9 Aprile 2022

Lezione D NEFROLOGIA IN MEDICINA TERRITORIALE

Approccio globale e Gestione complessiva dei pazienti con ridotta funzionalità renale in presenza di ipertensione, cardiovasculopatie, diabete o semplicemente grandi anziani

UNIVERSITÀ DEGLI STUDI DI MILANO
LA STATALE

Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico
Sistema Socio Sanitario
Regione Lombardia

Agenda

- **- Cosa accade quando il rene si ammala cenni sull'IRC :** concetti generali.
- **L'invecchiamento e la malattia renale: come leggere il decremento del GFR nel tempo**. Quali segni di allarme? Quando inviare dal nefrologo?
- **Disidratazione, acidosi, alterazioni elettrolitiche** di interesse in medicina del territorio: il ruolo del rene, il ruolo dei farmaci.
- **Valutazione dei segni nefrologici e del loro significato clinico**
- **Insufficienza renale acuta**
- **Diabete e patologia renale**
- **Novità in nefroprotezione**

Which are the main reasons to consult a nephrologist?

Patient referred signs

- Macroematuria
- Edema
- Alterations in the general state

Patient referred symptoms

- Renal colic
- Lower back pain
- Dysuria

After a geneal examination

- Hypertension
- Proteinuria
- Microematuria

REDUCTION OF RENAL FUNCTION

Urine analysis

Edema of renal origin

Hypertension of renal origin

Renal cystis

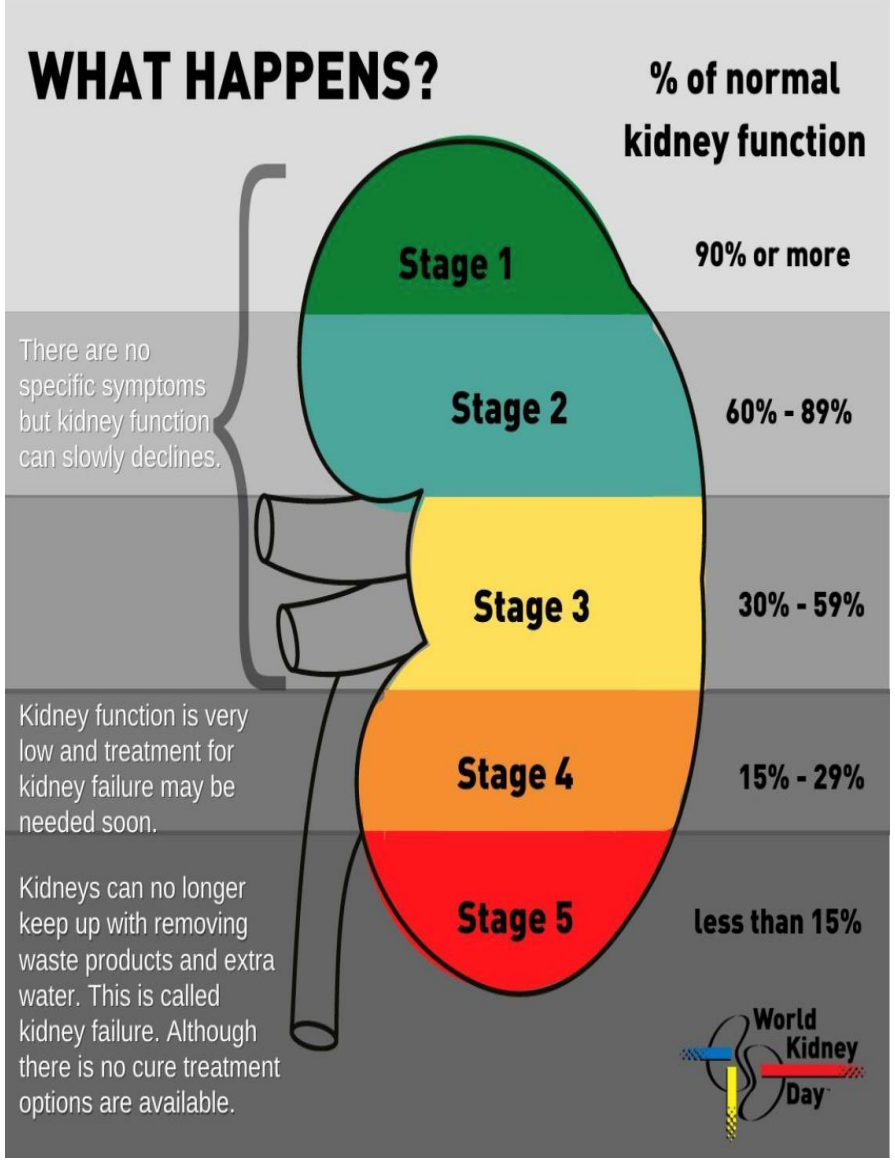
Urolithiasis

- Urine analysis
- Edema of renal origin
- Hypertension of renal origin
- Renal cystis
- Urolithiasis

Stages of CKD

STAGES OF CHRONIC KIDNEY DISEASE		GFR* mL/min	% OF KIDNEY FUNCTION
Stage 1	Kidney damage with **normal** kidney function	90 or higher	90–100%
Stage 2	Kidney damage with **mild loss** of kidney function	89 to 60	89–60%
Stage 3a	**Mild to moderate** loss of kidney function	59 to 45	59–45%
Stage 3b	**Moderate to severe** loss of kidney function	44 to 30	44–30%
Stage 4	**Severe** loss of kidney function	29 to 15	29–15%
Stage 5	Kidney failure	Less than 15	Less than 15%

* Your GFR number tells you how much kidney function you have. As kidney disease gets worse, the GFR number goes down.



2018 National Kidney Foundation

The assessment of glomerular function

- ***Quantitative evaluation***
  - **GFR**

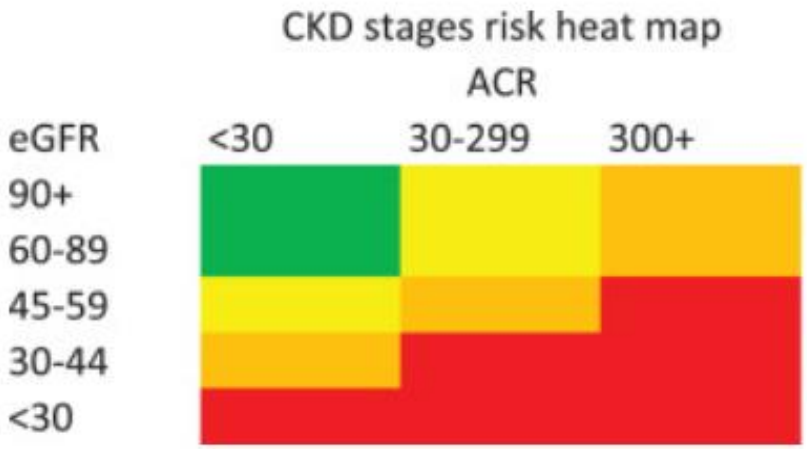
- ***Qualitative evaluation***
  - **Proteinuria**
  - **Urine analysis**

Stages of CKD

Prognosis of CKD by GFR and albuminuria categories: KDIGO 2012

GFR categories (ml/min/1.73 m²) Description and range			Persistent albuminuria categories Description and range		
			A1	**A2**	**A3**
			Normal to mildly increased	Moderately increased	Severely increased
			< 30 mg/g < 3 mg/mmol	30–300 mg/g 3–30 mg/mmol	> 300 mg/g > 30 mg/mmol
G1	Normal or high	≥ 90			
G2	Mildly decreased	60–89			
G3a	Mildly to moderately decreased	45–59			
G3b	Moderately to severely decreased	30–44			
G4	Severely decreased	15–29			
G5	Kidney failure	< 15			

Incorporating kidney disease measures into cardiovascular risk prediction: Development and validation in 9 million adults from 72 datasets



CKD Stages Risk ratio, Median (IQI)	Risk ratio of ASCVD "patch" to recalibrated	Risk ratio CVM "patch" to recalibrated SCORE
No CKD	1.00 (0.87, 1.17)	0.98 (0.85, 1.06)
CKD at moderate risk	1.21 (0.98, 1.46)	1.37 (1.14, 1.69)
CKD at high risk	1.24 (1.10, 1.54)	1.86 (1.48, 2.44)
CKD at very high risk	1.55 (1.37, 1.81)	2.64 (1.89, 3.40)

Fig. 1 Enhancement of ASCVD and CVM risk by CKD status. ACR: urine albumin to creatinine ratio; ASCVD: atherosclerotic cardiovascular disease; CKD: chronic kidney disease; CVM: cardiovascular disease mortality; eGFR: estimated glomerular filtration rate. eGFR in ml/min/1.73m^2 and ACR in mg/g.

Domanda 2.

In che casi studiate la proteinuria nei vostri pazienti?

1) .....

1) .....

1) .....

Proteinuria

▣ *Dipstick:*

- *The albumin reagent strip test is based on the effect of albumin on a buffer (tetrabromophenol blue), which causes a* ***change in pH proportional to the concentration of the albumin*** *itself.*

- *The pad changes color, according to the pH changes induced by the albumin.*

- ***The strip is sensitive to albumin but has a very low sensitivity to other proteins*** *(tubular proteins and light-chain Immunoglobulins);*

- **Limit of detection 0.25-0.30 g/l**
  - **False pos: pH > 7.0 or hematuria or UTI**
  - **False neg: diluted urine**

Proteinuria

▣Albuminuria

- ■Urinary-Albumin ≥ 30 mg/day
  - Mild 30 mg - 300mg/ day
  - Moderate-severe > 300 mg/day

Albuminuria/Creatininuria

Albuminuria categories in CKD		
Category	**ACR (mg/g)**	**Terms**
A1	< 30	Normal to mildly increased
A2	30-300	Moderately increased*
A3	> 300	Severely increased**

*Relative to young adult level. **ACR 30-300 mg/g for > 3 months indicates CKD.**
**Including nephrotic syndrome (albumin excretion ACR > 2220 mg/g)

2018 National Kidney Foundation

▣Proteinuria:

- ■ > 0.200 g/day
  - Low 0.200- 1.0 g/day
  - Mild 1.0-3.5 g/day
  - Severe (nephrotic) >3.5 g/day

Proteinuria

Pathologic proteinuria

Overflow Proteinuria
Due to massive excretion of a systemic low molecular weight protein

- Multiple Myeloma (Bence-Jones Proteins)
- Myelo-monocytic leukemia (Lysozyme)
- Rhabdomyolysis (Myoglobin)
- Intravascular Hemolysis (Hemoglobin)

Glomerular Proteinuria
Due to impairment of Glomerular Basement Membrane (GBM)

- Primary Glomerulonephritis
- Secondary Glomerulonephritis
- Diabetic Nephropathy
- Hypertension
- Chronic Kidney Disease

Tubular proteinuria
Due to tubular dysfunction and impaired reabsorption of low molecular weight proteins

- Tubulo-interstitial nephritis

Post-renal proteinuria

- Urinary tract tumors,
- Urinary tract infections
- Urinary tract severe inflammation

Domanda 3.

In che casi richiedete l’esame delle urine?

1) …..

1) …..

1) …..

Domanda 4.

Avete mai richesto la valutazione del sedimento urinario di II livello?

1) Mai
2) In casi selezionati
3) Non sapevo che fosse disponibile

Urinalysis

Urinalysis is one of the key tests to evaluate kidney and urinary tract disease

The use of an *early morning* urine sample is suggested by the Kidney Disease Improving Global Outcomes (KDIGO) guideline, especially for the measurement of albumin

General and microscopic characteristics

- ***Colour*** **depending on the concentration of the urochrome. Abnormal changes in color can be caused by pathologic conditions, drugs, or foods.**
- ***Appearance*** **normally transprent and odorless**
- **Specific *gravity weight (PS)* of a volume of urine compared with the weight of the same volume of distilled water: depends on the mass and number of the dissolved particles.**
- ***pH*** **reflects the presence of hydrogen ions (H+)**
- ***Proteinuria***
- ***Sediment***
  - **RC**
  - **WC**
  - **Casts**
  - **crystals**

Urine sediment examination is an integral part of urinalysis!!

Urinary microscopic evaluation

Red blood cells

Urinary microscopic evaluation

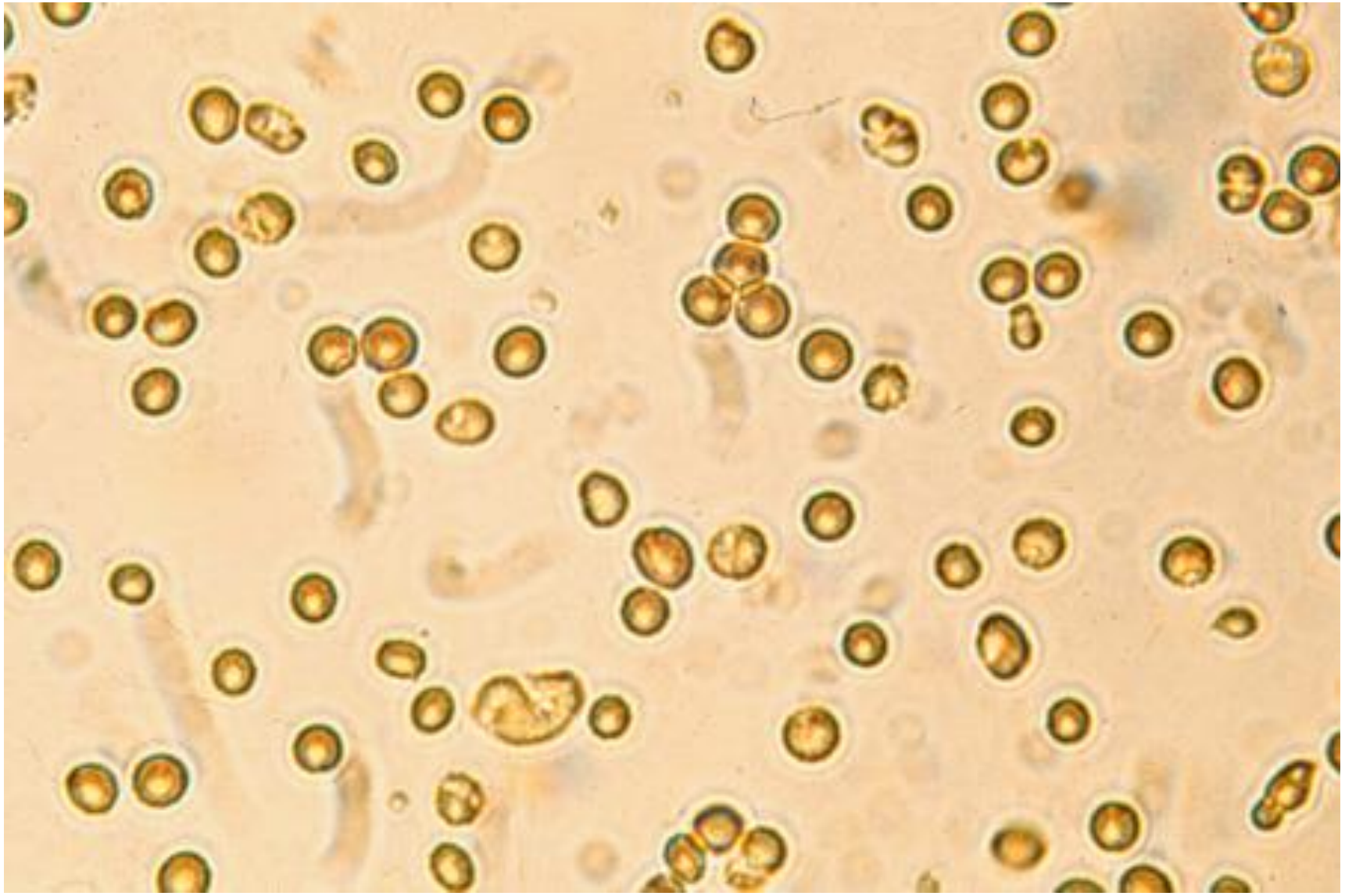
Urinary erythrocytes have a mean diameter of approximately 6 µm:

