OVIDIUS UNIVERSITY OF CONSTANTA
FACULTY OF MEDICINE
DEPARTMENT OF ANATOMY

RETROPERITONEAL TUMORS

- THESIS ABSTRACT -

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CONTENT

INTRODUCTION

Retroperitoneal tumor formations are those formations developed and located in the retroperitoneal SPTI, having as starting point anatomical structures located in this space: perirenal tissues, pararenale, vessels and lymph nodes, nerves, remains of embryonic tissue included in connective tissue of this space.

From the category of primitive retroperitoneal tumor formations are excluded retroperitoneal tumor formations of organs located in this space: adrenal glands, kidneys, pancreas, duodenum, colon, or partly retroperitoneal situated organs: right liver lobe, gastric fornix, or retroperitoneal tumor formations secondary to other neoplastic sources or invading from adjacent anatomical spaces.

The first description of a retroperitoneal tumor is attributed to Morgagni in 1761 on a necropsy study. Term of retroperitoneal tumor was first used by Lobstein in 1834. Subsequently, large series have been published by Ackerman, Braasch, Donnelly, Mellicow, Pack and Tabah, Bories-Azeau. In our country the first monography dedicated to primitive retroperitoneal tumors was published by D. Setlacec, E. Proca and C. Popa in 1986 and is based on clinical experience of 351 patients (histological confirmation) operated between 1960-1984.

Among other authors who have addressed this pathology must remember Juvara, Olanescu, Burghele. As retroperitoneal organs, kidneys with proper adrenal gland are the organs whith the most common surgical intervention. Regarding the surgical therapy of the kidney, it is intended to preserve the organ, either totally or partially, given its major role in the functioning of the entire body. The importance of the kidney in the body is resulting from the fact that it is the richest vascularized organ, renal arteries being the largest branches of the aorta in corelation to the volume of organ that they irrigate. For a successful surgical intervention on the kidney, first you need to know as thoroughly the arterio-venous circulation, arterial circulation being the underlying kidney segmentation. Delmas said that "in order to clarify the best possible kidney segmentation problem by examining the changes that are seen in this connection, it is best first to study vascular changes." As in other parts of the body also at the level of kidneys, the needs of modern surgery are those that determine anatomical and direct research. Indeed,

systemic study of renal vessels reveals with unmatched impulse in the moment of partial nephrectomy. From all of these, the most widely used is angiography showing the trajectory of the renal arteries and their branches and origins, the mode and collateral and terminal branches of distribution has many and important variants. These are the reasons why I chose the topic of the PhD thesis - surgery of the retroperitoneal space, since this topic is less discussed in the specialized literature, especially in the tumor formations of this area.

In the general part of the thesis, in the chapter regarding general state of knowledge, first presented data is about the anatomy of the retroperitoneal space: delimitation, compartments and openings, which explains the expansion posibilities of tumors, are also approached weaknesses in this level, content (anatomical structures located at this level) and renal space with its fascial system.

Following is presented data on the arterial vascularization of the kidney, describing the origin of the renal artery, path and direction, morphometry, relations, place and manner of termination, collateral and terminal branches, all described in accordance with the descriptions given in the last anatomical terminology.

Following of the renal vein have been described: the origin, the formation, track, morphometry, relations, and related branches. They also described: the venous capsulo-fat system and its anastomoses, the anomalies and renal venous variants and also the renal vein anastomosis and the branches of its origin. (1)

Then are described the retroperitoneal tumor formations on the sections of this area, both in adults and in children. Among the statistics on retroperitoneal tumor formations I mention the one of Braasch and Setlacec's, Proca and Popa. I mentioned several known classification: Pellegrini, Adams (Schwartz), Jacobs, Marquand, Goldsmith, continuing with the classification of soft tissue tumors by WHO. Paraclinical explorations are described below, both biochemical and radiological as: radiography, urography, irigigrafie, ultrasound, CT, MRI, PET. After that follows the etiology approach, clinical aspects and evolution, clinical examination and symptomathology, the differential diagnosis and pathology presentation: adrenal, liver, spleen, gastrointestinal tumors and ectopic testicle. At the end of the General Part are presented the treatment principles of the retroperitoneal space tumoral formations.

The personal part begins with method and work material, both on the anatomical part reffering to arterio-venous vascularization of the kidney, as well as the clinical presentation that includes the lot of patients that I had under observation. Then there are presented the objectives of the clinical study performed and widely shown the morphological characteristics of the artery and vein and their collaterals, giving their anatomical variants that I have encountered in the performed study. Next follows the presentation of cases that I have been working on, making statistical analysis of demographic data and morphopathological analysis of retroperitoneal tumor formations, with their features and imaging diagnosis of retroperitoneal tumor formations. Further I present the personal experience of the surgical approach of retroperitoneal tumor formations (especially laparoscopic approach) and do a statistical analysis and comparative evolution of postoperative evolution in studied cases. In the last chapter, one of the conclusions, first I present a series of recommendations arising from results of arterio-venous vascularization of the kidney, absolutely mandatory to be known by the surgeon urologist, as well as important details about the clinic and treatment of the retroperitoneal tumors.

At the end of each chapter I presented the selective bibliography in order of citation in the text of the authors of the literature I have been able to consult, and finally I presented the general bibliography, in alphabetical order of authors.

I had the opportunity to regularly communicate the results in various symposia and congresses, both nationally and internationally, abstracts published in edited volumes on this occasion or well rated magazines ("Surgicalland Radiologic Anatomy" in Springer-Verlag publishing house or "Morphologie" in Elsevier publishing house) and I also published "in extenso" in magazines quoted B +.

I am thankfull from all my heart to Prof. Bordei Petru, who always guided me in making this PhD thesis. I also thank my teachers in Medicine school and during residency training period, colleagues from the urology clinic of Constanta County Emergency Hospital, and the collective of Anatomy discipline, Constanta Faculty of Medicine.

METHODS AND MATERIALS OF WORK. CLINICAL STUDY OBJECTIVES

My study of renal arterial vascularization was performed on a total of 228 human kidney or gutted (fresh and formolized), either in situ, on cadavers in the dissection halls of the anatomy lab or necropsy rooms from legal medicine. For injection with plastic we used fresh renal organic blocks: kidney with perirenal fat and corresponding segments of the abdominal aorta and inferior vena cava. Also, on this statistic are added over 86 aortic angiographies, 88 angioCT films and 16 IRM and 20 Dopller ultrasounds, I was able to consult. In addition to these cases there are a number of 68 cases that were pursued only the morphological characteristics of renal veins, thereby the number of cases I studied, arise to 508. Not all anatomical landmarks could be studied in the studied cases, each anatomical landmark being followed on a different number of cases.

Terminal branches of the renal arteries were followed only up to the interlobular arteries that I studied in relation to the portion of the renal parenchyma which they serve, aspect that is very important to establish kidney segmentation.

As a working method I used dissection for most parts investigated, both fresh kidney and formolized kidneys, most parts studied emanating from adult human cadavers, a number of 22 pieces being fetal kidneys, whose age ranged from 5-9 months. Dissection was performed also on objects treated with plastic injection, using Tehnovitul 7143, a synthetic auto-polymerized resin based on methyl methacrylate powder. As a solvent is used NN dimethyl toluidine 3%. Corrosion has been made with sodium hydroxide, which I accelerated by heating it to $70\text{-}900^{0}$.

Ultrasounds were performed with a Logiq^{TM} 700 device, produced by General Electric Medical System. The angiographies that I was able to examine came from Medimar Exploration Center in Constanta Emergency Hospital and Diagnostic Imaging Center Euromedic Constanta, beeing performed on a tomograph computer GE Lightspeed 16 Slice CT. I also had available angiographies performed in the Diagnostic Center Pozimed being performed on a GE Lightspeed CT VCT64 Slice CT. Angiographies provide valuable information especially on the origin of arteries in relation to the spine, the size, trajectory and direction of the arteries and the collateral branches and their terminals.

Images of the studied cases were processed and stored by a Pentium computer, which makes us to currently have a database with all the cases we studied.

The purpose of the hereby study was to evaluate the clinical particularities of the retroperitoneal tumor formations, principles of clinical diagnosis, Para clinical bio-humoral, imaging and try to develop an algorithm for definite diagnosis and also an algorithm of treatment for this type of tumors.

Hospital cases allow surgeons only occasionally to encounter such cases, but rarity of this disease doesn't make it uncommon. It is difficult to find a surgical clinic where these types of tumors are a diagnosis and therapeutic routine. Precisely for this reason, to stand in front of a primitive retroperitoneal tumor is, for any surgeon, a professional challenge, as tempting as it is difficult. In the above context, this surgical approach is particularly interesting for a young surgeon; seems easy to notice the motivation of a long and careful study of primitive retroperitoneal tumors even in an emergency hospital. In achieving the objectives of the thesis, the first step was represented, as it was only natural, the theoretical documentation on the subject of primitive retroperitoneal tumors, in the general section of this paper is exposed a large part of the data recorded in medical national and foreign literature on the theme.

Basically, most scientific papers in this area are based on personal cases experience and further present the point of view of the authors on this subject. This is the reason why case studies registered for retroperitoneal tumor formations takes considerable scientific value, rarity of the disease making this pathology one very difficult to study both clinically and statistically. In light of these comments, direct clinical observation takes on greater scientific value in the study of primitive retroperitoneal tumors, recording, reporting and interpretation of statistical data on retroperitoneal tumor formations being considered an important focus of study in this field.

Therefore, the second step in achieving this thesis was the careful collection of data on each patient identified with a primitive retroperitoneal tumor. Recruitment of patients was done in several surgical specialties, due to the diversity of clinical manifestations. Most patients initially addressed to a clinic of urology and general surgery, but I also met cases coming from other specialties such as gynecology or endocrinology.

The desire to elucidate the disputed issues about retroperitoneal tumor formations, combined with the need of developing diagnostic and therapeutic lines, meant to become guide for medical behavior in front of such tumors, led to the usefulness of a multicentric study on primitive retroperitoneal tumors. The value of such study is much more increased by the statistical analysis revealing in this field. Taking into account the casuistry of the Surgery and Urology clinic from Constanta County Emergency Hospital, it only seems logical and useful the comparison with recorded data in the Urology Clinic of Hospital Th. Burghele.

In this way, the targeted objectives could be tracked throughout the clinical study. Obtaining an enlightening image in terms of morfopathology was performed with direct competition of the anatomo-pathologist specialist.Collaboration surgeon - pathologist is essential in such cases, tumor size and its pleomorphism always representing test points in correct microscopic diagnosis, according to disease prognosis to be established. The hereby study attempted to approximate the surgical vision with the one of the pathologist: this has been translated into a close cooperation both in the operating room and the microscopy laboratory, through a direct information on the pathology examined and operated, and through a large intercolegial consultation in case of the pathologist doubt of interpretation.

A second morphopathological opinion represented a positive aspect of the measures taken to establish a correct diagnosis for operated retroperitoneal tumors. Diagnosis confirmation of a retroperitoneal tumor, nosological classification of the tumor in question and development of a treatment plan where appropriate to the case.

Clinical and laboratory approaches for the diagnosis of retroperitoneal primitive tumor, were the most important part of the present clinical study. Clinical evaluation of a potential abdominal tumor having as starting point the retroperitoneal cavity was the starting point of intense diagnostic approaches for each studied case.

Another important objective of this thesis was to establish an assessment of therapeutic attitudes to retroperitoneal tumor formations, natural finality of any clinical study.

The place of surgical treatment in the management of retroperitoneal tumor formations was the main object of the thesis, much more accessible to the scientific judgment made by a surgeon.

Surgical tactics, intraoperative decision and the technical means of solving the excision - resection - tumor biopsy dilemma, were the purpose of medical care when facing a retroperitoneal tumor.

This study attempted to define practical rules to be followed by the surgeon when facing such problems. Can any retroperitoneal tumor be excised? Which are the retroperitoneal tumor formations with indication for radical excision and which with indication for partial resection? Is tumor's biopsy useful to the patient for adjuvant treatment? Does surgery remain the only available treatment for retroperitoneal tumor formations? Personal experience had a decisive role in the elucidation of such questions.

The conclusions of the PhD thesis will attempt to outline a diagnostic and therapeutic behavior regarding primitive retroperitoneal tumors, as they are seen at this moment.

INDIVIDUAL FINDINGS ON THE MORPHOLOGY OF THE RENAL ARTERY

ORIGIN OF THE RENAL ARTERY

Fig. 12 - Right renal artery originated above-lying (1/3 lower L1) than the left renal artery origin (the upper edge L2)

Fig. 13 -The two renal arteries have their origin at the same level: L1-L2 intervertebral disc

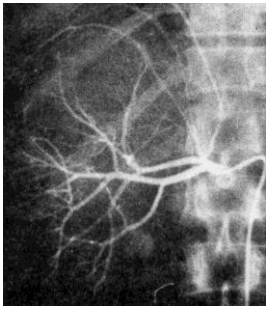


Fig. 15 - Right renal artery has its origin from the level of T12-L1 intervertebral disc

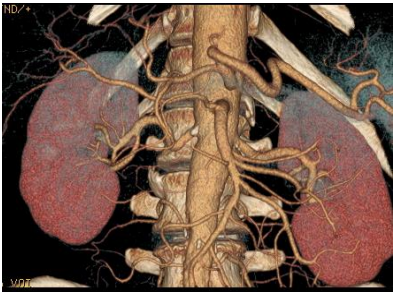


Fig. 18 - Right renal artery has its origin from the level 1/3 medium of L2 vertebra and left renal artery at 1/3 lower of vertebra L2

In relation to the spine, aspect pursued in 169 cases, the origin of aortic renal arteries is very variable, finding it enclosed between the intervertebral disc T12 - L1 and the 1/3 middle of L3 vertebra. At the level of intervertebral disc T12 - L1, the renal arteries had their origin in 6 cases (3.55% of cases). In most cases, 109 cases (64.50% of cases), renal arteries have their origin from the

aorta at the level of L1 vertebra, the percentage being slightly higher on the right than left. At the level of intervertebral disc L1-L2, the renal arteries originated in 25 cases (14.79% of cases) and in 28 cases (16.57% of cases) had their origins on the level of L2 vertebra. In only one case (0.59% of cases) the origin of the renal artery was located on the third middle of L3 vertebra.

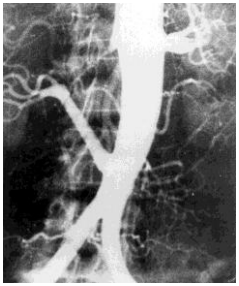


Fig. 20 -Right renal artery originating from the third middle of L3 vertebra.

