## ON THE RETROPERITONEAL SYNDROME

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The clinical picture of acute abdomen are conditioned by a series of pathological processes (hemorrhage, inflammation, obstruction in the gastro-intestinal tract) which develop in the peritoneal cavity and demand an urgent surgical intervention. The symptoms of acute abdomen may be caused also by a number of extra peritoneal disorders. Symptoms which resemble acute abdomen and are due to such extraperitoneal disorders are generally notified as "peritonism". Peritonism includes the so called retroperitoneal syndrome, which is a symptomocomplex due to a pathological process in the retroperitoneal space resembling the clinical picture of acute abdomen.

Etiologically the retroperitoneal syndrome may be caused by almost all acute pathological processes in the retroperitoneal space. Spontaneous and traumatic retroperitoneal hematoma is the most common etiologic factor. Next rank the inflammation of organs and tissues in the retroperitoneal space which have occurred primary or secondarily in the neighbouring organs, such as peri- and paranephritis, thrombophlebitis of the retroperitoneal venous network of vessels, purulent echinococcus cysts, purulent pancreatitis, purulent appendicitis etc. Tumours of the retroperitoneal space rank third in incidence.

From pathogenetic standpoint in the retroperitoneal syndrome it is of importance to explain the character of the pain and the occurrence of peritoneal irritation, manifested to a varying degree by means of muscular resistance. It is a well known fact, that the skin and the muscles of the posterior abdominal wall, the parietal peritoneum and the supportive structures of the abdominal organs are innervated by V—XII intercostal nerves, n. iliohypogastricus and n. ilioinguinalis. The visceral peritoneum and the retroperitoneal organs are innervated by the vegetative nervous system. Excitation of the vegetative nervous system, which originates from the organs located in the abdominal and retroabdominal space, results in the so called visceral pains which are not definitely localized, colicoid and are not accompanied by muscular resistance. When the parietal peritoneum and the supportive structures of the abdominal organs are irritated the so called somatic pains appear (vaguely localized, permanent, accompanied by muscular resistance). In most of the disorders of the abdominal organs painful sensations contain elements of both visceral and somatic pains. In pathological processes in the retroperitoneal space irritation of the parietal peritoneum gives rise to typical somatic pains; the disorders localized in the retroperitoneal organs — visceral pains, whereas the processes

involving the retroperitoneal organs and the parietal peritoneum — pains of a mixed type.

Muscular resistance is already a quite well elucidated cerebrospinal reflex, whose afferent and efferent routes are located in the V—XII intercostal nerves, n. iliohypogastricus, n. ilioinguinalis, nn. lumbales and n. phrenicus. For that reason the pathological processes, which cause muscular tension, may be localized intraabdominally, retroperitoneally, in the muscles, intercostal space, diaphragm or in the pleural cavity. In retroperitoneal localization of pathological processes depending on the site and intensity of irritation, the following may be observed:

1. Peripheral muscular resistance — in intensive irritation of the posterior parietal peritoneum.

2. Central resistance of the abdominal muscles — in disorders of a retroperitoneal organ occurring very seldom along the viscero-parietomotoric process.

3. Lack of muscular resistance — most commonly in isolated disorders of the retroperitoneal organs and tissues without any irritation of the nervous receptor elements of the parietomotoric reflex.

Symptomatology. General and local symptoms may be observed in the course of the retroperitoneal syndrome. The general symptoms in a suddenly occurring hemorrhage are sharply different from those observed in inflammatory processes. Local findings irrespective of their etiology, are however identical with those of acute abdomen. Shock occurs in all cases or traumatic retroperitoneal hemorrhage (renal or pararenal). It is due to the severe pain and more or less rapidly turns into collaps, depending on the degree of bleeding. Intensity of the pain depends upon the degree of compression of nervous endings. For that reason closed and markedly strained hematomas run a more severe course than the open ones. In spontaneous retroperitoneal hemorrhages (usually due to a rupture of aortic aneurysma) — collaps prevails rapidly leading to death. In inflammatory processes, inducing the retroperitoneal syndrome, general signs are dominated by local ones. Shock is either lacking or is of mild degree (in perforation of a hollow organ in the retroperitoneal space). In the subsequent hours and days prevails the picture of rapidly occurring septic intoxication (lassitude, high temperature, chills, leucocytosis) due to the effusion of purulent exudate, urine, intestinal and pancreatic fluid in the retroperitoneal space. Pain is an obligatory symptom in the retroperitoneal syndrome. It has a somatic character and different localization — lumbar, abdominal, epigastric, dull or acute, sometimes colicoid. The diversity of painful sensations is a factor that commonly renders the diagnosis difficult. Vomiting is a common sign. A regular symptom is the gradually occurring intestinal paresis, which is manifested by meteorism and gas and excrement retention. When the pathological process involves the kidneys and the ureters, mictional disorders (disuria, pollakyuria) and urinary changes (hematuria, piuria) are present.