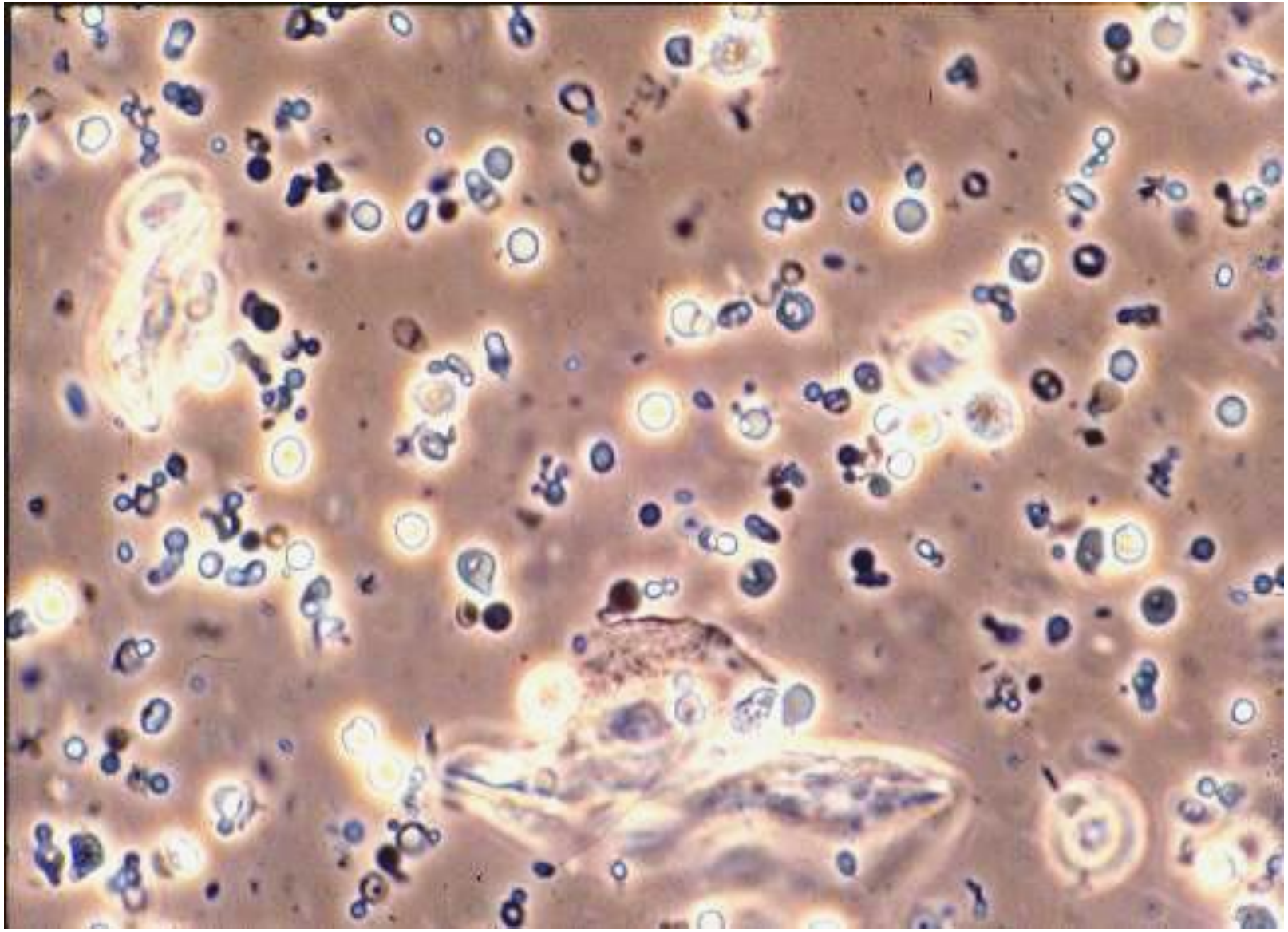
- ***isomorphic,*** **with regular shapes and contours, derived from the urinary excretorysystem;**
- ***dysmorphic,*** **with irregular shapes and contours, which are of glomerular origin**

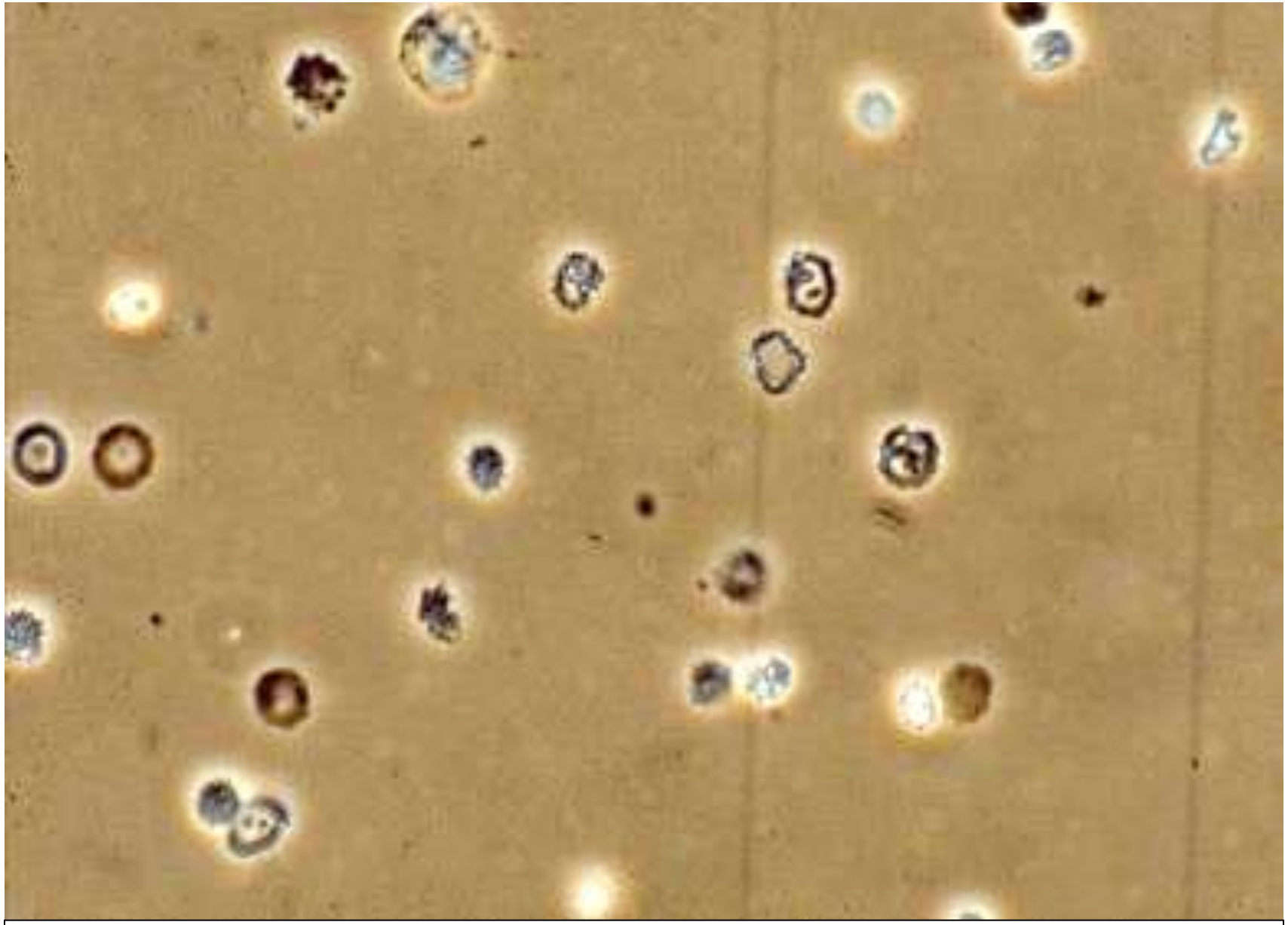
Glomerular hematuria

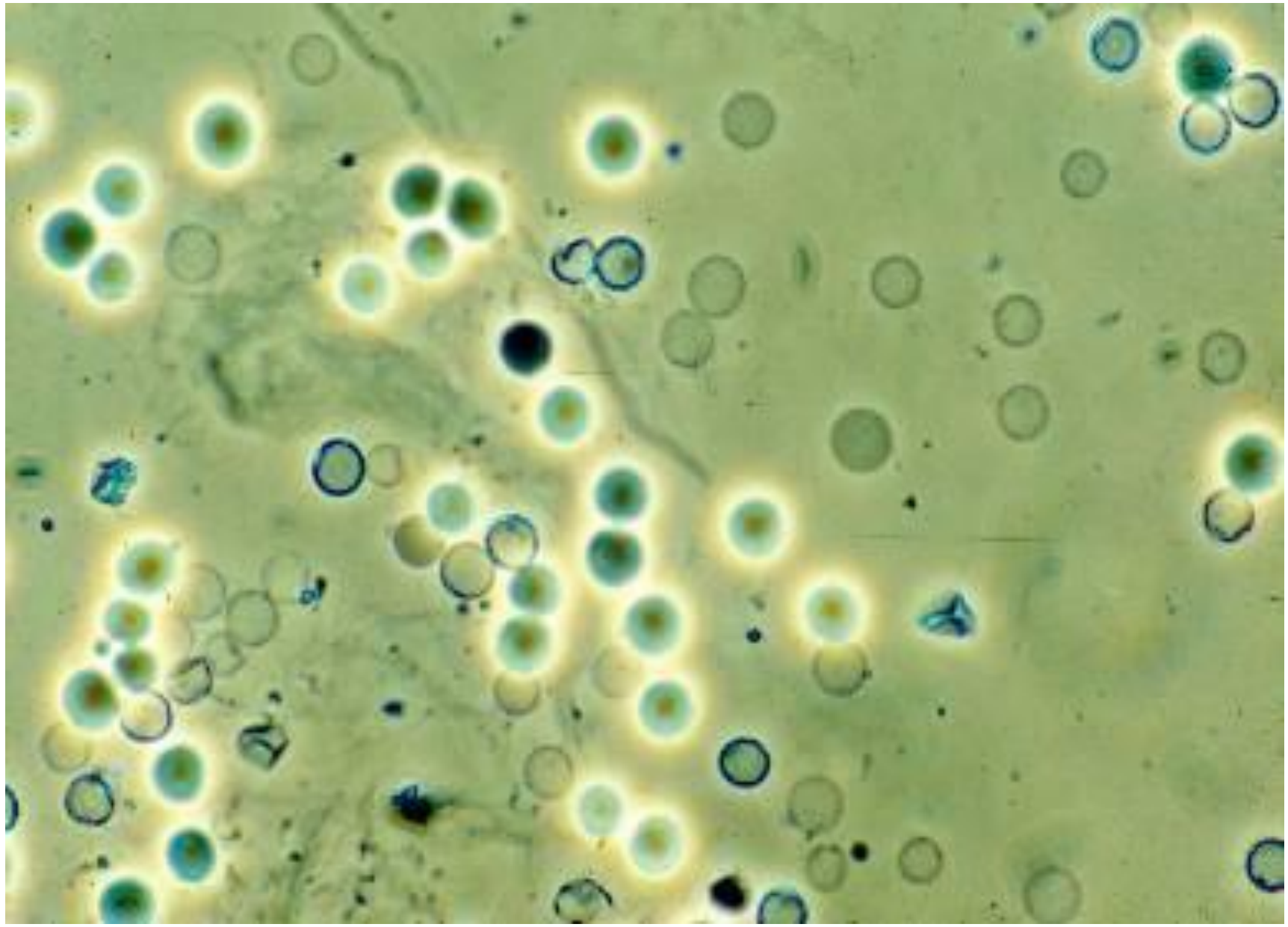
- 40% or more dysmorphic erythrocytes and/or
- 5% or more acanthocytes and/or
- one or more red blood cell casts/50 lpf (×160).

- **Hematuria**
  - **Microscopic: > 3-4 RBC x field**
  - **Macroscopic**
  - **Continuous**
  - **Episodic/sporadic**

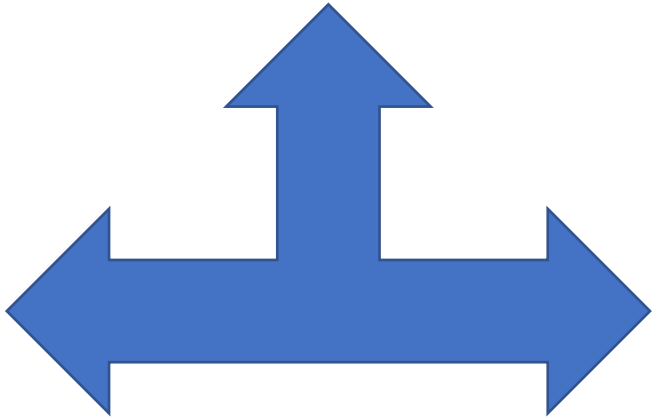








Top 5 Natural Remedies for UTIs
1 D-mannose
2 Vinegar sits baths
3 Probiotics
4 Unsweetened cranberry juice or supplements
5 Uva ursi



UROLOGY

Urinary microscopic evaluation

WBC

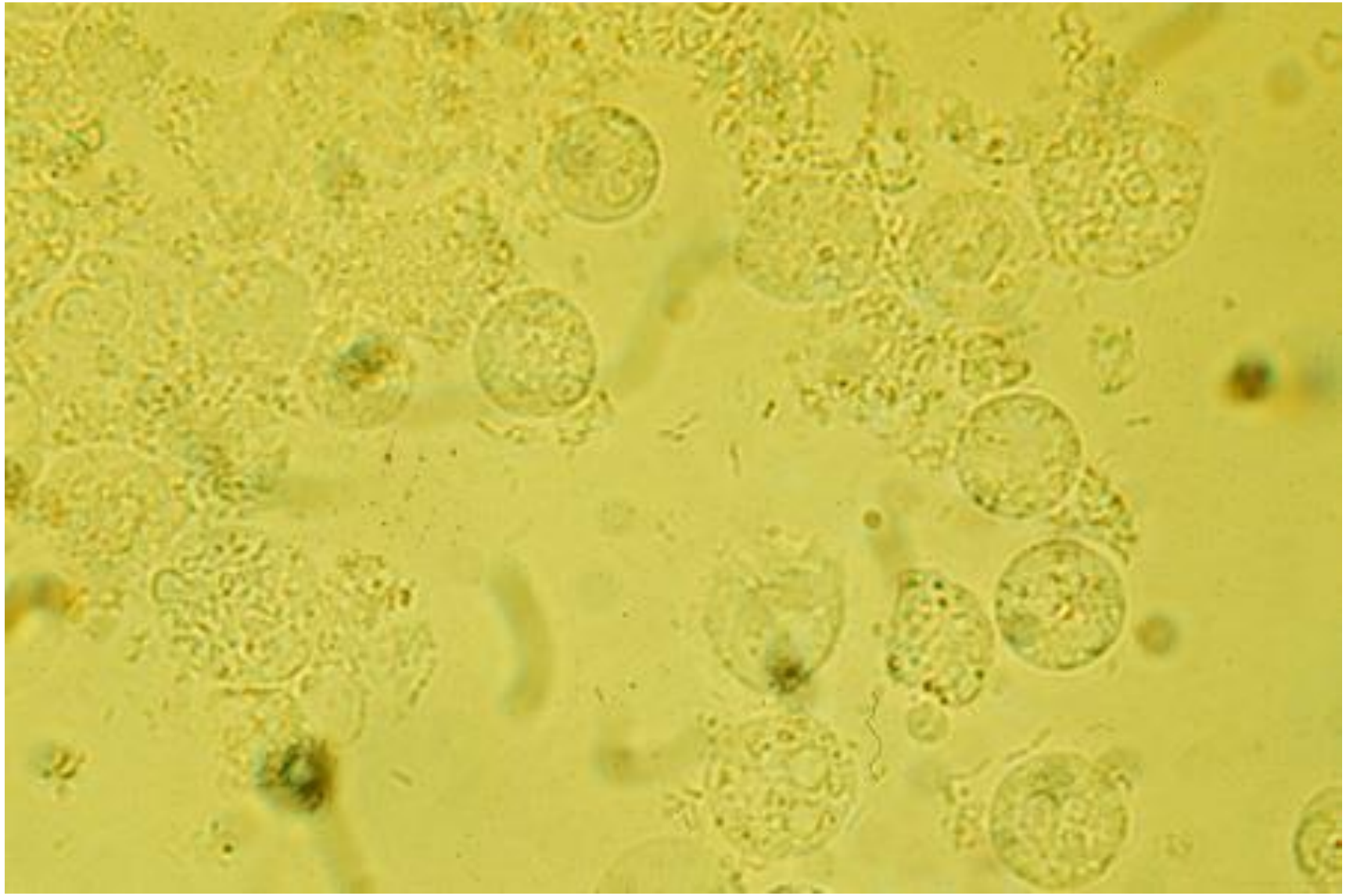
Urinary microscopic evaluation

- N*eutrophils:* average diameter of 10 µm; granular cytoplasm and lobulated nucleus; Found in **UTI, acute interstitial nephritis (rarely), urine contamination (genital secretions).**

- *Eosinophils:* once considered a marker of acute allergic interstitial nephritis (not specific) May be present in various types of **GN, prostatitis, chronic pyelonephritis, urinary schistosomiasis, and cholesterol embolism**.

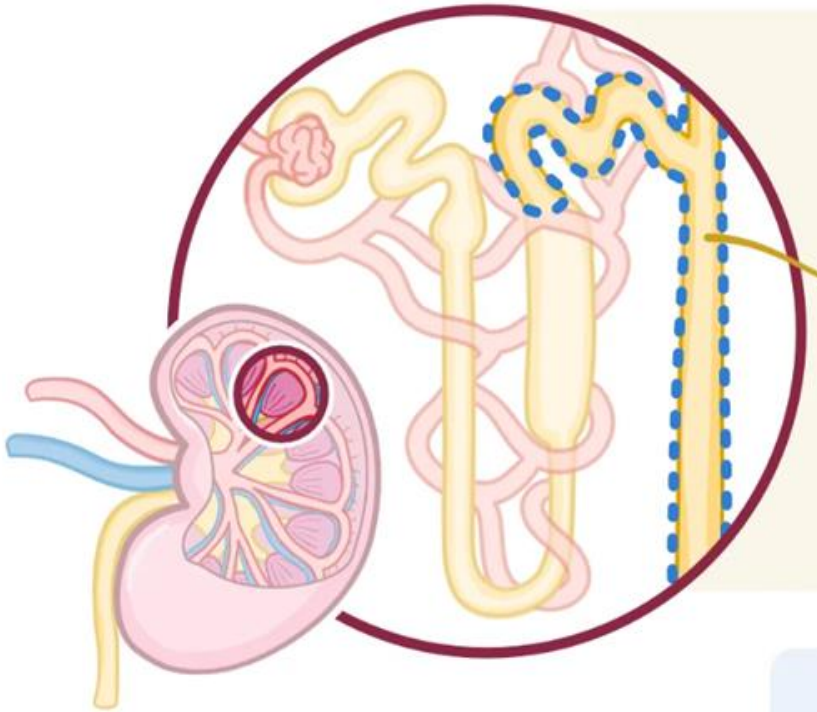
- *Lymphocytes,* may be present in **acute cellular rejection in KTx**;

- *Macrophages:* mononucleated or multinucleated cells of variable size (13 to 95 µm in diameter). **Present in nephrotic syndrome**. Lipid droplets, appearing as “oval fat bodies.”