TABLE 10 - THE LEVEL OF RENAL ARTERIES ORIGIN IN RELATION TO THE SPINE

	ADACHI (1928)	ANSON MacVAY (1936)	SOUTOUL (1961)			GUNTZ (1967)	KOUMARE (1973)	V.DELMAS (1983)			PERSONAL CASES		
			Total	Right	Left			Total	Right	Left	Total	Right	Left
							1						
D12													
	2		13	6	7	**63**	2	1		1			
	3						17	2	1	1	**6**	**4**	**2**
	5		5	2	3		52	14	8	6	**14**	**11**	**3**
L1	12	3				91	115	18	11	7	**20**	**16**	**4**

	23	5	29	12	17	133	141	25	7	18	**75**	**34**	**41**
	35	18	46	23	23	161	178	23	14	9	**25**	**11**	**14**
	16	26	45	21	24	105	55	10	5	5	**16**	**6**	**10**
L2	7	19	24	11	13		50	11	4	7	**6**	**3**	**3**
	3	10	15	8	7	**112**	13	1		1	**6**	**3**	**3**
	4	13	2	2			5	2	1	1			
		2	4	4			1						
L3			7	4	3						**1**	**1**	
		1						1	1				
		1						2	1	1			
		1				**35**							
L4		1											
			4		4			1		1			
			4	4									
	110	100	200	99	101	700	630	110	53	57	**169**	**890**	**808**

In the consulted literature, the origin of the renal arteries from the aorta, was located between 1/3 middle of D12 vertebra and intervertebral disc L4-L5 (4 cases quoted by Souto), while I found the upper limit of the renal arteries origin at the level of intervertebral disc T12-L1. The lower limit of renal arteries origin from the the aorta, was on the lower edge of the L2 vertebra, one case originating in the middle of L3 vertebra, representing the only case of low ectopic artery on a normally located kidney.All authors referred to, describe both high ectopic arteries (which have their origin above the L1 vertebra) and low ectopic arteries (originating from the aorta situated caudally to vertebra L2), except Anson, which finds the top origins of the renal artery in the 1/3 middle of L1 vertebra.

High ectopic arteries are quoted by Adachi in 5 cases (4, 55% of cases), Soutoul in 13 cases (6, 5% of cases), Koumare in 20 cases (3, 17% of cases), Delmas in 3 cases (2, 73% of cases), Guntz finding 63 cases between 1/3 middle vertebra D12-third upper

L1 vertebra (9% of cases). The highest origin is quoted by Koumare, encountering a single case in the third upper vertebra D12.. Low ectopic arteries are quoted by (1) in 4 cases at L2-L3 intervertebral disc, (3, 64% of cases), (2) in 6 cases (6% of cases), Soutoul (quoted by 4) în 19 cases (9, 5% of cases), (3) in 35 cases (5% of cases), Koumare in 6 cases (0, 95% of cases) and (4) in 6 cases (5, 45% of cases) .

TABEL 11-THE ORIGIN OF THE TWO RENAL ARTERIES, COMPARATIVE RIGHT-LEFT.

AUTHOR	TOTAL CASES	RIGHT ABOVE	SAME LEVEL	LEFT ABOVE
F. Calas (1963)	83	65%	More frequently	Rarely
V. Delmas (1983)	49	17(34, 69%)	18 (36, 73%)	14(28, 57%)
Ecoiffier (1972)	1000	20, 5%	71, 8%	7, 6%
Ternon (1959)	80	20, 1%	34, 4%	45, 5%
Bordei (1992)	119	85 (71, 43%)	21 (17, 65%)	13 (10, 92%)
Personal cases	**148**	**81 (54,73%)**	**29 (19,59%)**	**38 (25,68%)**

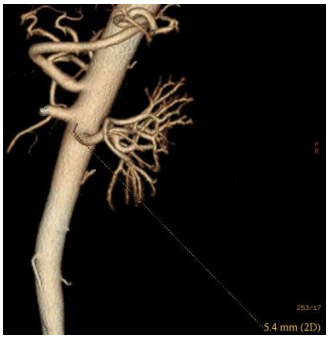


Fig. 21 -The origin of the right renal artery is located above the 5,4 mm than the left renal artery origin.

Regarding the level of renal arteries origin, aspect followed by 148 cases, we found that the right renal artery has its origin upper located in 81 cases (54, 73% of cases), left renal artery having its origin from the aorta upper located in cases 38 cases (25, 68% of

cases), in the remaining of 29 cases (19, 59% of cases) the two renal arteries originating from the aorta located at the same level.

My results are significantly different regarding the origin of both renal arteries and found that the most frequently right renal artery has its origin upper-located comparing to the left one, results superior comparing with Delmas 20.04 percent, compared with Ecoiffier 34.23 percent, compared with Ternon 34.72 percent, but smaller than Callas' results with 10.27 percent and Bordei's results with 16.7 percent. The origin located on the same level of the aorta of both renal arteries I found it in a smaller percentage than Ternon with 14.81 percent, compared to Delmas with 17.14 and to Ecoiffier with 52.21 percent, only higher than the Bordei's statistics with 1.94 percent. The origin of the left renal artery, located above the right renal artery origin I found it higher than the statistics of Ecoiffier with a difference of 18.08 percent plus and Bordei's statistics with a difference of 14.76 percent, but lower to Delmas statistics with 2,89 percent and comparing to Ternon's with 19.82 percent.

TERMINATION PLACE OF THE RENAL ARTERIES

I studied the renal arteries termination place on a total number of 164 cases, from which 87 on the right side and 77 on the left side.

Because the difference in length of the two arteries (respectively the distance between their origin from the aorta and their corresponding kidney), we found differences, sometimes quite significant between the two renal arteries.

Fig. 36 -Extrahilar bifurcation closer to the aorta, in upper and lower branch. Kidney hilum into the slot

Thus, on the right side, *the prehilum ending closer to the kidney* I found it in 23 cases (26, 44% of cases), and on the left I found it in 15 cases (19, 48% of cases). *The prehilum ending closer to the aorta*, I found it on the right side in 12 cases (13, 79% of cases), on the left side in 19 cases (24, 68% of cases). *The prehilum ending* halfway between the aorta and kidney, I met it on the right side in 18 cases (20, 69% of cases), on the left side in 15 cases (19, 48% of cases).

Fig. 37 - Left renal artery has its origin from the aorta above-situated than the right renal artery's origin. Left renal artery branches off extrahilum, closer to the kidney, the anterior and posterior branch. Right renal artery is branches off in three juxta hilum.

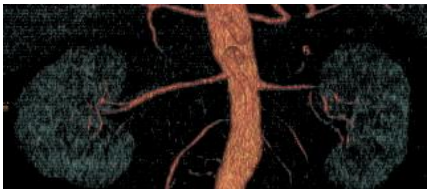


Fig. 38 - Right renal artery has its origin above-situated than the left renal artery's origin. Right renal artery ends by juxtahilum branching off and left polar artery originates in the renal artery trunk prior to its intrahilum branch ending.

Juxtahilum ending we met on the right side in 19 cases (21, 84% of cases) and in 12 cases (15, 58% of cases) for left renal arteries.

Intrahilum ending I met it in 15 cases on the right side (17, 24%) and in 16 cases on the left side (20, 78% of cases).

It ascertains that prehilum termination, with its three versions, is most common, encountered in 53 cases on the right side (60, 92% of cases) and in 49 cases on the left side (63, 64% of cases).

Regarding the place of terminal branching of the renal arteries it is shown a higher percentage of straight arteries that end prehilar and juxtahilar, while on the left side prevails the intrahilar ending. It results that the approach of the right renal vascular pedicle

is easier in most cases, which greatly facilitates the arterial ligature in order to execute partial nephrectomy.

Fig. 39 - Left renal artery branching Intrahilum and right renal artery branching extrahilum, closer to kidney

TABLE 16 - ENDING PLACE OF THE RENAL ARTERY

AUTHOR	PREHILAR	JUXTAHILAR	INTRAHILAR
Arvis	-	-	35%
Callas	60%	30%	10%
Cordier	52, 5%	15%	32, 5%
Ecoiffier	47, 8% 7, 3% closer to the aorta; 28, 1% closer to the kidney; 12, 4% half distance aorta-kidney	19, 7%	-
Gerard	33% 10% closer to the aorta; 23% half distance aorta-kidney	67%	-
Gregoire	+ +	+ +	33%
Guntz	19% 7% closer to the aorta; 12% half distance aorta-kidney	48%	10%
Paturet	60%	30%	-
Poirier	+ +	+	+
Rouviere	+ +	+	10%
Schmerber	30-60%	30-60%	10%
Testut	60%	30%	39, 42%
Personal Cases	**62, 20%** **18, 90% closer to the aorta; 23, 17% closer to the kidney; 20, 12% half distance aorta-**	**18, 90%**	**18, 90%**

	kidney		

In the specialized literature, prehilum ending of the renal arteries is given in very variable percentages, ranging from 19% (Guntz) and 60% of cases (Testut, Paturet, Callas, Schmerber), Cordier asserting that can reach up to 60%. My statistic exceeds 2,20% of these results. Percentage close to 50% of cases also gives Cordier, 52,5%, and Ecoiffier, 47,8% of cases. Also for Poirier and Rouvière, the most common is prehilum ending, juxtahilum and hilum endings being in equal percentages.

Terminal branching closer to the aorta I met it in a higher percentage with 18,90% than Gerard, 11,87%, higher than Ecoiffier and 11,90% higher than Guntz.

Terminal branching half distance between aorta-kidney, I met it higher than Guntz with 8,12% and than Ecoiffier with 7,72%, being slightly lower than in Gerard's study with 2, 88%.

Terminal branching closer to the kidney I met in a smaller percentage than Ecoiffier with 4,93%. Juxtahilum *terminal branching* enclosed in the specialized literature ranges from 15% of cases (Cordier) and 67% of cases (Gerard), Schmerber giving a percentage of 30-60% of cases. I found it in a smaller percentage of 11, 1% than in Testut, Paturet and Callas and with 19.1% lower than Guntz, being close to Ecoiffier (just below with 0,8%).

Hilum terminal branching is found in the literature in a percentage between 10% (Guntz, Callas, Rouvière and Schmerber) and 39% of cases (Testut).

To be noticed that other authors meet this kind of terminal branching in 30% of cases (Cordier, Arvis and Grégoire), between my results and the results of these authors are differences in minus ranging between 13,6 to 16.1%.

ADRENAL LOWER ARTERY

From all the 120 followed cases, in 91 cases (75, 83%) I found only one lower adrenal artery and in 29 cases (24, 17%) have met two or three inferior adrenal arteries.

Regarding the origin of the single inferior adrenal artery, I found it top be either on the level of the renal artery (in the trunk of renal artery before its terminal branch, as terminal branch of the renal artery or in one of the terminal branches of the renal artery) either at the level of the aorta and rarely at the level of the gonadal artery and celiac trunk.

Fig. 84 - Lower left adrenal artery originating from the trunk of the renal artery near its terminal branch

Originating at different levels of renal artery we found it in 75 cases (62, 5%), most commonly, in 58 cases (48, 33%), inferior adrenal artery's origin being located in the trunk of renal artery prior to its terminal branch. Usually, the artery arises from the upper side of the renal artery, can rarely arise on the lower side and rarely on the front side of it.

When there are one or two additional renal arteries, inferior adrenal artery arises from the upper renal artery, which may or may not be a superior polar and more rarely from the renal artery underlying the former, most commonly as a second lower adrenal artery. Adrenal branch can be detached either from the trunk, either from one of the terminal branches of the additional renal artery.

From all cases with triple renal arteries, we found only one case in which the lower renal artery separates into two lower adrenal branches.

As the upper terminal renal artery branch I met it in 5 cases (4, 17%), presenting two issues: distributing exclusively to the

adrenal gland or may give rise to a collateral branch for the superior pole of the kidney.

In one of these five cases, on the right side, in a seven months fetus, I found an arterial trunk which branched off in three close to the aorta in middle adrenal artery, inferior adrenal artery and renal artery itself, branched terminal juxtarenal and which does not give rise to any additional adrenal branch.

Fig. 85 - Right inferior adrenal artery is terminal branch of branching off in three for the renal artery.

Originating in one of the terminal branches of the renal artery I found 12 cases (10%), in the most common cases the adrenal artery had its origin in the end of the anterior branch of the renal artery, 10 cases (8, 33%), distributed as follows: the upper quail, 5 cases (4, 17%) either as its ascending collateral branch, either forming with it a common arterial trunk which divides into two branches of equal size, one upper polar and one lower adrenal; in lower quail, in case of ending by bifurcation or in the middle, in case of termination by branching off in three, I met it in 3 cases (2, 5%).

Detaching themselves from the convexity of a quail in arch, we found it in 2 cases (1,67%). Is also rare the origin of a inferior adrenal branch from the retropielică artery, only in two cases (1, 67%).

In 11 cases (9.17%) the single lower adrenal artery had its origin in the abdominal aorta above the renal artery's origin.

Fig. 87 - Right inferior adrenal artery originating from the middle anterior branch of the renal artery

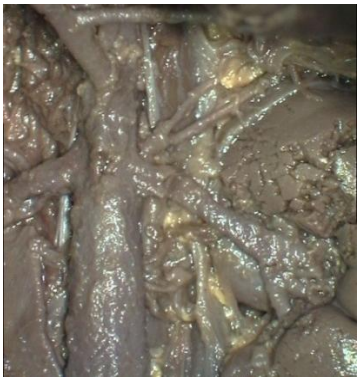


Fig. 88 - Lower left adrenal artery with its origin in the aorta.

In 5 cases (4, 17%), all found in fetuses, the inferior adrenal artery arise from the celiac trunk, either alone or together with middle adrenal artery as an arterial trunk that branched close to origin, in middle and inferior adrenal arteries

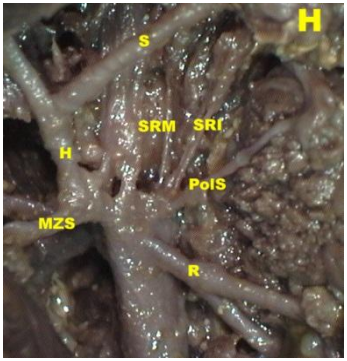


Fig. 90 - Inferior adrenal artery originating from the celiac trunk

Fig. 91 - Both inferior adrenal arteries originated in gonadal artery

From all of the 29 cases with multiple inferior adrenal arteries, I have seen two arteries in 21 cases (17, 5%), three arteries in the other 8T cases (6, 67%).

The cases with three lower adrenal arteries may present the following issues:

- all three arteries originate in the renal artery: 4 cases (3, 33%);

Fig. 92 - Two right inferior adrenal arteries: an upper one (more voluminous) originating from the aorta, forming a common body with middle adrenal artery and the other lower, with a vertical trajectory originating in the upper branch of the lower renal artery.

Fig. 93 - Three lower right adrenal arteries: two with thw origin in the trunk of the renal artery, closer to the aorta, and the third having its origin also in the renal artery trunk, but closer to the terminal branch of the artery.

