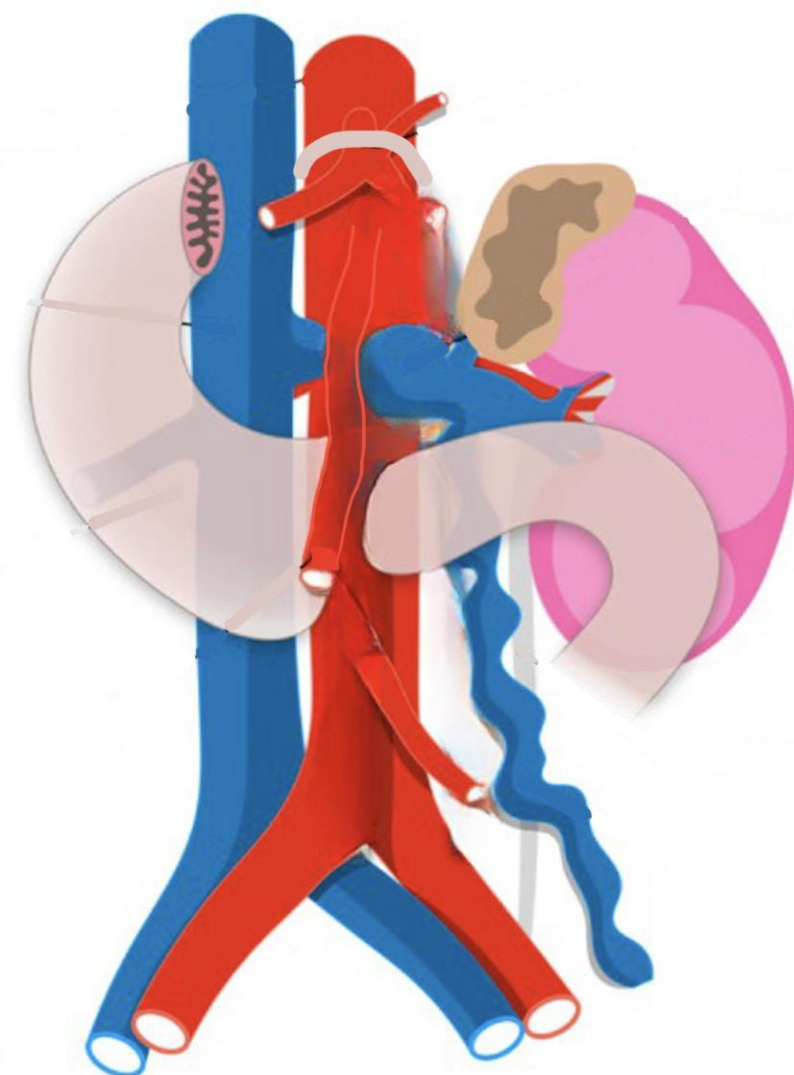


Abdomino-pelvické kompresívne syndrómy ciev v dutine brušnej.

Vincze L, Šišková S, Živčák J, Ali T.

Oddelenie intervenčnej angiológie
NÚSCH a.s.



angiology.sk

Kompresívne syndrómy ciev

- Syndrómy vaskulárnej kompresie (VCS) zahŕňajú rôzne zriedkavé stavy, pri ktorých sú cievny a príležitostne aj nervy stláčané anatomickými štruktúrami, ako sú svaly, kosti alebo väzy.
- Kompresia môže brániť prietoku krvi, spôsobovať bolesť a, ak sa nelieči, viesť k závažným komplikáciám.
- Multifaktorálne príčiny:
 - Anatomické varianty
 - Trauma
 - Zmeny pomerov medzi štruktúrami (tehotenstvo)
 - Poruchy pojiva



Kompresívne syndrómy ciev

- Príznaky VCS sú veľmi variabilné a závisia od miesta kompresie, jej závažnosti a postihnutých štruktúr:
- **Lokalizovaná bolesť:** Bolesť je často špecifická pre oblasť kompresie: brucho alebo nohy.
- **Opuch a zmena farby kože:** Stavby ako May-Thurnerov syndróm môžu spôsobiť opuchy nôh a zmenu farby kože.
- **Neurologické príznaky:** Postihnutie nervov, ako pri MALS
- **Špecifické príznaky orgánov:** Niektoré VCS stavby majú príznaky súvisiace s konkrétnymi orgánmi, ako napríklad krv v moči pri Nutcrackerovom syndróme



DIAGNOSTIC IMAGING



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International Angiology 2023 August;42(4):282-309
DOI: 10.23736/18907924.23.05190-3

GUIDELINES

International Union of Angiology consensus document on vascular compression syndromes

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ABSTRACT

Vascular compression syndromes (VCS) are rare diseases, but they may cause significant symptoms interfering with the quality of life (QoL) of patients who are often in their younger age. Given their infrequent occurrence, multifactorial clinical and anatomical presentation, and absence of dedicated guidelines from scientific societies, further knowledge of these conditions is required to investigate and treat them using modern imaging and

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TABLE I.—Imaging examinations for diagnosis of vascular compression/entrapment syndromes.

Test	Advantages	Disadvantages	Indications
Radiography	<ul style="list-style-type: none"> Cheap Easily accessible Non-invasive Good for seeing the bones 	<ul style="list-style-type: none"> Radiation Bidimensional Bad for soft tissues 	Thoracic outlet syndrome
Duplex ultrasound	<ul style="list-style-type: none"> Quick Readily accessible Non expensive Non-invasive No radiation Hemodynamic information (flow, stenosis degree, etc.) Functional/provocation tests 	<ul style="list-style-type: none"> Bad visualization if overlying bones/air Patient-, anatomy- and explorer-dependent 	<ul style="list-style-type: none"> Thoracic outlet syndrome Popliteal entrapment Visceral entrapment Iliac artery endofibrosis Femoro-popliteal vein entrapment Iliac vein entrapment syndrome (May Turner)
IVUS	<ul style="list-style-type: none"> Almost every vascular territory Does not have X-ray projection limitations. Identify and describe lesions in the vessel walls Very accurate and real time diameter measurements (for balloon/stent selection) Can be simultaneously combined with arteriography/phlebography 	<ul style="list-style-type: none"> Invasive Expensive Requires some training 	<ul style="list-style-type: none"> Thoracic outlet syndrome Popliteal entrapment Visceral entrapment Iliac artery endofibrosis Femoro-popliteal vein entrapment Iliac vein entrapment Syndrome Nutcracker
Computed Tomography	<ul style="list-style-type: none"> Contrast enhanced Accurate definition of vessels/lesions Anatomical structure relations Bony and soft structures 3D/multiplanar reconstructions Non-invasive Relatively available and quick 	<ul style="list-style-type: none"> Radiation Contrast-induced nephropathy 	<ul style="list-style-type: none"> Thoracic outlet syndrome Popliteal entrapment Visceral entrapment Iliac artery endofibrosis Femoro-popliteal vein entrapment Iliac vein entrapment syndrome Nutcracker syndrome
Magnetic Resonance	<ul style="list-style-type: none"> Good for soft tissue Non-invasive Can provide hemodynamic information/flow direction Dynamic studies Non-ionizing radiation Can visualize different structures depending on potentiation, avoiding contrast 3D 	<ul style="list-style-type: none"> Nephrogenic sclerosis (gadolinium) Time-consuming Not easily available Vascular image protocols difficult to establish 	<ul style="list-style-type: none"> Popliteal entrapment Visceral entrapment Femoro-popliteal vein entrapment Iliac vein entrapment Nutcracker/pelvic congestion

Dynamické skiaskopicko skiagrafičné vyšetrenie
Dr. Ščipaková

Relatívne lacné, neinvazívne, dynamické, funkčné

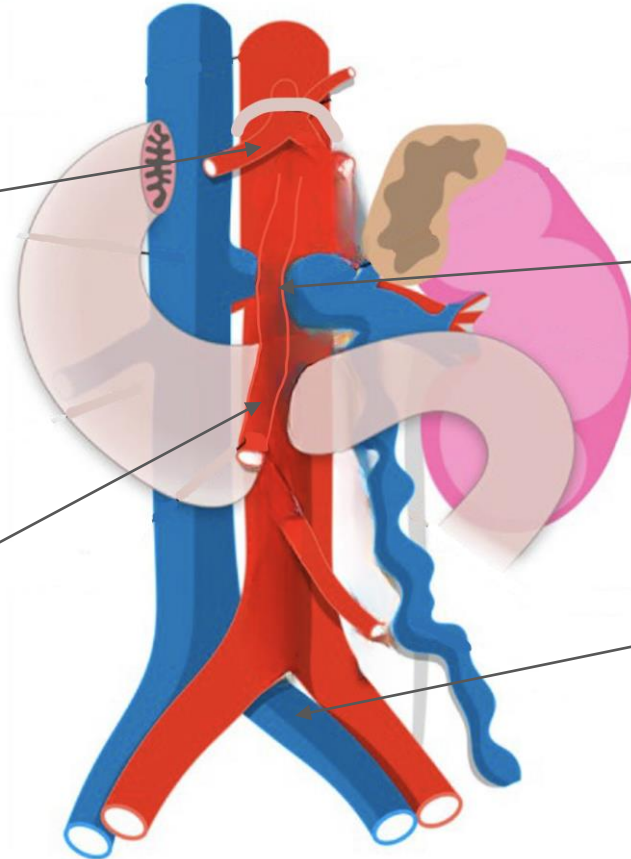
Operator dependent
Nedostupné
Časovo náročné

MALS, SMAS

ABDOMINO-PELVIC VASCULAR COMPRESSION SYNDROMES

**Median Arcuate
Ligament Syndrome**
MALS
(Dunbar S.)

**Superior Mesenteric
Artery Syndrome**
SMAS
(Wilkie S.)

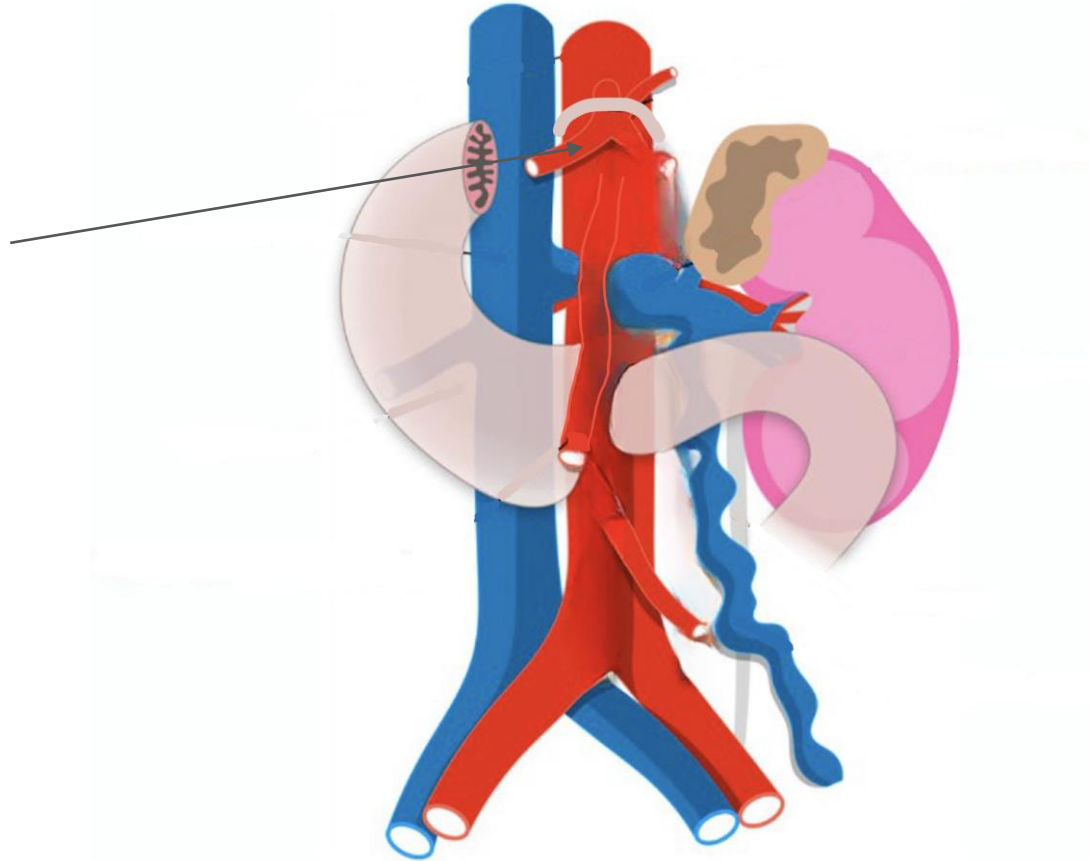


**Left Renal Vein
Compression Syndrome**
NCS
(Nutcracker S.)

**Iliac Vein Compression
Syndrome**
MTS
(May Thurner Syndrome)

ABDOMINO-PELVIC VASCULAR COMPRESSION SYNDROMES

Median Arcuate
Ligament Syndrome
MALS
(*Dunbar S.*)



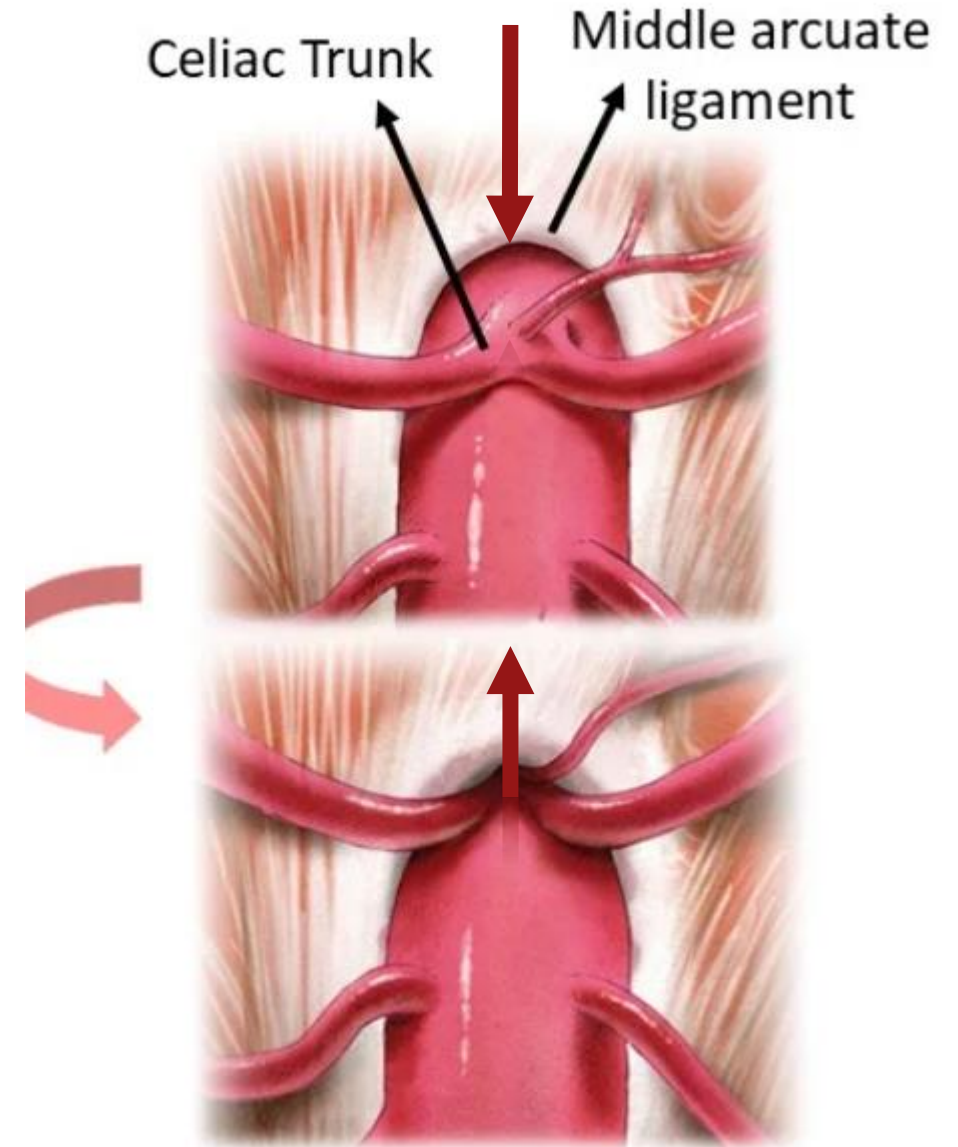
Median Arcuate Ligament Syndrome MALS (*Dunbar S.*)