Diagnosis of the retroperitoneal syndrome is difficult. Differentiation from acute abdomen is particularly difficult. Attention should be paid to previous disorders, which may lead to a retroperitoneal hema-

toma or suppuration (arteriosclerosis, blood hypertension, nephrolithiasis, etc.).

In recording the history of the disease of decisive importance is trauma suffered in the abdominal or lumbar region, particularly if it has been accompanied by fractures of the ribs, vertebrae, pelvis etc. It is typical that the abovementioned symptoms have a gradual occurrence and incessantly intensify. Symptoms of alternative value, partly of lumbar and partly of abdominal origin should always arouse suspicion for a pathological process localized in the retroperitoneal space (Mathis). The general condition is affected to a varying degree; in severe cases shock prevails, in milder ones — the pulse displays bradicardia, in aortic aneurysma pulsations of the femoral vessels are lacking, in inflammatory processes the temperature is raised. Local inspection in the first hours following trauma may discover traumatic deformities in the vertebral column and pelvis, subcutaneous hematoma, collateral oedema or a swelling in the lumbar region. In later hours the abdomen is distended and does not participate in breathing; the lumbar swelling increases, a psoas-symptom may occur. Palpation of the lumbar region may discover cutaneous hypesthesic zones, fractures, tumor, skin oedema, crepitations, muscular resistance and deep pain. On palpation of the posterior abdominal wall the sign of peritoneal irritation is present; in retroperitoneal tumors the calorimetric symptom of Gesse may be positive; the phrenicus symptom is always negative. The percussion of the lumbar region and the posterior abdominal wall is painful, succussio renalis is positive, the symptom of Joyce (a limited, immobile, slowly increasing dullness in the lumbar area) may be positive; more seldom the sign of Hunter (dullness in percussion of spina iliaca anterior superior) may also be positive. On auscultation a slowly progressing intestinal paresis is recorded. X-ray examination may detect considerable meteorism or unilateral decreased motility of the diaphragm. Roentgenograms discover meteorism with purulent collection or hematoma — an enlarged contour of the kidneys and obscure contours of m. psoas major; in other cases — fractures of the ribs or the vertebral column, in aortic aneurysm — notching of the vertebrae. Contrast X-ray examination may be more useful. When suspicion exists of a renal lesion, venous urography is indicated; retroperitoneal abscesses and tumors give rise to deviation of orificium ureteri and a shade when retropneumoperitoneum is performed; aortic aneurysm may be detected by means of aortography or pneumoperitoneum. Laboratory data are also important: blood in the urine indicates renal injury; in hematoma or abscesses the leucocyte counts are considerably increased; in hemorrhage the hemoglobin index and blood pressure rapidly decrease. Puncture of the retroperitoneal space is obligatory in all cases of positive physical findings (particularly when the symptom of Joyce is present).

Differential diagnosis of the retroperitoneal syndrome is particularly difficult with peritonitis, intraabdominal hemorrhage and ileus.

Treatment of pathological processes with a retroperitoneal syndrome depends upon the nature of the disorder. Conservative treatment is indicated in small hemorrhages and initial inflammatory processes. Treatment consists in confinement to bed, the administration of hemostatic

drugs, antibiotics, puncture aimed at draining the fluid and paranephral blockade in order to suppress shock and intestinal paresis. Lumbotomy is indicated if hemorrhage increases (increasing lumbar swelling, abrupt decrease in hemoglobin values, erythrocyte count and blood pressure). Lumbotomy may erradicate the source of bleeding (ligature of a ruptured blood vessel, nephroraphy, nephrectomy). Drainage may eliminate the complications (shock, urinary infiltration, purulent intoxication, a deepening intestinal paresis). In obscure retroperitoneal syndrome and suspicion for the injury of an intra abdominal organ laparotomy is indicated, revision of abdominal organs and of the retroperitoneal space by means of incision of the posterior parietal peritoneum. If on laparotomy a retroperitoneal process is discovered then drainage of the retroperitoneal space appears necessary by means of a small additional lumbar incision.