In 21 cases (17, 5%) from the inferior adrenal artery branches off a lower diaphragm branch, in 8 cases (6, 66%) both arteries with approximately equal in size, so that we can speak of a common arterial trunk, that creates the two arterial branches.

Bianchi, on 25 human cadavers, finds the origin of the inferior adrenal pedicle from the renal artery on the right side in 15 cases (60%) and in 10 cases on the right (40%). Hureau finds the origin of the inferior adrenal pedicle from the renal artery more frequently on the right side (68, 9% of cases), most often the origin of the adrenal artery being closer to the aorta. Lamarque finds the origin of the inferior adrenal artery from the renal artery trunk in 51, 5% of cases on the right side (from 175 selective arteriographies right) and in 44% of cases on the left (from 200 selective arteriographies left). Regarding the origin of the inferior adrenal artery, on 50 studied cases, Bergman finds it in 46% of cases as being from the renal artery.

THE VARIATION OF NUMBER OF RENAL ARTERIES

We studied 208 cases of renal arteries number variants, finding that in 40 cases (19, 23% of cases) were multiple renal arteries (double and triple), of which 16 cases are for right kidney and 24 cases the left kidney. Only in three cases we found multiple bilateral renal arteries, in two cases renal arteries were double and in one case with triple renal arteries bilateral.

Double renal arteries were found in 31 cases (14, 90% of cases), in 13 cases the right renal artery and left renal arteries in 18 cases. In two we had double renal arteries bilaterally in 3 cases double renal arteries were accompanied by triple left renal artery and in one case double left renal arteries were accompanied by triple right renal artery.

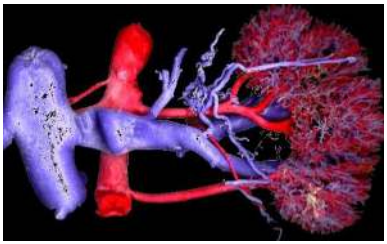


Fig. 94 –One case with double left renal arteries, additional artery is a inferior polar artery.

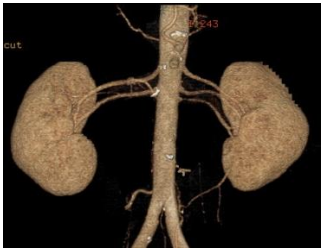


Fig. 95 – Double right renal arteries and triple left .

Fig. 97 – Double left renal arteries with slightly curved parallel trajectory.

Fig. 98 – Bilateral double renal arteries with cross convergent trajectory.

In 4 cases of 19 cases (21,05% of cases) with double arteries, studied (dissection and injection with plastic), additional renal artery (lower pole) went back ureter, 2 cases each of the two parts of the body (10, 53 % of cases). Of the 13 double right renal arteries, which we studied, in 3 cases (23, 08% of cases) additional renal artery passed anterior of inferior vena cava.

Triple renal arteries we found in 9 cases (4, 33% of total cases and 29, 03% of cases with multiple arteries), 3 cases (33, 33% of cases with triple renal arteries) is on the right and 6 cases on the left side (66, 67% of cases with triple renal arteries). Only in one case we encountered bilateral triple renal arteries.

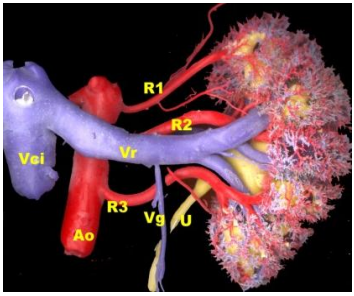


Fig. 102 – Triple left renal arteries: superior pole (smallest volume), real renal artery(biggest volume) and polar inferior artery .

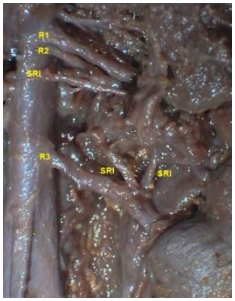


Fig. 103 – One case with three left renal arteries: superior and mid artery with crossed trajectory in the hilum and the inferior one polar artery that is the origin for two adrenal arteries .

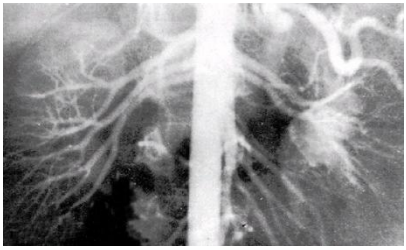


Fig. 105 –Three right renal arteries mid and inferior arteries with the same trajectory.Two left renal arteries with the same trajectory.

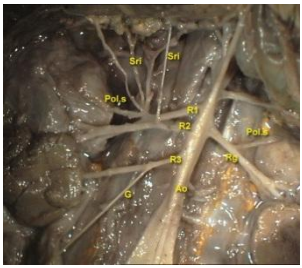


Fig. 106 – Three right renal arteries mid and superior arteries with crossed endings Mid and inferior arteries with the same trajectory.

The frequency of multiple renal arteries is very varied and in literature I found the rich statistics references dealing with this topic. The most common cases are those with double renal arteries, whose frequency varies between 4.3% (Ionescu)) and 23.5% (Hellstrom), Carla only giving a percentage of 50%. I found a percentage of 14,90% on a statistic of 208 kidneys. Three cases of renal arteries in the literature range from 0,5% (16) and 15, 1% (11). I found 4, 33% of cases. 4 or more than four arteries, the percentages are lower, ranging between 0.5% (Hellstrom and Ionescu) and 3, 4% (Gillaspie). Personally, I have not encountered any case of 4 or more renal arteries. Although frequently described, no consensus has been found on the name of these arteries in addition to the normal number, usually for a kidney. After Gray, many interpretations of the variants of renal artery would result from anatomy nomine. Thus, they were called ***multiple*** (Guntz, Chugh, Sampaio, Cordier, Papin. Moore), and speaks in their renal arteries, ***double, triple***. (Moore, Chevrel). Graves and Vilhova called them ***aberrant***, Satyapal ***additional*** calls them, and (Callas, Guntz, Graves) further call them ***suplimentary***. Are called accessory arteries (Paturet). Sykes calls them depending on their penetration level in the kidney, describing: "**accesory aortic hilary**", "**aortic superior polar**" and "**lower aortic polar**". Merklin talks about "**upper polar artery**" and "**lower polar artery".** Coen and Poisel call them additional arteries or accessory renal arteries only those that are above normal number and enters the kidneys through hilum and those aberrant artery entering the kidney arteries outside the hilum. The name of these renal arteries above the normal number, considering the caliber artery, their penetration into kidney and renal territory that blood into it, I have

named them **additional renal arteries, double or triple**. If additional arteries that penetrate the renal hilum have deemed themselves more and more renal arteries entering the kidney at one pole we have called the **lower polar arteries**, respectively **upper polar arteries**. Of the two renal arteries that penetrate the hilum, one that has a caliber above and thus the territory of greater vascularity, I considered the main renal artery and the other I called **additional hilar renal artery**.

GONADAL ARTERIES WITH THE ORIGIN IN THE RENAL ARTERY

I found the frequency of this variant very variable in the literature that I was able to consult, the percentages being between 4, 7% from Asala (1), (which includes the high origin of gonadal arteries), 5 % to Radojevic and Stoli (cited by 9) and 8, 8% Cicekbasi (3), the percentage also includes high origin gonadal arteries to 14% from Shoja (9) and Notkovitch (cited by 9), 15% to Bergman, Conroy (4) and Figley (5) and even 18% from Lippert and Pabst (6). After (3),this variation is more common in males, Radojevic (quote 9) states that there is gender differences, and after (3, 8, 9), is more common on the right side.

Following a study on the renal arterial vascularization, we found a total of 16 cases of gonadal artery originated from renal artery, additional or single (double or triple) or as single artery or as a second gonadal artery.

In cases of gonadal arteries originating from the renal artery in 12 cases (75%) had a single gonadal artery, and in 4 cases (25%) were two gonadal arteries. Of all cases encountered in 13 cases (81, 25%) gonadal arteries were located on the left and only 3 cases (18, 75%) on the right.

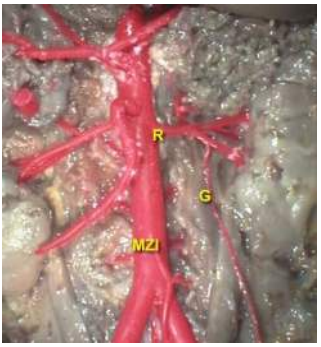


Fig. 107 – Left gonadal artery with the origin in the inferior segment of anterior branch of renal artery

In 7 cases (43, 75% of the 16 cases found), I met a single gonadal artery that arise from a single renal artery, in 3 cases (18, 75%) taking delivery of the artery with the origin in the inferior segment of anterior branch of renal artery in 3 cases (18, 75%) of the renal artery trunk before its terminal branch, and in one case (6, 25%) of the artery above the upper segment of the renal artery wreath.

In 5 cases (31, 25%), single gonadal artery arise from an additional renal artery in 4 cases (25%) of double renal arteries (3 cases of lower and in one case of renal artery superior) and in one case from triple renal arteries (lower renal artery).

Of the 4 cases with double gonadal arteries, all on the left, in 2 cases (12, 5%) the two gonadal arteries arose from a single renal artery trunk, in the third case lateral gonadal artery artery arise from the inferior segment of anterior branch of renal artery and medial gonadal artery from aorta, in the fourth case lateral gonadal artery artery arise from antero-inferior segment of a single renal artery and the medial gonadal artery from aorta, 3 mm below the renal artery origin

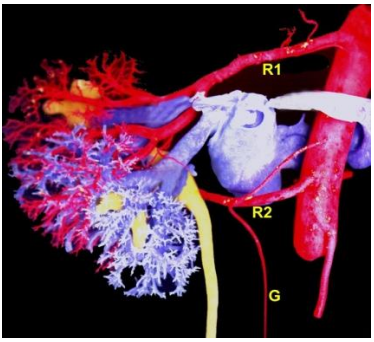


Fig. 109 – Right gonadal artery with the origin in inferior renal artery having a straight trajectory.

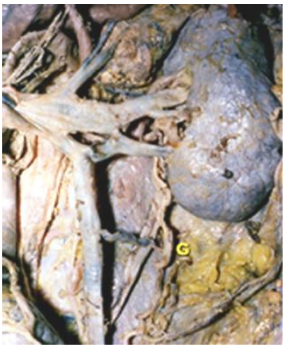


Fig. 110 – Left superior gonadal artery with the origin in renal artery having a curl trajectory.

RENAL VEIN

In the study conducted on 100 cases, renal veins were followed by dissection on human cadavers and excised kidneys by injection of contrast material (barium sulfate) followed by radiography and plastic injection (technovit 7143) followed by corrosion with NaOH.

Regarding the formation of renal veins, it is done:

Fig. 112 - Mold of renal vein formed from two previous venous trunks, rear branch ends in the anterior-inferior branch.

- 56% of cases, renal vein to form two venous trunks, they are formed from a previous vein and posterior vein or both branches of origin are anterior, one superior and one inferior;
- from three venous trunks in 39% of cases;
- 5% of cases the renal vein is formed from four venous trunks, unprecedented cases of renal vein consists of more than four branches, in the cases reported, cases rarely reported in the literature, meeting them in the test Rouvière, Kamina, Chevrel, can reach 5-6 branches (after test).

Fig. 115 – Renal vein formed by confluence of three branches polar superior, mid renal, inferior polar.Posterior vein ends in midrenal branch.

Fig. 116 – Mold of a vein formed from three trunks: antero-superior antero-inferior şi posterior.

Comparing the results found by Mandarin da Lacerda, it notes that the authors don't find more than 4 branches forming renal vein (32% of cases), I found a higher percentage (24 percent for cases with two branches (Paturet finding 32% of cases) for cases with the formation of three branches, the percentage is close (only 3 percent higher, Paturet found in 36% of cases).

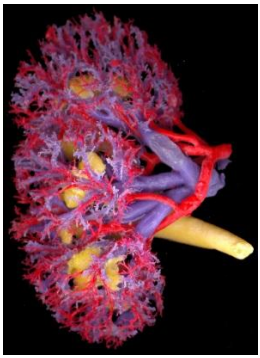


Fig. 118 – Renal vein formed from four tunks, three anterior and one posterior.

When all trunks are anterior, veins that originate in the back of the kidney are dependent of one or more previous venous branches, on their way earlier veins, posterior venous branches passing through arterial branches and among small and large pelvis, and the issues raised test, Paturet, Grégoire. Most commonly, posterior vein is less bulky and less than the previous two veins may be of equal size, appearance also reported by, Rouvière, Paturet, Rigaud, Gillot, Testut. Sometimes, though existing, posterior vein is very thin, having a smaller caliber than the veins of one polar or midrenal vein branches.

Fig. 119 – Mold of renal veinformed from four trunks: 3 anterior (superior polar, inferior and midrenal), posterior vein ends in venous trunk.

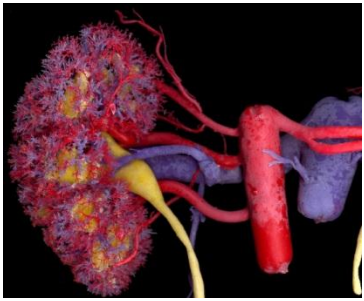


Fig. 122 – Left posterior vein that ends in renal vein trunk. Renal vein goes along three left renal arteries.

AREA OF RENAL VEIN FORMATION

After Testut, Rouvière, Paturet, renal vein trunk is formed at any level of distance renal hilum to inferior vena cava, and after Kamina, Chevrel, Papilian is formed in the renal hilum. After Grégoire, Gillot, Auvert is formed in the renal hilum or beyond.

I found that the left renal vein can form inside the renal sinus (14% of cases) or intrarenal intrasinusian, thus leaving the renal hilum there is a single trunk which will pay only the lower adrenal and gonadal veins left.

Fig. 123 – Right renal vein that is strictly formed intrasinusian. Artery is situated posterior and inferior to the vein.

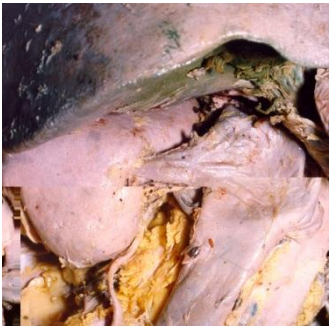


Fig. 124 – Right renal vein formed intrasinusian Vein is situated anterior of artery whom it covers entirely.

Sometimes, the confluence of the origin of renal vein branches is done at the medial edge of the kidney, so near to the kidney (18% of cases).

Fig. 126 – Right renal vein formed next to hilum from two venous trunks

Fig. 129 – Renal vein formed inside the kidney from three large venous trunks.

From all levels of formation of renal veins, forming outside the kidney is most convenient in situations where the intervention to the renal pedicle and by analogy with the ending of the renal artery (extrarenal), we called this type of training ideal type, masterly or *maître-type*.