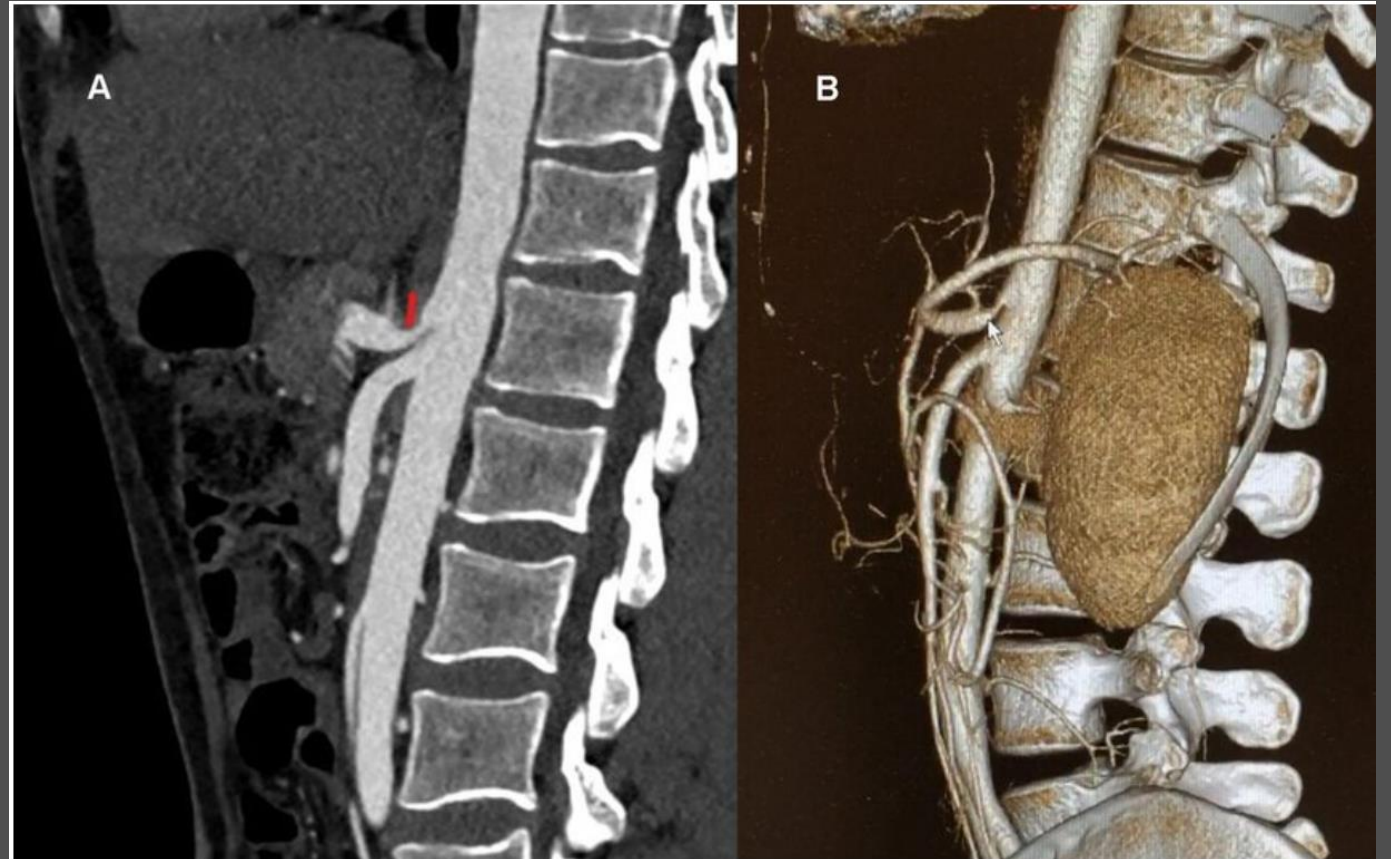
•Syndróm kompresie truncus coeliacus

•**Bolesť brucha:** Zvyčajne sa vyskytuje v hornej časti brucha, často popisovaná ako tupá alebo pichľavá bolesť, ktorá sa môže zhoršiť po jedle- intermitentná alebo trvalá

•**Nevolnosť a vracanie:** *strata hmotnosti*- pacienti často strácajú na váhe v dôsledku zníženého príjmu potravy, pretože bolesť ich vedie k tomu, aby sa vyhýbali jedeniu.

•Intolerancia cvičenia





Median Arcuate Ligament Syndrome

MALS (*Dunbar S.*)

•Kongenitálne



•Vývojovo



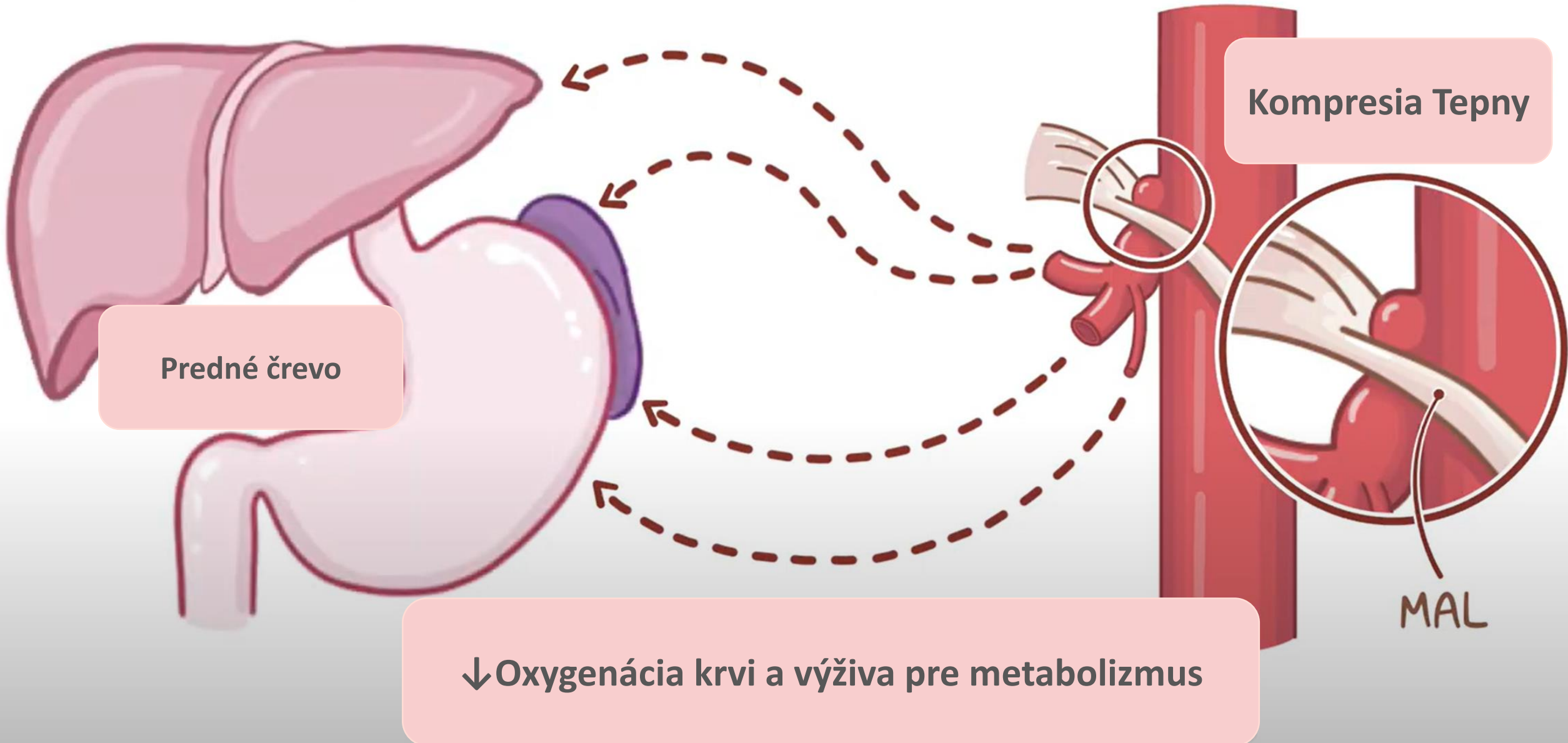
•Získané

- Iatrogenne
- Posttraumaticky

•Poruchy spojiva
•Lordóza



Patológia 1. príčina (zúženie tepny)



Predné črevo

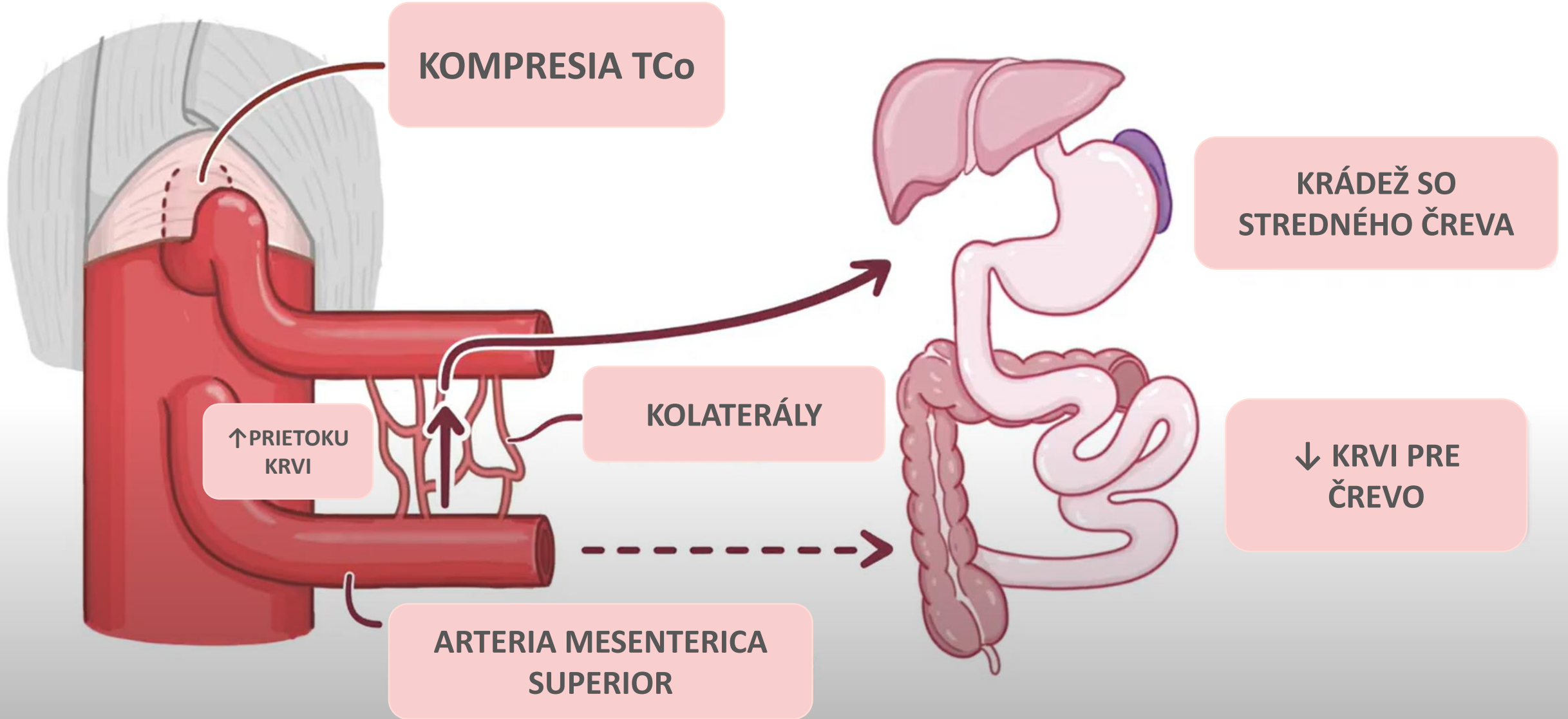
Kompresia Tepny



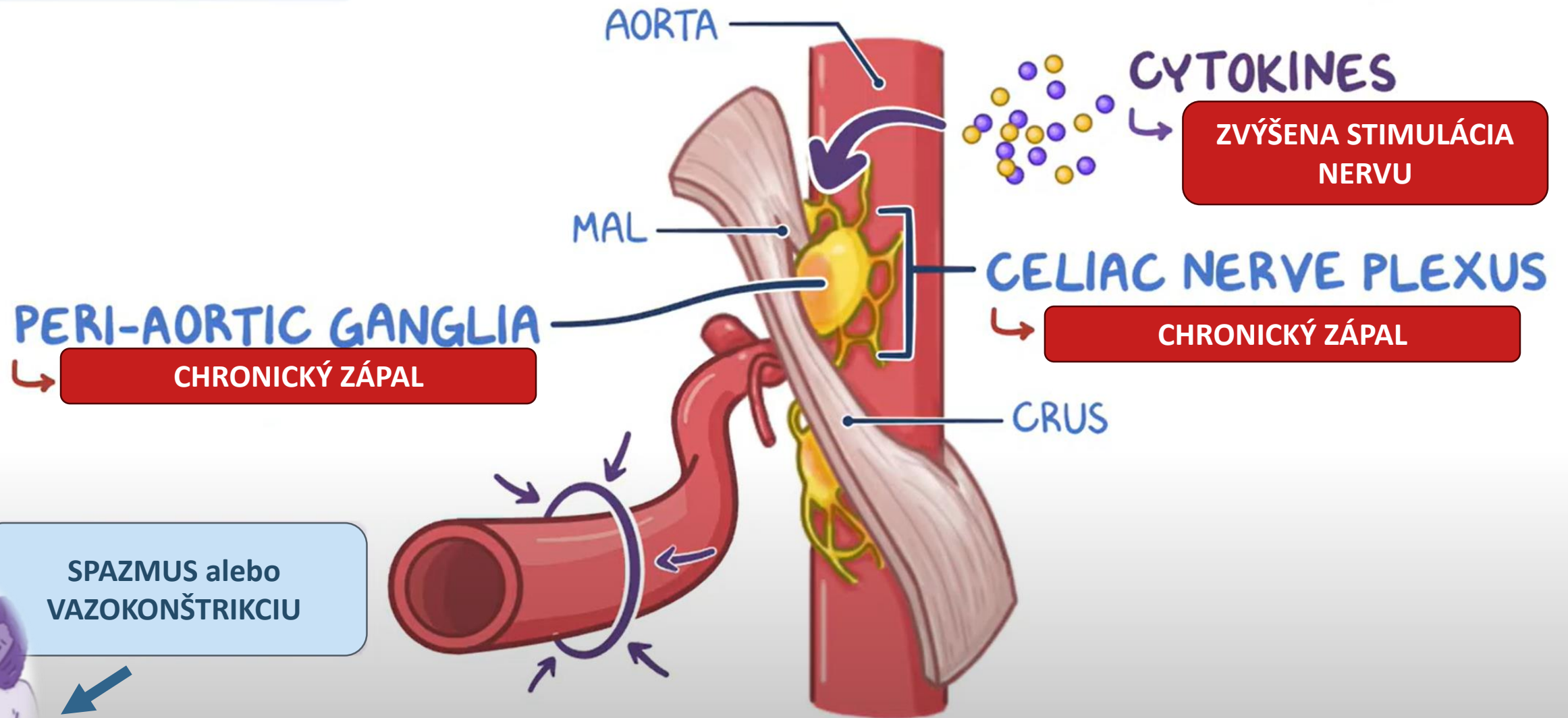
MAL

↓ Oxygenácia krvi a výživa pre metabolizmus

Patológia 2. príčina (steel fenomén)