Treatment for the control of shock, hemorrhage, intestinal paresis and infection is carried out in the postoperative period.

In the last ten years we have followed up 17 cases with a marked retroperitoneal syndrome. Etiologically they may be divided as follows:

*a. As a result of retroperitoneal hemorrhage.*

1. From rupture of an abdomino-aortal aneurysm — 2 cases. In both cases an arteriosclerotic dissicating aneurysm was concerned. One of the cases ran a course of a calculous pyonephrosis which was lumbotomized and confirmed on operation. (He is mentioned below as case 1). The other case displayed signs of ileus and was not operated on. Both cases terminated fatally.

2. From rupture of the kidneys — 9 cases. Trayma was the cause in all cases. In 3 of the cases there was a combined trauma. In all cases the retroperitoneal syndrome ran a course with gros or microscopic hematuria. Correct diagnosis was made in seven cases. They were treated by conservative methods because of their improvement. Incorrect diagnosis was made in two cases. They were subjected to laparotomy (in one case laparotomy ended with nephrectomy owing to a marked rupture of the kidney — case 3). One of the cases was complicated with an acute renal insufficiency and terminated fatally (case 2). Another eight patients recovered.

3. From rupture of perirenal vessels — 2 cases. One patient on account of a diagnostic error was subjected to laparotomy, his disorder was established on operation and recovered. The other patient died of severe shock.

4. From fracture of the vertebral column — 2 cases. False diagnosis was made in both cases. They were treated conservatively and were healed (case 4).

*b. As a result of retroperitoneal inflammation.*

One patient with calculous pyonephrosis, incorrectly diagnosed, was operated on for appendicitis and died (case 6); another patient with retroperitoneal duodenal perforation, incorrectly diagnosed, was operated on for acute appendicitis and died (case 5). To illustrate the diversity of the retroperitoneal syndrome we report the following personal observations.

Case 1. M.P., aged 72, case histroy No. 32 from April 8th, 1954, admitted for treatment in the Governmental policlinic and hospital. Since 4 days complains of acute pains in the left lumbar region, polakyuria, hematuria, flatulence, constipated, hick ups, since 15 years suffers from a right sided nephrolithiasis; since 4 — from diabetes. His condition is slightly altered, pulse 108/min. of good quality; RR — 150/90, afebrile. Abdomen — above the chest level, with soft painless wall, mild muscular resistance in the left hypochondrium, no audible intestinal peristalsis. The kidneys are not palpable, succussio renalis — positive on the left, marked palpatory sensitiveness along the left ureter. Urine — alb (+), sed: single erythrocytes. Hemoglobin — 88%, erythrocyte count — 4,600,000, leucocytes — 7500, ESR — 53 mm., blood urea — 72 mg%, blood d sugar level — 240 mg%. X-ray examination: marked spondylosis of the backbone; cystoscopy reveals a vesical calculus. In the following days acute colicoid pains occurred in the left lumbar region which continued with chills and fever reaching 38°C, the abdomen began to distend with flatulence. On the 8th day following admission a tumor with the size of an orange and severely painful is detected in the left lumbar area. In the following days progressive growth of the tumor is observed, displaying pulsations. Blood hemoglobin decreases to 58%, erythrocyte count — to 3,240,000, the abdomen is considerably distended, the abdominal walls are slightly stretched, intestinal paresis deepens. Lumbotomy is performed for left sided pyonephrosis. Surgical findings: left kidney of normal size and consistency, gigantic hematoma involving the left groin up to crista iliaca; tamponade and drainage performed. Several hours following the operation — collapse with lethal outcome. On necropsy: generalized arteriosclerosis, dissecting false aneurysm of the abdominal aorta, gigantic left-sided lumboiliosacral retroperitoneal hematoma, anemia, spondylarthrosis, a calculus in the left kidney and the urinary bladder, nephrocirrhosis.