Intrarenal formation (intrasinusian) renal vein ligation raises big issues for one of its branches of origin, in case of partial nephrectomy.

Fig. 130 - Left renal vein consists of two venous trunks left flank of the aorta. Strong vertical anastomosis between the two venous trunks. The lower venous trunk less bulky than the upper, left gonadal vein ends perpendicular, which is larger than the lower adrenal vein, renal vein terminating in the front of the aorta, medial of end of the gonadal vein.

We found 12 cases the left renal vein had retroaortic trajectory, Davis found a percentage of 18% of cases, and Chuang 14% of cases.

INFERIOR ADRENAL VEIN

If for inferior adrenal artery we can speak of an adrenal pedicle, for inferior adrenal vein this is not met ever, always inferior adrenal vein is unique. I have not seen situations where to the formation of adrenal inferior vein phrenic vein participates as notes Chuang, Satyapal and Sljivic, but we encountered cases in which the forming was made including a venous branch of the upper renal segment. In all studied cases, the adrenal vein ends just below the renal vein the venous trunk, so after confluence anterior and posterior branches.

Lower adrenal vein can end in corresponding renal vein in approximately equal proportions, either perpendicular or nearly perpendicular to the renal vein or infero-medial oblique. It is specified that the obliquity is higher for lower left adrenal veins.

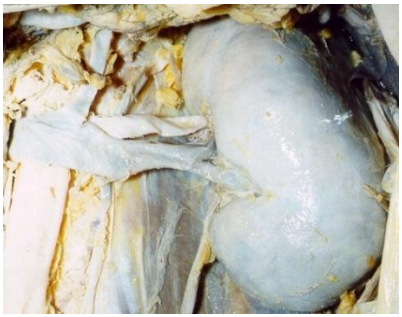


Fig. 134 – Inferior adrenal vein ends in renal vein on the antero-lateral side of aorta, medial to left gonadal vein, both having perpendicular trajectory to renal vein.

Fig. 136 – Inferior adrenal vein which ends perpendicular to renal vein on antero-superior side, on the anterolateral flanc of the aorta.

In relation to the place where left gonadal vein ends in the left renal vein, inferior adrenal vein ends in left renal vein at the level as the gonadal vein less frequent and more frequently medial to it

LEFT GONADAL VEIN

With the caliber, often, almost a quarter of the size of the left renal vein, gonadal vein ends in the left renal vein, most often perpendicular to it and only about one third of cases (28% of cases) has a trajectory oblique and supero media.

Fig. 138 – Left renal vein formed intrasinusian. Left gonadal vein ends in renal vein on anterior side of aorta, medial to adrenal vein

Fig. 139 – Left renal vein formed in hilum, with retroaortic trajectory. Left gonadal vein less bulky than inferior adrenal vein is oblique supero and it ends in renal vein lateral toleft inferior adrenal vein.

Ending area in the renal vein is situated on lateral side of the lower left adrenal vein in 61% of cases, in 18% of the cases ending medial and 21% of cases the two veins, ended in left renal vein at the same level, one above the other.

Ending is away from the aorta in 78% of cases and only 22% of cases the antero-lateral side flank.

In 14% of cases left gonadal vein accompanies a left gonadal artery originating from the renal artery, most commonly an additional renal artery

Fig. 140 - Right renal vein near hilum consists of two venous trunks. Gonadal vein ends in left renal vein at the same level with the lower end of the adrenal vein. Gonadal vein has an oblique supero-medial trajectory, while the lower adrenal vein is vertical.

ADDITIONAL RENAL VEINS

In my study, in 14 cases we found double renal veins, of which 12 cases (85, 71% of cases) were on the left. Delmas (20) encountered five cases of double renal veins in 20 cases studied (25% of cases), 4 cases are on the right (20% of cases) and one case on the left side (5% of cases).

Fig. 141 - Two straight renal veins, the lower is less bulky lower polar lying posterior to inferior polar artery which is an additional renal artery.

Fig. 142 - Two straight renal veins, inferior much less bulky, formed intrarenal. Superior renal vein is formed extrahilar, halfway kidney-inferior vena cava, from two venous trunks. Lower renal vein passes anterior ofureter.

Additional renal veins I have encountered more frequently on the right (12 cases), true renal veins, which ended independently of each other in the inferior vena cava.

CASES PRESENTATION. MULTICENTER STUDY

Made in Constanta County Emergency Hospital, this study adds casuistry of Surgery and Urology Clinics Hospital during 2006 - 2010, and casuistry from Urology Clinical Hospital Burghele Th during 2006 - 2010 on primitive retroperitoneal tumors. In this way we could achieve a multicenter clinical-epidemiological, descriptive and observational, longitudinal bidirectional (in terms of research) conducted prospective group of patients from the emergency room and back to the group of patients from hospital Th. Burghele. The need for such a study was due to the opportunity to present the same doctoral thesis personal surgical experience, at the Constanta County Emergency Hospital, without which the study in this discuttion had not been made and valuable experience parallel that of hospital Th. Burghele, to obtain comparative data necessary and sufficient for a competent assessment and statistically significant, leading to final conclusions on the subject especially pertinent and relevant. In the comparative statistical analysis, we used profesional analysis of medical statistics. For this purpose we used two databases, MS Excel. Statistical package used was SPSS v13 for Mac OS X (SPSS Inc. From 1989 to 2006). Threshold of statistical significance chosen was p <0, 05.

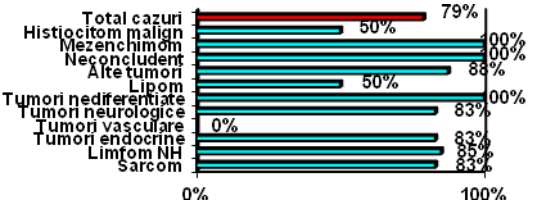
From case study of the present study, only 11 patients (16, 5%) had recurrent retroperitoneal tumors, of which 8 (12%) were reoperated, while 3 patients (4, 5% of all cases studied) that have presented recurrent retroperitoneal tumors were not been reoperated.

Among cases admitted and operated in Constanta County Emergency Hospital, four patients (6% of the 67 taken in the study) were operated for retroperitoneal tumor recurrence, while 2 patients (3%) were not operated.

In casuistry of Th. Burghele Hospital, 4 patients (6% of cases) had tumor recurrences and have been reoperated, while only 1 patient (1, 5% of cases) was not operated for the respective tumor recurrence.

CLINICAL FEATURES OF RETROPERITONEAL TUMORS FROM OUR CASE GROUP STUDY

Analysis of patients in the study group regarding the symptoms presented on their admission identified a number of issues specific to clinical aspects of primitive retroperitoneal tumors.



GRAPHIC 36 - THE PRESENCE OF ABDOMINAL PAIN IN STUDIED PATIENTS, BY HISTOPATHOLOGICAL TYPE OF PRIMITIVE RETROPERITONEAL TUMORS.

The chart above can be seen that the prevalence of pain varies greatly according to the histopathological type of tumor: some retroperitoneal tumors are frequently associated with pain (such as retroperitoneal mezenchimoms, sarcomas nonHodgkiniene malignant lymphoma, undifferentiated retroperitoneal tumors), other less frequently (retroperitoneal lipomas, malignant fibrous histiocitoms).

Overall, the prevalence of pain was 76, 9% (over three quarters of cases), which further underlines the importance of pain as a diagnostic feature of retroperitoneal tumor formations.

CHART 28 - CORRELATION BETWEEN THE PRESENCE / ABSENCE OF PAIN RETROPERITONEAL TUMOR SIZE (IN CENTIMETERS) - 39 PATIENTS (58, 2%) THE STUDY GROUP HAS BEEN SPECIFIED WHERE THE GREATEST DIAMETER INTRAOPERATIVE TUMOR.

	Nr. Cases	Medium diameter-	Medial (interval of trust 95%)	Minimal value	Maximal value

		lui tumoral	Limit inferi-or	Limit supe-rior	observed	observed
Witho ut pain	9	15, 17	11, 01	19, 23	8	24
With pain	30	20, 12	15, 30	21, 43	7	46
Total	39	17, 73	13, 22	20, 78	7	50

Clinical diagnosis of retroperitoneal tumor by palpation was another milestone in the study group analysis: it can be remembered that average of 44,4% from all cases studied in the retroperitoneal tumor was accessible to palpation.

Another clinically identified and analyzed in this study is that weight loss patient clinical expression of the tumor and the impregnation and invasion of digestive tract tumor, were identified in 15 patients (22, 4% - a fifth of all patients studied) with weight loss due to retroperitoneal tumor disease. (2)

CHART 30 – DIAGNOSIS AT ADMITTANCE, COMPARISON BETWEEN TWO CENTERS

	DIAGNOSTICE LA INTERNARE			TOTAL
	DIAGNOSIS OF RT	DIAGNOSIS OF ABDOMINAL TUMOR	ANOTHER THAN DIAGNOSIS OF ABDOMINAL TUMOR	
SCJU Constanţa	6 24%	13 52%	6 24%	25
SC Th. Burghele	9 21, 4%	25 59, 5%	8 19, 04%	42
Total	15 22, 38%	38 56, 71%	14 20, 89%	67 100%

One can notice a similarity between the two surgical centers studied (Constanta County Emergency Hospital and Th. Burghele Hospital) on diagnosis at admission: - This statement is strengthened by the statistical (p = 0, 749 test chi2).

In both places however remains relatively high proportion of failure of diagnosis for the retroperitoneal tumor formations (only a fifth of patients with retroperitoneal tumors at admission).

IMAGISTIC DIAGNOSIS OF RETROPERITONEAL TUMORS (COMPARISON AND CORRELATIVE STUDY)

If for the cases admitted in Constanta County Emergency Hospital, abdominal ultrasound has been the strength of imaging diagnostic in the coming years we could see the translation of medical preferences to abdominal CT, mandatory in such cases, in recent years, RM and angiography brought additional diagnostic data. In Th Burghele Hospital., abdominal CT was noted that the basic diagnostic procedure for retroperitoneal tumor formations.

The first imaging used in patients in the study group was represented by **abdominal ultrasound**: ultrasound identified retroperitoneal tumor site, its relations with parenchymal structures, hollow (more difficult) and vascular tumor content uniformity, emphasizing the limits between normal tissue and tumor were elements both retrospectively and prospectively followed in ultrasound performed in patients in the study group and led to the final decision on the Statute of conclusive or not this investigation, for each case (Sinescu).

Ultrasound examination aimed at identifying and positioning that the retroperitoneal tumor, which are basic criteria that were the defining ultrasound aspect conclusive / inconclusive.

We can identify some aspects that define the different histological types of retroperitoneal tumor - retroperitoneal lipoma example: the situation of the retroperitoneal tumor formation (peripancreatic located between the pancreas and spine, periaortic and around superior mesenteric vessels), tumor type structure lipomatos (specific ultrasound density), with imprecise borders delineated by compressing adjacent vascular structures.

Fig. 152 - Lipoma intraoperator photo

Fig. 153 - . Ultrasound aspect

Ultrasound image can be seen, diffusely echogenic structure, defined imprecisely located prevascular retroperitoneal, intraoperative appearance consisting of diffuse accumulation of fat in the mesentery area, without limits, with thicker than normal mesenteric fat.

Association with the ultrasound investigation by abdominal computed tomography appears to be beneficial in defining preoperative diagnosis of retroperitoneal tumor.

32 patients (47.76% of cases) in our group have benefited from this combination investigational imaging: vascular tumors are diagnosed at 100% by the investigational combination, while malignant fibrous histiocitoms (66.7% of cases) and tumors of different aspects (generally benign) (62.5% of cases) values are above 50% of cases in which was the positive diagnosis. To limit assertion of preoperative imaging with a 50% or close to it, are part of retroperitoneal tumor formations such as sarcomas, endocrine tumors, lipomas, tumors with histopathological doubtful aspect.

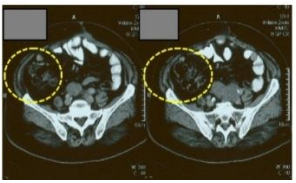


Fig. 154 - CT Images - retroperitoneal leiomyosarcoma

Fig. 155 - Intraoperator aspect

Fig. 156 - Macroscopical aspect

The pictures above illustrate the case of retroperitoneal leiomyosarcoma (PE, 64 years) the diagnosis of retroperitoneal primitive tumor was established based on abdominal CT, which showed the presence of tumor formation in the right iliac fossa and right flank near the posterolateral muscles side of the abdomen, pushing the colon as previously, tumor heterogeneity, hipoecogen appearance, tone and halftone of reflective radiation, the image of a capsule is not circumferential and alternating areas hiperecogene interpreted as calcified areas, could correct preoperative diagnosis by a party sarcomatos retroperitoneal primitive tumor type, issues addressed by analyzing the CT images were confirmed by intraoperative situation and analyze macroscopic resection parts (double lobe sarcomatous tumor structure, relatively well encapsulated). Abdominal CT for malignant fibrous histiocytoma seems to have more elements that lend themselves to diagnostic confusion because of the complexity of tumor. In the following case (PF, 74 years), one can observe the position corresponding to lodge adrenal tumor straight right renal upper pole invasion, tumor was vaguely defined, discrete homogeneous areas with fluid infiltration poor iod-uptake and minimal body fat around the kidney area (Setlacec).

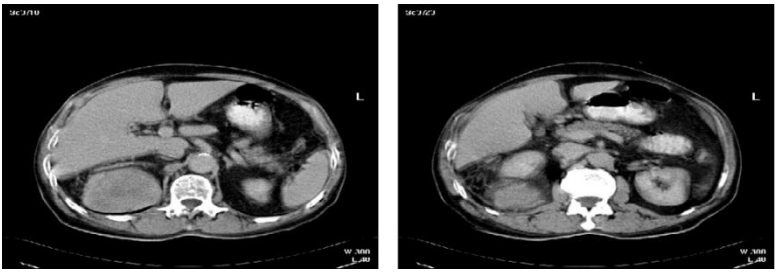
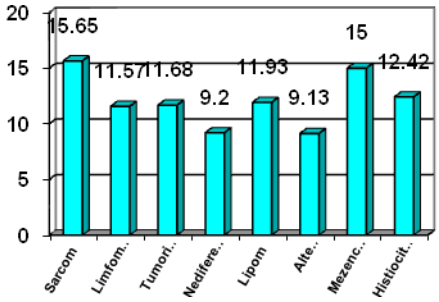


Fig. 157 - Malignant fibrous Histiocytoma– aspect CT.

Starting from the fact that more than half of the cases studied showed retroperitoneal tumor invasion into adjacent structures (in 34 cases of 67 to 50.74% of cases), it may be noted that a higher percentage of patients with tumor invasion was registered as malignant fibrous histiocytoma and mezenchimoma (over 60% of cases).