Patológia 3. príčina (iritácia nervu)



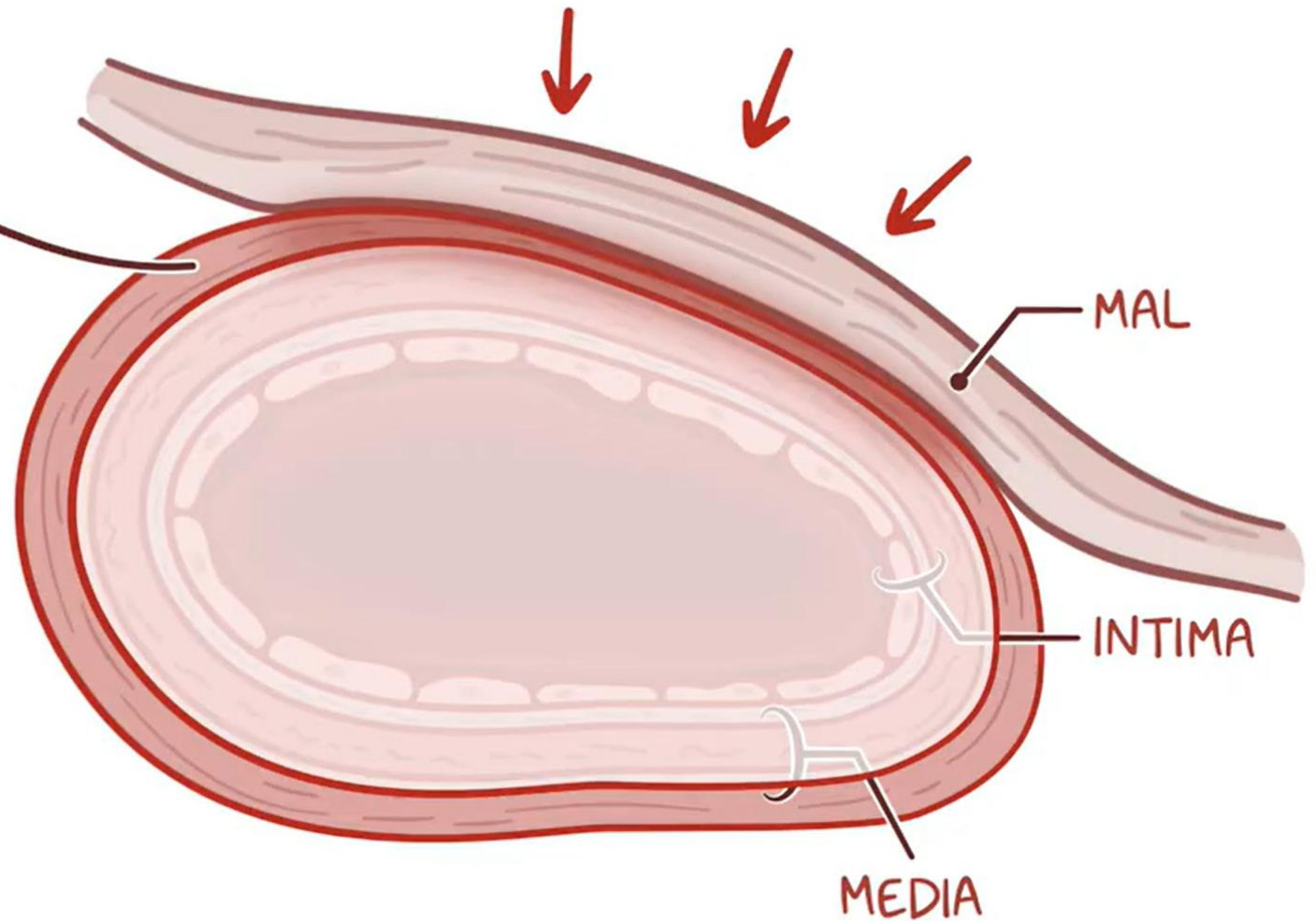
Patológia 4. príčina (tlak na adventíciu)

MIKROSKOPICKÉ
ZMENY

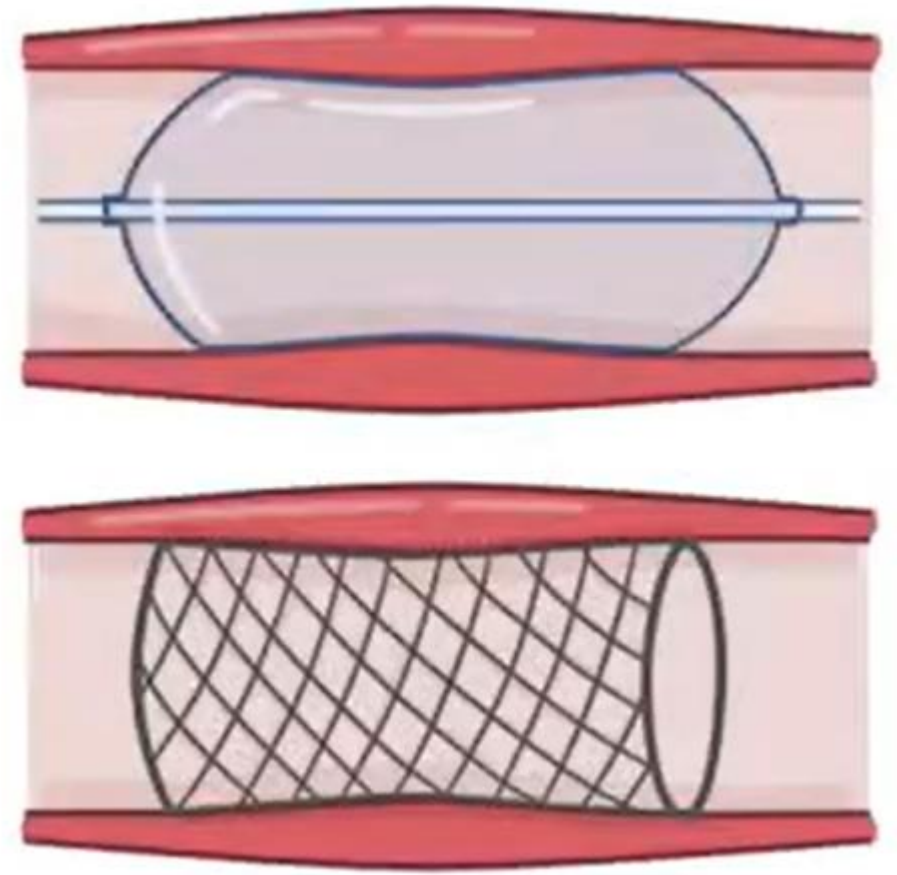
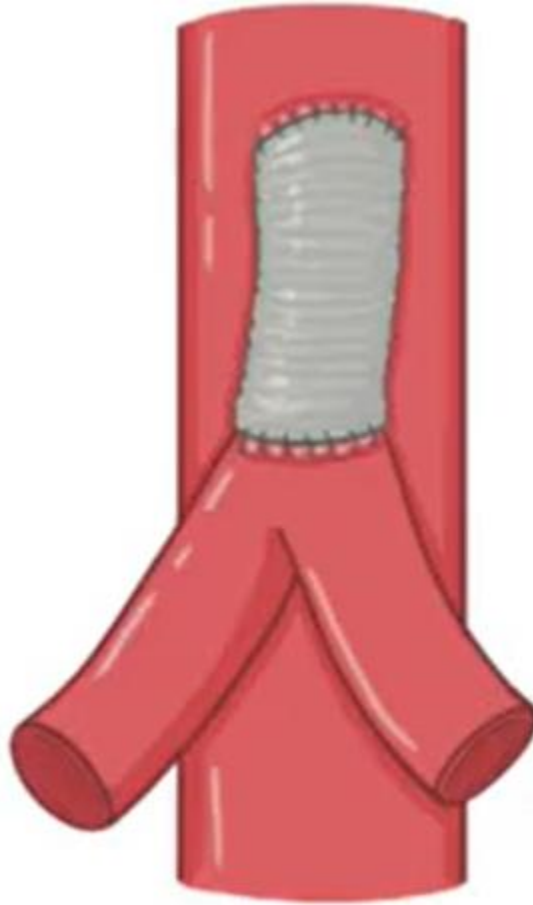
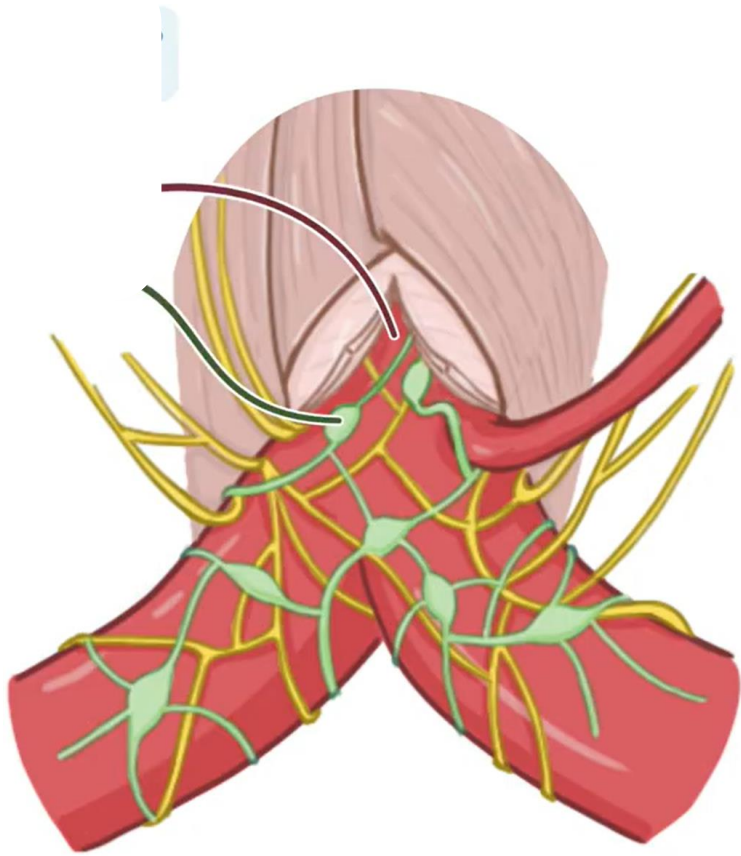
ADVENTITIA

VYSOKO SENZITÍVNA
NOCICEPCIA

NARASTÁ PRI CVIČENÍ



Intervencia MALS



Median Arcuate Ligament Syndrome

MALS (*Dunbar S.*)

TABLE III.—Core features of MALS symptoms, diagnosis and management.

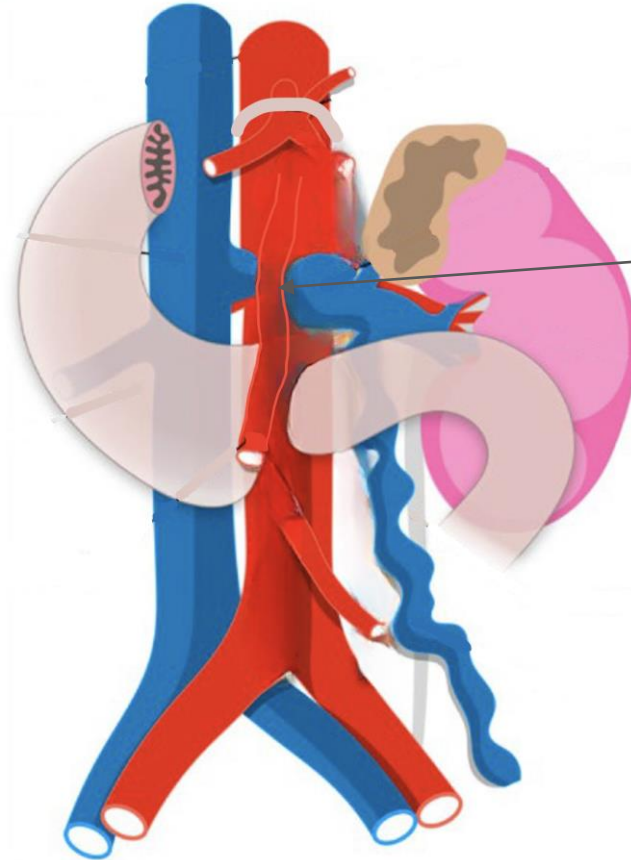
Syndrome	Symptoms	Diagnosis	Management
Celiac artery compression syndrome	<ul style="list-style-type: none"> • Epigastric pain that may be worsened by eating, exercise, or forward flexion • Unintentional weight loss • Nausea or vomiting 	<ul style="list-style-type: none"> • Duplex ultrasound with respiratory manoeuvres • CT angiography • Endoscopy and gastroenterology work-up to rule out other aetiologies 	<ul style="list-style-type: none"> • Celiac plexus block for physiologic testing and prognostication • Surgical MAL release • Revascularization for residual or recurrent celiac artery stenosis

Konstipácia
Zmeny v pulse a TK
Askultačne šelest v epigastri

1. Vylúčiť gastritídu, cholecystitídu, IBD, CVO
2. PSV nad 200cm/s EDV nad 50cm/s
3. Zvýšenie rýchlosti pri hlbokom výdychu
4. Úhol odklonu viac ako 50 st. medzi Ex a In

Prerušenie ligamenta
Repozícia Tco
Endovaskulárna PTA alebo sPTA po chir. Výkone.
Alkohol. Ablácia plexus coeliacus

ABDOMINO-PELVIC VASCULAR COMPRESSION SYNDROMES

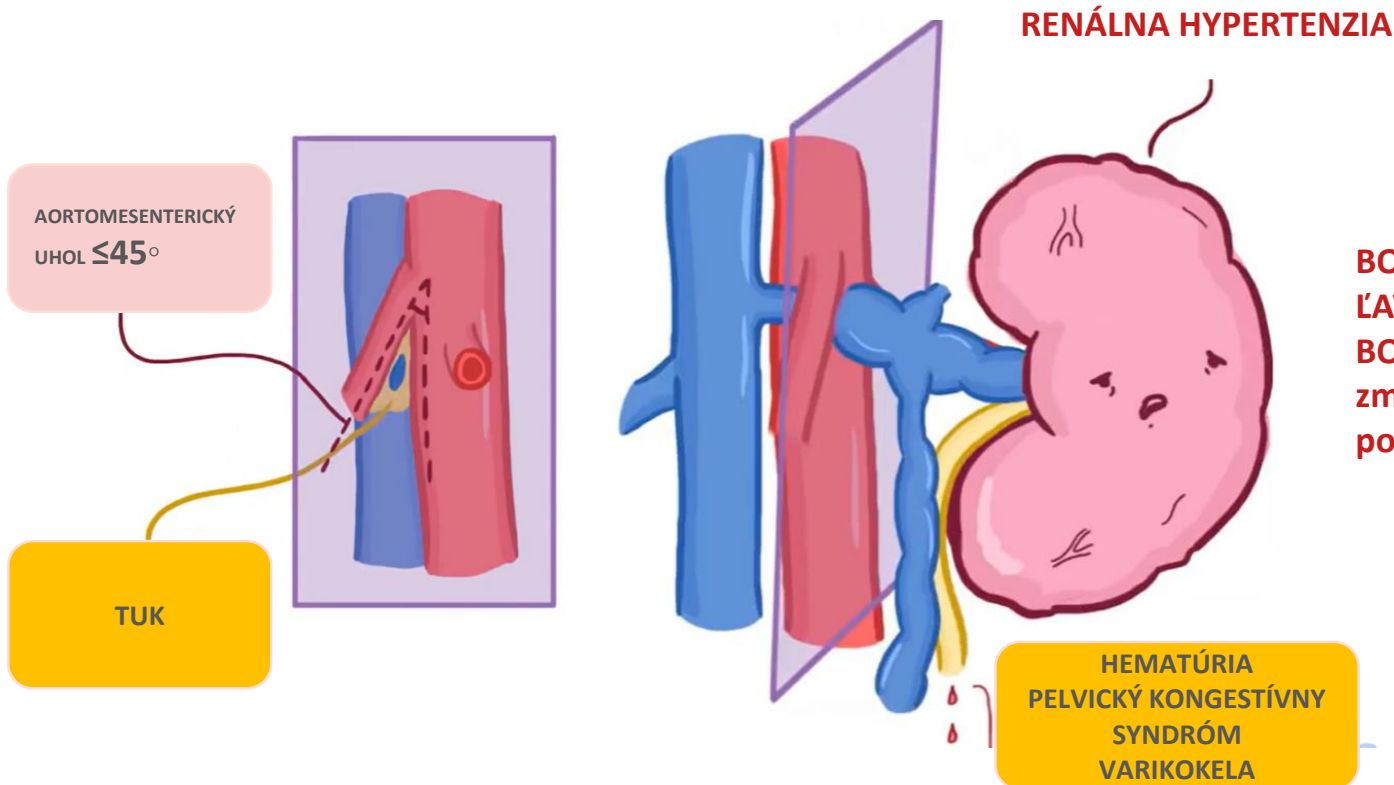
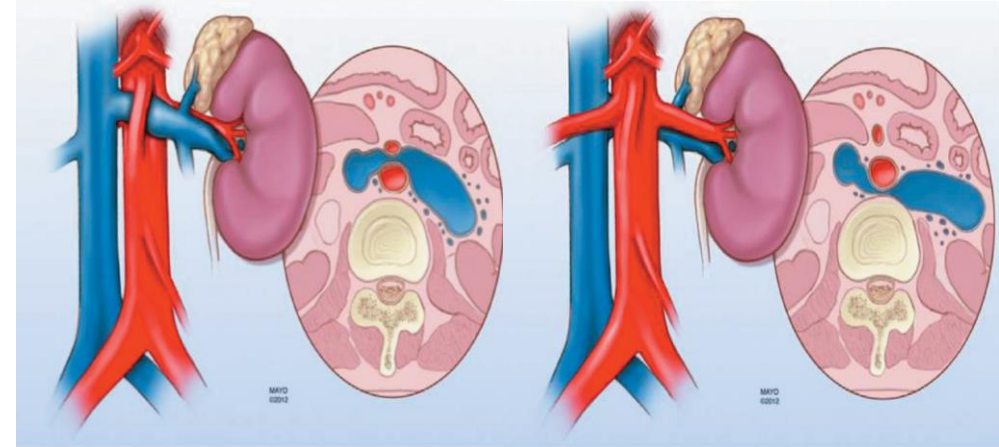