Granulocytes with even more accentuaded swelling
and degeneration (400x)

Casts



BACKGROUND

* **URINARY CASTS** – MICROSCOPIC CLUSTERS of PARTICLES WRAPPED in TAMM-HORSFALL PROTEIN MATRIX
  - FORMED in DISTAL CONVOLUTED TUBULE and COLLECTING DUCT
  - CLINICAL INDICATORS of KIDNEY CONDITIONS
* HYALINE CASTS – FOUND in HEALTH and PATHOLOGY
  - TREATMENT NOT USUALLY REQUIRED

DIAGNOSIS

* SEDIMENT MICROSCOPY
* **HYALINE CASTS** = CLEAR, TINY TUBULE-SHAPED PARTICLES
  - EASILY MISSED (LOW REFRACTIVE INDEX)
  - BETTER IDENTIFIED USING STAINS, REDUCED or DIM LIGHTING , and PHASE CONTRAST MICROSCOPY

CAUSES

* ↑ TAMM-HORSFALL PROTEIN
* STRENUOUS EXERCISE
* DIURETIC MEDICATION USE
* SEVERE VOMITING or FEVER
* WITH OTHER TYPES of CASTS
  - ACUTE KIDNEY INJURY

TYPES of URINARY CASTS

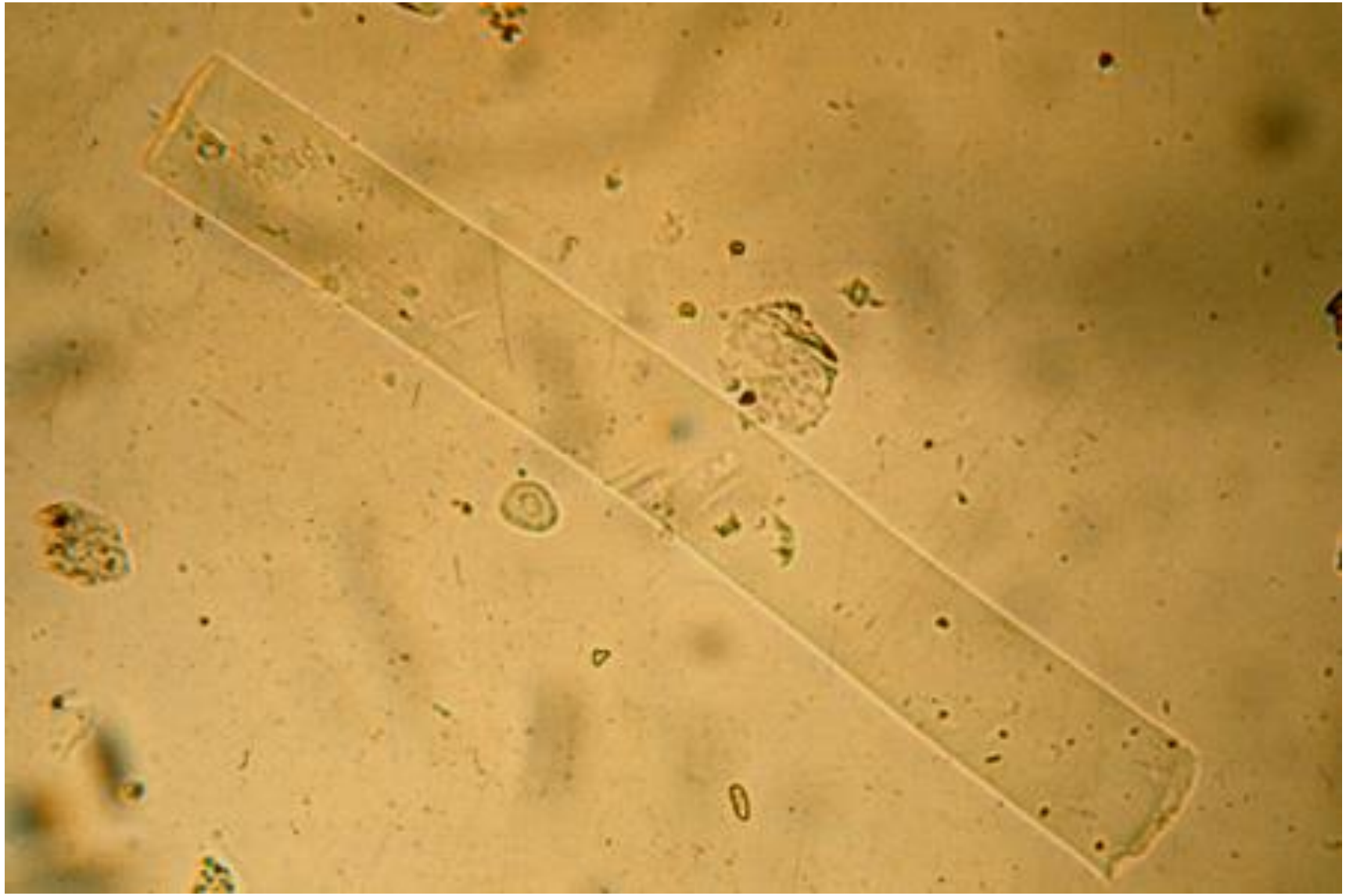
CELLULAR	NON-CELLULAR
* RENAL TUBULAR EPITHELIAL CASTS	* HYALINE CASTS
* RED BLOOD CELL (RBC) CASTS	* GRANULAR CASTS
* WHITE BLOOD CELL (WBC) CASTS	* FATTY CASTS
	* WAXY CASTS

OSMOSIS.org

Urinary Casts

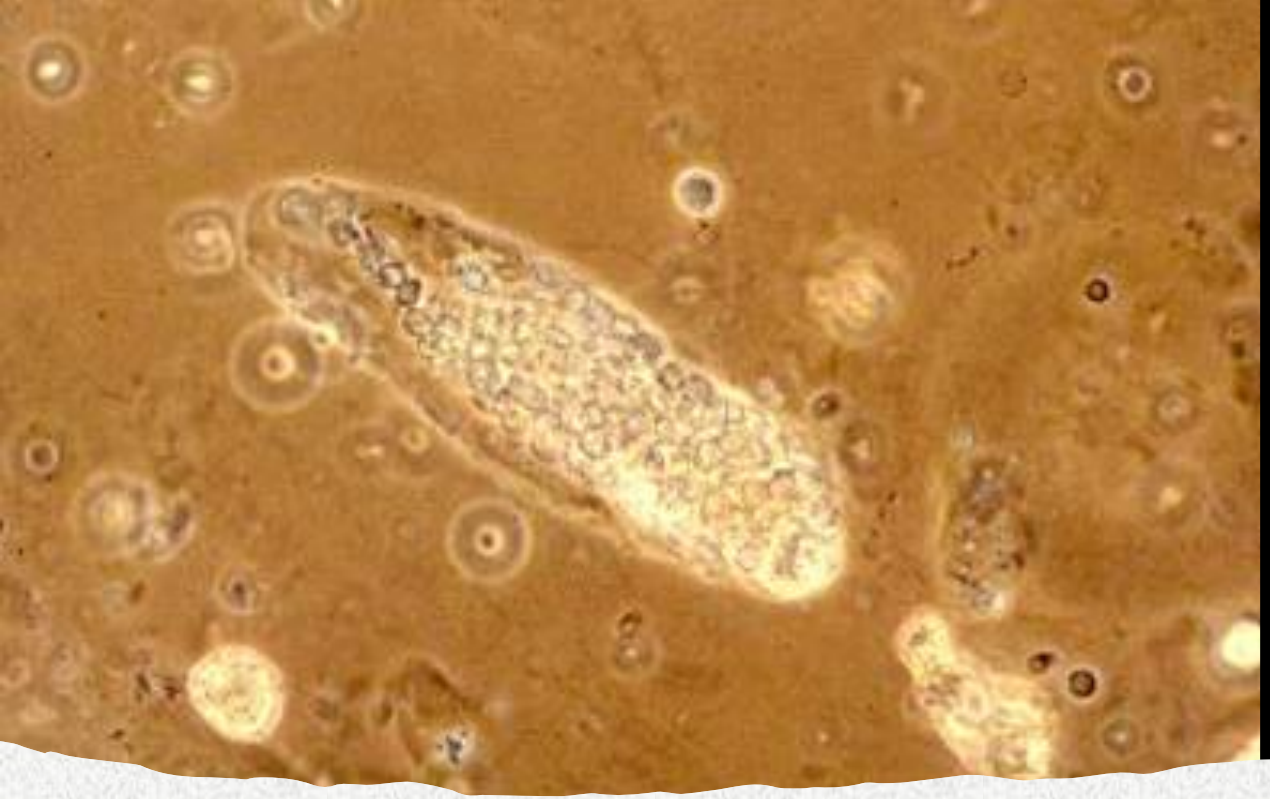
Cast	Main Clinical Associations
Hyaline	Normal individual; renal disease
Hyaline-granular	Normal individual; renal disease
Granular	Renal disease; acute tubular necrosis
Waxy	Renal disease with possible functional impairment
Fatty	Proteinuria; nephrotic syndrome
Erythrocyte	Glomerular hematuria; proliferative/necrotizing GN; acute interstitial nephritis
Leukocyte	Acute interstitial nephritis; acute pyelonephritis; proliferative GN
Renal tubular epithelial cell (so-called epithelial casts)	Acute tubular necrosis; acute interstitial nephritis; proliferative GN; nephrotic syndrome
Hemoglobin	Same as for erythrocyte cast; hemoglobinuria caused by intravascular hemolysis
Myoglobin	Rhabdomyolysis
Bilirubin	Jaundice caused by increased direct bilirubin
Bacterial, fungal	Bacterial or fungal infection in the kidney
Containing crystals	Renal stone disease; crystalline nephropathies
Mixed	According to components present in the cast

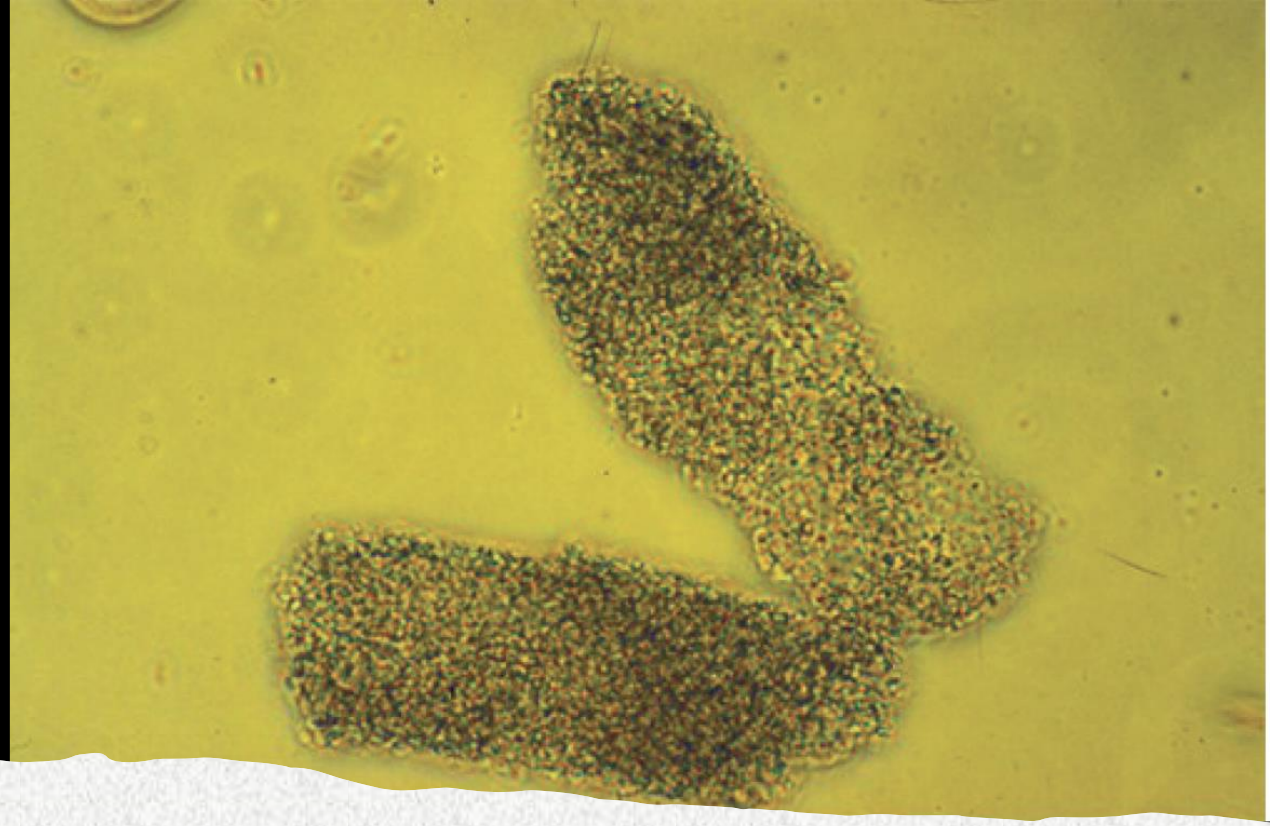
Cylindrical elements of variable diameter and length which form mostly in the distal tubules and collecting ducts of the kidneys.



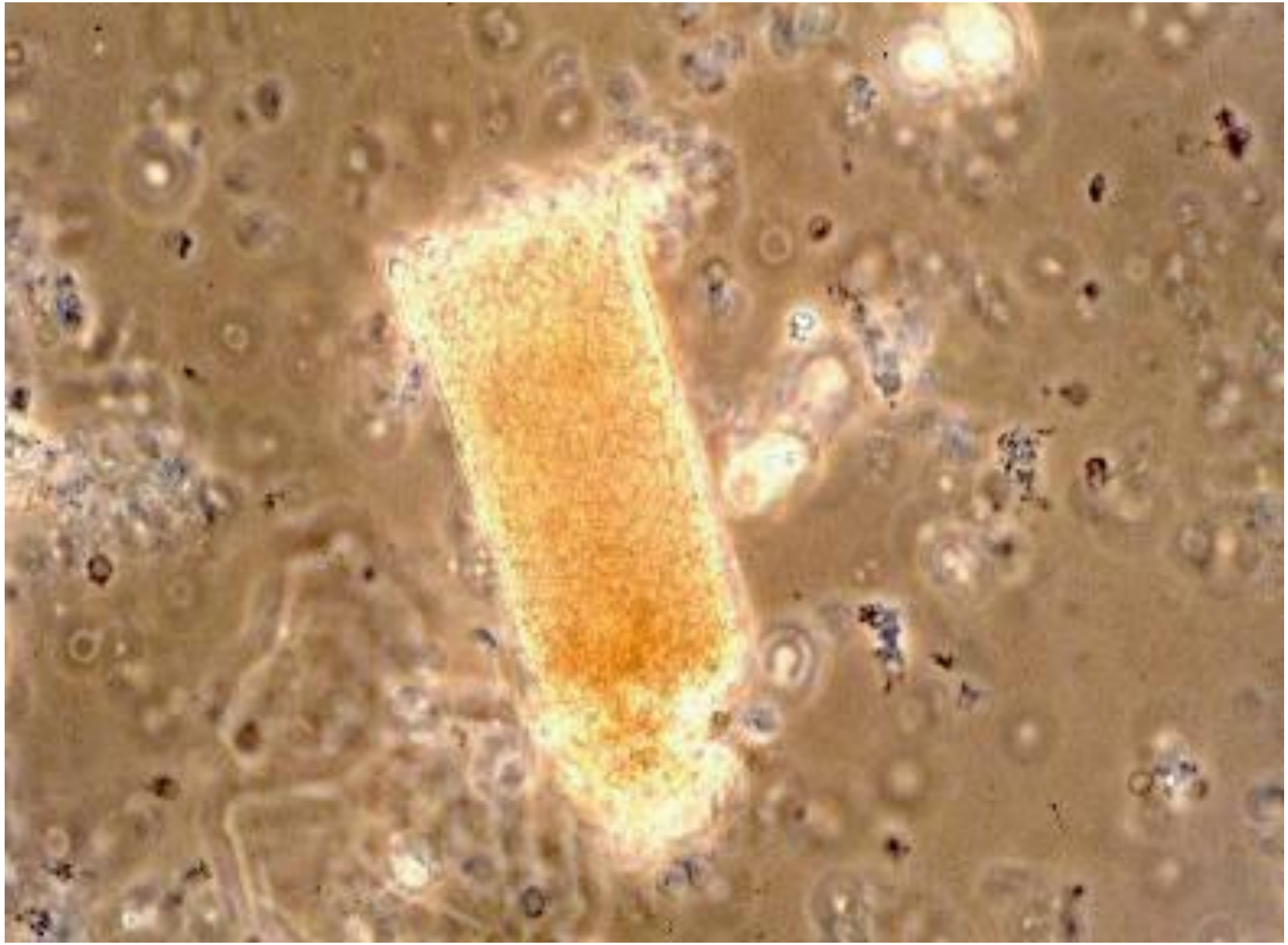
Firm hyaline cast ('glassy' cast).
Elements like this generally point to an anatomical renal lesion. Chance, isolated findings of these casts in old people may indicate nephrosclerosis. (100x)

- *Mixed granular-waxy cast.*
- *Specimens such as this suggest that the granules in these casts can be transformed from large to small, until they become uniformly waxy (small lateral band) (400x)*





ERYTHROCYTE CAST usually considered a marker of glomerular bleeding

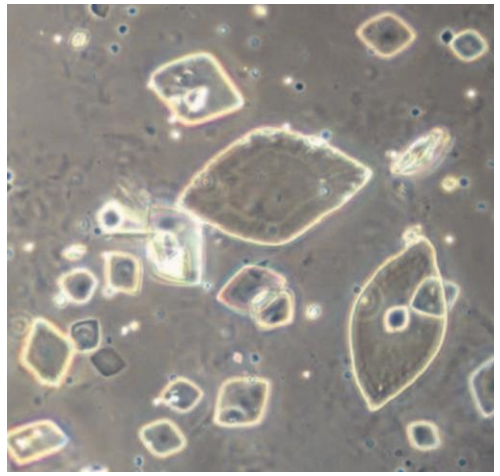


***HAEMOGLOBIN CAST** may derive from the degradation of erythrocytes entrapped within the cast matrix hemoglobinuria, as may occur in intravascular hemolysis.*