GRAPHIC 41 – AVERAGE TUMORAL DIAMETER (CENTIMETERS) ON CT IN CORRELATION WITH HISTOPATHOLOGICAL TUMOR TYPES.

It may be noted that retroperitoneal tumoral formations with the largest diameters observed on CT were sarcomas (15.65 cm), mezenchimomas (15 cm), malignant fibrous histiocytomas (12.42 cm) while undifferentiated tumors (9.20 cm) and other tumors (9.13 cm) had the lower dimensions. Even if there are large differences (up to 6 cm) between the mean tumor size between different histological types of retroperitoneal tumor, the results achieved do not reach statistical significance test (CHI 2 - p = 0, 182), probably because the small number of analyzed cases. (1)

The contribution of magnetic resonance (MR) to positive diagnosis of primitive retroperitoneal tumors is a win for clinician only in recent years, with the increase in availability of imaging methods in the two hospitals. Of the 67 patients with retroperitoneal tumors studied, only 6 (9% of cases) received abdominal MR examination: 2 to Emergency County Hospital of Constanta (8% of patients studied in this hospital, 25) and 5 Th Burghele Clinical Hospital. (11, 9% of patients studied in this hospital, 42). In these patients there was a rate of 3/7 cases of a positive diagnosis in MRI conclusive for FTR, the remaining 4 cases not providing imaging data sufficient to express this diagnosis (Sinescu).

In the following figure you can see the appearance of a case of leiomyosarcoma MRI confirmed intraoperatively and by histopathologic examination:

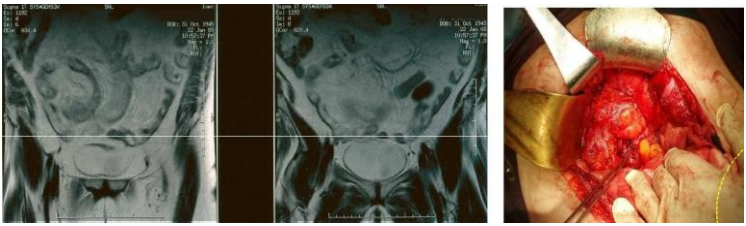


Fig. 159 – MRI aspect of leiomyosarcoma. Intraoperative aspect /

DIAGNOSIS ALGORITHM FOR RETROPERITONEAL TUMORS

The experience of 67 patients studied in the two surgical clinics, allowed me to conceive the diagnosis algorithm for primitive retroperitoneal tumors that are useful for any clinician.

The proposed algorithm would include mandatory investigational gestures (see continuous line contour) and optional (outlined discontinuous line). Diagnostic scheme proposed below (as a novelty in the medical literature on retroperitoneal tumor formations, not in the bibliography of the author of this study) can always be improved in terms of its steps Investigation. Of course, current situations in the diagnosis of a tumor diagnosis makes this algorithm can not always be used for various reasons (technical, ethical, real lack of time in therapy of these tumors, because of clinical features that may suggest an emergency diagnosis in these patients). Importantly, there must be some milestones investigations for diagnostic to follow and help the surgeon to facilitate its therapeutic approach. In short, to try not to get "blind" to such cases.

At the end of comments on the diagnosis of primitive retroperitoneal tumors we can retain the following:

- triad of palpable abdominal + abdominal pain + weight loss, clinical features are common in symptomatic picture of pathology studied in this work (Sinescu);
- admission diagnosis of retroperitoneal tumor is difficult to determine (Sinescu), only the clinical picture, the medic being forced to use modern investigational methods;
- Abdominal ultrasonography and computed tomography are pillars of paraclinical diagnosis of RT;

- Modern imaging, and abdominal examination magnetic resonance angiography, detailing the structure of retroperitoneal tumor extendings to define histopathological tumor type, have direct and significant impact on surgical tactics and technique addressed to the treatment of these tumors (Sinescu, Setlacec);
- It is useful to follow an algorithm to define preoperative diagnosis of primitive retroperitoneal tumors

PERSONAL EXPERIENCE IN THE SURGICAL APPROACH OF RETROPERITONEAL TUMOR FORMATIONS

What type of therapy or surgery in primitive retroperitoneal tumors ? was the main objective of this paper questions: what retroperitoneal tumors can be operated or not?

There may be a tumor extension to adjacent structures with multiple limfonodule extensions and the surgical approach may not remove the tumor and remote surgical gesture as a palliative therapy (reducing the tumor release of invaded structures or the visceras, etc..) Or just simple tumor biopsy that could lead to therapeutic benefit after starting a complementary procedures (radiotherapy, chemotherapy). There are situations in which surgical gesture is prohibited. The most common example is that of associated defects that prevent patient surgery. Can be identified particular situations in which primitive retroperitoneal tumors can be surgically addressed? It is a question that personal experience has much to say. First, it should be emphasized once again the power surgeon dealing with such pathology: cancer surgery targets a retroperitoneal experienced surgeon is able to achieve safe tumor mobilization, protection of other viseceras involved in the surgical field, sometimes special training in certain areas (vascular surgery, urologic surgery, gynecologic surgery), which enable interventional gestures retroperitoneal tumor resection range. Surgical skills, surgical courage, "knife sense", is very important for operators of such procedures. Here, then, that one particular situation that may contraindicate surgery in a primitive retroperitoneal tumors are not tumor itself, but training of the surgeon! (Setlacec)

It also requires a discussion of a particular surgical approach as technique for primitive retroperitoneal tumors: partial excision of tumor (tumor reduction), tumor resection (oncology visa, palliative) or

simple tumor biopsy? Is clearly much better than the answer to be found preoperatively, based on the clinical and laboratory data but this is not very often. Moreover, the golden rule to confirm or refute positive diagnosis intraoperative, operates not only this time.

INTRAOPERATIVE PARTICULARITIES OF THE STUDIED RETROPERITONEAL TUMORS

Not always the first image revealed by laparotomy is definitive for diagnosis of a tumor with retroperitoneal location: the first time (A), the surgeon is faced with large tumors that comes out of the wound edges and has the image of intraperitoneal tumors, then (B), after taking off descending colon, it can be seen retroperitoneal origin of serous cystic tumor.

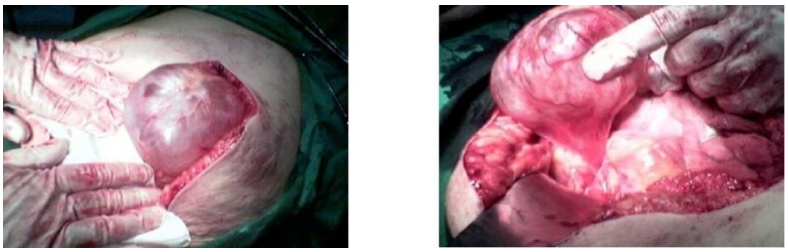


Fig. 162 - Intraoperative image of a cystic retroperitoneal tumor
A – After laparotomy B – after taking aside left colon

Particularity of the case was an identification of its vascular pedicle, revealed only after taking off descending colon, given that it was pushed sideways by the tumor developed in retroperitoneum.

Preoperative image of primitive retroperitoneal tumor may differ radically from intraoperative appearance (Setlacec). The surgeon can enter the room with the image of a single tumor, intraoperative to highlight two separate tumors but attached with existing macroscopic cleavage plan but extremely difficult to predict preoperatively.

A

B

B'

C

Fig. 163 - Leiomyosarcoma – CT aspect (A) şi intraoperative (B, B') also the image of the excized piece of tumor (C)

Step by step dissection allowed the surgeon to complete resection of 2 tumors one doublelobed, where CT image of a single tumor was vaguely defined.

A particular problem is raised by lipomatous retroperitoneal tumors: intraoperative appearance may be ambiguous, especially if the tumor that develops in the mesenteric origin, otherwise the place of choice of such tumors:

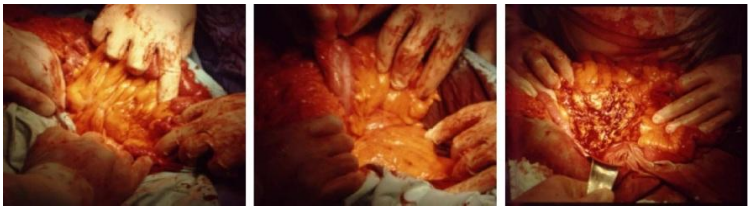


Fig. 164 - Intraoperative aspects in one case of retroperitoneal lipoma

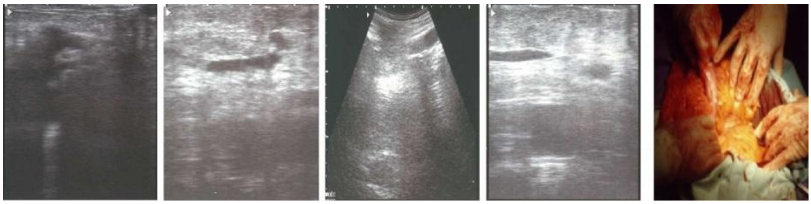
PREOPERATIVE ASSESSMENT VERSUS ASSESMENT OF TUMOR EXTENSIONS INTRAOPERATIVELY

Lack of positive preoperative diagnosis undoubtedly led, often to marked delays in time from patient admission to surgery, on average, 5, 7, 9 days. Given the diagnostic features of primitive retroperitoneal tumors, predictable period of time from patient admission until the diagnosis of RT. In the present study, the statistical expertise that have made it, we tried to demonstrate by logistic regression analysis that factors such as abdominal ultrasound, abdominal computed tomography and magnetic resonance imaging exam of the abdomen could have a role in lowering the time. Logistic regression analysis showed, however, that these factors are not independent factors that can predict freely during preoperative hospitalisation (p between 0, 097 and 0, 757).

The main aspect of comparing preoperative diagnosis - intraoperative aspect assessment in this study was the assessment of tumor extensions.

There is the possibility of diverse visceral invasion by primitive retroperitoneal tumors, especially multivisceral invasion. 21 patients (31, 34% of cases) had multiorgan tumor invasion, benefiting in 52, 38% of cases (11 patients out of 21) partial tumor resection in 38% of cases (11 patients) with tumor ablation invaded the viscera (partial or total) and only 9, 5% of cases (only 2 patients) palliative surgery was performed a gesture (such as tumor biopsies or nodular biopsies), the latter situation being extremely invasive tumors in the near areas.

An interesting approach in terms of the present study, taking into account its prospective side, was the realization of intraoperative ultrasound to define the limits of tumor extension to adjacent structures.



A- inferior cava vein | B- superior mezenteric artery | C-aorta | D- superior mezenteric vein | E- intraoperator aspect

Vessels examined with ultrasound intraoperatively showed no sonographic signs of tumor invasion

A B C D E

Fig. 165 - Retroperitoneal lipoma ultrasound evaluated intraoperatively with linear transducer.

EVALUATION OF LOCAL REGIONAL AND DISTANCE METASTASIS IN RETROPERITONEAL TUMORS

Another questionable chapter of the comparison preoperative diagnosis - Intraoperative aspect is the correlation between intraoperative imaging and reality of nodular metastasis of these invaded lymph nodes tumors. Preoperative assessment of tumor invaded lymph nodes was given, in most of cases, by computer-tomographic image size based on the evaluation of these lymph nodes. (2)

Statistically speaking, the presence of invaded tumor nodules revealed by CT, is strongly associated with positive intraoperative evaluation results of these nodules (p <0, 001, highly statistically significant results).

CHART 37 – CONCORDANCE BETWEEN LYMPH NODE METASTASIS AS EVIDENCED BY CT AND THOSE CONFIRMED INTRAOPERATIVELY

			LIMPH NODES METASTASIS REVEALED ON CT		TOTAL
			ABSENT	PREsENT	
Lymph node metastases revealed intraoperatively	Absent	Number cases % from cases intraoperative % from CT cases	44 95, 65% 81, 48%	2 4, 35% 18, 52%	46 100% 68, 65%
	Present	Number cases % from cases intraoperative % from CT cases	10 47, 61% 18, 51%	11 52, 39% 84, 61%	21 100% 31, 35%
Total		Number cases % from cases intraoperative % from CT cases	54 80, 59% 100%	13 19, 41% 100%	67 100% 100%

This visceral distance metastasis rate is low given the average size of retroperitoneal tumor recorded in this study, 16, 7 cm, but it seems that this aspect is a feature of the FTR.

CHART 38 – INTRAPERITONEAL METASTASIS CASES AT DISTANCE FROM THE PRIMITIVE RETROPERITONEAL TUMOR.

	CASE	PRIMITIVE RETROPERITONEAL TUMOR	PLACE OF INTRAPERITONEAL METASTASIS AT DISTANCE FROM PRIMITIVE TUMOR
Constanta County Emergency Hospital	1	Carcinoma undiferentiated	Liver (both lobes)
	2	neuroendocrine tumor	liver (segment VI)
	3	Leiomiosarcoma	Ileon(wall)+ pelvic peritoneum
	4	Sarcoma	parietal peritoneum + omentum
Th. Burghele Clinical Hospital	1	. Paraganglioma malignant	liver (segments VII-VIII)
	2	Carcinoma neuroendocrine	liver (segment III)

PERSONAL SURGICAL TACTIC ELEMENTS APPROACHING RETROPERITONEAL TUMORS

Recalling a few rules for RT surgical approach recommended by the literature and examples of personal experiences of this study may note some elements of surgical tactics in the personal approach of the RT, but subscribing the general belief:

- Surgery should always pursue tumor ablation;
- Always intraoperative surgical exploration decides the gesture addressed to the tumor;
- Approaching a retroperitoneal tumor from edge to its center, multipolar;
- Assessing the extension of tumor to vascular structures for surgical extirpation avoids major surgical accidents;
- Extracapsular dissection of the tumor is the best;
- Intracapsular dissection of a major RT predisposes to neoplastic dissemination, but can provide safety for greatly extended tumors, (2)

- Any retroperitoneal tumor should be biopsied even, by the risk of massive bleeding restriction is imposed when having highly vascularized tumors;
- It is preferable to even a partial resection for a retroperitoneal tumor, than leaving the tumor in its site.

RESECTABILITY OF PRIMITIVE RETROPERITONEAL TUMORS

Data analysis of primitive retroperitoneal tumors resectability from this study may lead to the following final considerations:

- retroperitoneal tumor excision surgery is addressed to RT in patients admitted in this two surgical clinics operated from the analyzed group, have benefited from this therapeutic conduct (about half of them having retroperitoneal tumor ablation);
- Partial resection of tumor with remaining tissue known, is a therapeutic option to the invasive RT surgery and may benefit from adjuvant treatment procedures;
- • "aggressive" surgery in the two surgical clinics recommended by the high rate of surgery with intent of excision (complete or partial), 49 patients (73, 13% of cases), almost three quarters, benefiting from surgical gesture of this magnitude , both by open and laparoscopic method, (2)
- • tumor or nodes biopsy and / or surgical gesture is required for RT, with an important role in the complex treatment of oncology;
- • adult patients benefited most from partial or total excision of the retroperitoneal tumor and elderly patients surgical outcomes could be appreciated alike, young pacients, due to tumor invasion, were the most represented age segment for "surgical failure" (exploratory laparotomy, simple tumor or node biopsy);
- I did not find a direct correlation between retroperitoneal tumor size and operative time, while the time, was influenced, more likely by the complexity of the case and neoplastic aggressiveness of the tumor.