Left Renal Vein
Compression Syndrome
NCS
(*Nutcracker S.*)

Kompresia ľavej renálnej tepny (*Nutcracker syndróm*)

- Útlak ľavej renálnej vény = fenomén 51-72% populácie
- Predný typ: medzi SMA a aortou
- Zadný typ: medzi aortou a telom stavca (retroaortálne)

- ! Vysoký prietok RA! (20% MO)



Ptóza obličky
Rapídne schudnutie
Vývoj Lordóza
Anomálie SMA
EDS

Kompresia ľavej ranálnej tepny (*Nutcracker syndróm*)

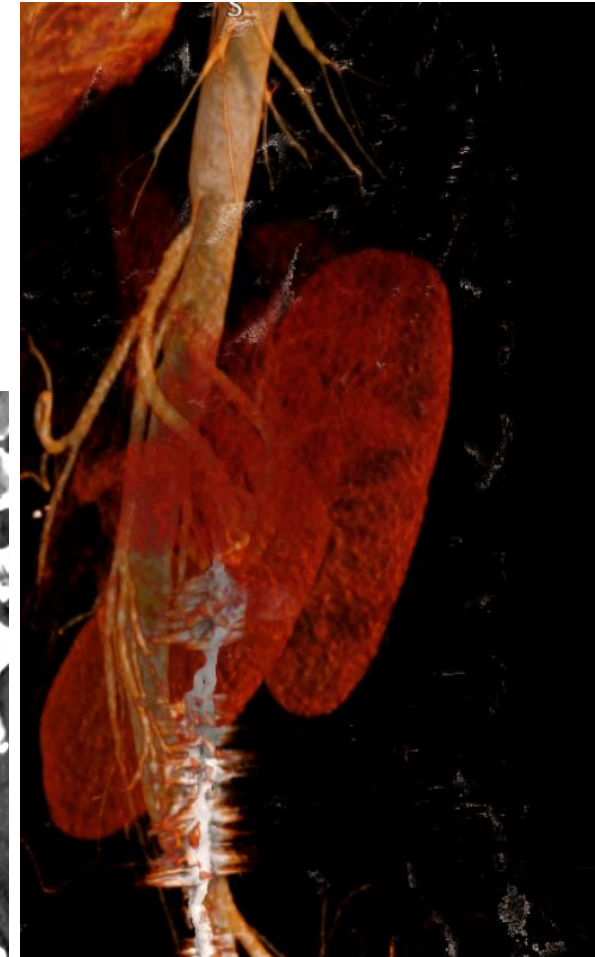
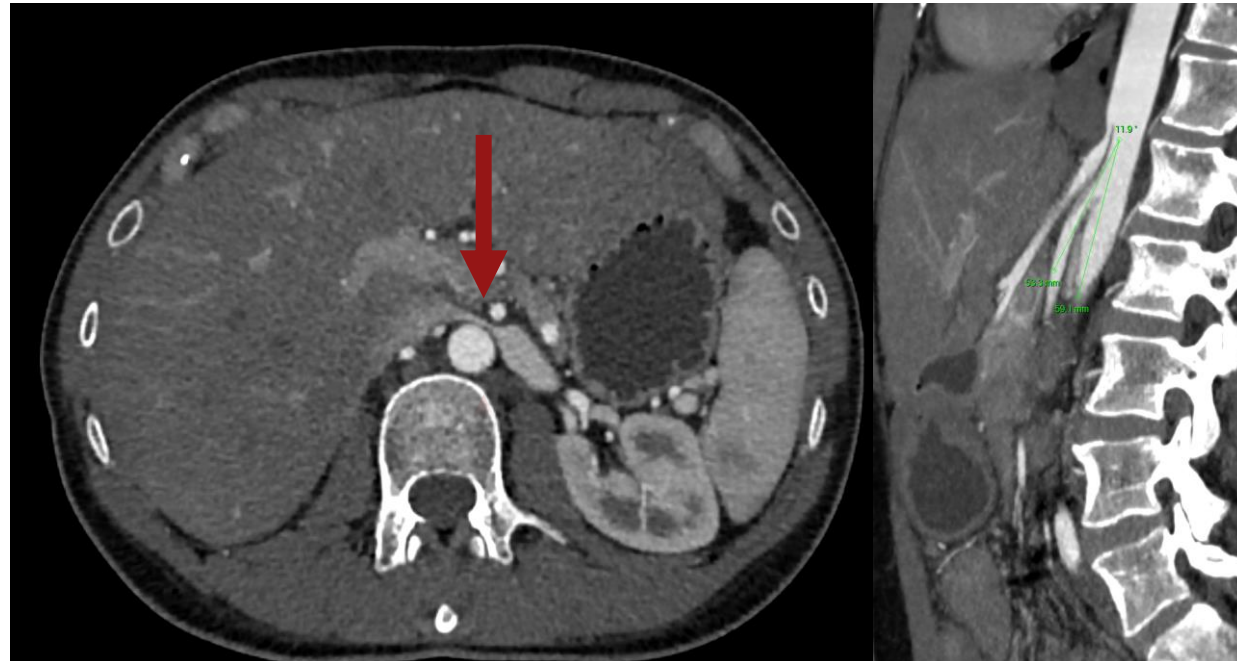
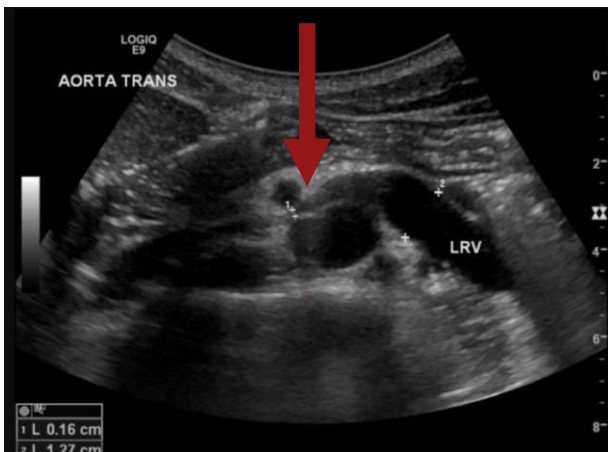
- **Diagnostika:**

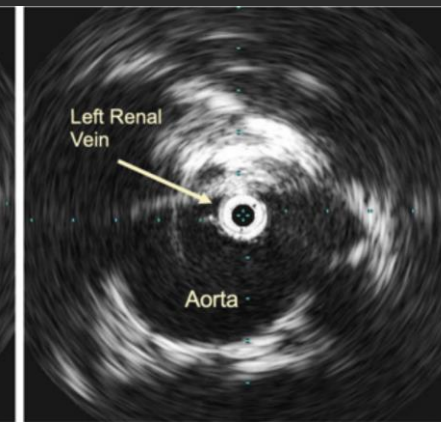
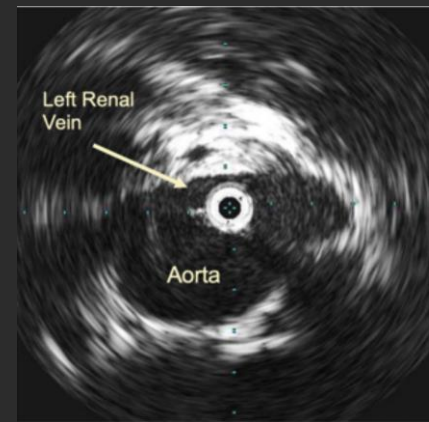
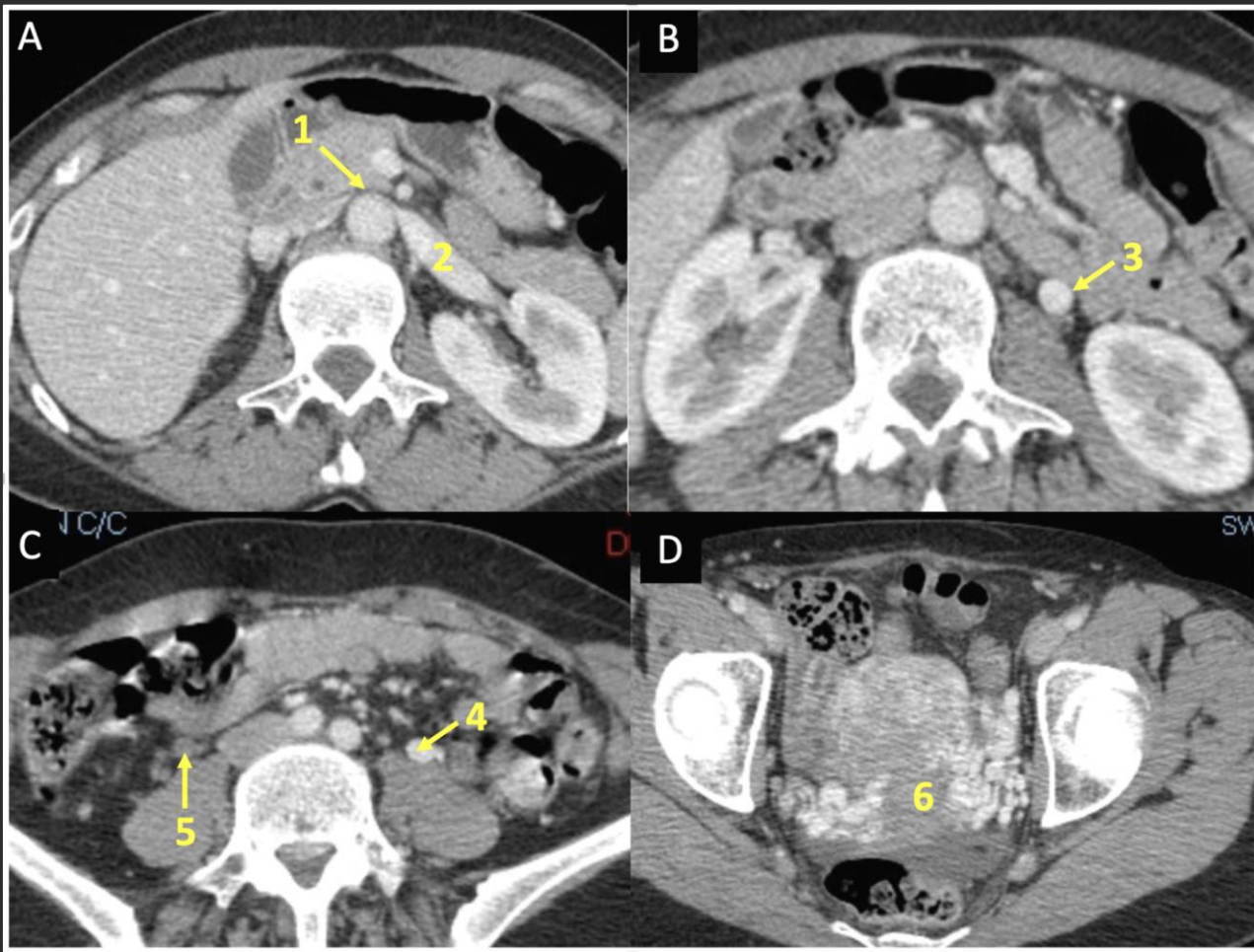
- Poctivé odobratie OA
- Per exclusionem (najmä hematúria)

- **CCDS:** rozdiel PSV (stenóza vs dilatácia) OPR

- **CT venografia+ DSA+ IVUS**

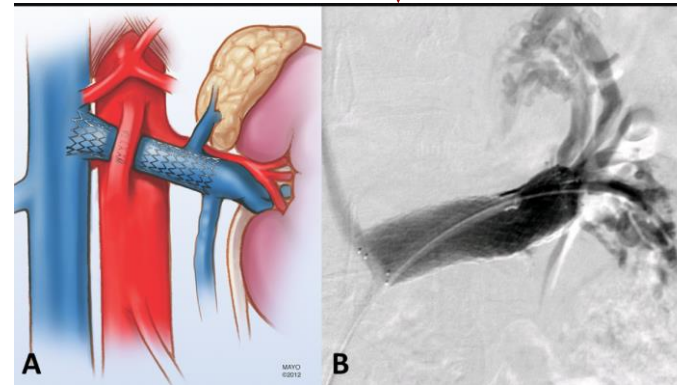
- Hydratácia
- AM uhol (6-16°)
- Zúženie LRV
- Kolaterál



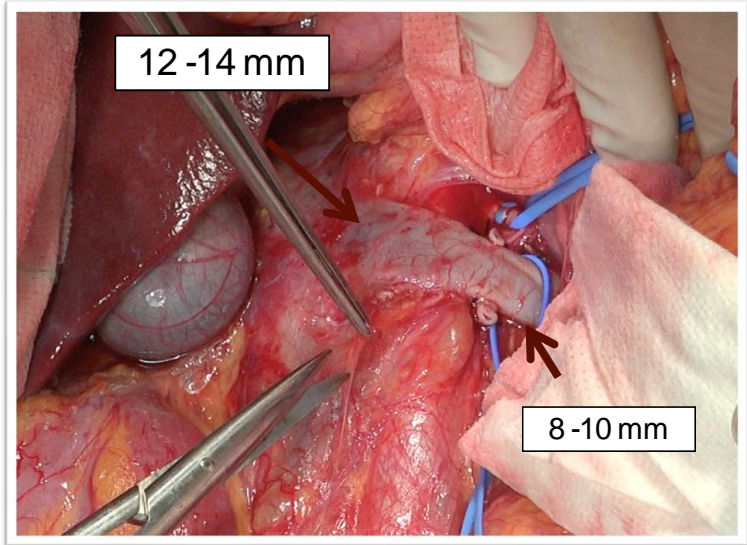


Kompresia ľavej ranálnej tepny (*Nutcracker syndróm*)