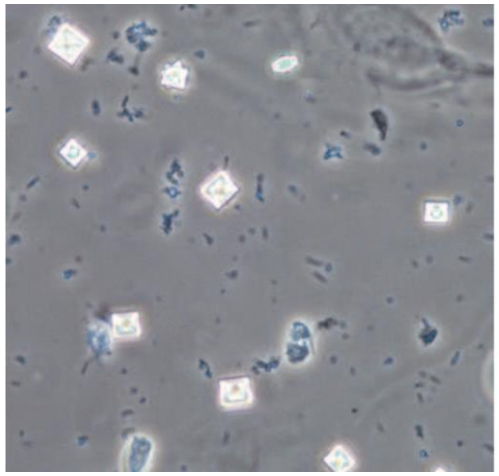
Crystals

Urinary microscopic evaluation

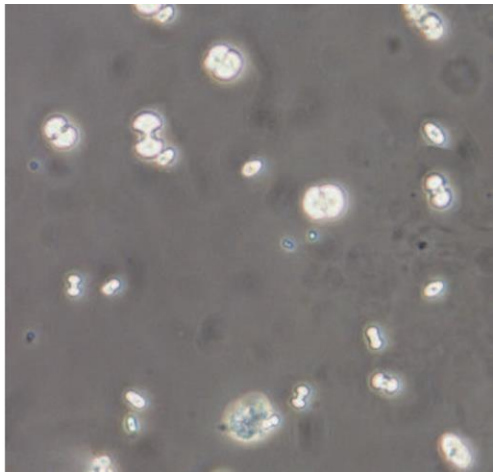
- **Correct identification of urine crystals requires knowledge of crystal morphology, their appearance under polarized light, and urine pH.**



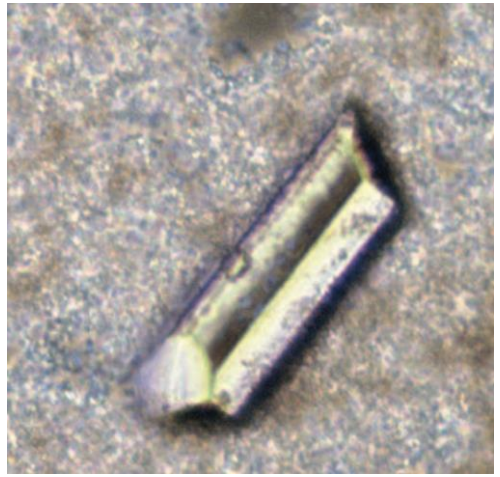
Uric acid
(pH 5.0-5.8)



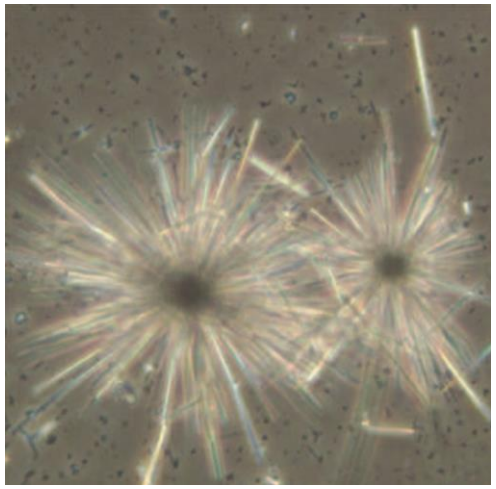
Ca oxalate monohydrated
(pH 5.0-5.8)



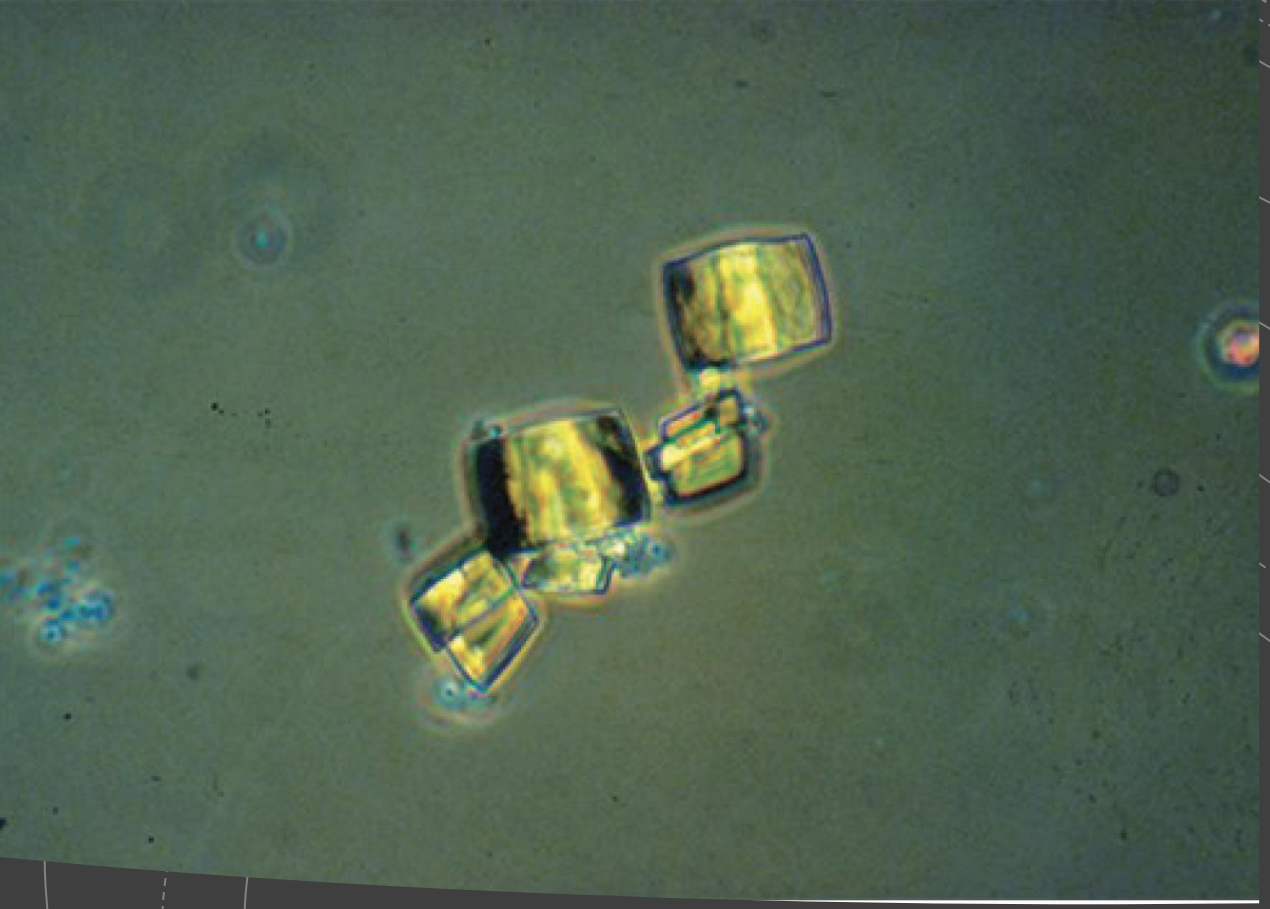
Ca oxalate bi-hydreated
(pH 5.4-6.7)



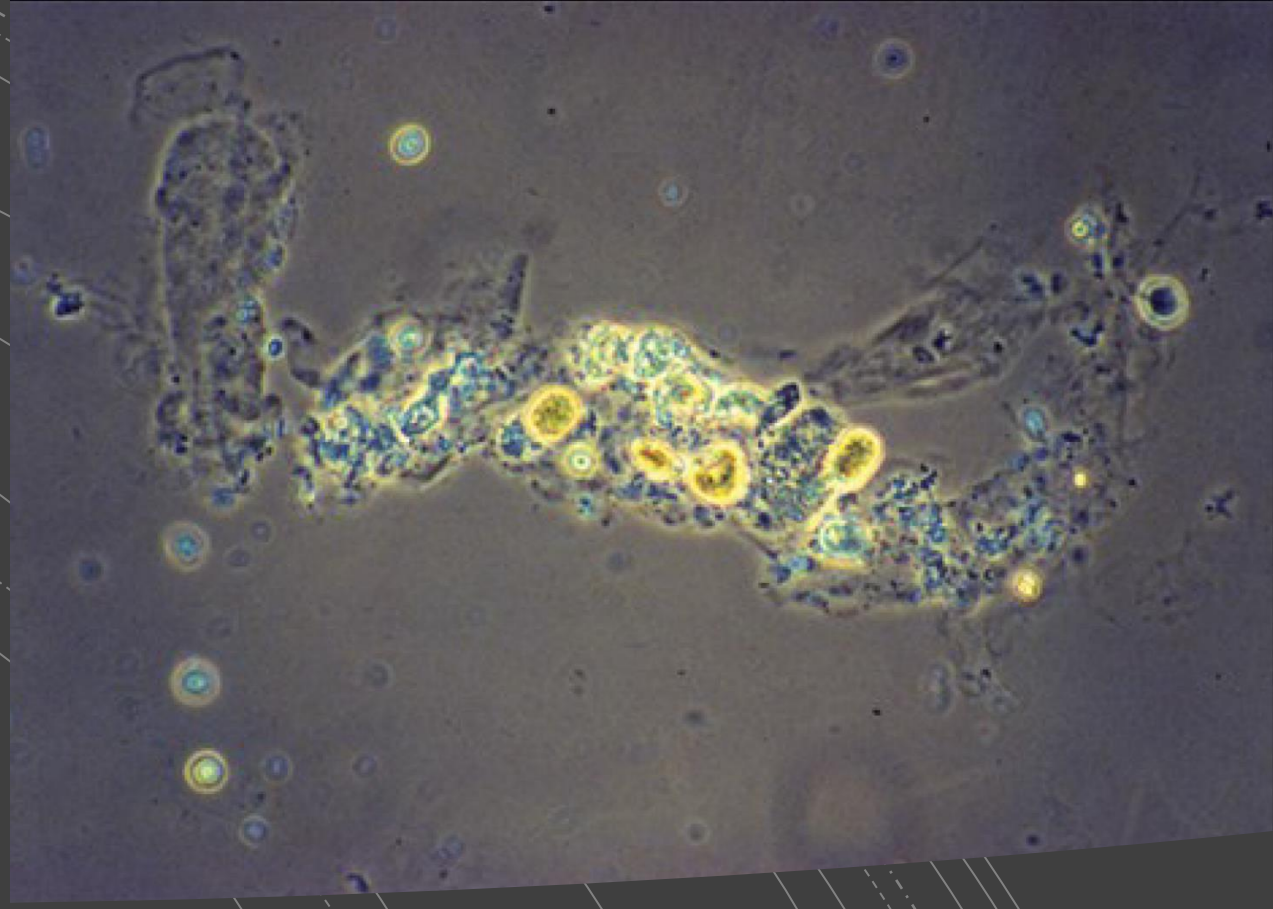
Struvite (magnesium, ammonium, phosphate)
(pH >7.0)



Ciprofloxacin



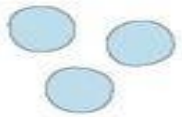
Uric acid
(pH 5.0-5.8)



Struvite (magnesium, ammonium, phosphate)
(pH >7.0)

NORMAL URINE

Squamous Epithelial Cells


RBCs

RBC Cast

WBCs

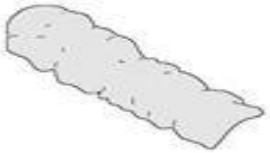
WBC Cast

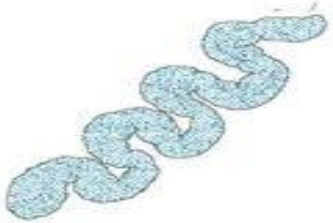
Yeast

Granular Cast

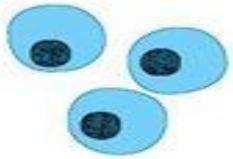
Spermatozoa

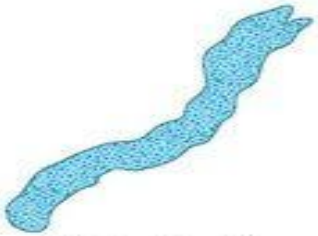
Hyaline Cast


Waxy Cast

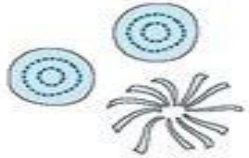

Convoluted Hyaline Cast

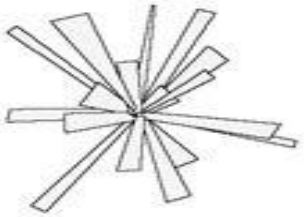
Mucus Threads

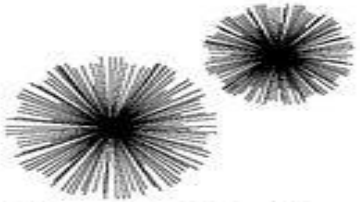

Renal Tubular Epithelial Cells

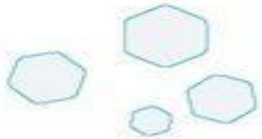

Cylindroids

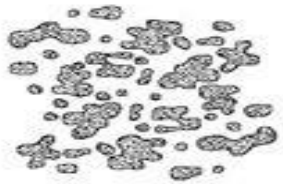
ACID URINE


Leucine Spheres

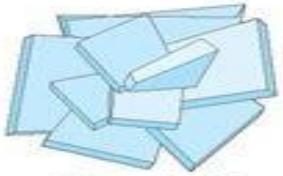

Sodium Urate Crystals


Tyrosine Needles

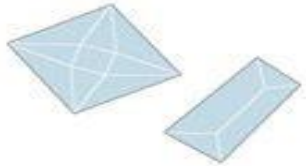

Cystine Crystals

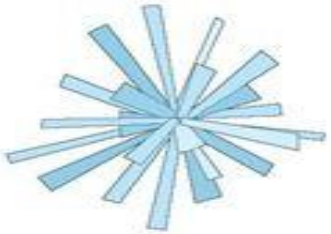

Amorphous Urates

Calcium Oxalate Crystals


Uric Acid Crystals

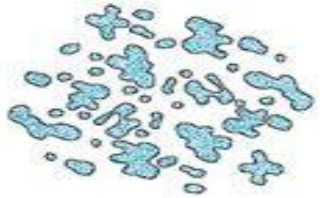
ALKALINE URINE


Triple Phosphate Crystals


Calcium Phosphate Crystals

Ammonium Urate Crystals

Calcium Carbonate Crystals


Amorphous Phosphates

Utility of urinary sediment in principal nephrologic syndromes

Renal Disease	Hallmark	Associated Findings
Nephrotic syndrome (proteinuria: ++++)	Fatty particles	Renal tubular epithelial cells (RTECs) RTEC casts Erythrocytes (absent to moderate number)
Nephritic syndrome (proteinuria: + → ++++)	Erythrocytes (moderate to high number) Erythrocyte/hemoglobin casts	Leukocytes (low to moderate number) RTECs (low number) RTEC casts Waxy casts
AKI with ATN (proteinuria: absent to +)	RTECs RTEC casts Granular casts	Variable according to cause of ATN (e.g., myoglobin casts in rhabdomyolysis, uric acid crystals in acute urate nephropathy, erythrocytes in proliferative/active glomerulonephritis)
Urinary tract infection (proteinuria: absent)	Bacteria Leukocytes	Isomorphic erythrocytes Superficial transitional epithelial cells Struvite crystals (for infections caused by urease-producing bacteria) Leukocyte casts (in renal infection)
Polyomavirus BK infection (proteinuria: absent)	Decoy cells	Decoy cell casts (in BK virus nephropathy)
Urologic diseases (proteinuria: absent)	Isomorphic erythrocytes (low to high number) Leukocytes	Transitional cells (deep, superficial, atypical)

- Urine analysis
- Edema of renal origin
- Hypertension of renal origin
- Renal cystis
- Urolithiasis

Domanda 5.

Quale tra queste è una caratteristica dell’edema di origine renale?