LAPARASCOPIC APPROACH OF THE PRIMITIVE RETROPERITONEAL TUMORS

Since both the Constanta County Emergency Hospital and the Th. Burghele Hospital are experienced in laparoscopic surgery, it

seems interesting to follow the contribution and utility of laparoscopy for RT. Unfortunately, low number of cases registered in two lots are only 4 patients (5, 97% of the total 67 cases) who was made by laparoscopic surgery.

Small percentage recorded for this type of surgical approach can be also explained by pathology associated to RTthat did not allowed a laparoscopic surgery, knowing that this type of surgery has some relative and absolute contraindications, and viewed in terms anesthesia and intra-and postoperative risks.

My surgical laparoscopy experience allowed me some notings and comments:

- the myth of unreacheable laparoscopic surgery on primitive retroperitoneal tumors can be removed
- retroperitoneal laparoscopic approach is feasible when tumor location is in supramezocolic space with acceptable size;
- it is required to use devices that allow dissection, dissection and hemostasis surgical gestures are made in these situations to give place to a operating field when bleeding can not be conveniently viewed by laparoscopy;
- It is important that approached laparoscopic retroperitoneal tumor to be of reasonable size and, especially, is well defined, with well individualized capsule (which is good not be broken intraoperatively, this involves carefully handling tools and not using the electrical dissection but sharp cutting edges);
- optical image provided by 30 ° endoscopy is more favorable compared to that in optics of 0 °, but the operative field lighting can be poor in case of a bleeding period during laparoscopic dissection;
- identification of anatomical sites in the peritumoral dissection remains a matter of personal experience in laparoscopic surgery;
- more prolonged operating time is fully justified by the rapid postoperative recovery.

We can not say that the experience of four cases approached laparoscopically of RT can give the relevant conclusions in this area, but we may remember some main ideas:

- RT laparoscopic approach is feasible for well-defined tumors, noninvasive, up to 10 cm, located both over-and inframezocolic areas;
- personal experience in laparoscopic surgery is of great importance in the RT minimally invasive approach;

- surgical instruments for laparoscopic surgery of RT must provide good visibility in the surgical field and facilities for dissection and hemostasis achieved by laparoscopy;
- solid tumors, locoregional noninvasive, well individualized capsule, mobile to adjacent structures, are ideal candidates for laparoscopic ablation;
- tumor biopsy / excision by laparoscopic surgical gesture can be technically easy to perform and well supported by the patient;
- Laparoscopic exploration of RT may be imposed as usual gesture in surgery of these tumors, with the advantages of this minimally invasive technique, applicable to these types of tumors.

COMPARATIVE STATISTIC ANALYSIS OF POSTOPERATIVE EVOLUTION OF THE STUDIED GROUP

PERIOPERATIVE MORBIDITY IN THE STUDIED GROUP

Postoperative complications of RT in surgery can be a barometer of the difficulty by applying surgical treatment for these types of tumors (Sinescu). The main surgery used to treat RT were the block retroperitoneal tumor ablation and other organs (surgery with radical intention cancer) or partial resection of the tumor in block with other organs (palliative surgery, but with real benefits for patient comfort). It requires a conclusion that we could identify two types of complications, some directly related to surgery of primitive retroperitoneal tumors, others not related to them.

One can see that most of the cases operated not associated with postoperative complications, whether or not in direct connection with that RT. Moreover, it appears that partial resection of retroperitoneal tumor is accompanied by a smaller percentage of postoperative complications, whether or not this is linked directly to RT. Even if radical surgery (tumor removal) was attended, the incidence of complications was not very high.

As an overview of this aspect of the postoperative evolution of patients who received surgical treatment for primitive retroperitoneal tumor can be held as follows:

- rate of postoperative complications in patients operated on for RT is modest (12% - in terms of complications directly related to RT);
- In this study, removal of retroperitoneal primitive tumor with macroscopic free limit (oncological surgery) was not accompanied by the occurrence of postoperative complications;
- average time to onset of postoperative complications was 3, 68 days;
- retroperitoneal hemorrhage and limforagia were the main postoperative complications occurred in patients operated for RT in direct connection with that primitive retroperitoneal tumor, (1)
- main surgical reinterventions gestures performed by operators were related to haemostasis in remaining tumor site, (1)
- development of unwanted complications postoperative at patients with RT was due to association of poor biological status of these patients.

RELAPS OF PRIMITIVE RETROPERITONEAL TUMORS

Insufficient surgical extirpation and pathological features of tumor itself, are the tumor recurrence phenomenon pillars in these patients (Setlacec)

Of the 67 patients taking the study only 11 cases (16.5% of cases) was found retroperitoneal tumor recurrence, of which 8 (12% of cases) to reoperative surgery.

It Is interesting to watch and anatomopathological correlation of primitive retroperitoneal tumors operated and tumor recurrences that required reintervention. Histopathology in paraffin, made at the first surgery RT may be different from paraffin histopathology performed for recurrent tumor. This polymorphism may be an argument for retroperitoneal tumors or explanation for the difficulty of histopathology relevant to these types of tumors. There were 5 match histopathological in the 6 cases of Constanta County Emergency Hospital and 3 histopathological match of 5 cases of Th. Burghele Hospital.

It should be noted that most tumor recurrences is recorded for sarcoma, and lipomas and malignant fibrous histiocytoamas who had tumor recurrences that required surgical reinterventions. Neurological and endocrine tumors, and tumors with inconclusive

histopathological appearance showed themselves, tumor recurrence requiring surgical repeated surgical interventions.

Most frequent surgery for relapse were the block retroperitoneal tumor ablation for tumor recurrences in other organs, which argues the idea of aggressive surgical attitude for primitive retroperitoneal tumors, treatment principle enunciated by the majority of data in medical literature, as noted and in general part of the study. (Sinescu, Setlacec, Persu) of the 11 cases operated for recurrence RT, it may be noted that in 7 of them received a surgical excision procedure, with or without radical intention.

Only in 4 cases was given only a palliative procedure - or nodular tumor biopsy or exploratory laparotomy.

At the end of comments about relapse RT, it is worth noting some ideas about the cases studied:

- tumor recurrence rate was not very high in my personal study cases;
- retroperitoneal sarcomas are the most frequent recurrent RT, (2)
- aggressive surgery is the surgeon's response to the retroperitoneal tumor recurrence;
- recurrent block tumor ablation with other organs can provide the opportunity for a definitive surgical treatment for recurrent retroperitoneal tumor;
- partial resection of retroperitoneal tumor only offers temporary comfort reducing patient symptoms, but paves the evolutionary continuity of the RT. (2)

MORTALITY AND PROGNOSIS IN RETROPRITONEAL TUMORS (COMPARATIVE STUDY)

Accurate marker of therapeutic success, the survival analysis in patients with primitive retroperitoneal tumors allows an overview of the evolution of these tumors, and comparison with other relevant studies.

Perioperative deaths recorded in cases of this study included 6 patients, 8, 73% of cases.

Analyzing deaths according to the histopathological type of retroperitoneal tumor, we can see that there are large differences in death rates for each type of FTR, but the relatively small for

statistical analysis (χ2 test) this difference was not statistically significant (p = 0, 682).

In this situation we comment:

- mortality of 33, 3% for endocrine tumors is, in fact, one death of all the three cases recorded;
- Similarly, if malignant fibrous histiocitoamelor, there were two deaths from a total of 6 cases;
- one death was noted from a total of 10 cases of retroperitoneal lipomas studied;

Without a high statistical significance there was a mortality of 14, 28% (of cases) for retroperitoneal tumors with nervous origin but in reality it was a single case of a total of 7 as well as for malignant non-Hodgkin lymphomas - 10% is, in fact, a single death. of all the 10 cases operated.

It is worth noting, however, perioperative mortality rate of 5.55% for retroperitoneal sarcomas which included 18 cases operated (1 patient died).

If the 21 patients for which data are available with regard to postoperative survival, there was an average survival of 29, 6 months, proved by readmission to hospital for clinical investigation and medical imaging.

Discussing this survival in patients operated according to the histopathological type of retroperitoneal tumor, could be identified the processed data in the database:

- survival at 40 months is the worst in patients with malignant fibrous histiocytoma;
- 60 months are recorded with poorest results for endocrine origin tumors lipomas. Tumors with neurological origin have the lowest survival (just over 80 months);
- retroperitoneal sarcomas is accompanied by the highest survival (Setlacec)

Compared with other studies, tumor recurrence rate recorded in my study was lower, being 16, 5% of all tumors and 22 cases, 2% of the sarcomas, from similar studies: 74, 2% - Zhan (16), 71% - Marinello (23), 57% - Makela (21), 44% - Shibata (19), 37% - Erzen (17).

Regarding the survival rate of patients after treatment, even if there were some deficiencies of data recording for my study, it may be noted an average survival rate of 29, 6 months for all RT and 24, 2 months for retroperitoneal sarcomas , falling global figures in a final

assessment of the positive trial results compared with other authors (24 months - Shibata, 19, 41 months - Kilkenny, 20).

CONCLUSIONS

From the renal artery's vascular versions, I consider that a special attention should be given additional renal artery, renal arteries with retroureteral paths, the latter being involved in producing hydronephrosis and renal artery's origin of the gonadal artery.

Additional renal arteries originating from the aorta, is one of the most common vascular versions, at the kidney's level being much more common than the existence of additional renal veins, approximately in the ratio of 1/8. Polar arteries originating from the aorta may be damaged during mobilization or other surgical maneuvers on the pole of the kidney and a very important aspect is that the upper polar artery gives rise to inferior adrenal artery and the lower one may give rise to gonadal artery, issues that must be considered to the conservative renal surgery. During conservative renal surgery interventions, outside bleeding and loss of renal parenchyma, arterial lesions have as a serious consequence a segmental ischemia followed by hypertension. The presence of additional renal arteries increases the complexity of renal transplant, because kidneys presenting additional renal arteries are responsible for a failure, significantly more important than the ones having a single renal artery. For these reasons, results the requirement of renal arterial vascular imaging assessments that must precede each sampling of each kidney and kidney surgery, in order to identify any artery version (1, 2). Imaging examination should also be conducted prior to a nephrectomy involving primary renal artery ligature, the existence of additional renal arteries can be responsible for a failure of vascular control, for example in case of extirpation of renal tumors (3, 4, 5, 6, 7, 8, 9).

Lower polar arteries are involved in the mechanism of producing hydronephrosis, quite often giving them retroureteral trajectory, thus raising the ureter, to which makes a ply which embarrassed the normal flow of urine. This ply is important when the crossing occurs at the levels already narrowing of the ureter: at the level of Pelvi-ureteric junction or in the case of ectopic kidney or

ptosis, or in case of low ectopic arteries, at the level of the iliac ureter.

The morphology of the upper renal artery segment exhibits great variability. Frequently, I met a good separation of the upper renal segment comparing to the upper meso-renal (over 45% of cases), which allows relatively easy performance of superior nephrectomy. It is harder to execute when upper segment arteries participate in anterior-segment vascularization upper or the arteries of this segment participate in the high vascularisation of the kidney, nephrectomy being more difficult to execute, requiring multiple vascular ligatures. Nephrectomy is more difficult in cases where the upper segment artery or one of its branches penetrate the upper pole by its anterior side. It is important to know this to avoid accidentally pulling the artery during blind release of this pole. So, in the upper polar nephrectomy, the one that raises problems is the antero-superior artery, the posterior one presenting morphology less variable.

The origin of gonadal artery in the renal artery are of special importance for renal surgery in performing partial or total nephrectomy and renal transplant, with the possibility to compromise the vascularization of the respective gonad, especially when gonadal artery originating from the renal artery is unique, without being a second gonadal artery originating from the aorta or other artery source. *Therefore the gonadal artery should be preserved with great care in order to prevent vascular glandular disorder, representing the main arterial source of the gonad.*

Existence of a gonadal artery originating from the lower polar artery makes that this can be injured during percutaneous treatment of an acute pielo-ureteral junction syndrome, which would contraindicate such intervention. Damage of such arteries is followed by a bleeding which requires hemostasis by embolization. Therefore, a technique of renal retroperitoneal approach would perhaps be an alternative less invasive than conventional surgery in such cases.

Two particular aspects are striking in the formation mode of single renal veins: often inconsistency of the venous and arterial branches and relatively high frequency of unique renal veins formation, intrasinusian and juxtarenal, especially on the right side, aspect that makes the surgical approach of these branches more difficult.

Contrary to the classical anatomy, which states that in most cases the inferior adrenal vein ends above the end of the left

gonadal vein in the renal vein, I found this aspect only in a very small percentage, most commonly left gonadal vein ending in renal vein laterally to superjacent adrenal vein. Interesting are the situations where left gonadal vein is satellite of the left gonadal artery originating from the renal artery, single or accessory aspect less quoted in specialized literature. Interesting is the ratio between lower polar vein and ureter, the vein usually passing previously the ureter. In cases where the inferior polar vein passes posterior to the ureter, this is raised and plied, thus disturbing the flow of urine and thus constituting one of the cases producing hydronephrosis.

Applied anatomy of renal venous vascularization. During surgery, ligature of a segmental artery previously of segment resection (as in partial resection of lower pole), will control or reduce arterial bleeding in section's tranche. Significant bleeding can occur however from the venous system, especially around the calyx, this being due to the existence of close relations between the intrarenal veins and calyx system, but also because systemic venous pressure is directly manifested in all intrarenal venous system. Intrarenal venous system is of great importance in renal tumors.

At the end of of this exhaustive study on the primitive retroperitoneal tumors, we noted the following conclusions:

1. The rarity of primitive retroperitoneal tumors is expressed by most medical literature data and confirmed by this study. From here, along with anatomical-surgical, histopathological and evolutive particularities of the primitive retroperitoneal tumors, also results the complexity of diagnosis and therapy of these cases. In these circumstances, it can't be related the occurrence of primitive retroperitoneal tumors to the sex of patients, but there is a statistical connection between patient age and certain types of histopathological tumors (eg, occurrence of retroperitoneal tumors with neurological origin at young patients).

2. Histopathological aspects of primitive retroperitoneal tumors are varied and tumor polymorphism can occur even within the same tumor. Paraffin histopathological examination is defining, extemporaneous examination predisposing to errors of interpretation to the detriment of positive diagnosis. The techniques of immunohistochemistry and molecular genetic diagnosis are news useful in elucidating tumoral appearance. Within primitive retroperitoneal tumors prevails malignant tumor type (sarcoma are the most common). Invasion of the lymph nodes and distant

metastases are exceptions in the evolution of primitive retroperitoneal tumors.

