed a case of carcinoma of the uterus at the pediatric clinic at Prague, in a girl eight years of age. She had had irregular vaginal hem-

orrhage two to three years. On examination a muco-sanguinous vaginal discharge was found. The vagina was dilated and a tumor springing from the anterior lip of the cervix, the size of a hazelnut, was found. A specimen removed for pathologic examination showed it to be medullary carcinoma. The tumor was destroyed with the cautery, but the child died thirteen days later. At the autopsy no lymphatic involvement or involvement of the remaining part of the uterus was found. Lorthivir reports a case of a girl three years of age from whom a small, apparently fibrous mass was removed from the cervix. Three months later a partial hysterectomy was done by marcellement. Three months after that a total oblation of the uterus and appendages was done by the abdominal route. Enormous recurrences filled the entire true pelvis. Death occurred from shock. Microscopically all tissues removed after the first operation showed small round cell sarcoma. Pick also reports a case of sarcoma of the uterus in a child of two years. A sarcomatous mass, the size of a fist, was found, which protruded from the cervix and was diagnosed a sarcomatous polyp. The child died two and one-half months later. Numerous mestastases were found at autopsy. Cavaillon discusses a case of a fibroma of the uterus in a child thirteen years of age. Her menses appeared at twelve and she suffered from menorrhagia. There was marked anemia. On examination an abdominal tumor was found, which at operation proved to be a fibroma of the uterus, the size of two fists, and weighing three kilograms. The microscope confirmed this diagnosis. The patient did well and made an uneventful recovery.

Tumors of the Vagina. Kolisko reports three cases of vaginal sarcoma in children and reviews the literature in which he was able to find eight other cases reported. The first case was child a year and half old, the second one year old, and the third one and a half years old. All of the growths appeared as papillomata and were removed with the cautery. There were re-

currences in all of his cases. However, death was due in two of his cases to septic peritonitis, or pyelonephritis, while the other one died of the malignant growth. Reviewing the literature, Kolisko finds that in children the growth is usually found in the anterior wall of the vagina, and always takes the polypoid form, which becomes multiple. In advanced cases there is involvement of the uterus, of the urethra, the bladder, and even the vulva. Very seldom did he find the lymphatic glands involved, and in no case was the rectum involved. The complications were generally cystitis, pyleonephritis, and peritonitis. In all cases there were hydroureters and hydronephrosis. Microscopically these tumors were fibrosarcoma, spindle cell sarcoma, and myxosarcoma, or round cell sarcoma. In some cases the histories showed that pathologic growths existed since birth apparently as benign growths which later assumed the characteristics of sarcoma and then grew rapidly. All cases ended fatally with the exception of one case reported by Schuchardt in which the child seemd to be well two years after a recurrence had beenremoved. Operation can only be of value when made quite early and when it is possible to remove the tissues quite extensively. Frick in Virchow's Archives also discusses two cases of vaginal sarcoma in children. The first case was a girl seven months old who had the tumor removed and died three to four months after the operation. The second case was a girl two and one-half years old. She had the tumor operated on and one month later she again had a recurrence the size of a walnut removed. She then was well two and one-half years later. Frick also emphasizes the fact that extensive removal of tissue has to be done in these cases if a recurrence is to be avoided. The sarcoma which had not recurred two and one-half years after the second operation had been attached to the posterior vaginal wall.

Urethral Tumors. Sims reports a case of a colored girl three

years of age. A mass protruded through the urethra and there had been considerable obstruction to urination for some time. The patient was in bad condition. The urethra was dilated, the mass pulled down and dissected off from the posterior wall. The growth weighed 3 oz. and was described as a myxofibroma. Villéon also reports a case of a pure fibroma which developed in the urethra of a three year old girl.

We further have to consider the possibility of pregnancy in some of the cases of pelvic tumors of childhood. Giffin has encountered this condition on examining older children and calls attention to this fact. Also fecal impaction and a distended bladder from other causes than a bladder tumor may form the mass. The former condition generally offers but little difficulty in diagnosis while the latter, of course, promptly disappears on using the catheter.

Conclusions.

1. Benign ovarian tumors in children, both at the Mayo Clinic and in the literature prove to be good surgical risks.

2. In cases of malignant ovarian tumors in children, the percentage of those which do not have recurrence is practically nil. The immediate surgical risk is small.

3. Bladder tumors in children are a most serious condition. Practically all the malignant cases and a high percentage of benign cases die.

4. In bladder tumors in children hematuria as a diagnostic sign is not of much value as it is rarely present. Frequency and dysuria are the leading symptoms.

5. Retroperitoneal tumors which are of a malignant type have a very grave prognosis indeed. Practically all the cases have ended in death. Those cases reported in the literature which were of a benign nature made a very

satisfactory convalescence.

6. The surgery of pelvic tumors in children which are of an intestinal nature is very encouraging, the operative risk being low and the future outlook good.

7. Pelvic abscesses in children as well as other chronic and acute infections carry a high mortality as the host generally has a lowered resistance.

8. As shown in the literature, tumors of the prostate are practically always sarcoma and invariably lead to a fatal termination.

9. The literature shows the greater number of tumors of the uterus and vagina to be malignant. All of the malignant cases of the uterus ended in death while a small percentage of the malignant vaginal tumors which had a liberal excision apparently recovered. One case of fibroma of the uterus recovered.

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