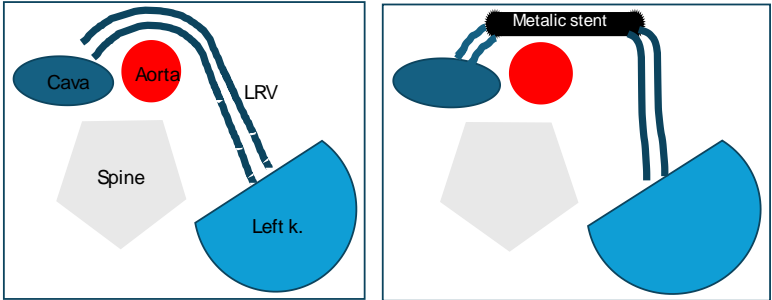
• Management: hľadanie menšieho zľ'a



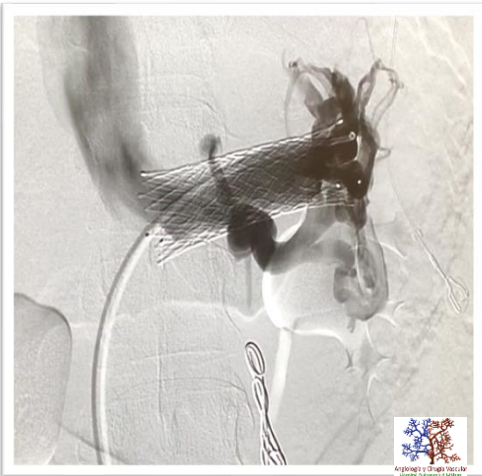
MIGRÁCIA STENTU



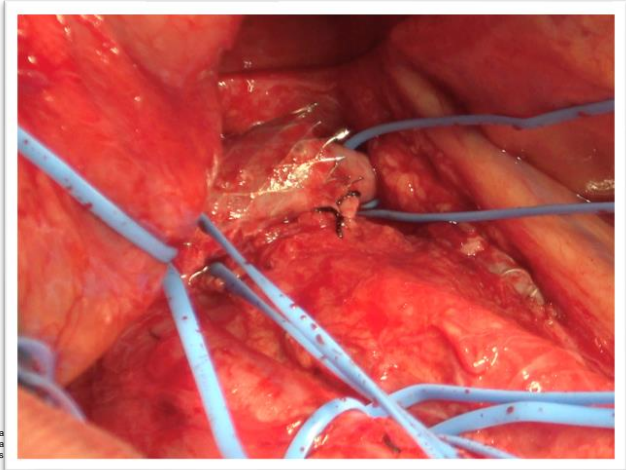
DISTÁLNY KINKING



DISTÁLNA OVEREXPANZIA

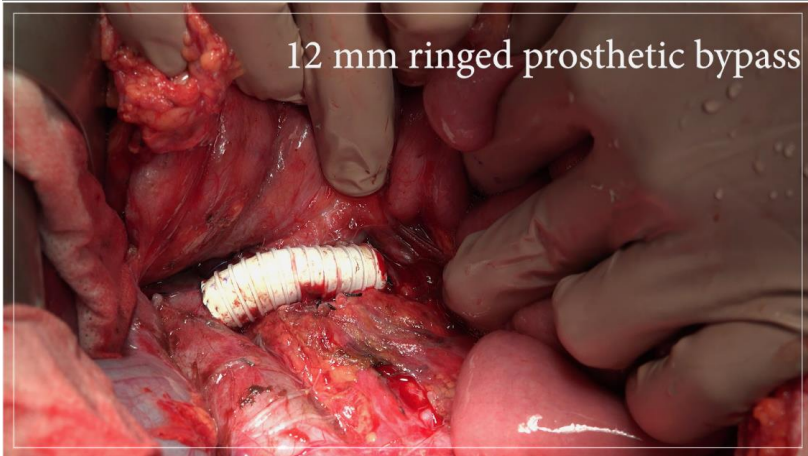


PERFORÁCIA

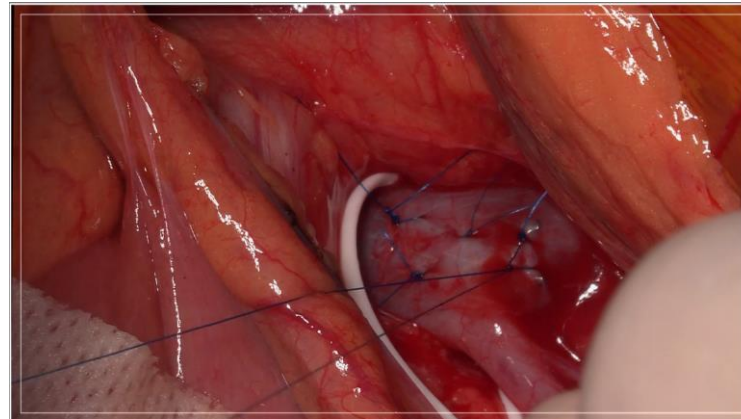


Compression syndromes and **Pelvic Congestion** as a source of Chronic Pelvic Pain.

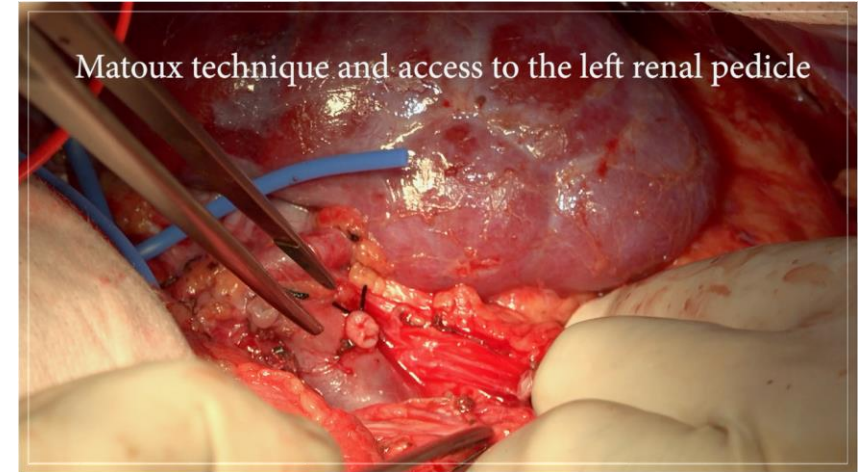
RENOKAVÁLNY BYPASS



HYBRID (prišitie stentu)



RENÁLNA AUTOTRANSPANTÁCIA



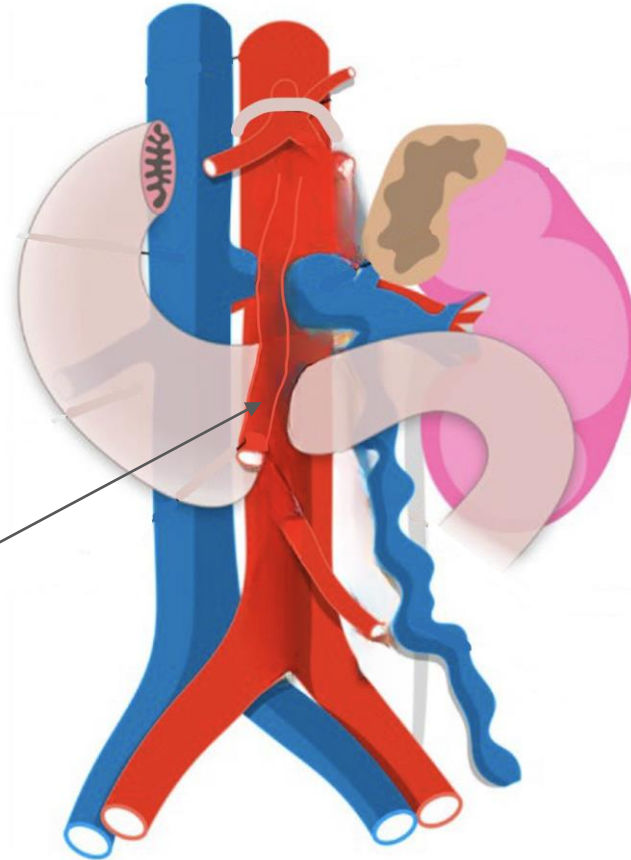
Kompresia ľavej ranálnej tepny(*Nutcracker syndróm*)

TABLE III.—Core features of MALS symptoms, diagnosis and management.

Syndrome	Symptoms	Diagnosis	Management
Celiac artery compression syndrome	<ul style="list-style-type: none">• Epigastric pain that may be worsened by eating, exercise, or forward flexion• Unintentional weight loss• Nausea or vomiting	<ul style="list-style-type: none">• Duplex ultrasound with respiratory manoeuvres• CT angiography• Endoscopy and gastroenterology work-up to rule out other aetiologies	<ul style="list-style-type: none">• Celiac plexus block for physiologic testing and prognostication• Surgical MAL release• Revascularization for residual or recurrent celiac artery stenosis

ABDOMINO-PELVIC VASCULAR COMPRESSION SYNDROMES

**Superior Mesenteric
Artery Syndrome
SMAS
(Wilkie S.)**



SUPERIOR MESENTERIC ARTERY SYNDROME (WILKIE SYNDRÓM)

•KOMPRESIA HORIZONTÁLNEJ ČASTI DUODENA (D3) MEDZI AORTOU a AMS

•Vzácný (0.013-0.3%) kompresívny sy

•Definícia

•Klinické:

- Dlhodobé GI problémy
- Postprandiálna abdominálna bolesť
- Skorý pocit nasýtenia
- Zvracanie žlče
- Strata hmotnosti

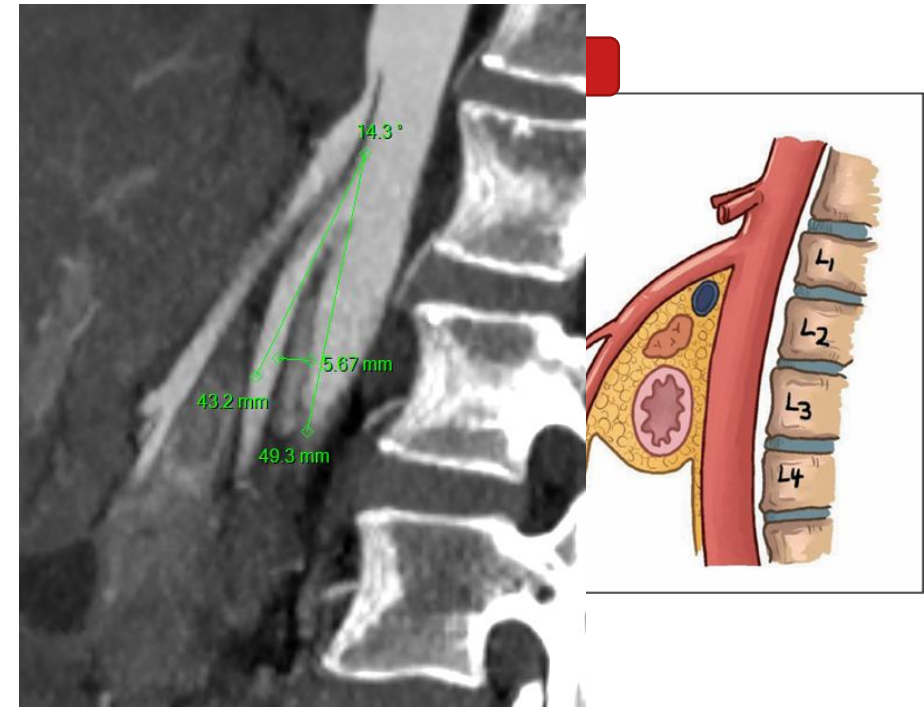
•Objektívny nález:

- Hlasné „žblnkanie“ v bruchu
- Obštrukcia duodena

•Zobrazovacie modality

•CT/USG

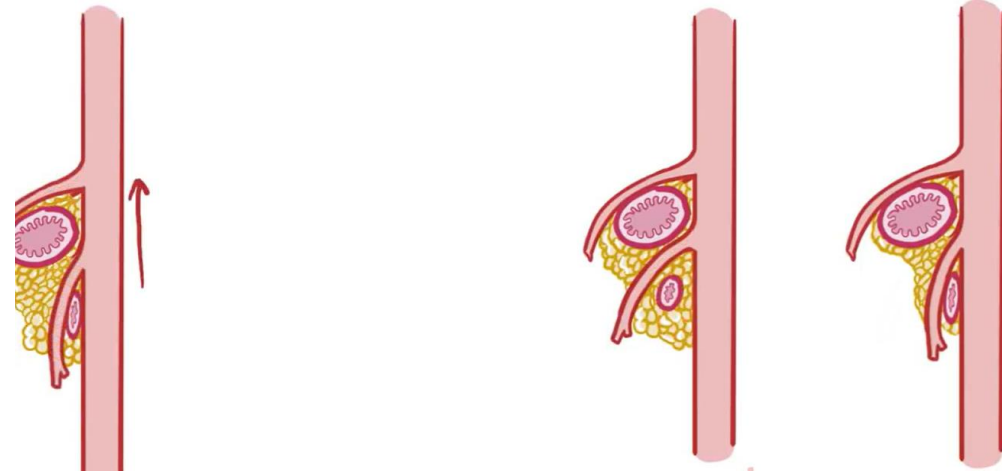
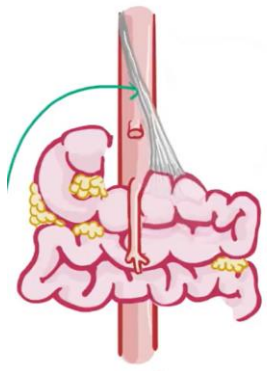
- Aortomesenterický (AM) uhol pod 16° (není až tak ojedinelý)
- AM vzdialenosť pod 7-8 mm



SUPERIOR MESENTERIC ARTERY SYNDROME (WILKIE SYNDRÓM)

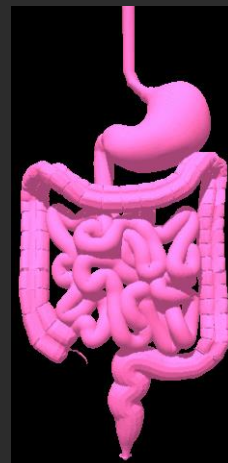
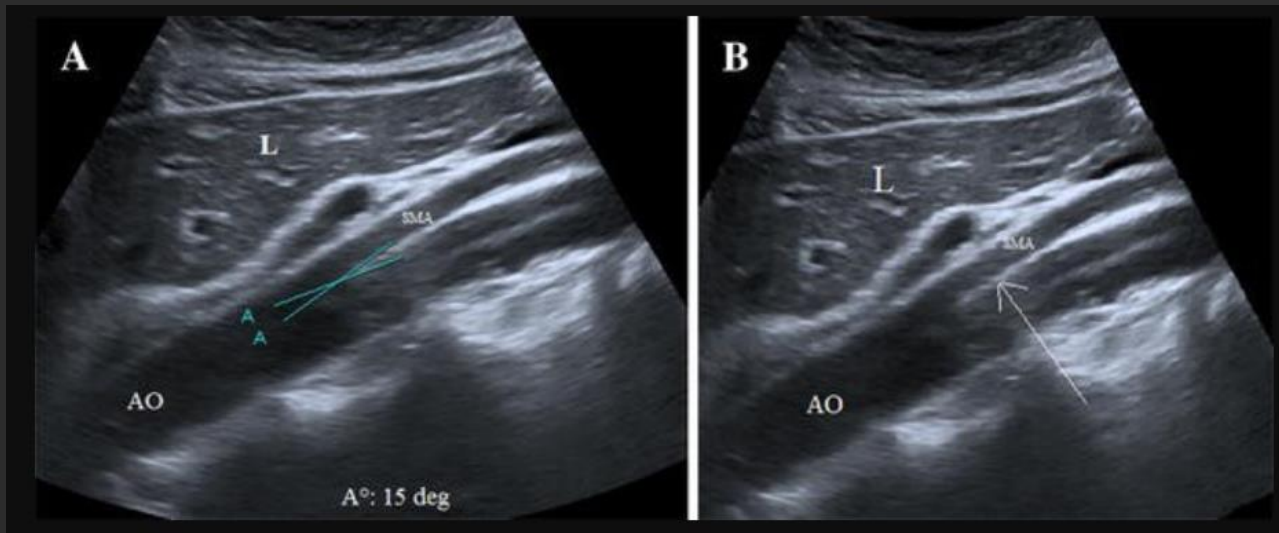
Vrodené:

- Abnormálna inercia alebo abnormálne vysoký Treitzov väz
- Hypertrofia väzu
- Duodenálna malrotácia do kraniálnej polohy
- Krátke črevné mezenterium
- Anomálny alebo nízky odtup SMA (superiornej mezenterickej artérie)
- Vysoká fixácia duodena
- Lumbálna lordóza
- Visceroptóza
- Peritoneálne zrasty



Získane:

- Závažná strata hmotnosti (nádory, popáleniny, malabsorpčný syndróm, anorexia nervosa, malígna kachexia, AIDS, dlhodobé ležanie na lôžku, polytrauma, hyperkatabolický stav a zneužívanie drog)
- Pooperačné (operácia chrbtice, operácia aneuryzmy aorty alebo disekcie aneuryzmy aorty)





Najvýpovednejšie vyšetrenie!