3. Classification of primitive retroperitoneal tumors is difficult to realise because of the tumoral and intratumoral polymorphism; classification of soft tissue tumors of the World Health Organization in 2002 seem to be most appropriate to this problem.

4. The symptomatology of primitive retroperitoneal tumors is unspecific; clinical aspects such as abdominal pain, transabdominal palpation of the retroperitoneal tumor, weight loss, have been identified as relevant clinical data with high relevance in diagnosis of these tumors.

5. Imaging investigations represent the positive diagnosis pillar for retroperitoneal tumors and is based on a investigational combination between abdominal ultrasonography - abdominal CT. Preoperative diagnosis of tumoral histopathological type is a goal of the clinician, rarely met in the usual diagnosis methods.

6. Each type of primitive retroperitoneal tumor presents intraoperatory particularities, starting from its size and delimitation up to its relationship with adjacent structures. Often, intraoperatory appearance may differ from preoperatory diagnosis image of retroperitoneal tumors.

7. Surgery should always follow complete removal of the respective retroperitoneal tumor, tumor biopsy being the minimum required for final diagnosis and adjuvant therapeutic purposes. The ideal tactics in surgical approach of primitive retroperitoneal tumors is based on the extracapsular dissection of the tumor, with multipolar access from the edge to the center of tumor. The main concern of the surgeon is represented by the approach of vascular pole of the tumoral formation, and also the surgical solution for adjacent tumor invasion, especially in vascular structures.

8. „*Aggressiveness of surgery*" in front of FTR, manifested by objective pursued of complete extirpation of the tumor or its partial resection, bring direct benefits to the patient, measured by increasing survival rates and decreasing postoperative tumor recurrence rate. Moreover, partial excision of the tumor has the advantage of improving living standards of the patient (by solving of temporary complications of tumor invasion of the adjacent visceral structures), but also further gain of adjuvant oncological treatment. In principle, any retroperitoneal tumor should be operated, and this can be done with good results only by an experienced surgeon, with performance.

9. Laparoscopic approach of primitive retroperitoneal tumors seems to be in his earlier therapeutic years for these tumors. Laparoscopic surgical gesture (made only with advanced tools of dissection - hemostasis), is reserved both to videoscopic exploring and to extirpation of the tumor or tumor biopsy. Primitive retroperitoneal tumors laparoscopic approach is practicable for well-defined tumors, noninvasive, up to 10 cm, located conveniently for laparoscopic access.

10. The benefits of surgical treatment of primitive retroperitoneal tumors is expressed by the reduced rate of postoperative complications in these tumors (from which, the more frequent are retroperitoneal bleeding and limforagia) occurred mainly in patients with associated genes, and also by relatively small mortality recorded in patients of this study; idea of beneficial surgery in the treatment of primitive retroperitoneal tumors.

I do not claim to have said everything about the tackled subject on anatomy and surgery of the retroperitoneal space, but I consider that in addition to systematization of the existing data in specialized literature on this subject, I brought my personal contribution through the work effectively done in carrying out this study, being a disciple of Montesquieu who said that *"when treating a subject is not necessary to exhaust it, but is enough to attract the least attention to it."*

GENERAL BIBLIOGRAPHY

1. ADACHI-BUNTARO. Das arteriensystem den Japaner. Kyoto kaiserlich. Japanischen Universitat zu Kyoto, 1928, pag. 74-87.
2. CONSTANTINOVICI ALEXANDRU, CIUREA ALEXANDRU VLAD. Diagnosticul si tratamentul tumorilor hipofizare Ghid practic de neurochirurgie Editura Medicala 1998 ; 285-293
3. ANDERHUBER F., WEIGLEIN A. Zur Nomenklatur der Nierengefasse. Ann. Anat., 174, 1992, pag. 229-234.
4. ANDERSON DJ. Cell fate determination in the peripheral nervous system the sympathoadrenalprogenitor. J Neurobiol, 1993, 24:185-198
5. ANSON B.J., RICHARDSON G.A., MINEAR W.L. Variations in the number end arrangement of the renal vessel: A study of the blood supply of 400 kidneys. J. Urol 36: 211 – 219, 1936.
6. ARVIS G. Anatomie practique du sinus du rein. Bull. Asoc. Anat., 53 Congres, Tours, 7-11 avril, 1968, pag. 432-444.
7. ASALA S., CHAUDHARY S.C., MASUMBUKU-KAHAMBA N., BIDMOS M. - Anatomical variations in the human testicular blood vessels. Ann. Anat., 183(6), 2001, pag.:545-549.
8. ATUK NO., MCDONALD T., WOOD T., et al. Familial pheochromocytoma, hypercalcemia and von Hippel-Lindau disease: a ten year study of a large family. Medicine (Baltimore) 1979, 58:209-218.
9. AUVERT J. La veine rénale gauche. Pr. Med., 1967, 75, pag. 1405 – 1407.
10. BABA S., MIYAJIMA A., UCHIDA A., ASANUMA H., MIYAKAWA A., MURAI M. A posterior lumbar approach for retroperitoneoscopic adrenalectomy: assessment of surgical efficacy. Urology 1997, 50 (1): 19-24.
11. BÉRARD PH., POUYET M. Les voies d'évacuation veineuse du rein après ligature de la veine rénale gauche – extrait du Lyon chirurgical, Tome 64, nr.5, 781 – 785, 1968.

12. BERGMAN R.A., CASSEL M.D., SAHINOGLU K., HEIDGER J.R. Human doubled renal and testicular arteries. Anat. Anz., 174, 1992, pag. 313-315.
13. BIANCHI H., FERRARI A. The arterial circulation of the left suprarenal gland. Surg. Rad. Anat., 2, 1991, pag.:113-116.
14. BORDEI P. Importanţa distribuţiei intraparenchimatoase a vaselor arteriale renale. Teză de doctorat, Iaşi, 1992.
15. BORDEI P., ŞAPTE E., ILIESCU D. Double renal arteries originating from the aorta. Surg.Rad.Anat., vol. 26, nr.6, Paris, 2004, pag. 474-479.
16. BROHI R.A., SARGON M.F., YENER N. High origin and unusual suprarenal branch of a testicular artery. Surg. Radiol. Anat., 23 (3), 2001, pag.:207-208
17. CALAS F., MARTIN R., CONVERT A. Contribution a l'etude de la vascularization du rein. C.R. Assoc. Anat., nr. 117, 1963, pag. 408-421.
18. CATHELINEJ M., GILLARDI L, BARRAT C., CHAMAULT G. Facteurs de risque et prention du risque thrombo-embolique en celioscopie. AnnChir 1998, 52, pag.890-895.
19. CAYOTTE Y., BRULE A. La vascularisation du pôle supérieur du rein, C.R. Ass. Anat., 1954, pag.1019–1027.
20. CERFOLIO RJ., VAUGHAN ED. JR., BRENAN TC., HIRUELA ER. Accuracy of computed tomographyin predicting adrenal tumor size. Surg Gynecol Obstet 1993, pag.176:307.
21. CHEVREL J.P. Anatomie clinique, Le Tronc, Springer – Verlag, Paris, Berlin, Heidelberg, New York, Londres, Tokyo, Hong-Kong, 1994, pag.495.
22. CHIGOT JP., MOVSCHIN M., EL BARDISSI M. et al. Comparative study between laparoscopic and conventional adrenalectomy for pheochromocytomas. Ann Chir 1998, 52: 346-349.
23. CHUGH K.S., MALIK N., GHOSH A.K., SAKHUJA V., MINZ M. Pattern of renal arteries in normal subjects: a study of 170 renal donor angiograms. Indian Journal of Nephrology, 3, 1993, pag. 9-11.
24. CICEKCIBASI A.E., SALBACAK A., SEKER M., ZIYLAN T., BUYUKMUMCU M., UYSAL II. The origin of gonadal arteries in human fetuses:anatomical variations. Ann. Anat., 184(3), 2002, pag.:275-279.

25. COEN L.D., RAFTERY A.T. Anatomical variations of the renal arteries and renal transplantation. Clin. Anat., 5, 1992, pag. 425-432.
26. COL V., DE CANNIÈRE L., MESSAOUDI L. et al. Heart failure induced by pheochromocytoma: laparoscopic treatment and intraoperative changes of several new cardiovascular hormones. Horm Res 1999, 51, pag. 50-52.
27. COMAN IOAN, DUCA SERGIU. Laparoscopic adrenalectomy Urological laparoscopic surgery Editura Iuliu Hatieganu 2005, pag.167-175
28. CONROY R.M., VANDER MOLEN R.L. Scrotal "Arteriocele" from the Artery Occlusion. Am. J. Roentgenol., 127, 1976, pag. 670-672.
29. CORDIER G., NGUYEN-HUU, BUI-MON-HUNG. Segmentation arterielle du rein. Presse Med., vol. 72, nr. 42., 1964, pag. 2433-2438.
30. CORDIER G.J. Anatomie. Rein. Encyclopedie médico-chirurgicale, 7-1939, pag. 1-8.
31. COUPLAND RE., DOBBIE JW., SYMINGTON T. Blood supply of the adrenal gland. In: Greep RO, Astwood EB, Ed Hand book of physiology ;sect 7:EndocrinologyVol VI Adrenal Gland Wasinghton, DC American Phisiological Socitey 1975.
32. DAVID N.ORTH, WILLIAM J. KOVACS. The adrenal cortex Williams textbook of endocrinology cap 12 Evaluation of adrenocortical function 610-628
33. DAVIS C.J., LUNDBERG G.D. Retro-aortic left renal vein: A relatively frequent anomaly. Am. J. Clin. Path., 1968, 50, pag. 700 –703.
34. DELMAS V. Rein et rachis. Essai sur la segmentation et les variations de l'appareil urinaire a l'etage lombaire. Paris, 1983.
35. DEMEURE MJ., CARLSEN B., TRAUL D. et al. Laparoscopic removal of a right adrenal pheochromocytoma in a pregnant woman. J Laparoendosc Adv Surg Tech A 1998, 8: 315-319.
36. ROHDE DETLEF, ALBERS CLAUDIA, MAHNKEN ANDREAS, TACKE JOSEF. Regional thermoablation of local or metastatic renal cell carcinoma Oncology reports 10: 753-757, 2003.

37. DRAGOMIRESCU C., COCULESCU M., COPAESCU C., CATRINA S.B., MUNTEANU R. Tratat de patologie chirurgicala- Patologia chirurgicala a glandelor suprarenale, Ed Medicala 2003 ;1280-1301.
38. ECOIFFIER J. L'arteriographie renale. Annales de radiologie, Paris, 1972.
39. EIJI HIGASHIHARA MD., KIKUO NUTAHARA MD., AND MORIAKI KATO MD. Laparoscopic Adrenalectomy: Alternative or New Standard? Current Urology Reports 2002, 3:172-178.
40. ERZEN D., SENCAR M., NOVAK J. Retroperitoneal sarcoma: 25 years of experience with aggresive surgical treatment at the Institute of Oncology, Ljubljana, J Surg Oncol, 2005 Jul 1;91(1):1-9
41. FĂGĂRĂŞANU I. Recherches anatomique sur la veine rénale gauche et ses collatérales. Leurs rapports avec la pathogénie du varicocell essentiel et de varices du ligament large (démonstrations expérimentales), Ann. Anat. Path., 1938, 15, pag. 9 – 52.
42. FERNANDEZ-CRUZ L., SAENZ A., TAURA P., BENARROCH G., ASTUDILLO E., SABATER L. Retroperitoneal approach in laparoscopic adrenalectomy: is it advantageous? Surg Endosc 1999; 13 (1): 86-90.
43. FERREIRA A., DOS SANTOS, PEREIRA J., PIRES. ANDREA M. Segmentation arterielle du rein. C.R. Assoc. Anat., nr. 138, 1967, pag. 526-533.
44. FILIPPONI S., GUERRIERI M., ARNALDI G. et al. Laparoscopic adrenalectomy: a report on 50 operations. Eur J Endocrionol 1998; 138: 548-553
45. GAGNER M., LACROIX A., BOLTE E. Laparoscopic adrenalectomy in Cushing's syndrome and pheochromocytoma. N Engl J Med. 1992, 327:1033.
46. GAGNON R. The venous drainage of the human adrenal gland .Rev Can Biol., 1956
47. GEYER J.R., POUTASSE E.F.: Incidence of multiple renal arteries on aortography. Report of a series of 400 patients, 381 of whom had arterial hypertension. J. Am. Med. Assoc., 182, 1962, pag. 118-125.
48. GILLIS. & NOVICK AC. Laparoscopic versus open adrenal surgery. AUA Update Series 1999; 28:258-263.

49. GILLOT C., GALLEGOS A. – Anatomie topographique des veines rénales chez l'homme, Ass. Anat., 135 – 429, 1966.
50. GILLOT C., GALLEGOS A., MONROY A., AARON C. L'anatomie chirurgicale de la veine rénale gauche, J. Chir., 93 – 447, 1967.
51. GOSCICKA D., SZIPINDA M., KOCHAN J. Accessory renal arteries in human fetuses. Anat. Anz., 178, 1996, pag. 559-563.
52. GRAVES F.T. The aberant renal artery. J. Anat., 90, 1956, pag. 553-558.
53. GRAVES T.F. The anatomy of the intrarenal arteries in health and disease. Brit. J.Surg., nr.43, 1956, pag.605-616.
54. GREGOIRE R. L'appareille uro-genital. Masson & C –ie. Éditeur, Paris, 1920.
55. GUAZZONI G., MONTORSI F., BOCCIARDI A., et al. Transperitoneal laparoscopic versus open adrenalectomy for benign hyperfunctioning adrenal tumors: a comparative study. J Urol. 1995;153:1597-1600.
56. GUNTZ M. Radioanatomie de l' artère renale. Deductions chirurgicales. CR. Assoc. Anat., 148. 1967, pag. 623-631.
57. HEINTZ A., JUNGINGER T. Technique and results of the retroperitoneoscopic adrenalectomy via a lumbar approach. Langenbecks Arch Surg 1998, 383 (3-4): 286-8.
58. HOWLETT TA., REES LH. Is it possible to diagnose pituitary dependent Cushing's disease? Ann Clin Biochem 1985, 22:550–558
59. HUREAU J., HIDDEN G., A Ta THANH-MINH. Vascularisation des glandes surrénales. Anat. Clin., 2, 1979, pag:127-136
60. JAMES NORMAN, MD., AND KENNETH D., BAKER, MD. Laparoscopic adrenale resection: Changing techniques for established indications Cancer Control Journal 1999, Vol 6; number 1;17-27.
61. JANETSCHEK G., FINKENSTEDT G., GASSER R. et al. Laparoscopic surgery for pheochromocytoma: adrenalectomy, partial resection, excision of paragangliomas. J Urol 1998, 160: 330-334.
62. JANETSCHEK G. Surgical options in adrenalectomy: laparoscopic versus open surgery Curr Opin Urol. 1999, May;9(3):213-8.

