

**DESCRIPTION OF COURSE UNIT FOR DOCTORAL STUDIES
AT VILNIUS UNIVERSITY**

Scientific Area/eas, Field/ds of Science	Medical and Health Science (M000): Medicine (M001)			
Faculty, Institute, Department/Clinic	Faculty of Medicine Institute of Clinical Medicine Clinic of Gastroenterology, Nephrourology and Surgery			
Course unit title (ECTS credits, hours)	Interventional Nephrology 9 credits (239 hours)			
Study method	Lectures	Seminars	Consultations	Self-study
Number of ECTS credits	-	-	2	7
Method of the assessment (in 10 point system)	<p><u>Exam</u>: written form of exam with 20 multiple choice questions <u>Evaluation criteria</u>: minimal passing mark is 5. Every question is evaluated by 0,5 points. 10 points: excellent 9 points: very good 8 points good 7 points: highly satisfactory 6 points: satisfactory 5 points: sufficient 4,3,2,1 points: insufficient</p>			
PURPOSE OF THE COURSE UNIT				
<p>To acquaint doctoral students with the main interventions in the field of nephrology. To acquire theoretical knowledge of the methods of performing nephrological interventions, to know their modifications, indications and contraindications, to study their possible complications and treatment of complications, to get acquainted with the latest guidelines and recommendations.</p>				
THE MAIN TOPICS OF COURSE UNIT				
<p>Native kidney biopsy. Renal anatomy, relationship with other organs. Evaluation of kidney size, parenchyma, collectoric system, formations and blood flow. Indications for urgent and planned renal biopsy. Absolute and relative contraindications. Patient preparation for biopsy and care during and after biopsy. Performing a biopsy: ultrasound control, puncture site selection, technique modifications. Complications after kidney biopsy: bleeding, macrohaematuria, renal rupture, arteriovenous fistula formation. Their diagnosis and treatment: examination, ultrasound evaluation, indications for embolization or surgical revision. Basics of biopsy material evaluation: light microscopy, immunofluorescence, immunohistochemistry, electron microscopy.</p> <p>Transplanted kidney biopsy. Indications for kidney allograft biopsy. Protocol graft biopsies, their significance, periodicity. Ultrasound examination of transplanted kidney, evaluation of blood flow. Allograft biopsy under ultrasound control, selection of puncture site, technique.</p> <p>Insertion of a central vein catheter for hemodialysis. Non-tunneled and tunneled catheters for hemodialysis: indications and contraindications. Selection of the central vein, its evaluation by ultrasound. Methods of catheter insertion into the central vein, catheter replacement, removal technique. Indications for hemodialysis. Anatomy of the main veins (v. jugularis int., v. subclavia, v. femoralis), puncture technique. Advantages and disadvantages of catheterization of different veins. Use of ultrasound and X-ray control during catheter insertion. Suspicion, diagnosis, treatment of complications during the procedure: pneumothorax, arterial puncture, bleeding, air embolism, arrhythmia, Horner's syndrome, thoracic duct injury. Complications of the later period: infectious - inflammation of the catheter exit site, tunnelitis, bacteremia, catheter sepsis;</p>				

catheter dysfunction, thrombosis, v. cava sup. pressure syndrome, pulmonary embolism. Treatment of infectious complications: main agents, antibiotic therapy, indications for catheter removal. X - ray evaluation of the catheter position. Alternative vascular approaches to dialysis: percutaneous, translumbar, transhepatic.

Peritoneal dialysis catheters. Catheter insertion into the peritoneal cavity: procedure methodology, methods: laparoscopic, laparotomic, blind insertion methods. Removal of the catheter. Indications and contraindications for peritoneal dialysis. Advantages of peritoneal dialysis. Early and late complications associated with peritoneal dialysis catheter: catheter malposition, dysfunction, catheter exit site infection, tunnelitis. Peritoneal dialysis catheter associated peritonitis: etiology, the main causative agents, diagnosis and treatment. Peculiarities of antibiotic therapy. Indications for temporary transfer of a patient to hemodialysis and removal of a peritoneal dialysis catheter.

Arteriovenous fistula. Indications for arteriovenous fistulas, peculiarities of fistula formation in different groups of patients. Preparation of the patient for arteriovenous fistula formation: ultrasound examination of blood vessels ("mapping"), venography. Main formation sites and methodology: radiocephalic (Brescia-Cimino), brachiocephalic, brachiobasilic, v. brachialis transposition, arteriovenous fistula in the thigh. Early and late complications of arteriovenous fistulae: bleeding, thrombosis, immaturity, infection, dysfunction, aneurysms, ischemic steal syndrome. Methods of arteriovenous fistula assessment and examination: physical examination, ultrasound, angiography, CT angiography. Surgical treatment of complications. Percutaneous treatment of complications: thrombectomy, dilation, stenting.

Formation of **arteriovenous grafts**: use of autovein, allovein, prosthesis. Advantages and disadvantages of different arteriovenous junctions.

Renal angiography. Methods for the procedure. Indications and contraindications. Understanding the use of renal artery angioplasty: dilation, stenting, thrombolysis, thrombectomy, embolization. Complications of the procedure: atheroembolism, nephropathy caused by contrast media. Their risk factors, diagnosis, prevention.

RECOMMENDED LITERATURE SOURCES

1. Yevzlin A. S., Asif. A. e al. Interventional Nephrology: Principles and Practice. Springer, 2nd edition. 2022.
2. Yevzelin A. S., Asif A. et al. Dialysis Access Cases: Practical Solutions to Clinical Challenges. Springer, 2017.
3. Wu S., Kalva S. et al. Dialysis Access Mangement. Spriner, 2nd edition. 2021
4. Haggerty S. Surgical Aspects of Peritoneal Dialysis. Springer, 2017.
5. Krediet R.T., Struijk D. G. Peritoneal Dialysis Management: A Guide ofr Understanding the Treatment. Karger, 2018.
6. Feehally J. et al. Comprehensive Clinical Nephrology. Elsevier, 6th ed.
7. Fairweather J. Clinical Companion in Nephrology. Springer, 2nd edition. 2020
8. www.uptodate.com
9. www.era-online.org
10. www.theisn.org

CONSULTING LECTURERS

1. Coordinating lecturer: Marius Miglinas (Prof. Dr.).
2. Laurynas Rimševičius (Assoc. Prof. Dr.).

APPROVED:

By Council of Doctoral School of Medicine and Health Sciences at Vilnius University:
29th of September 2022

Chairperson of the Board: Prof. Janina Tutkuvienė