<https://smj.org.sa/content/smj/42/10/1145/F2.large.jpg>



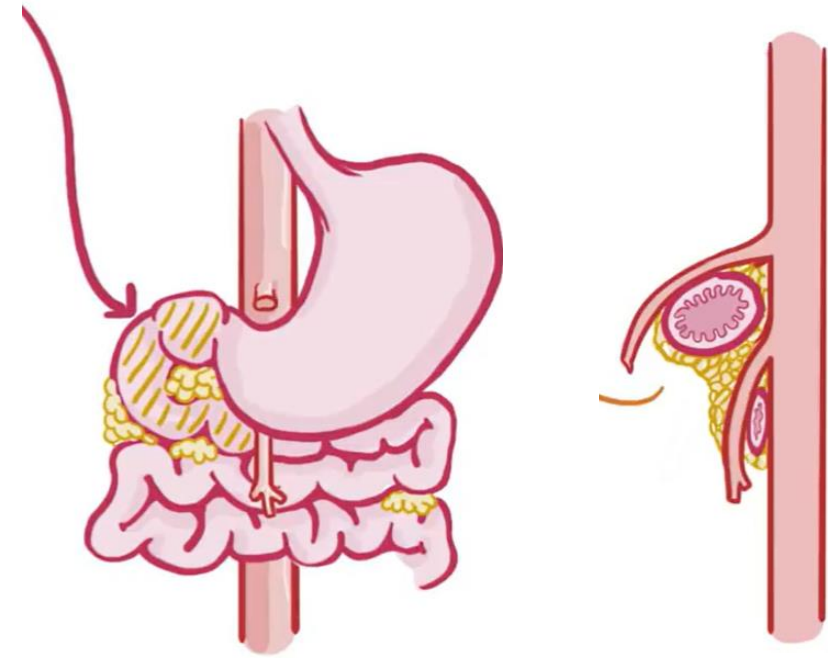
NÁRODNÝ ÚSTAV SRDCOVÝCH
A CIEVNÝCH CHORÔB, A.S.

SUPERIOR MESENTERIC ARTERY SYNDROME (WILKIE SYNDRÓM)

(Haynes. kritéria)

Skiagraficko- skioskopické vyšetrenie

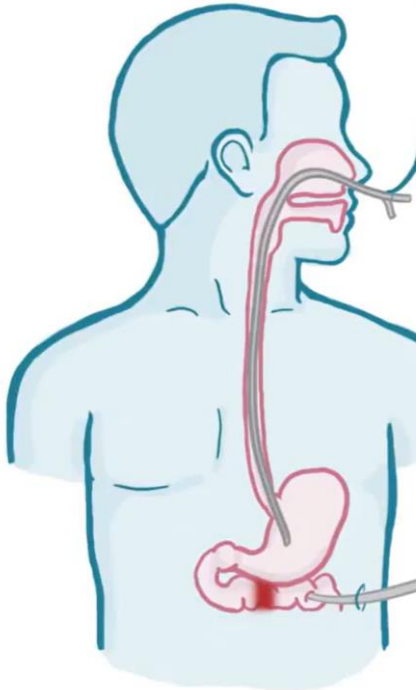
- Dilatácia D1 a D2, vertikálne zúženie D3
- Prechodné zadržanie kontrastu v gastroduodenálnom segmente s pohybom tam a späť.
- Rýchly distálny tok kontrastu po zaujatí ľavej bočnej polohy.



Management (WILKIE SYNDRÓM)

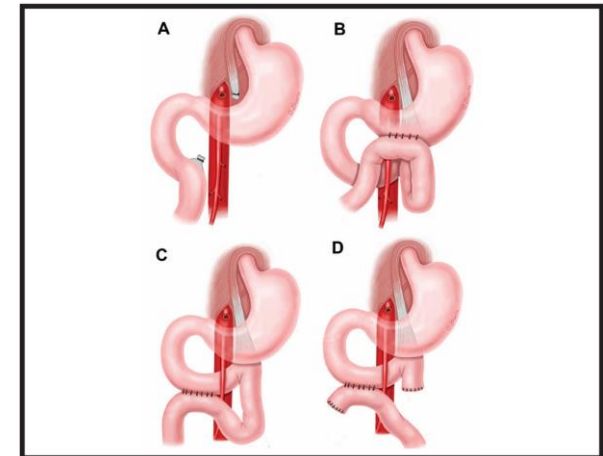
•Konzervatívny (80-86% úspešný)

- Dekompresia žalúdka a duodena
- Hradenie tekutín a elektrolytov
- Realimentácia (nárast mesenteriálneho tuku)
 - Parenterálne
 - NGS za obštrukciu (pod RTG), manévrovanie po jedle
 - Tekuté- kašovité- dolidné
 - Metoclopramide



•Chirurgicky (failure rate of 8-21%)

- Operácia podľa Stronga (derotácie čreva, preťatie DJ junkcie)
- Gastrojejunostomy
- Duodenojejunostomy ± distal duodenum resection



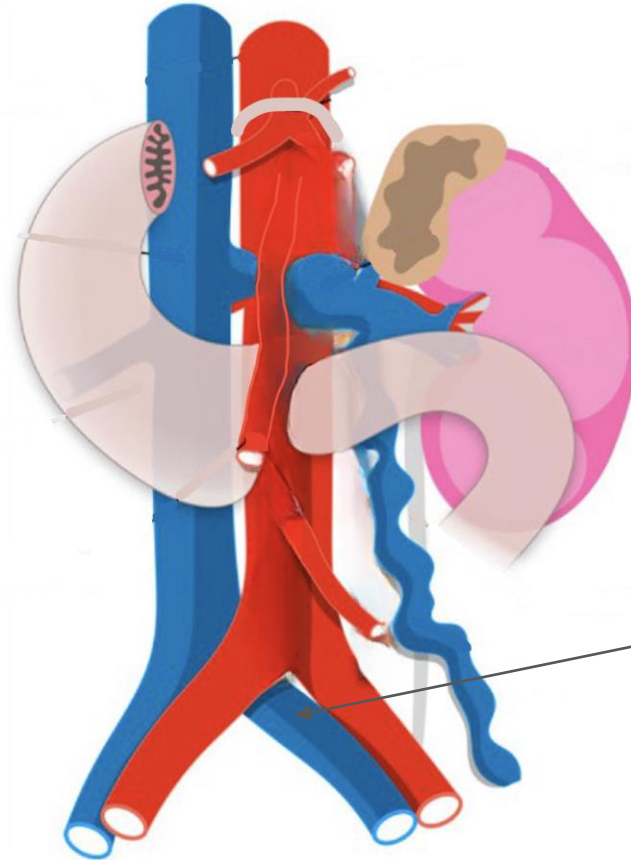
SUPERIOR MESENTERIC ARTERY SYNDROME (WILKIE SYNDRÓM)

TABLE II.—Core features of Wilkie Syndrome: symptoms, diagnosis and management.

SMA syndrome or Wilkie Syndrome			
Causes	Symptoms	Diagnosis	Management
<p>(a) Congenital:</p> <ul style="list-style-type: none"> • Abnormal insertion or abnormally high ligament of Treitz • Hypertrophy of the ligament • Duodenal malrotation to a cranial position • Short intestinal mesentery • Anomalous or low origin of the SMA • High duodenal fixation • Increased lumbar lordosis • Visceral ptosis • Peritoneal adhesions <p>(b) Acquired:</p> <ul style="list-style-type: none"> • severe weight loss (tumours, burn, malabsorption syndrome, anorexia nervosa, malignant cachexia, AIDS, prolonged bed rest, poly-trauma, hyper-catabolic state and drug abuse) • postoperative (spinal surgery, body casting, open aortic aneurysm or dissecting aortic aneurysm repair) 	<ul style="list-style-type: none"> • Weight loss • Post-prandial abdominal pain • Early satiety • Bloating • Vomiting 	<p>(a) Initial: upper gastro-intestinal series</p> <p>(b) Confirmative:</p> <ul style="list-style-type: none"> • Computed tomography • Magnetic resonance imaging 	<p>(a) Conservative:</p> <ul style="list-style-type: none"> • Nasogastric tube • Enteral feeding • Total parenteral nutrition <p>(b) Surgical:</p> <ul style="list-style-type: none"> • Strong procedure • Gastrojejunostomy • Duodeno-jejunosomy ± distal duodenum resection



ABDOMINO-PELVIC VASCULAR COMPRESSION SYNDROMES



Iliac Vein Compression
Syndrome
MTS
(*May Thurner Syndrome*)

May Thurner Syndrom (kompresia illickej vény)

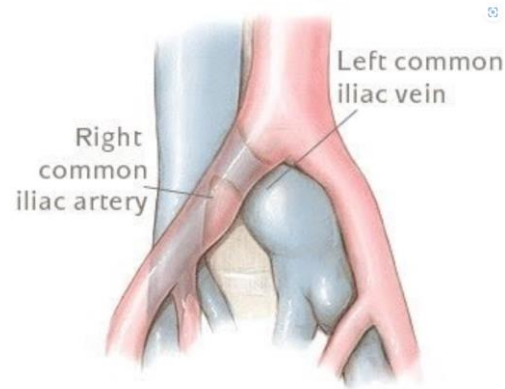
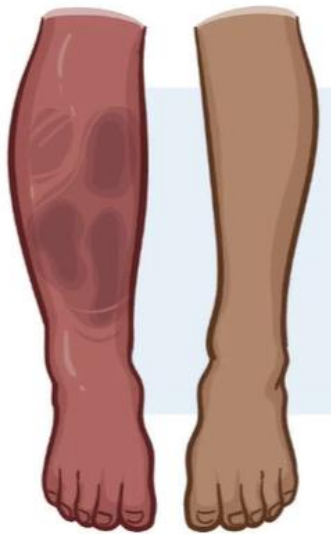
- Syndróm kompresie illickej vény (nad 50%)
- PRAVÁ SPOLOČNÁ PANVOVÁ TEPNA STLÁČA ĽAVÚ PANVOVÚ ŽILU PROTI STAVCU
- 25% POPULÁCIE MÁ DANÚ KOMPRESIU
- Mizivé percento aj klinické prejavy



May Thurner Syndrom (kompresia illickej vény)

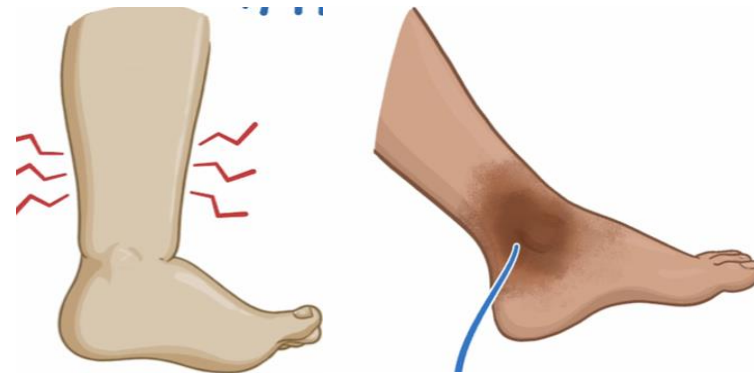
•Symptómy spojené s trombózou

- Trombofilný stav
- Mladé športovkyne
- HAK
- Fajčenie



•Symptómy bez trombózy

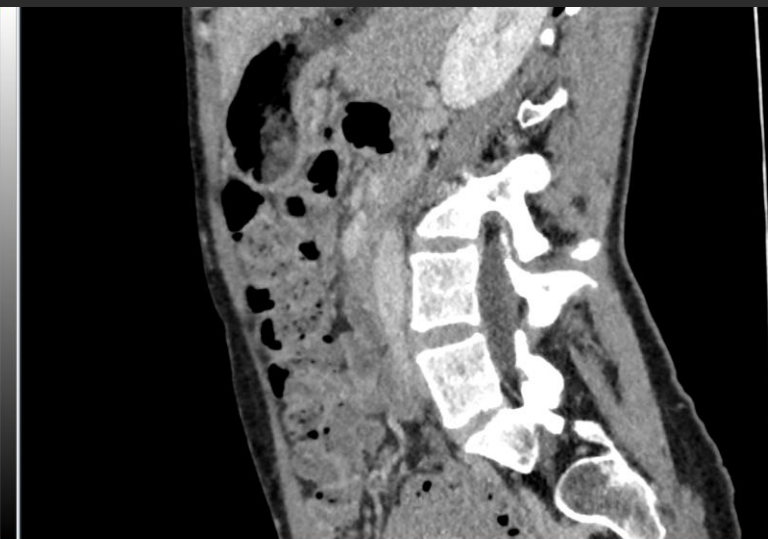
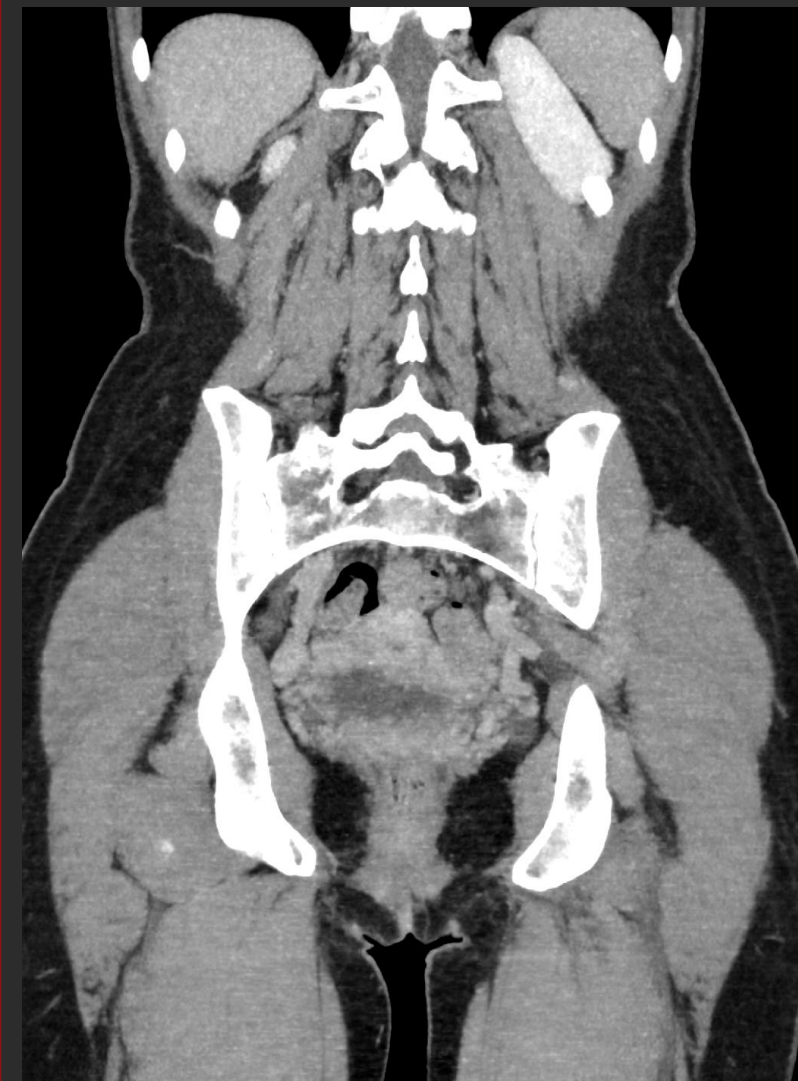
- Unilaterálne
- Žilná hypertenzia- venózna insuficiencia
- Venózne klaudikácie