63. JOHN NEWELL-PRICE, PETER TRAINER, MICHAEL BESSER, ASHLEY GROSSMAN. The Diagnosis and Differential Diagnosis of Cushing's Syndrome and Pseudo-Cushing's States Endocrine Reviews 19(5): 647–672.
64. KAMINA P. Anatomie clinique. Tome 3. Thorax. Abdomen. Ed. Maloine, Paris, 2007, pag. 145.
65. KOLMANNSKOG F., KOLBENSTVEDT A., BREKKE IB. CT and angiography in adrenocortical carcinoma. Acta Radiol. 1992, 33, pag.45-49.
66. LACOMBE M. Chirurgie de l'artère rénale. Rev.des Prat. 31, nr. 29, 1981, pag. 2109-2114.
67. LAMARQUE J.L., JASPART W., DELYLLE A., SENAC S.P. Radioanatomie angiographique des surrénales. Ann. Radiol., 9-10, 1973, pag.: 549-563.
68. LARGET P. Sur l'anatomie de l 'artère rénale et son mode de distribution dans le parenchyme rénal. Arch. Anat. Path., nr. 31, 1955, pag. 39-44.
69. LE FLOCH-PRIGENT P. Biométrie des veines rénales: dissection de 200 sugets frais – Bulletin de l'Association des Anatomistes., 1987, 71, pag. 45 – 50.
70. LIPPERT H., PABST R. Arterial Variation in Man, JFBergmann Verlag, Munchen, 1985, pag. 26-27
71. LOUKAS M., APARICIO S., BECK A., CALDERON R., KENNEDY M. Rare case of right accesory renal artery originating as a common trunk with the inferior mesenteric artery: A case report. Clin. Anat., 18, 2005, pag.: 530-535.
72. LUCAN M., CARMIGNANI G. Complicatiile chirurgiei laparoscopice Tratat de tehnici chirurgicale urologice. Editia a II-a Infomedica 2001, 30;1019-1023
73. LUCAN M. Tratamentul leziunilor accidentale in cursul unor procedee chirurgicale urologice Tratat de tehnici chirurgicale urologice. Editia a II-a Infomedica 2001, 15, pag.301-312.
74. MACHNICKI A., GRZYBIAK M. Variations in testicular arteries in fetuses and aduts. Folia Morphol., 56, 1997, pag.277-285
75. MAKELA J., KIVINIEMI H., LAITINEN S. Prognostic factors predicting survival in the treatment of retroperitoneal sarcoma, Eur J Surg Oncol 2000, Sep, 26(6), pag.552-555.
76. MANGER T., PIATEK S., KLOSE S. et al. Bilateral laparoscopic transperitoneal adrenalectomy in

pheochromocytoma. Langenbecks Arch Chir 1997, 382, pag. 37-42.
77. MARINELLO P., MONTRESOR E., IACONO C., BORTOLASI L., ACERBI A., FACCI E., MARTIGNONI G., BRUNELLI M., MAINENTE M, SERIO G. Long-term results of aggressive surgical treatment of primary and recurrent retroperitoneal liposarcomas, Chir Ital. 2001, 53(2), pag.149-57
78. MARTIN R., CONVERT A., SARRAZIN R. Vascularization artèrielle du rein. C.R. Assoc.Anat., nr. 122, 1964, pag. 254-264.
79. MAYO-SMITH WW., LEE MJ., MCNICHOLAS MM., et al. Characterization of adrenal masses (\5 cm) by use of chemical shift MR imaging: observer performance vs. quantitative measures. AJR Am J Roentgenol 1995, 165, pag.91–95.
80. MENDOZA D., NEWMAN RC., ALBALA D., COHEN MS., TEWARI A., LINGEMAN I. WONG M. et al. Laparoscopic complications in markedly obese urologic patients(a multi-instiutional review) Urology 1996, 48, pag.562-567.
81. MERKLIN R.J., MICHELS N.A. The variant renal and suprarenal blood supply with data on the inferior phrenic, uretheral and gonadal arteries. J. Int. Coll. Surg., 29, 1958, pag.:41-76.
82. MICCOLI P., BENDINELLI C., MATERAZZI G. et al. Traditional versus laparoscopic surgery in the treatment of pheochromocytoma: a preliminary study. J Laparoendosc Adv Surg Tech A 1997, 7, pag.167-171.
83. MLYNARCZYK W., VOSNIAC A., KIRSZ A. Varianten in der Anzahlund und Verlauf der Nierenarterien Anat. Auz., 118, 1965, pag. 485-488.
84. MÖBIUS E., NIES C. & ROTHMUND M. Surgical treatment of pheochromocytomas: laparoscopic or conventional? Surg Endosc 1999, 13, pag.35-39.
85. MOLEY JF., EBERLEIN TJ. Soft-Tissue Sarcomas în The Surgical Clinics of North America, Multidisciplinary Approach to Cancer, Rossi RL, Cady B, Martin RF, 2000, 80, 2, pag.687-708.
86. NAKADA T., KUBOTA Y., SASAGAWA I., YAGISAWA T., WATANABE M., ISHIGOOKA M. Therapeutic outome of primary aldosteronism: Adrenalectomy versus enucleation of

aldosterone-producing adenoma. J Urol., 1998, 153, pag.1775-1780.
87. NEVILLE AM., O'HARE MJ. Histopathology of the human adrenal cortex. Clin endocrinol Metab 1985;14, pag.791-820.
88. PAGE D.L., DELELLIS R.A., HOUGH A.J. JR. Tumors of the adrenal. In: HartmannWh, Sobin LH., eds. Atlas of tumor pathology, 2nd series, Fasc23. Washington, DC:Armed Forces Institute of Pathology, 1986, pag.115-170.
89. PAPILIAN V. Anatomia omului, vol.2, Splahnologie, Edit All, Buc., 1998, pag.241-242.
90. PAPIN E.: Chirurgie du rein. Tome premier. Ed. Gaston Doin, Paris, 1928, pag. 263-273.
91. PARRA R.O., HAGOOD PG, BOULLIER J.A., CUMMINGS JM., MEHAN DI. Complications of laparoscopic urological surgery:experiences at St Louis university. I Urol 1994, 151, pag.681-684.
92. PATURET G. Traité d'anatomie humaine. Tome III, Fasc. I, Appaareil circulatoire. Ed. Masson, Paris, 1958, pag. 511-526.
93. PĂUN S., GĂNESCU R., CREANGĂ C., IONESCU G. Difficulties in histopathologic diagnostic of primitive retroperitoneal tumors, 17th World Congress of the International Association of Surgeons, Gastroenterologists and Oncologists, September 5-8th, 2007, Bucharest, Romania; Hepato-Gastroenterology, Current Medical and Surgical Trends, vol.54, Supplement I Abstracts, 2007, pag. A 253.
94. PIATEK S., MANGER T., KUNZ D. et al. Laparoscopic transperitoneal adrenalectomy – technique and personal experiences. Zentralbl Chir 1997, 122, pag.1103-1107
95. PICK J.W., ANSON B.J. The renal vascular pedicle. An anastomical study of 430 body-halves. J. Urol., 44, 1940, pag. 411-434.
96. POIRIER P., CHARPY A. Traité d'Anatomie Humaine, Tome II, Fascicule II, Masson & C-ie Éditeurs, Paris, 1912.
97. POISEL S., SPANGLER H.P. Uber aberrante und akzessorische. Nierenarterien bei Nieren typischer Lage. Anat. Anz., nr. 124, 1969, pag. 244-259.
98. RAVERY V., CUSSENOT O., DESGRANDCHAMPS F., TEILLAC P., MARTIN-BOUYER Y., LASSAU J.P. Variations in arterial blood supply and the risk of hemorrhage during

percutaneous treatment of lesions of the pelviureteral junction obstruction: report of a case of testicular artery arising from an inferior polar renal artery. Surg. Radiol. Anat., 15 (4), 1993, pag.: 355-359.
99. RENON C., ILLES T., GOUAZÉ A. Essai de systématisation segmentaire et lobaire des vaisseaux du rein. Applicatoire et lobaire des vaisseaux du rein. Application à la nephrectomie partielle réglée. J. Urol. Med. Chir., nr. 60, 1956, pag. 208.
100. RIGAUD A., SOHIER H. L., GOUAZÉ A., ODANO R. A propos des veines du rein. C. R. Ass. Anat. 1958, pag.693 – 698.
101. ROUVIÈRE H. Anatomie humaine descriptive, topographique et functionelle. Tome II. Tronc. Ed. Masson, Paris, 1998, pag. 191, 533-534.
102. SAMPAIO F.J.B., PASSOS MARF. Renal arteries: anatomic study for surgical and radiological practice. Surg. Radiol. Anat., 14, 1992. pag. 113-118.
103. SATYAPAL K.S., KALIDENN J.E., HOFFEYN A.A., SINGH B., ROBBS J. V. Left renal vein variations. Surg. Radiol. Anat., 1999, 21, pag. 77–81.
104. SATYAPAL K.S., HAFFEJEE A.A., SINGH B., RAMSAROOP L., ROBBS J.V., KALIDEEN J.M. Additional renal arteries: incidence and morphometry. Surg. Radiol. Anat., 23, 2001, pag. 33-36.
105. SCHLINKERT RT., VAN HEERDEN JA., GRANT CS., et al. Laparoscopic left adrenalectomy for aldosteronoma: early Mayo clinic experience. Mayo Clin Proc. 1995, 70, pag.844-846.
106. SCHULSINGER DA., SOSA RE., PERLMUTTER AP., VAUGHAN JR. ED. Acute and chronic interstitial cryotherapy of the adrenal as a treatment modality. World J Urol 1999, 17, pag.59–64.
107. SETLACEC D., PROCA E. Patologia chirurgicala a glandelor suprarenale, Ed.Medicala, Bucuresti 1986, pag.7-158
108. SETLACEC D., PROCA E., POPA C. Tumorile retroperitoneale primitive, Ed.Medicala, Bucuresti 1986, pag.12-148
109. SHIBATA D., LEWIS JJ., LEUNG DH., BRENNAN MF. Is there a role for incomplete resection in the management of retroperitoneal liposarcomas?, J Am Coll Surg. 2001, 193(4), pag.373-379.

110. SHOJA M.M., TUBBS R.S., SHAKERI A.B., OAKES W.J. Origin of the gonadal artery: embryologic implication. Clin.Anat, 2006.
111. SINESCU IONEL, GLÜCK G. Tratat de urologie - Editia I, Editura Medicala 2008, 1763-1775; 1901-1960; 1817-2355; 2474-2487.
112. SINGH G., BAY B.H. - Bilateral accesory renal arteries associated with some anomalies of the ovarian arteries: A case study. Clin. Anat., 11(6), 1998, pag. 417-420.
113. SLJIVIC B., BOSKVIC M., SOVIC V. Étude morphologique et topographique des veines splénique et renale gauche, C. R. Ass. Anat., 1962, pag.114-118.
114. SOHIER H.M.L., RENON CH., ILLES J., GOUAZE A. Lobes et segments artériels du rein. C.R. Assoc. Anat., 1954, pag. 921-934.
115. STOLIC E., MRVALJEVIC D. La topographie intra-rénale des veines rénales chez l'Homme. C. R. Ass. Anat., 1967, pag.1106 – 1111.
116. SYKES D. The arterial supply of the human kidney with special reference to accesory renal arteries. Brit. J. Surg., 50, 1963, pag. 368-374.
117. TERACHI T., YOSHIDA O., MATSUDA T., ORIKASA S., CHIBA Y., TAKAHASHI K., TAKEDA M., HIGASHIHARA E., MURAI M., BABA S., FUJITA K., SUZUKI K., OHSHIMA S., ONO Y., KUMAZAWA J., NAITO S. Complications of laparoscopic and retroperitoneoscopic adrenalectomies in 370 cases in Japan: a multi-institutional study. Biomed Pharmacother 2000, 54(Suppl 1), pag.211s–214s
118. TERAI A., TERACHI T., INOUE T. et al. Laparoscopic adrenalectomy for bilateral pheochromocytoma: a case report. Int J Urol 1997, 4, pag. 300-303.
119. TERNON Y. Anatomie chirurgicale de l'artère rénale. Bases d'un segmentation artérielle du rein. J. Chir., Paris, nr. 78, 1959, pag. 517-521.
120. TESTUT L. Traité d'anatomie humaine. Tome deuxième. Angéiologie-Système nerveux central. Ed. Gaston Doin, 1921, Paris, pag. 213-215.
121. TESTUT L., LATARJET A. Traité d'anatomie humaine. Tome cinquième. Peritoine. Appareil uro-génital. Ed. Gaston Doin, Paris, 1949, pag. 99-151.

122. TONGIO J., KIENY R., HAEHNEL P., WARTER P. La circulation collaterale au cours des stenoses des arteres renales. Etude angiographique. J. Radiol. Electrol., 52, nr. 1-2, 1971, pag. 7-12.
123. UCHIDA M., IMAIDE Y., YONEDA K., et al. Endoscopic adrenalectomy by retroperitoneal approach for primary aldosteronism. Hinyokika Kiyo 1994, 40 (1), pag. 43-6.
124. VASEN HFA., NIEUWENHUIJZEN KRUSEMAN AC., BERKEL H., et al. Multiple endocrine neoplasia syndrome type 2: the value of screening and central registration: a study of 15 kindreds in The Netherlands. Am J Med 1987, 83, pag.847-852.
125. VILHOVA I., KRYVKO Y.Y., MACIEJEWSKI R. The frequency of different plural renal arteries rare variants. Ann. Univ. Mariae Curie Sklodowska (Med), 57, 2002, pag. 68-73.
126. WALZ MK., PEITGEN K., SALLER B. et al. Subtotal adrenalectomy by posterior retroperitoneoscopic approach. World J Surg 1998, 22, pag. 621-627.
127. WALZ MK., PEITGEN K., SALLER B., MANN K., EIGLER FW. Subtotal retroperitoneoscopic adrenal gland resection-an alternative to adrenalectomy? Langenbecks Arch Chir Suppl Kongressbd 1998, 115, pag.1038.
128. WEISS S., GOLDBLUM J. Enzinger and Weiss's Soft Tissue Tumors, Fourth Edition, Mosby, 2001, pag.1-146,.
129. WILLIAMS P. Gray's Anatomy. -Warwick Dysson Bannister. Ed. Churchill Livingstone, London, 1995, pag.1826-1827.
130. **********TERMINOLOGIA ANATOMICA. International Anatomical Terminology. Ed. Thieme, 1998, pag. 88, 97.