Case 2. S.A., aged 25 years, case history No. 5932/July 27, 1959, admitted for treatment to the District Hospital — Varna. Three days ago the patient has been knocked down by a truck and remained unconscious for several minutes. After the trauma he had severe pains in the left lumbar region, passed clear urine. Admitted to hospital on account of rapidly developping oliguria. Severe general condition, pale skin and mucous membranes, deep noisy breathing, uremic breath, pulse — rhythmic 88/min., with good quality, RR — 110/70, afebrile. The right lumbar region is swollen, with a marked subcutaneous hemorrhage, the sign of Joyce is positive, the lumbar muscles are strained, succussio renalis to the right is markedly positive, the kidney cannot be palpated. The abdomen is distended, takes part in breathing, with marked cutaneous hyperesthesia, mild muscular resistance of the right abdominal area — hypersonoric percussion note, peristalsis is not audible. Diuresis — 100 cc., turbid urine. Laboratory examinations: urine: alb. (+), sugare (—), sediment — many erythrocytes, single leucocytes, single hyaline cylinders, specific gravity — 1012, erythrocytes — 4,160,000, hemoglobin — 82%, leucocytes — 16,100; blood urea — 214 mg%. X-ray examination of the abdomen — marked meteorism. In the following 3 days the condition of the patient becomes worse, anuria occurs. For that reason the patient is transferred to the Urologic Clinic at the Postgraduate Medical Institute. On account of progressive acute renal insufficiency the patient is subjected to extracorporal dialysis, which was followed by lethal outcome. Post mortem: cerebral oedema, uremic gastroenterocolitis, massive right-sided perirenal hematoma, cortical rupture of the right kidney.

Case 3. A.M., aged 20, case history No. 2941/March 28th 1963, admitted for treatment to the District Hospital in Varna. An hour ago she has been squeezed between two trailors. Later she felt progressively increasing pains in the lumbar region and the right hypochondrium. Severe general condition, pulse — rhythmic, 80/min., feeble, RR — 120/80, temperature 37°. Abdomen — below the chest level, takes part in breathing, marked tenderness and resistance of the abdominal wall in the right hypochondrium; on percussion — marked tenderness in the same area, Shtetkin — Blumberg (+), the lumbar regions have normal configuration, the kidneys cannot be palpated, succussio renalis is markedly positive on the right. Laboratory examinations: urine — macroscopic data of blood, hemoglobin — 73%, erythrocytes — 3,400,000, leucocytes — 18,200. With the diagnosis of ruptura hepatis an incision was made after Rio-Branco and the abdominal cavity was opened. The liver appeared intact whereas the posterior parietal peritoneum before the right lumber region was markedly swollen by an underlying blood collection. The latter was incised and a large perirenal hematoma was revealed due to the massive rupture of the kidney. Nephrectomy was performed, lumbar drainage and suture of the abdomen. After 12 days the patient was discharged recovered.

Case 4. N.H., aged 46 years, case history No. 6638/August 30th, 1957, admitted for treatment to the District Hospital in Varna. Several hours ago he fell from a 3 meter height, received severe pains in the lumbar and in the left abdominal area with impaired movements of the lower extremities; vomited several times. Good general condition, the lumbar areas are symmetrical, painless, the kidneys cannot be palpated, succussio renalis — positive on both sides abdomen— on the chest level, the abdominal wall is painful in the left hypochondrium, slightly resistant, Shtetkin-Blumberg is positive, no peristalsis is audible. The vertebral column is markedly painful on palpation from the X thoracic to II lumbar vertebra, the gait is stiff, sparing the backbone. Laboratory data: urine — no pathological findings; erythrocytes — 4,200,000, hemoglobin — 82%, leucocytes — 9,000; X-ray data for a fracture of the XII thoracic vertebra. The resulting retroperitoneal syndrome occurred on account of a retroperitoneal hemorrhage. Conservative treatment was carried out: immobilization, hemostatic and vagotonic drugs; improved on discharge from hospital.