1) È spesso preceduto da episodio trombotico

2) E’ nella maggior parte dei casi localizzato ed associato a incremento del peso corporeo

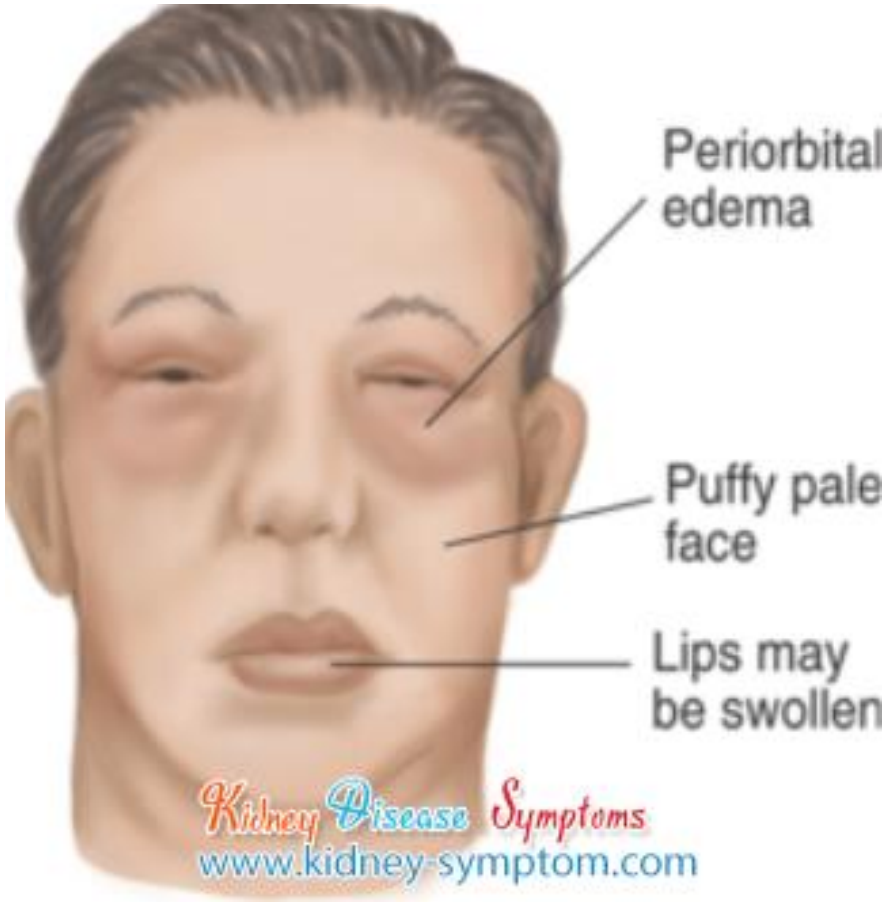
3) E’ bilaterale e simmetrico e frequentemente è associato a incremento del peso corporeo

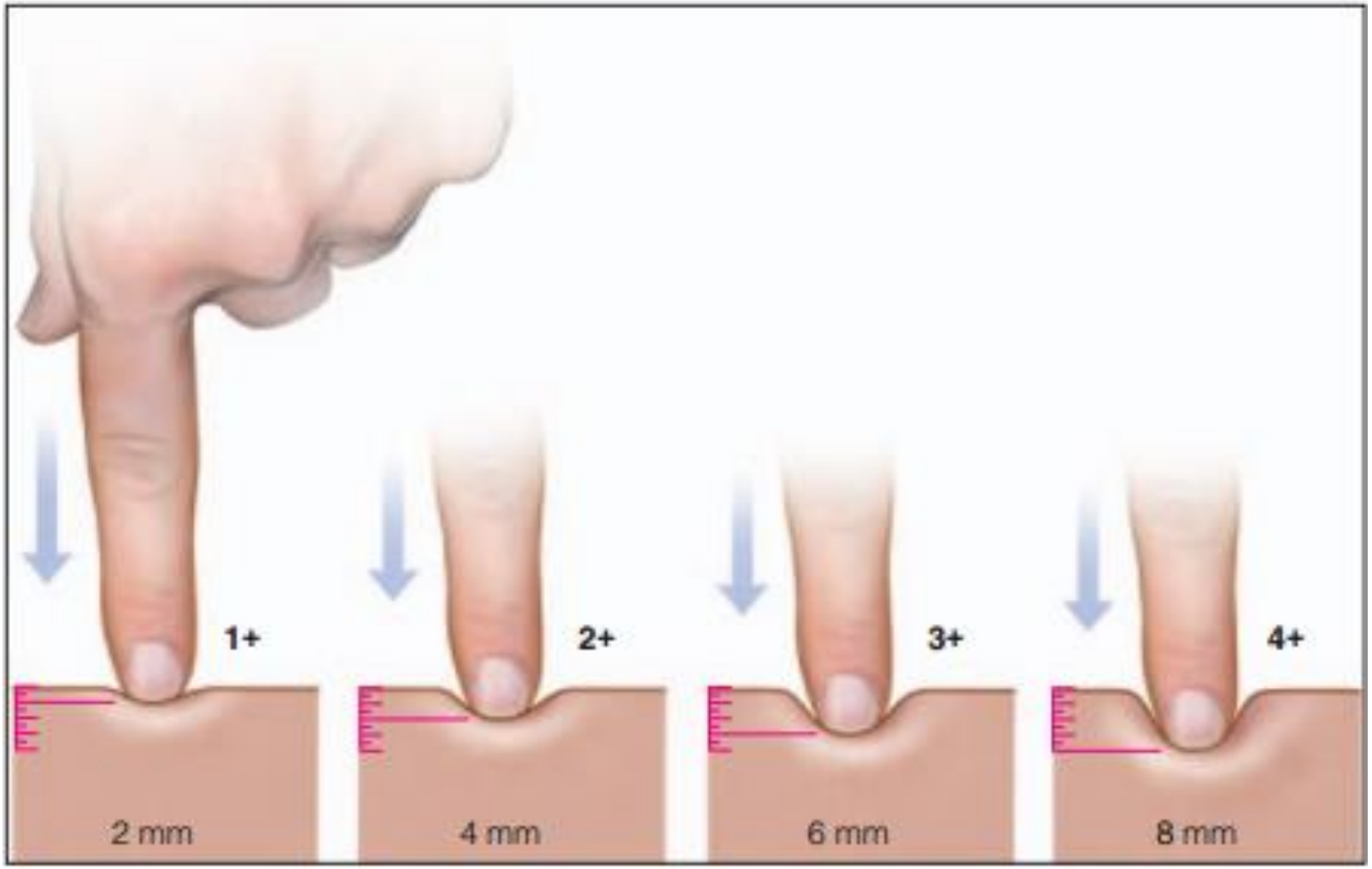
Normal foot and ankle

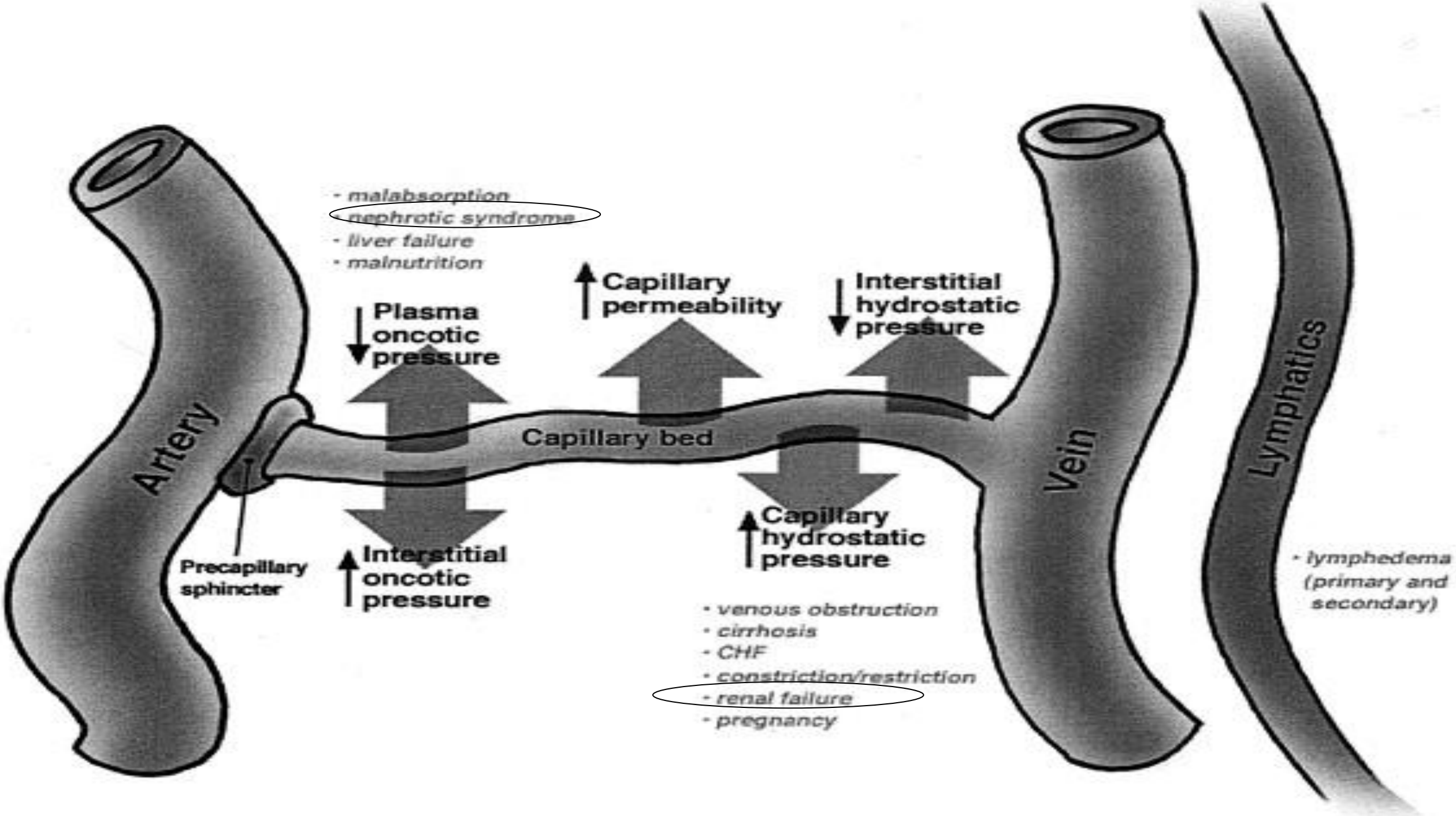
Mild edema

Moderate to severe edema

© SEIF & ASSOCIATES, INC., 2005


Periorbital edema
Puffy pale face
Lips may be swollen
Kidney Disease Symptoms
www.kidney-symptom.com


1+
2+
3+
4+
2 mm
4 mm
6 mm
8 mm


- malabsorption
- nephrotic syndrome
- liver failure
- malnutrition
Plasma oncotic pressure
Capillary permeability
Interstitial hydrostatic pressure
Artery
Capillary bed
Vein
Lymphatics
Precapillary sphincter
Interstitial oncotic pressure
Capillary hydrostatic pressure
- venous obstruction
- cirrhosis
- CHF
- constriction/restriction
- renal failure
- pregnancy
- lymphedema (primary and secondary)

Principal Causes of Generalized Edema: History, Physical Examination, and Laboratory Findings

Organ System	History	Physical Examination	Laboratory Findings
Cardiac	Dyspnea with exertion prominent—often associated with orthopnea—or paroxysmal nocturnal dyspnea	Elevated jugular venous pressure, ventricular (S_3) gallop; occasionally with displaced or dyskinetic apical pulse; peripheral cyanosis, cool extremities, small pulse pressure when severe	Elevated urea nitrogen-to-creatinine ratio common; serum sodium often diminished; elevated natriuretic peptides
Hepatic	Dyspnea uncommon, except if associated with significant degree of ascites; most often a history of ethanol abuse	Frequently associated with ascites; jugular venous pressure normal or low; blood pressure lower than in renal or cardiac disease; one or more additional signs of chronic liver disease (jaundice, palmar erythema, Dupuytren's contracture, spider angiomata, male gynecomastia; asterixis and other signs of encephalopathy) may be present	If severe, reductions in serum albumin, cholesterol, other hepatic proteins (transferrin, fibrinogen); liver enzymes elevated, depending on the cause and acuity of liver injury; tendency toward hypokalemia, respiratory alkalosis; macrocytosis from folate deficiency
Renal (CRF)	Usually chronic: may be associated with uremic signs and symptoms, including decreased appetite, altered (metallic or fishy) taste, altered sleep pattern, difficulty concentrating, restless legs, or myoclonus; dyspnea can be present, but generally less prominent than in heart failure	Elevated blood pressure; hypertensive retinopathy; nitrogenous fetor; pericardial friction rub in advanced cases with uremia	Elevation of serum creatinine and cystatin C; albuminuria; hyperkalemia, metabolic acidosis, hyperphosphatemia, hypocalcemia, anemia (usually normocytic)
Renal (NS)	Childhood diabetes mellitus; plasma cell dyscrasias	Periorbital edema; hypertension	Proteinuria (≥3.5 g/d); hypoalbuminemia; hypercholesterolemia; microscopic hematuria

Abbreviations: CRF, chronic renal failure; NS, nephrotic syndrome.

Harrison's Principles of Internal Medicine,

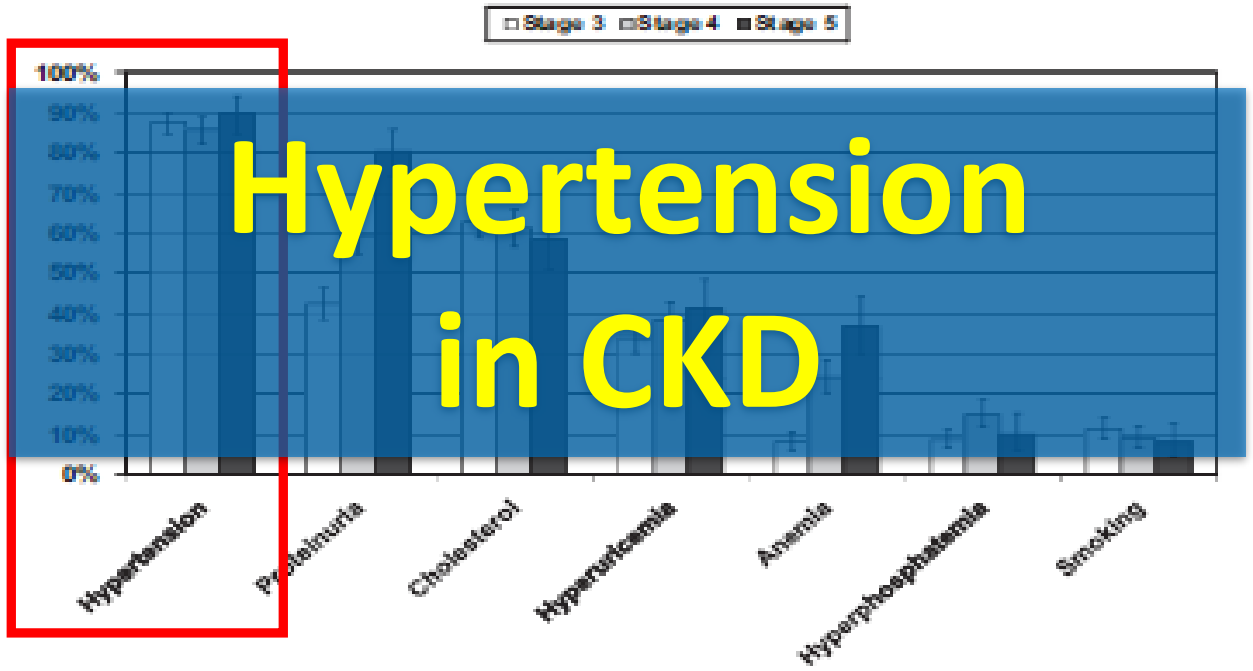
Medications Commonly Associated with Edema

A large number of widely used drugs can cause edema. Mechanisms include renal vasoconstriction (NSAIDs and cyclosporine), arteriolar dilation (vasodilators), augmented renal sodium reabsorption (steroid hormones), and capillary damage.

Class	*Specific medications*
Antidepressants	Monoamine oxidase inhibitors, trazodone
Antihypertensives	Beta-adrenergic blockers, calcium channel blockers, clonidine (Catapres), hydralazine, methyldopa, minoxidil
Antivirals	Acyclovir (Zovirax)
Chemotherapeutics	Cyclophosphamide, cyclosporine (Sandimmune), cytosine arabinoside, mithramycin
Cytokines	Granulocyte colony-stimulating factor, granulocyte-macrophage colony-stimulating factor, interferon alfa, interleukin-2, interleukin-4
Hormones	Androgen, corticosteroids, estrogen, progesterone, testosterone
Nonsteroidal anti-inflammatory drugs	Celecoxib (Celebrex), ibuprofen

- Urine analysis
- Edema of renal origin
- Hypertension of renal origin
- Renal cystis
- Urolithiasis

Prevalence of HT in CKD



De Nicola et al CJASN 2011

Domanda 6.

Quando sospettate una ipertensione di natura nefrovascolare?

1) Quando c’è una ipertensione non controllabile con 4 farmaci anti ipertensivi compresa la terapia diuretica

2) In tutti i pazienti nefropatici ipertesi

3) Solo in presenza di ipertensione associata a proteinuria

Ipertensione nefro-vascolare

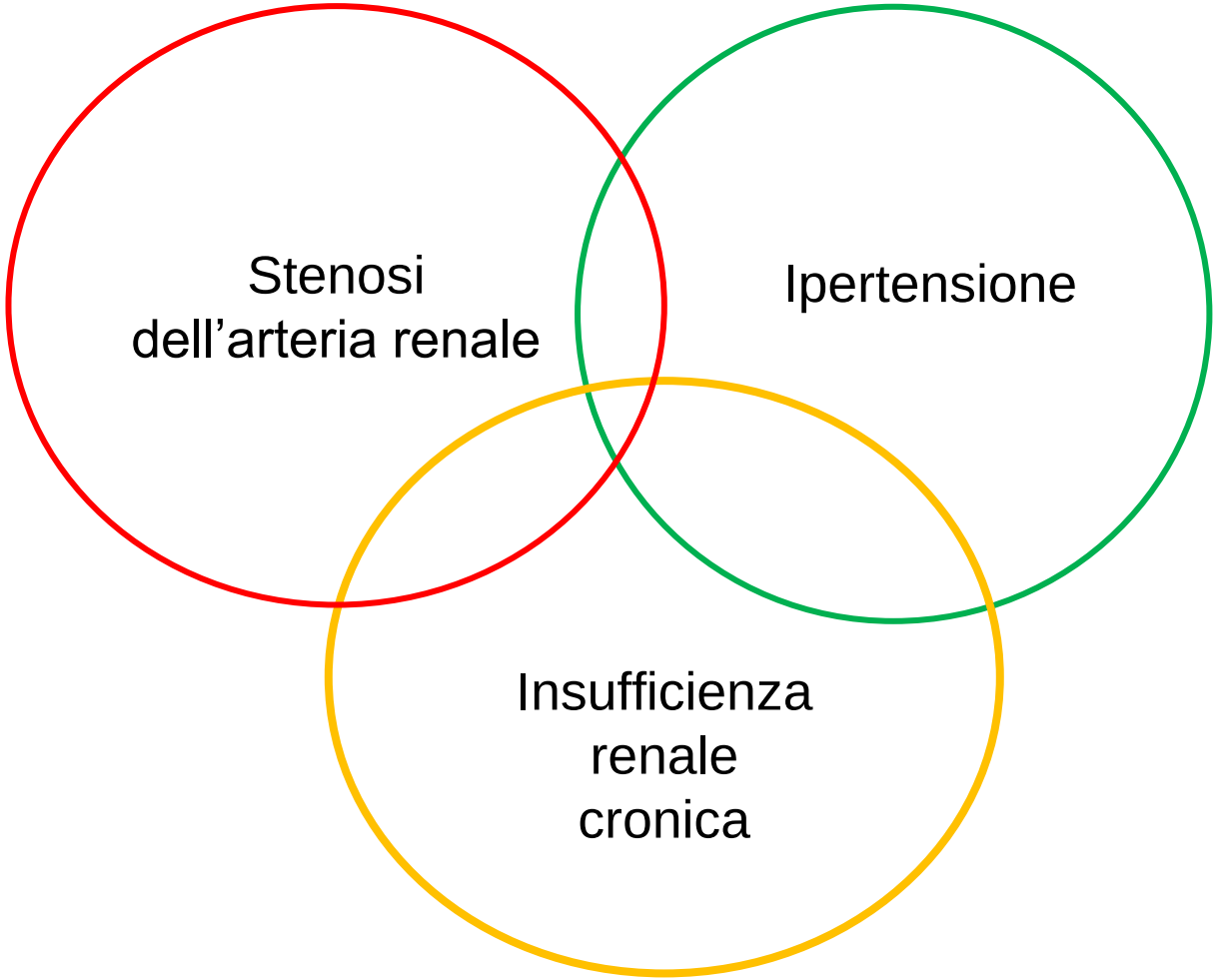
Ipertensione secondaria a difetto di perfusione del parenchima renale da stenosi dell'arteria renale:

1) Aterosclerosi 85-90%

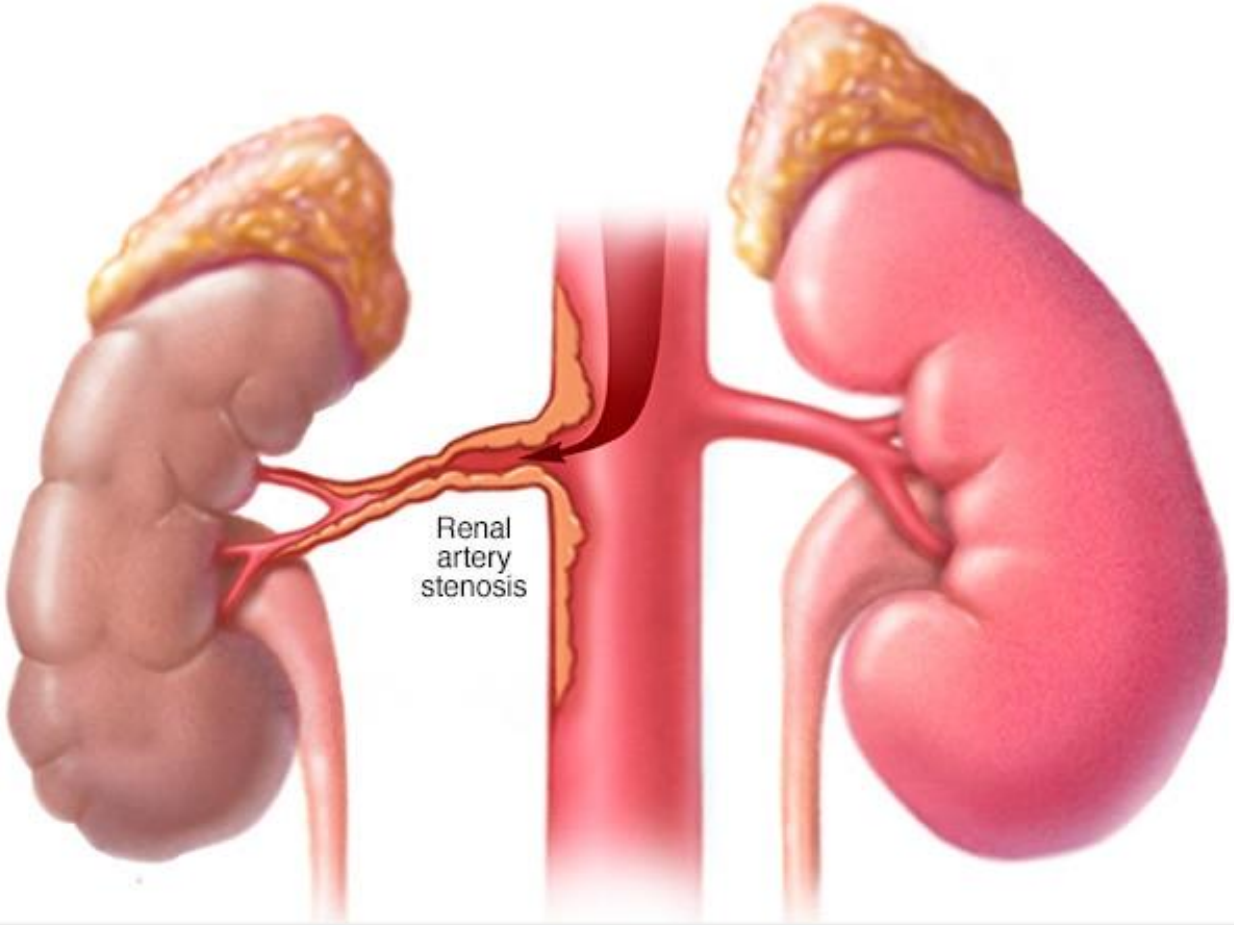
2) Displasia fibro-muscolare 10-15%

Altre cause più rare: compressione intra o perirenale post traumatica (rene di Page), ostruzione ureterale unilaterale, pielonefrite atrofica, ipoplasia renale congenita, coartazione dell'aorta, fistola arterovenosa o MAV intra-renale, ostruzione arteriosa da qualsiasi causa, compressione o infiltrazione neoplastica arteria renale…..

Aterosclerosi arteria renale



Prevalenza 4-20% in casistiche autoptiche, sino 40% in angiografie
Nel 20-40% dei casi sono bilaterali

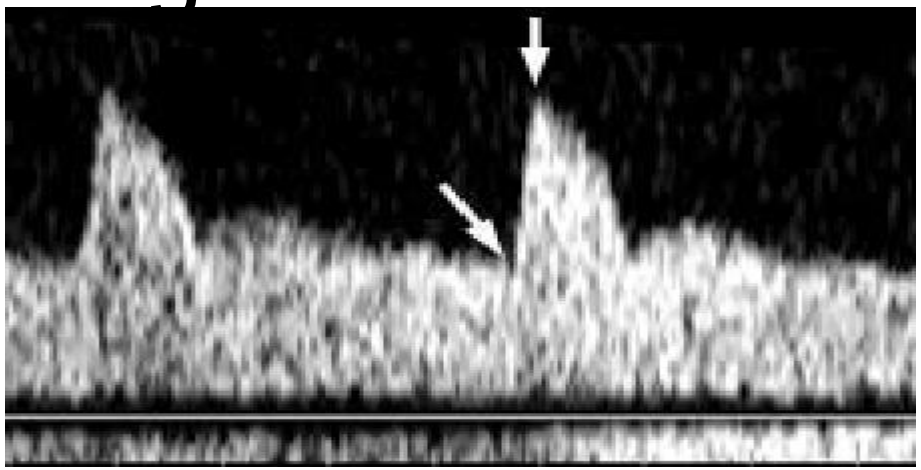


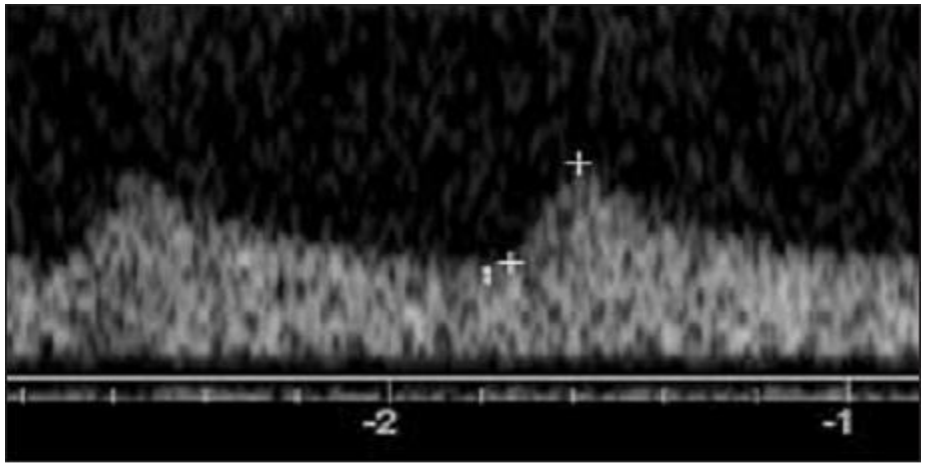
Renal artery atherosclerosis

Caratteristiche generali

Caratteristiche	Fibrodisplasia muscolare	Aterosclerosi
Età d’insorgenza	< 40 aa	> 50 aa
Sesso	80% femmine	> 90% maschi
Distribuzione lesioni	Distalmente arterie renali A volte multiple o con aneurismi (corona di rosario)	Ostio aortico, art renale prossimale
Progressione lesioni	Non frequente Può recidivare	Frequente Fino a ostruzione completa

Test di screening in presenza di sospetto diagnostico





Eco-color Doppler arterie renali:
-Velocità di picco sistolico >180 cm/sec. (per stenosi >60%)
-Rapporto velocità di picco sistolico tra aorta ed art. renale <3,5
-Polso post stenotico di tipo «tardus e parvus»
-Indici di resistenza arterire interlobari e arcuate ridotti (<0,7)
-Asimmetria diametro longitudinale renale >2 cm
-Turbolenza di flusso post stenotico

Difficoltà
L'accuratezza dipende dall'esperienza dell'operatore, dalla conformazione fisica del paziente (non obesi), e dalla preparazione per prevenire il meteorismo

Test di secondo livello per conferma

Angio TC

- Esame di elezione per la conferma dignostica
- A differenza della RM definisce anche placche calcifiche e stent

Caveat: radiazioni, mezzo di contrasto iodato
alto costo

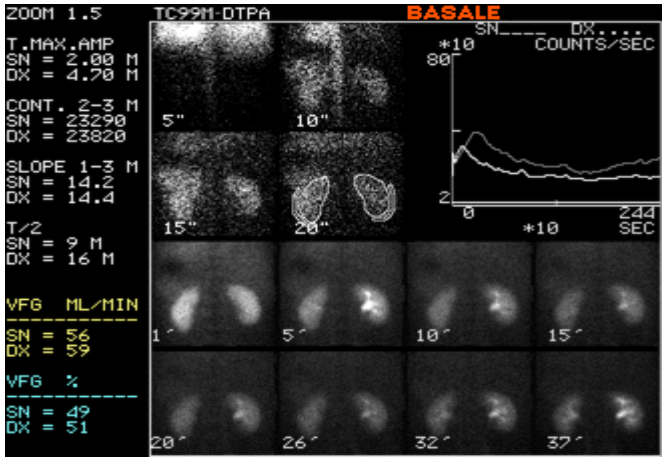
Angio RM

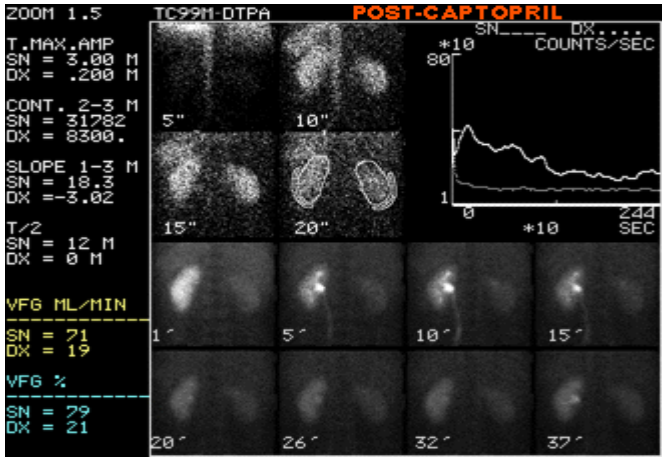
- Può fornire anche dati di tipo funzionale sul flusso
- In corso di validazione senza mcd

Caveat: Non ha alta risoluzione su stenosi distali all'ilo
Non utilizzabile con stent
non si può somministrare gadolinio se eGFR<30 ml/min
alto costo

Test prognostici

Scintigrafia renale con test al captopril (DTPA o MAG3)
Da eseguire in wash out da ACEI e ARBS per lateralizzazione della lesione (paziente ben idratata, meno evidente in stenosi bilaterale e ed insufficienza renale)





Fattori prognostici favorevoli all'Eco-color Doppler arterie renali
Diametro renale >9 cm
Indici di resistenza <0,8

Image size: 1920 x 1080
View size: 2878 x 1618

Add. Renale

C5-1
32Hz
RS

2D
57%
R din. 48
P Basso
AGen

Rene TX DX

TIS0.1 MI 1.3

53351820220218 (- , -)
Unnamed
Free Form
1

M3

X

Dist 13.0 cm
Dist 1.14 cm
Dist 1.23 cm

16cm

F#1066

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Made In Horos

Uncompressed

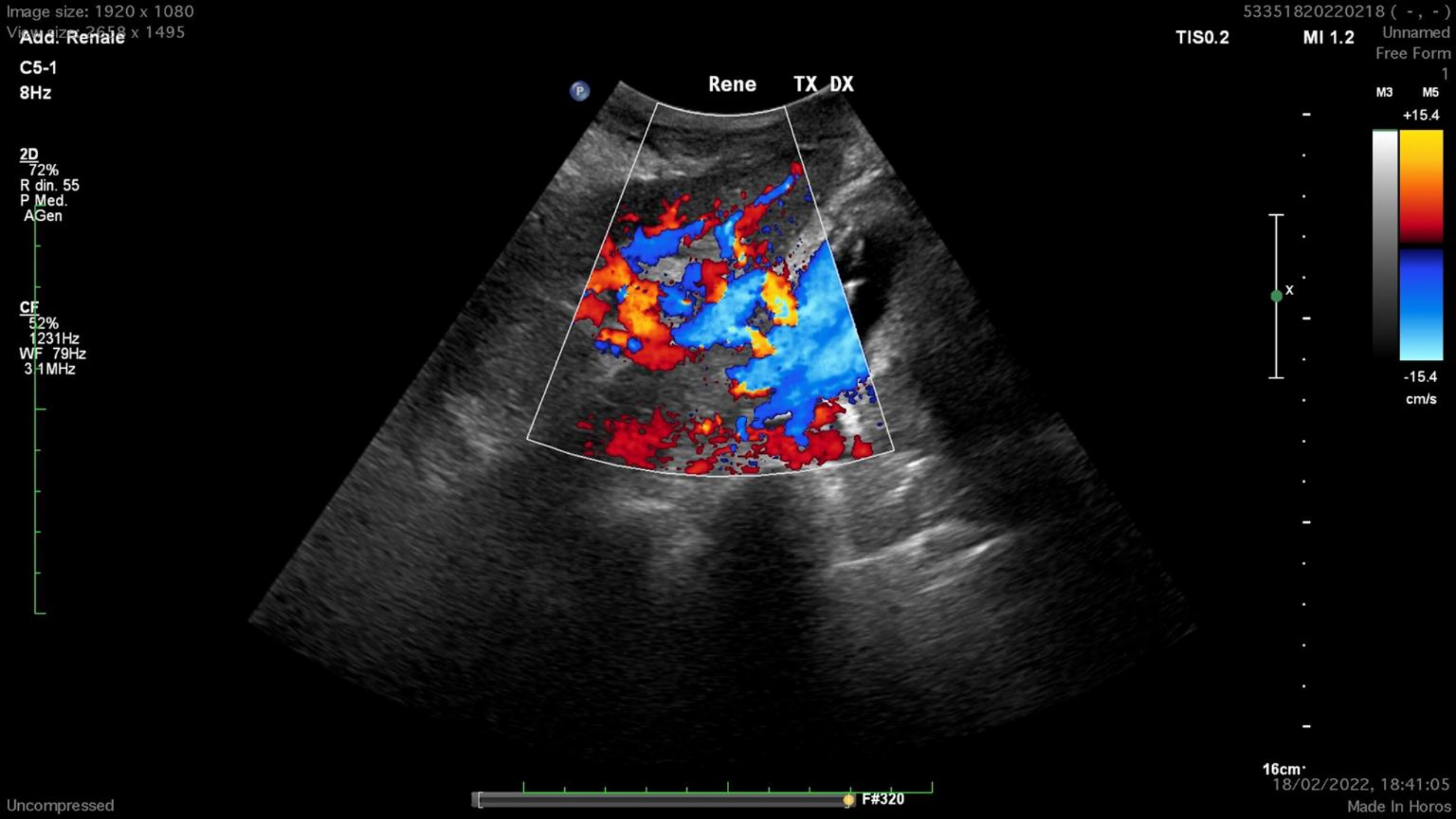
Image size: 1920 x 1080
View size: 2658 x 1495
Add: Renale
C5-1
8Hz
2D
72%
R din. 55
P Med.
AGen
CF
52%
1231Hz
WF 79Hz
3.1MHz
Rene TX DX
TIS0.2
MI 1.2
53351820220218 (- , -)
Unnamed
Free Form
1
M3
M5
+15.4
-15.4
cm/s
16cm
18/02/2022, 18:41:05
Made In Horos
F#320
Uncompressed

Image size: 1 Image size: 1920 x 1080
View size: 26 View size: 2658 x 1495

53351820220218 (- , -)