Kazuistika č.x

- **Terajšie ochorenie:** 36 ročná pacientka s klaudikáciami ĽDK, opuch ĽDK, bolesti v pod brušku
- Tlak: 120/73, Pulz: 65/min, Teplota: 36.2°C, Výška: 170.0 cm, Hmotnosť: 86.0 kg, BMI: 29.76, Povrch tela: 1.975 m²,
- **Osobná:**
 - Subakútna trombóza prox. úseku VF I. sin v gravidite 32tt 8/2022
 - Mutácia FV Leiden a FII protrombin
 - Primárna sterilita - poz. APA /fosfolipidy IgG, kardiolipin IgG, beta-2 GPI IgG)
 - Autoimunitná hypotyreóza
- **Doplnková:** stolica a močenie v norme, teles. hmotnosť stabilná
- **Lieková:** Euthyrox 150ug 1-0-0, Warfarin 5mg vysadený od 25.5.2023, tč Fraxiparine 0,6ml 2x denne
- **Gynekologická:** 2 pôrody,
- **Abúzy:** sine
- **Epidemiologická:** 4x očkovaná proti covid, covid prekonala 1/2023

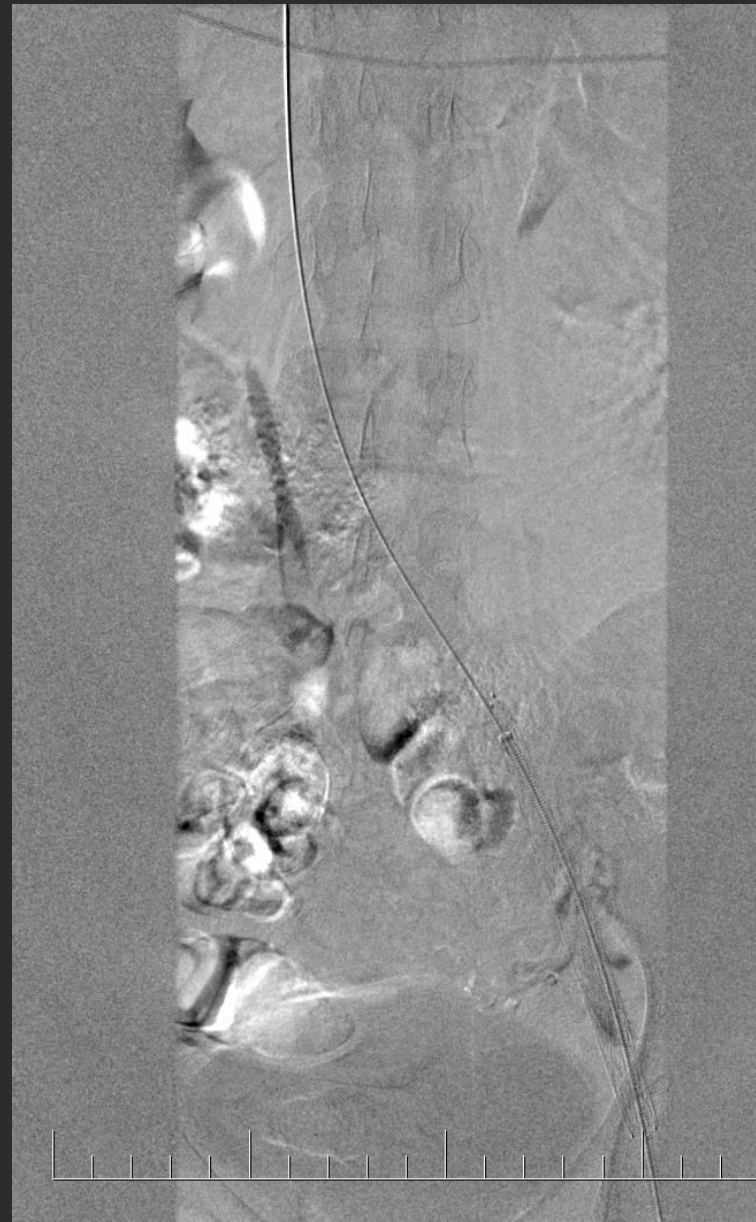


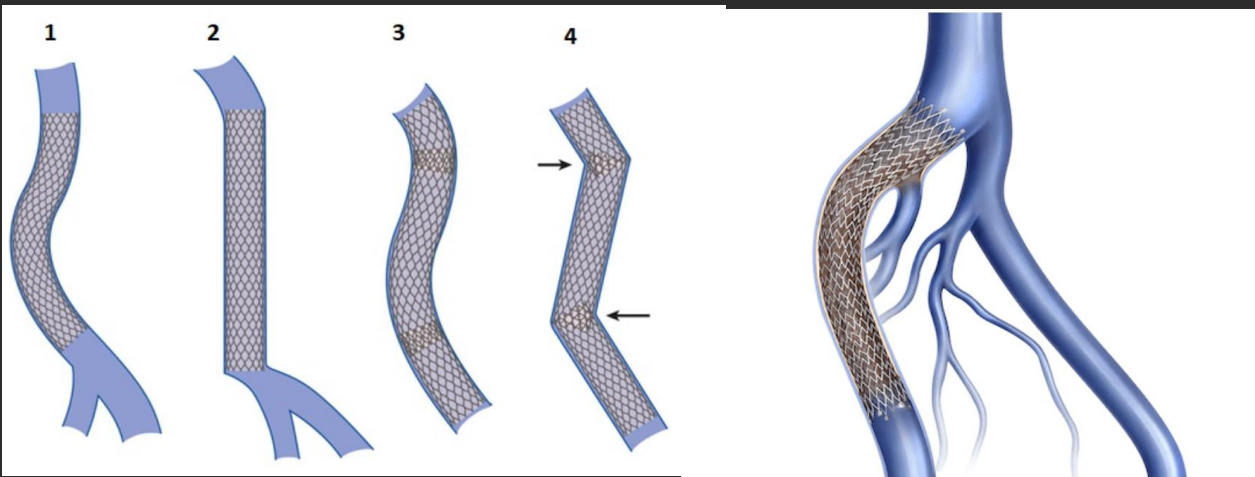
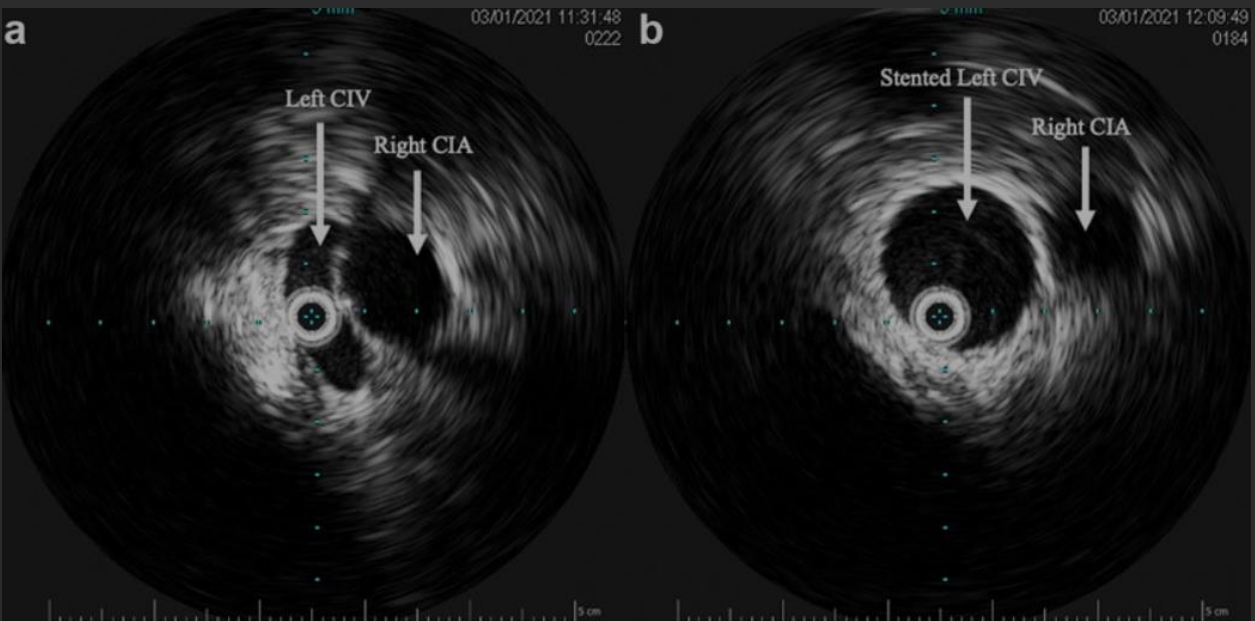


PRÁZDNY



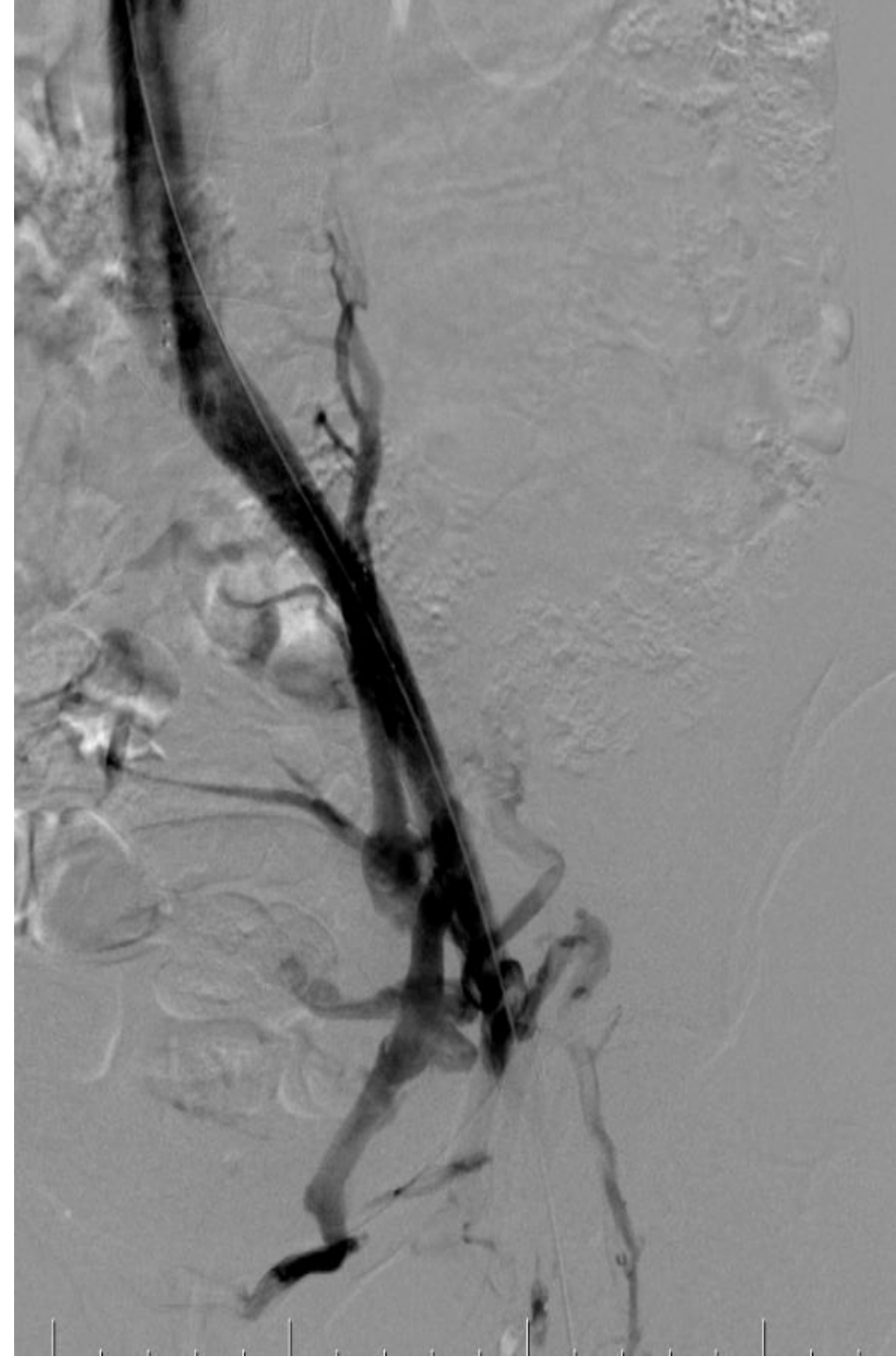






Kazuistika č.x

- Prepustená po 2 dňovej hospitalizácii
- 1 mesiac 1-0-0 Trombex 75mg p.o.
- 6 mesiacov Wafrarín p.o. INR 2-3
- Následná kontrola bez obťažii- kontrola každý rok.



