

## PhD THESES

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### APPLICATION OF MDCT TECHNIQUES IN DIAGNOSING RETROPERITONEAL EXTRARENAL MASSES

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#### I. INTRODUCTION

MDCT allows accurate assessment of retroperitoneal structures, which is the key to accurate diagnosis, early detection and monitoring of pathological processes in the area. With the advancement of software capabilities and speed of modern appliances, MDCT is now the method of choice for diagnosing retroperitoneal diseases.

The retroperitoneum is a space that can be affected by inflammation of the large bowel, appendix, pancreas, infections of tuberculosis of the spine (cold abscess), malakoplakia, haemorrhage, retroperitoneal benign cysts, idiopathic retroperitoneal fibrosis and others.

#### II. OBJECTIVES

The objective of this study is make a retrospective analysis and data comparison of examination data from the last 3 years. A 2 stage analysis is undertaken – analysis of the clinical and the physical aspects of the examinations. The main objective of the clinical analysis is to evaluate the role of MDCT as a primary diagnostic method for retroperitoneal masses, while the physical aspect of the study is targeting an assessment of the patient dose and a comparison of the results with European reference values in order to achieve an MDCT dose optimization.

#### III. MATERIALS AND METHODS

The diagnostic equipment used during the examinations consists of 2 multi-detector scanners – 16 and 64 slice, with individual peripheral collimation of 0,25 and central

0,65. The total detector collimation is 1,5 mm, x-ray beam – 20 mm, gentry rotation 0,5 sec and pitch 0,98.

Our experience is based on 20 cases – 15 men and 5 women at the age between 21 and 80, the method of choice is MDCT. We have 12 cases of retroperitoneal hematoma, 3 cases of pancreatic carcinoma, 5 cases of adrenal adenoma (Fig. 1, 2, 3).

The primary tumors of the retroperitoneum can arise from the adrenal glands, retroperitoneal lymph nodes (malignant lymphomas) and other tissues. Retroperitoneal soft tissue sarcomas are also shown in this field - liposarcoma, malignant fibrous histiocytoma, leiomyosarcoma, rhabdomyosarcoma, fibrosarcoma, vascular tumors, peripheral nerve tumors, synovial sarcoma, extraskkeletal osteosarcoma. Retroperitoneal germline tumors and metastasis of gonadal tumors can also be established. Primary retroperitoneal tumors are rare. Men and women suffer equally at all ages. Malignant mesodermal tumors of the retroperitoneum are: liposarcoma, fibrosarcoma, lymphosarcoma, reticulosarcoma, rhabdomyosarcomas, hemangioendothelioma, fibromiosarcoma, etc. Retroperitoneal tumors are often massive and can infiltrate neighboring organs and/or vital structures, making them difficult to resect.

Primary benign tumors of mesenchymal origin are benign or malignant. Benign tumors are: lipoma, leiomyoma, fibroma, rhabdomyoma, lymphangioma, hemangioma, xanthogranuloma and others. Tumors of neurogenic origin are: benign schwannoma, neurinoma with capsule, ganglioneurinoma, sympaticoblastoma and neuroblastoma. The third group is represented by dysontogenic retroperitoneum tumors, benign form of teratoma, which is rare and chondroma.

Metastatic tumors in the retroperitoneal space can appear from neighbor tissues or through lymph. Symptoms of retroperitoneal neoplasms are unclear, caused by compression and obstruction of organs.



Fig. 1. Kidney variety and cancer



Fig. 2. Retroperitoneal hematoma

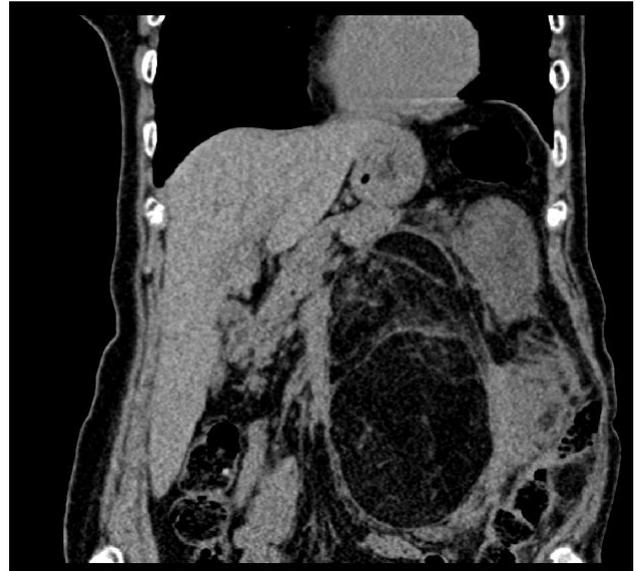


Fig. 3. Retroperitoneal liposarcoma

#### IV. CONCLUSION

MDCT is still the method of choice in specifying and characterization of retroperitoneal masses. It can easily specify pseudotumors and other anatomical variations and provides levels of attenuation, which confirms the presence of fluid in the cysts or fatty tissue in angioliipomas.

MDCT outlines exactly pararenal space and retroperitoneum, exact analysis of retroperitoneal masses requires the use of intravenous contrast. The continuing development improved detection, characterization and staging of extrarenal tumors and allows high quality multilayer reconstruction, required in surgery planning, especially with the increased use of laparoscopic and robotic surgery.

The diagnostic value and the role of MDCT as a method of choice in retroperitoneal masses are indisputable, while at the same time this presents a large risk factor due to the increased patient dose. Unnecessary exposure of patients may arise from the improperly selected and not individually tuned exposure parameters.