Add. Ren Add. Renale

C5-1 C5-1
8Hz 9Hz 32°

2D 72%
R din. 55
P Med.
AGen

2D 65%
R din. 55
P Med.
AGen

CF 52%
1231Hz
WF 79Hz
3.1MHz

CF 52%
1067Hz
WF 69Hz
2.7MHz

PW 40%
WF 110Hz
SV2.0mm
2.2MHz
4.3cm

PW 40%
WF 140Hz
SV2.0mm
2.2MHz
5.6cm

TIS0.3 MI 0.3

Unnamed
Free Form
1

Rene TX DX

II PSV 406 cm/s
EDV 57.5 cm/s
MDV 51.5 cm/s
RI 0.86

M3 M5
+15.4
-15.4
cm/s

10cm

400
300
200
100
cm/s
-100

36mm/s

F# 62

Uncompresse Uncompressed

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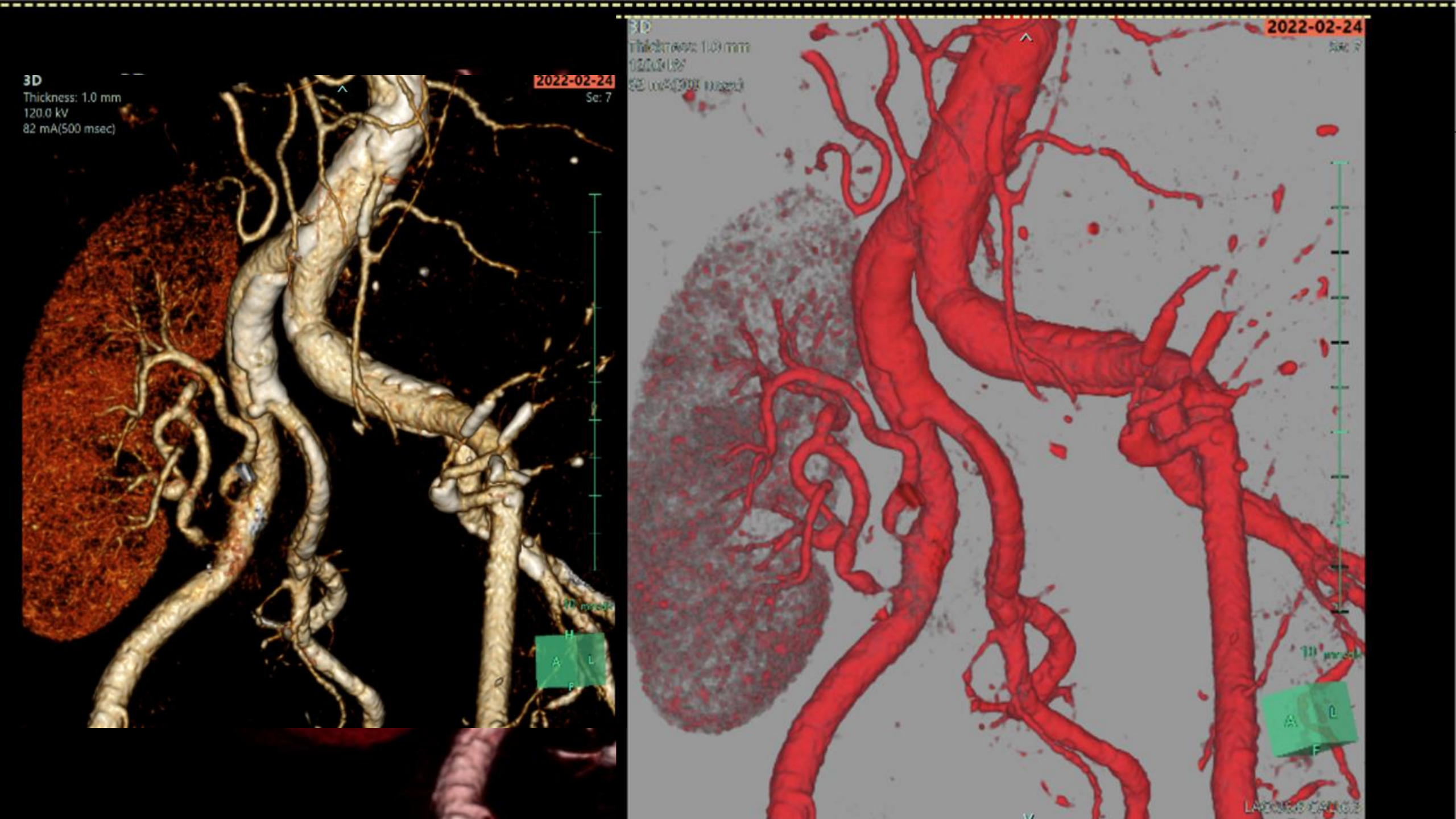
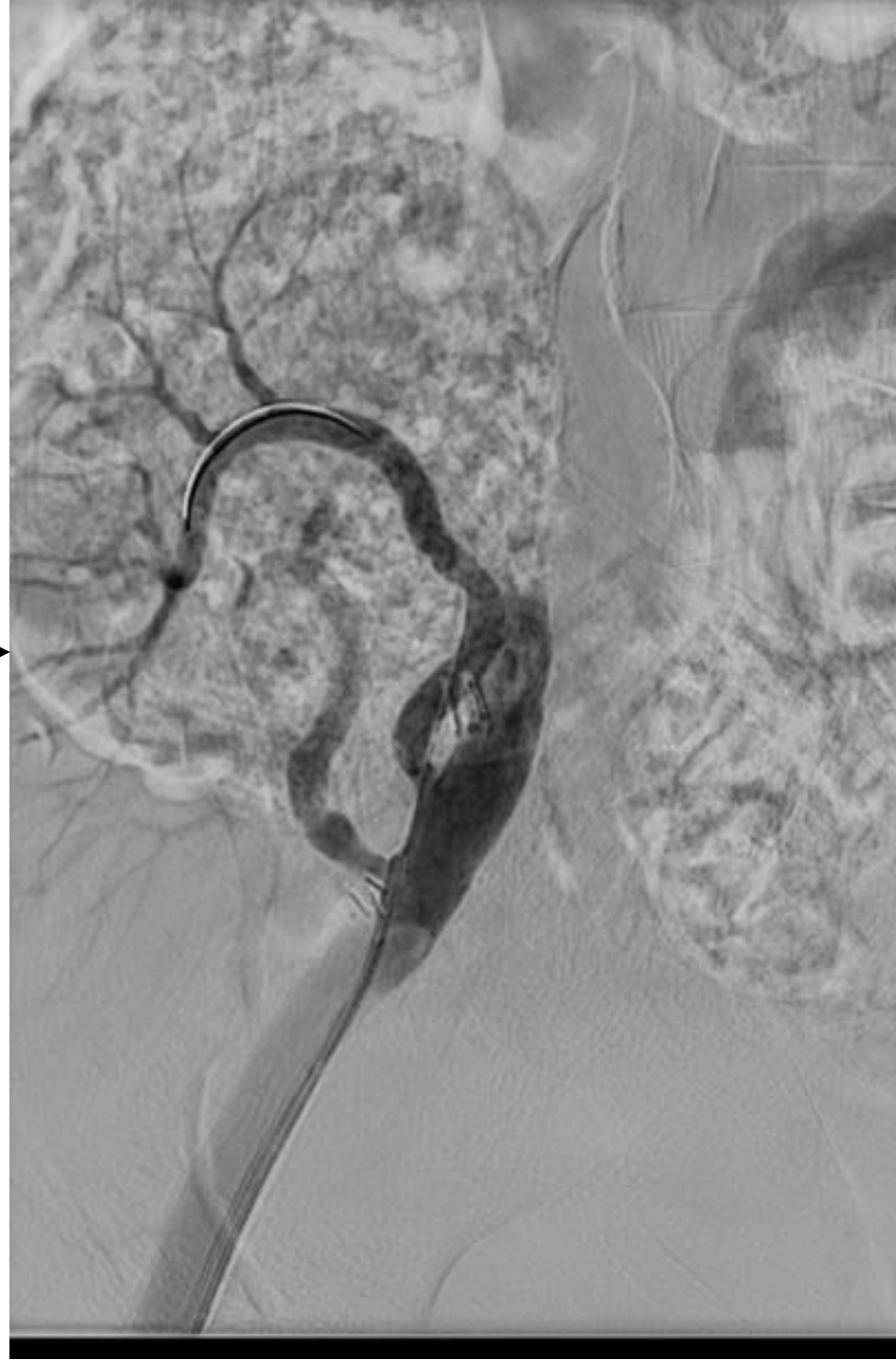
Made In Horos


3D
Thickness: 1.0 mm
120.0 kV
82 mA(500 msec)
2022-02-24
Se: 7
H
A
L
P
3D
2022-02-24
A
L
P



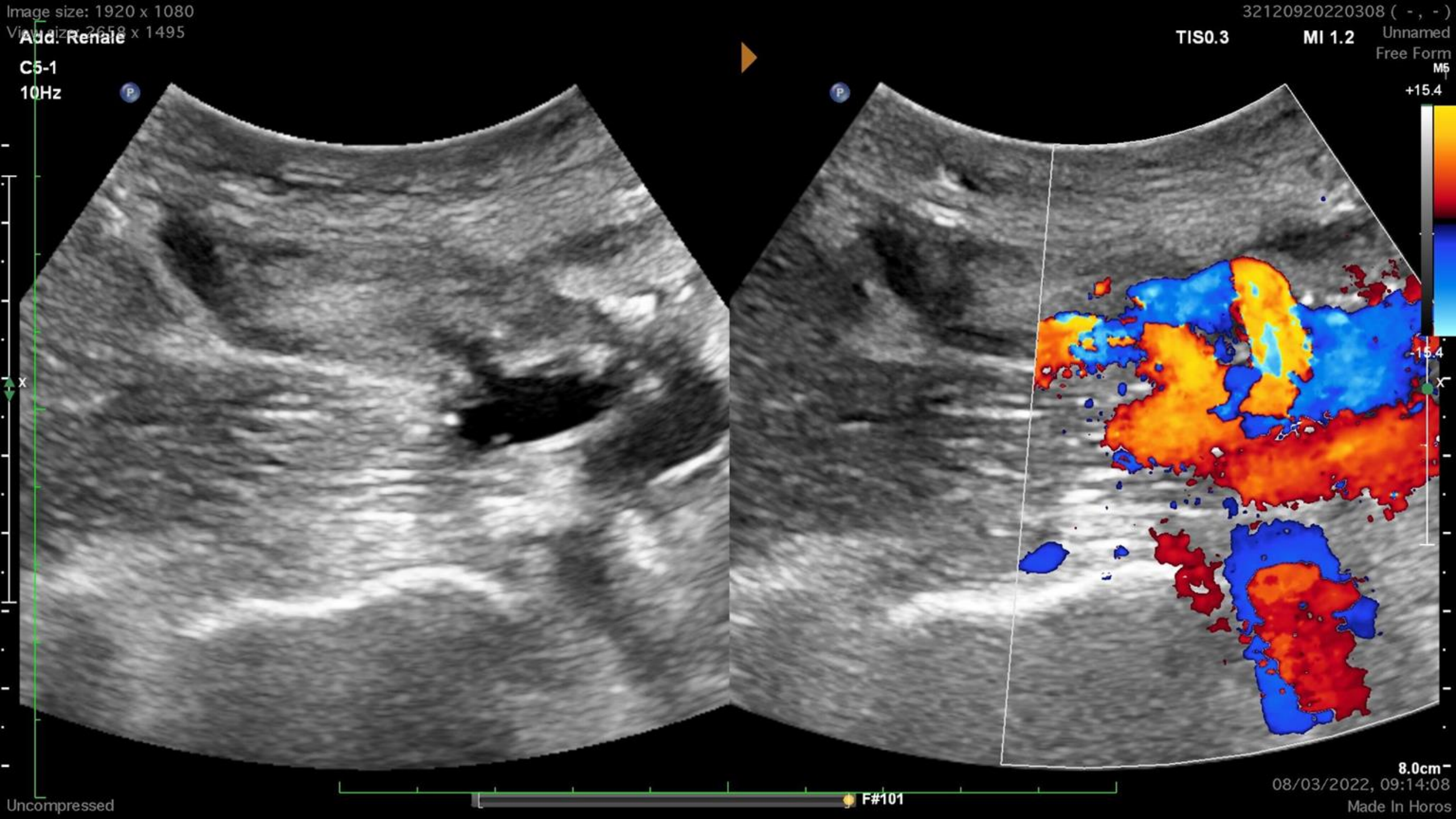


Image size: 1920 x 1080
View size: 2658 x 1495
Add: Renale
C5-1
10Hz
32120920220308 (- , -)
Unnamed
Free Form
TIS0.3
MI 1.2
M5
+15.4
-15.4
8.0cm
08/03/2022, 09:14:08
Made In Horos
F#101
Uncompressed

- Urine analysis
- Edema of renal origin
- Hypertension of renal origin
- Renal cystis
- Urolithiasis

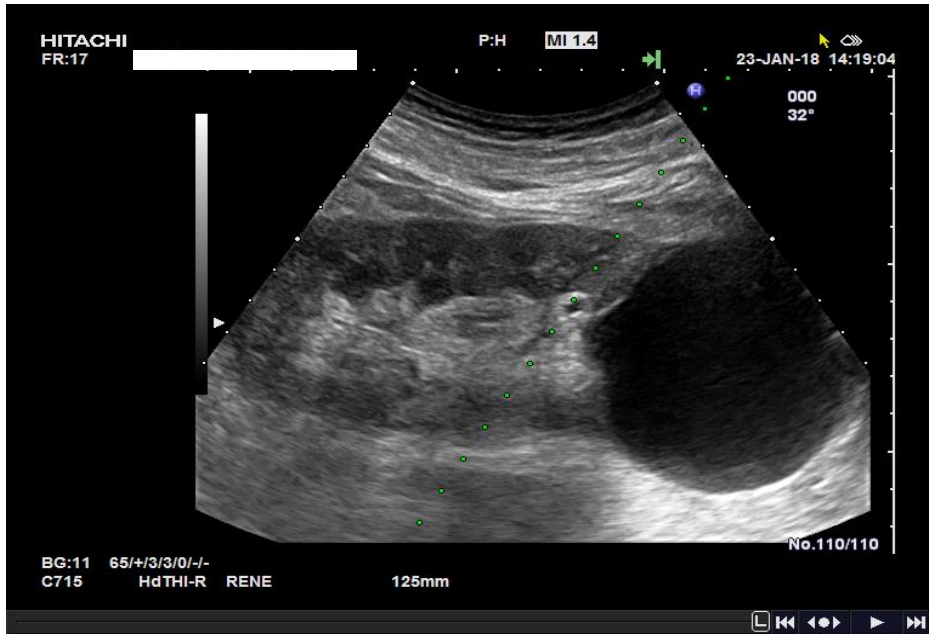
Domanda 7.

Quale di questi è un segno di allarme in presenza di cisti renali?

1) L’assenza di vascolarizzazione interna alla cisti

2) La presenza di setti, sepimenti, calcificazioni e vegetazioni aggettanti

3) La concomitante presenza di cisti epatiche



CISTI TIPICA

- **FORMA:** regolare/ ovalare/ o rotondeggiante
- **MARGINI:** ben definiti
- **CONTENUTO:** totalmente anecogeno
- **RINFORZO ACUSTICO POSTERIORE**
- **OMBRA ACUSTICA LATERALE**

CISTI ATIPICA

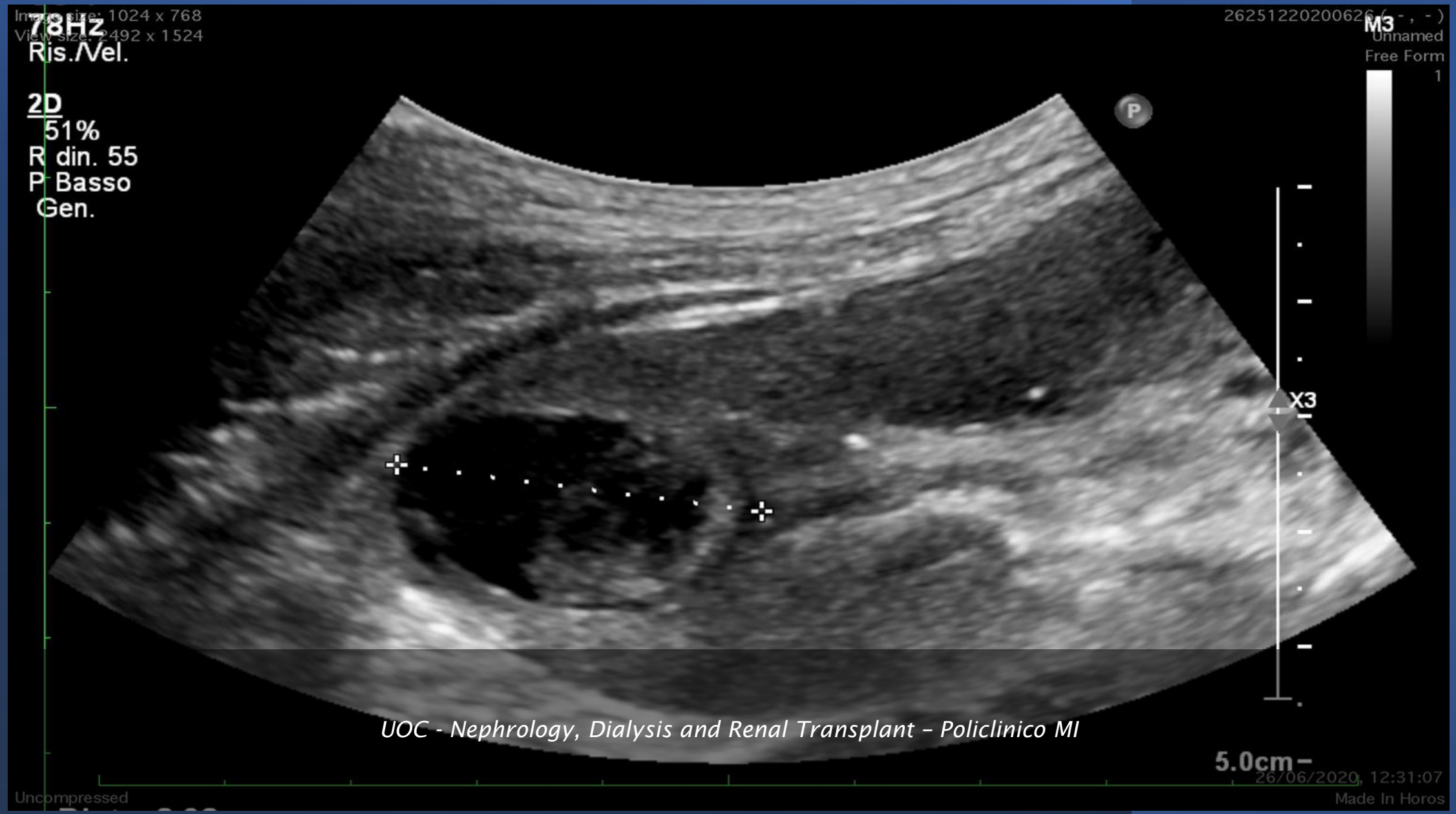
- ***FORMA: leggermente irregolare***
- ***CONTORNI: a volte sfumati***
- ***CONTENUTO IPO-ANECOGENO CON FINI ECHI***
- ***POSSIBILI SEPIMENTI INTERNI SOTTILI***