Case 5. H.P., aged 49, case history No. 7825/October 25th 1958, admitted to the District Hospital in Varna. Suffered from duodenal ulcer for several years. Twelve hours ago, sudden acute incessant pains appeared in the right hypochondrium, which were later localized in the iliocoecal region; vomited several times; the abdomen was swollen. The patient rapidly grew weak. Looks out severely ill, strained facial appearance, pulse — regular, rhythmic, 90/min., RR 140/80, temperature 38°, rectal temperature 39,2°. The lumbar regions exhibit normal configuration; succussio renalis is markedly positive to the right. The abdomen is distended, does not participate in breathing; the abdominal walls are with marked skin hyperesthesia; moderate muscular resistance, particularly to the right; marked deep palpatory painfulness in the same region, Shtetkin-Blumberg (+), liver and spleen — not enlarged. Laboratory data: urine — alb. (—), sediment — no pathological findings; erythrocytes — 3,300,000, hemoglobin — 65%, leucocytes — 8300, blood sugar — 170 mg%. With the diagnosis of acute appendicitis the abdominal cavity was opened. The appendix was retrocoecally situated adhering, with a slightly injected serous lining. Appendectomy was performed. In the following days the condition of the patient was satisfactory, pulse — with good quality, 90/min, temperature — 37—38°C, from the surgical wound a hemorrhagic, yellowish discharge appeared. This imposed a revision of the wound and drainage. Later the condition of the patient dramatically deteriorated, hiccupping occurred, the abdominal walls became slightly resistant, the operative wound discharged a yellow-greenish fluid. Despite complex treatment the patient died on the 22nd day following the operation with manifestations of initially localized and later slowly disseminating peritonitis. Post mortem examination: retroperitoneal perforation of the duodenum; retroduodenal and retrocoecal abscess; diffuse purulent peritonitis.

Case 6. D.D., aged 10, case history No. 9429/November 24, 1959; admitted for treatment to the District Hospital in Varna. Suffering for three years from bilateral nephrolithiasis. From two days — pains in the iliocoecal region, nausea, vomiting, fever. Unimpaired general condition, pulse — of good quality, 100/min, temperature — 37°C. Abdomen — below the chest level, mild muscular resistance in the right abdominal region, deep palpatory tenderness in the iliocoecal area, Shtetkin-Blumberg (+), the right kidney is enlarged and painful on palpation, succussio renalis — positive to the right. Laboratory data: urine — alb (+), sed.: single leucocytes, erythrocytes — 4,200,000, hemoglobin — 89%, leucocytes — 16,000. With the diagnosis of acute appendicitis the patient was subjected to appendectomy. On operation the appendix displayed a slightly reddened serosa. On the third day following operation the patient suddenly complained of acute pains all over the abdomen, vomiting appeared with strained facial appearance, pulse — filiform, 160/min, data for peritoneal irritation, temperature — 38°C, leucocytes — 11,200. A pareactal laparotomy was undertaken with purulent effusion from the abdominal cavity, the parietal peritoneum and the serous lining of the intestines are markedly reddened; the appendicular stump appeared permeable. For that reason an additional burying of the stump by means of a double suture was performed. Three days later the patient died. Post mortem examination: right calculous pyonephrosis with multiple renal abscesses, chronic pyelonephritis, diffuse peritonitis.

## Conclusions

1. Retroperitoneal syndrome should find an appropriate place in the nosologic classification as a well delineated pathological complex of symptoms; it should be searched for and diagnosed correctly.

2. Its etiology is mainly traumatic. For that reason it should be either confirmed or excluded in all abdominal traumas.

3. The symptoms of the retroperitoneal syndrome match to a large extent those of acute abdomen. This imposes active observation and polyvalent examination for its differentiation.

4. Treatment depends on the type and the degree of the basic process. Surgery should be undertaken on time and the operative approach correctly selected.

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## О РЕТРОПЕРИТОНЕАЛЬНОМ СИНДРОМЕ

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## РЕЗЮМЕ

Авторы рассматривают ретроперитонеальный синдром как хорошо оформленный симптомокомплекс, вызванный патологическими процессами в ретроперитонеальном пространстве, и дающий картину острого хирургического живота. Этиологически синдром проявляется при кровоизлияниях, воспалительных процессах, или опухолях в ретроперитонеальном пространстве. Патогенетически характер боли и появление мышечной защиты объясняются включением первнорецепторных элементов ретроперитонеального пространства в рефлекторную дугу, по которой проводятся импульсы для появления мышечной защиты. Симптоматика характеризуется последовательным появлением шока, коллапса, болей, рвоты метеоризма, медленно наступающего переза кишок, микционными нарушениями, иногда и изменениями в моче. Подчеркивается, что для диагноза имеют значение: анамнез, признаки острого живота, симптом Джойса, рентгеновское и лабораторное исследования. Указывается на показания и методы консервативного и оперативного лечений. Рассматриваются подробно 6 типичных случаев из 17 проследенных больных с ретроперитонеальным синдромом, поступивших для лечения в разные лечебные заведения в течение последних 10 лет.