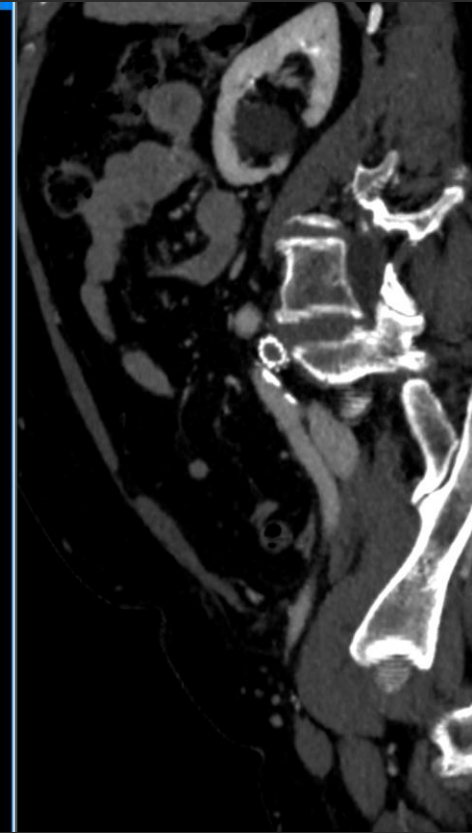
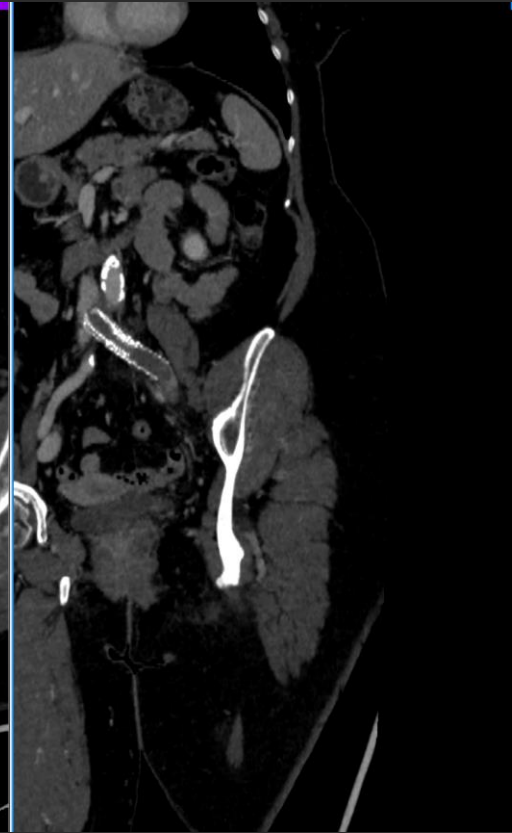
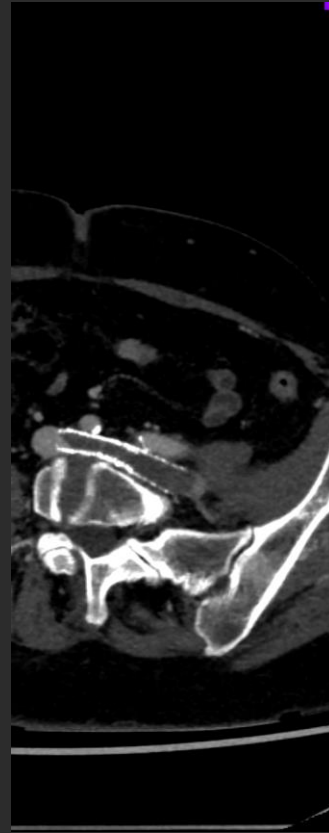
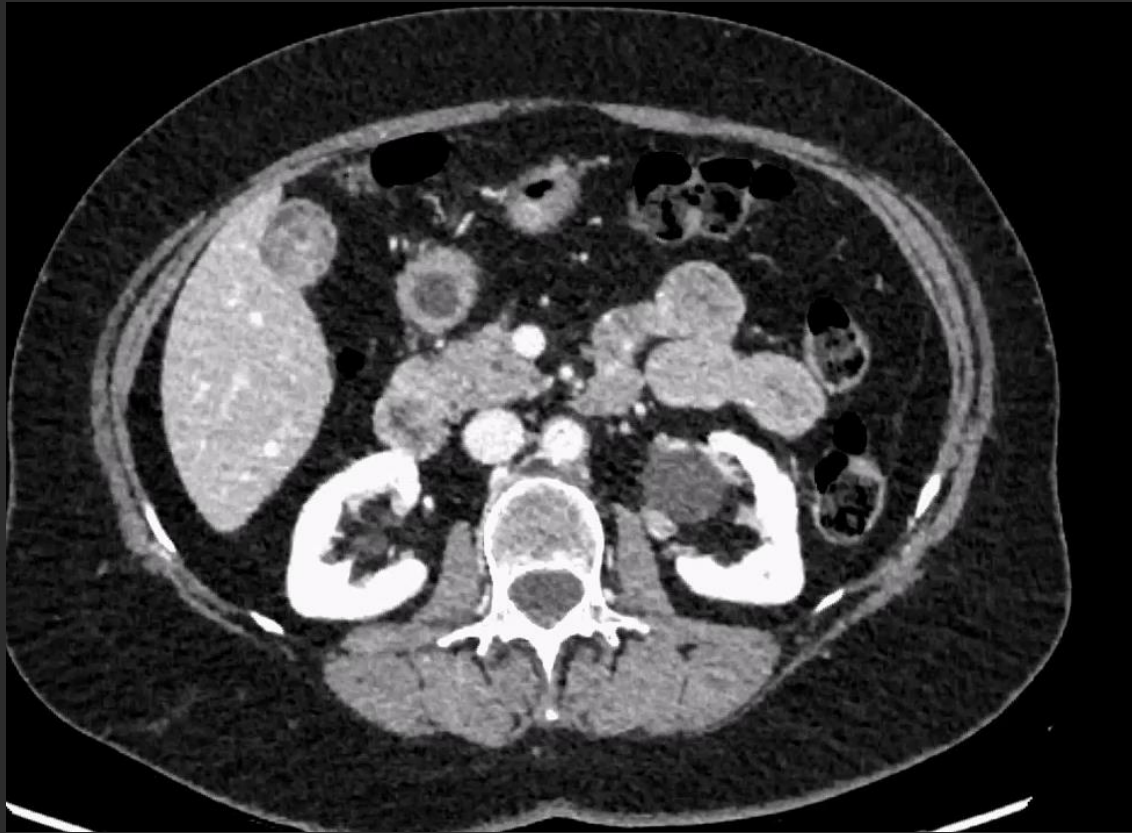
Kazuistika č.x

- **Terajšie ochorenie:** Pacientka po opak VTE príhode (2012, 2018), bez dlhodobej farmakologickej trombopropylaxie. Od včera večer silná bolesť ľavej nohy, modrasté sfarbenie, opuch. Dnes CTAG potvrdená trombóza VIC s miernym presahom do VCI. VIE a VFC priechodné.
Provokujúci moment nie jasný. Krvácavé príhody neguje. CT bez znakov TU procesu, KO v norme.

Pacientka preferuje invazívnu terapiu.

- Tlak: 150/90, Pulz: 90/min, Teplota: 36.8°C, Výška: 167.0 cm, Hmotnosť: 77.0 kg, BMI: 27.61, Povrch tela: 1.860 m²,
 - **CCDS vén ľavej DK:**
 - Akútna trombóza VIC vľavo. VIE a VFC priechodné
 - Stent vo VIC podľa CT bez kompresie.
 - **Osobná:**
 - Stav po extenzívnej žilovej trombóze ľavej DK 12/2012 (pri May Turner sy + stent VIC vľavo), jeden a pol roka brala antikoagulačnú liečbu.
 - 2018 nevyprovokovaná HŽT VP I.dx + embolia do AP nízke riziko - AKL asi do roku 2020
 - genetika trombofilných stavov negat
- RA: bez TE príhod,
LA: dlhodobo neužívala žiadne lieky, Včera a dnes po 1 tbl xarelto 15 mg
Ab: negat
AA: zázvor, Actilyse - opuch tváre pri lok TLL 2012, Novalgin – nauzea



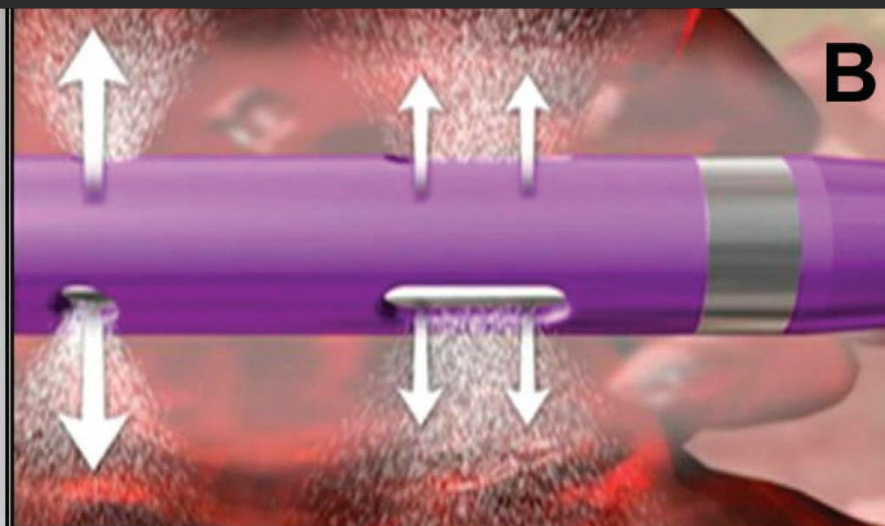


Archív obrazovej dokumentácie NÚSCH a.s.



NÁRODNÝ ÚSTAV SRDCOVÝCH
A CIEVNÝCH CHORÔB, A.S.

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24 h po TL



Po PTA



Archív obrazovej dokumentácie NÚSCH a.s.

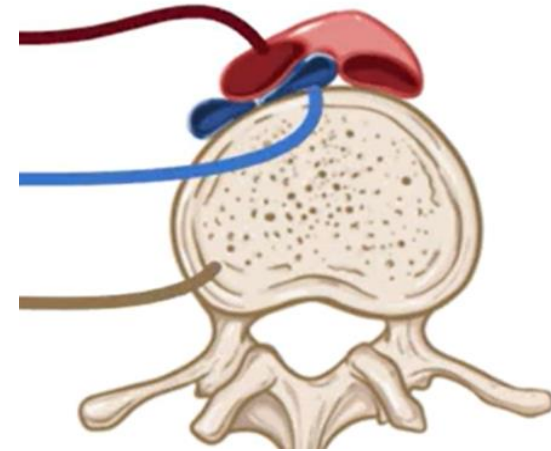


NÁRODNÝ ÚSTAV SRDCOVÝCH
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May Thurner Syndrom (kompresia illickej vény)

- Bežná varianta v populácii
- Vzácnne symptomatologická ĽDK
- Rozdelenie na s/ bez trombózy
- Venózne klaudikácie + CHVI
- Stenting+ koagulácia

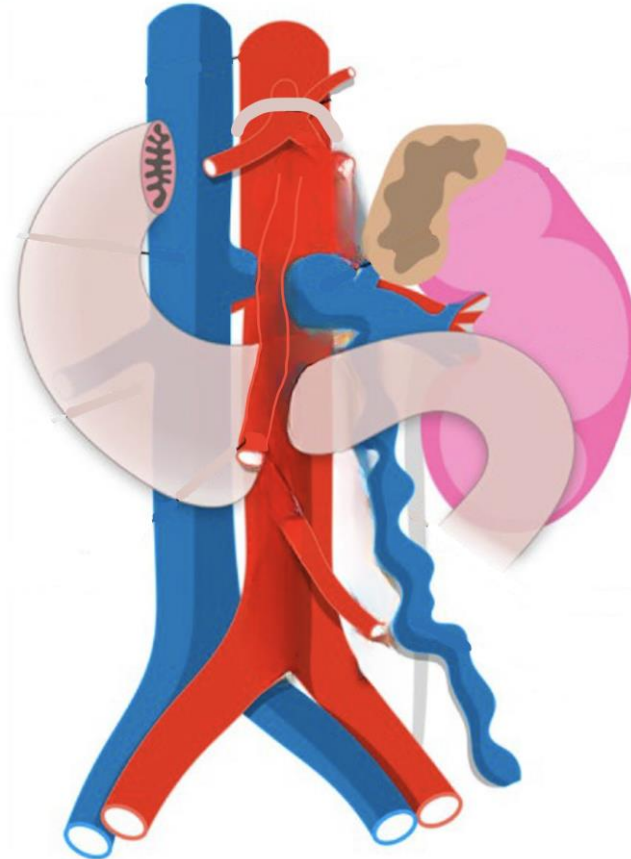


ABDOMINO-PELVIC VASCULAR COMPRESSION SYNDROMES

Náročný a dlhodobo
traumatizovaný pacienti

Častokrát psychicky
vyčerpaný

V prípade viacerých VK
nálezov myslieť na EDS



100 x merať a raz rezať

Centralizácia a
multišpecializačné
konzília

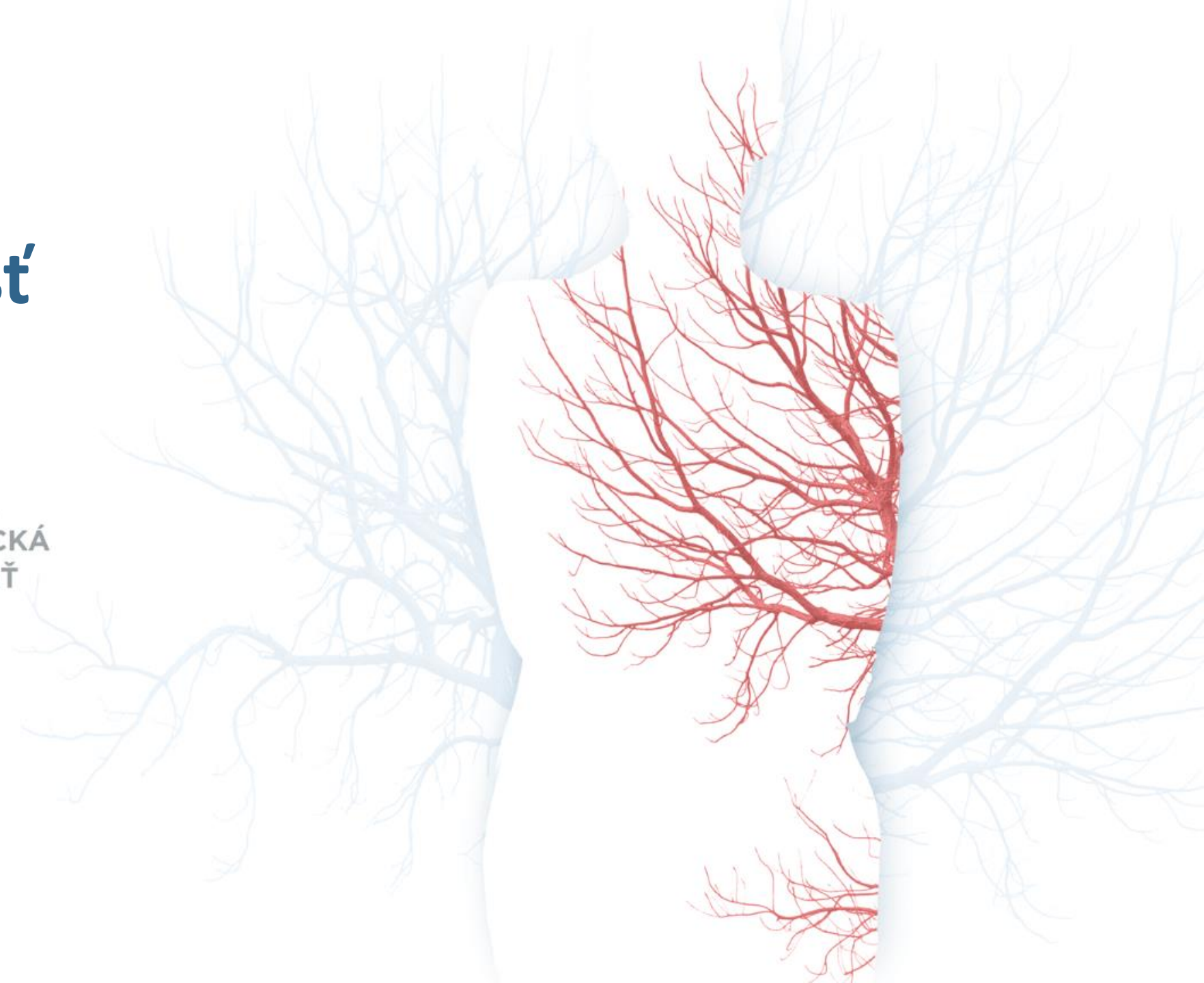
Vyčerpať konzervatívnu
terapiu

Ďakujem za pozornosť



SLOVENSKÁ
ANGIOLOGICKÁ
SPOLOČNOSŤ

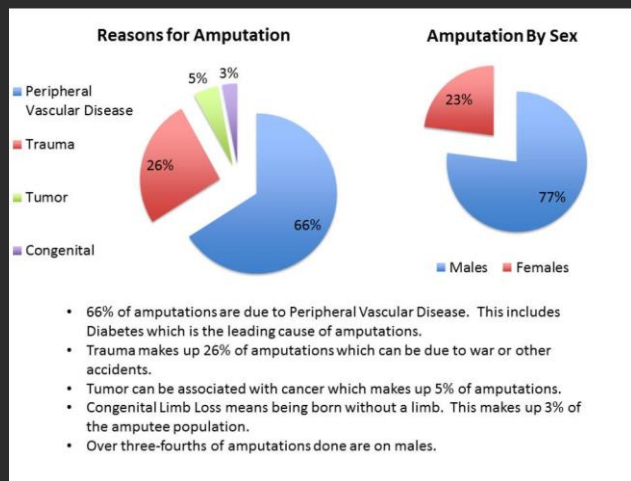
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Každý pacient s pokojevými bolesťami alebo defektom na DK ktorý sa nehojí viac ako 2 týždne má byť referovaný vaskulárnemu špecialistovi.

Recommendations	Class ^a	Level ^b
For limb salvage in patients with CLTI, revascularization is recommended. ^{564,567}	I	B
Early recognition of CLTI and referral to the vascular team are recommended for limb salvage. ^{417,560}	I	C
In patients with CLTI, imaging of the entire affected limb should be considered. ⁵⁶⁰	IIa	C

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lekárska správa + kontakt na
pacienta



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