CISTI COMPLICATA

Rappresenta una CISTI ATIPICA che si COMPLICA per fenomeni degenerativi, neoplastici, flogistici o emorragici:

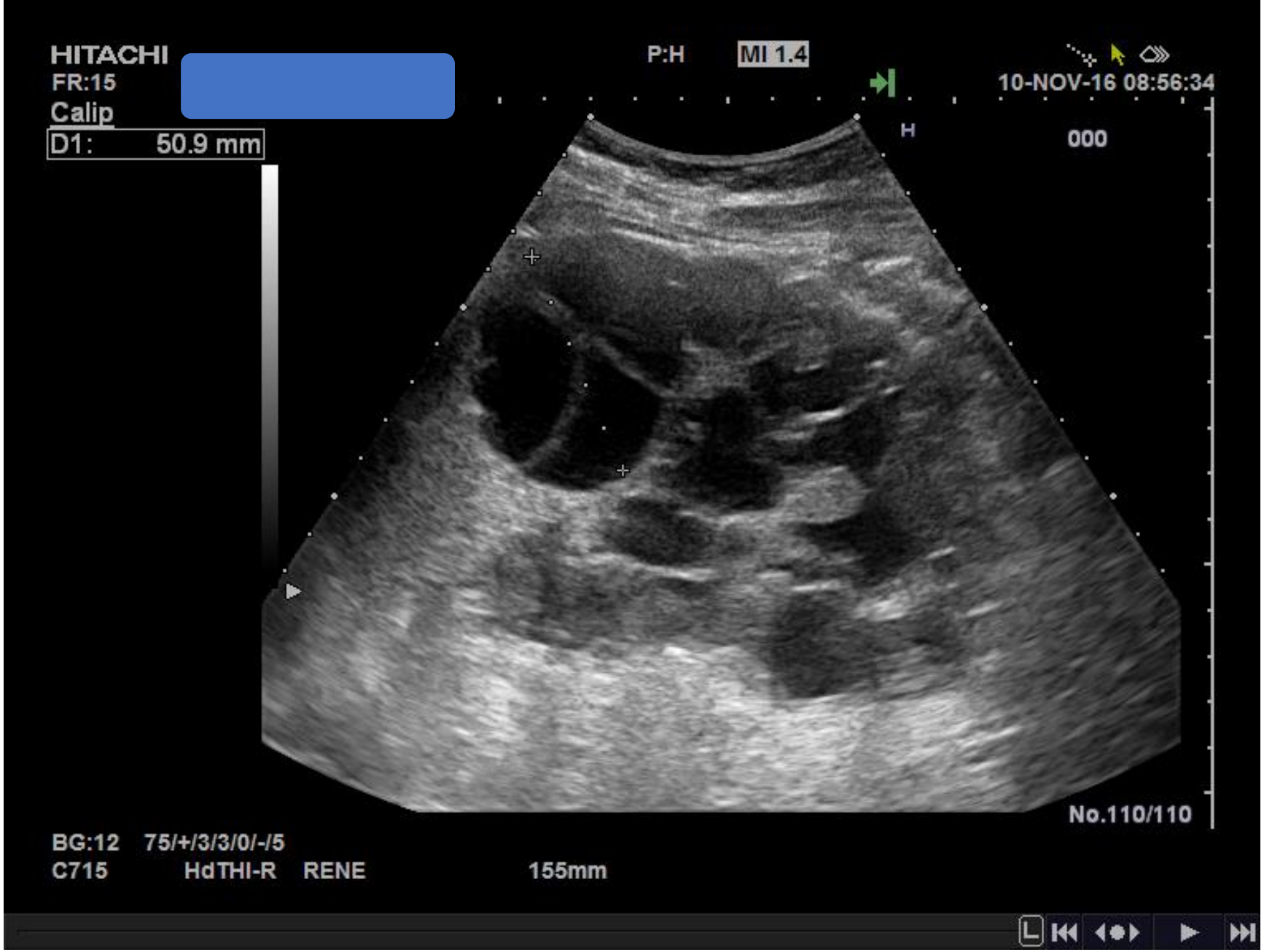
- ***FORMA: irregolare***
- ***CONTORNI: sfumati***
- ***CONTENUTO: ipoecogeno***
- ***PRESENZA di SETTI, SEPIMENTI, CALCIFICAZIONI, VEGETAZIONI AGGETTANTI***

UOC - Nephrology, Dialysis and Renal Transplant – Policlinico MI



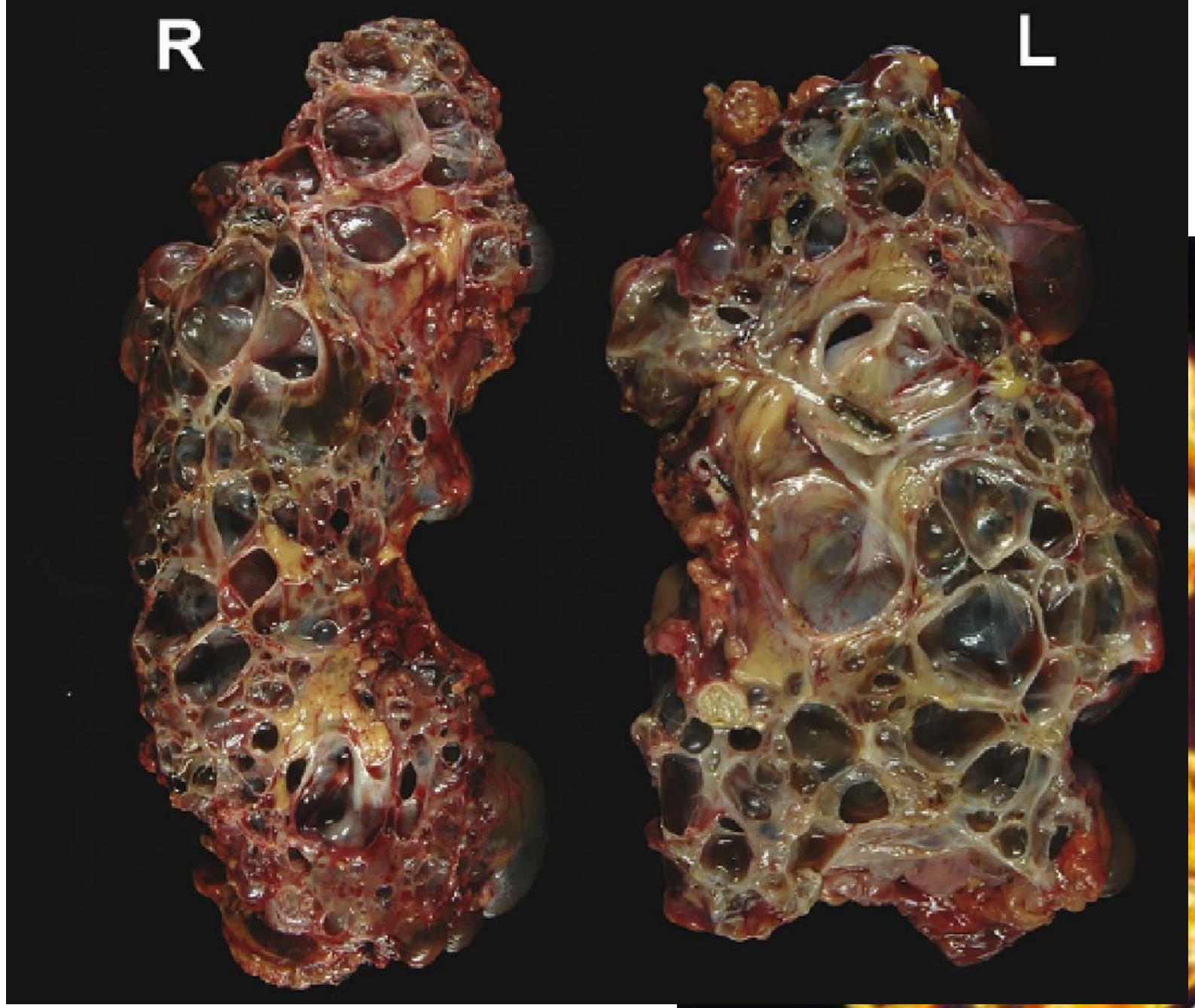
UOC - Nephrology, Dialysis and Renal Transplant – Policlinico MI

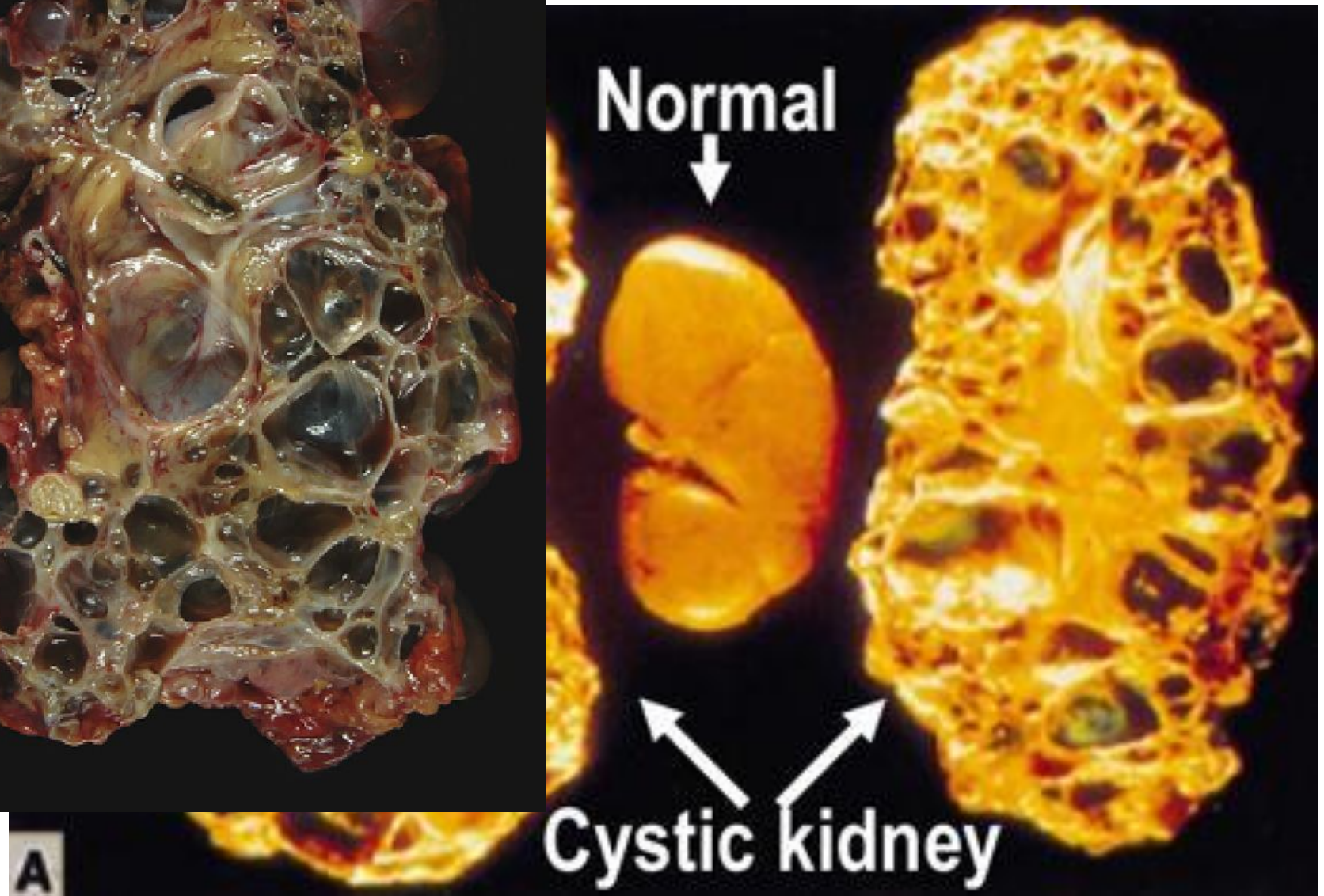
ADPKD



UOC - Nephrology, Dialysis and Renal Transplant – Policlinico MI

- ADPKD is the fourth most common cause of ESRD (first genetic cause) → 7-10 % of ESRD patients
- Incidence rate of ESRD due to ADPKD varies from 4.8 to 15.3 /pmp/year in the different countries

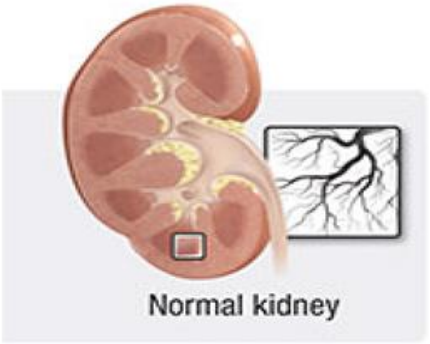

R
L

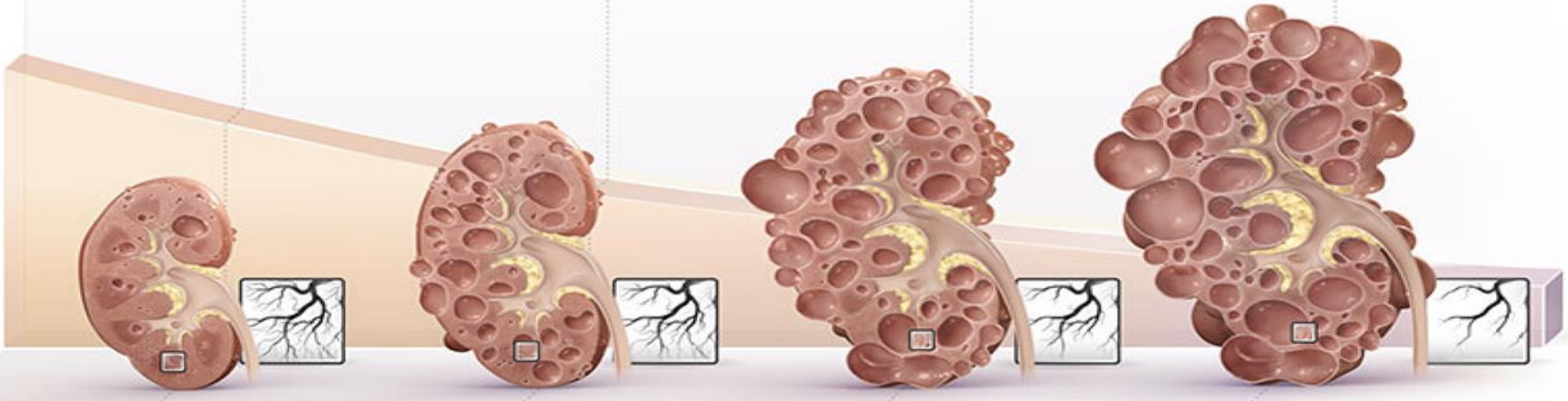

Normal
Cystic kidney
A

Kidney related symptoms and signs in ADPKD

- Reduced concentration and acidification of urine
- Progressive cystic growth and parenchymal substitution → CKD
- Juvenile Hypertension
- Nephrolithiasis
- Urinary Tract Infections
- Hematuria
- Neoplasia
- Mass related symptoms
  - pain
  - Digestive symtpoms

Kidney Disease Progression in ADPKD





HEALTHY TISSUE

CYST DEVELOPMENT AND ENLARGEMENT

VASCULATURE

FUNCTION: Normal | Hyperfiltration | Impairment | Failure

AGE: 15 | 30 | 45 | 60

SIGNS AND SYMPTOMS

Chronic
- Urinary concentrating defects
- Hypertension
- Dull pain and discomfort
- Proteinuria

Acute / episodic
- Cyst rupture
- Pain
- Hematuria
- Urinary tract infection
- Cyst infection
- Kidney stones

Extrarenal manifestations

- Liver
  - Cysts; not infrequently due to associated mutations in other genes :PRKCSH (protein kinase C-substrate 80K-H) e Sec63
  - Liver fibrosis; carcinoma
- Cists in other organs
  - pancreas, spleen, seminal vescicles, pineale
- Arterial Aneurisms (cerebral, aortic, coronary, etc..)
- Heart valve dysfuncion
- Herniae
- Diverticulosis of the colon

Ravine criteria applied in ultrasound diagnostics of ADPKD type 1

Age (years)	Number of cysts	
	Positive family history	Negative family history
<30	At least 2 in 1 or both kidneys	At least 5
30–59	At least 2 in each kidney	At least 5
≥60	At least 4 in each kidney	At least 8

Ravine criteria applied in ultrasound diagnostics of ADPKD type 2

Age (years)	Number of cysts
15–19	1 in each kidney or 2 unilaterally
20–29	>3 altogether, at least 1 in each kidney
30–59	At least 2 in each kidney
≥60	At least 4 in each kidney

Urine analysis

Edema of renal origin

Hypertension of renal origin

Renal cystis

Urolithiasis

Distribution of main stone components according to time period

Component	2003–2007 (%)	2008–2012 (%)
Calcium oxalate	4,647 (85.17)	5,959 (80.64)
Calcium phosphate	286 (5.24)	497 (6.73)
Uric acid	209 (3.83)	513 (6.94)
Ammonium magnesium phosphate	194 (3.56)	273 (3.69)
Others	120 (2.20)	148 (2.00)
Overall	5,456 (100)	7,390 (100)

Wenqi Wu et al *Urolithiasis* 2014

Risk of a recurrent stone event

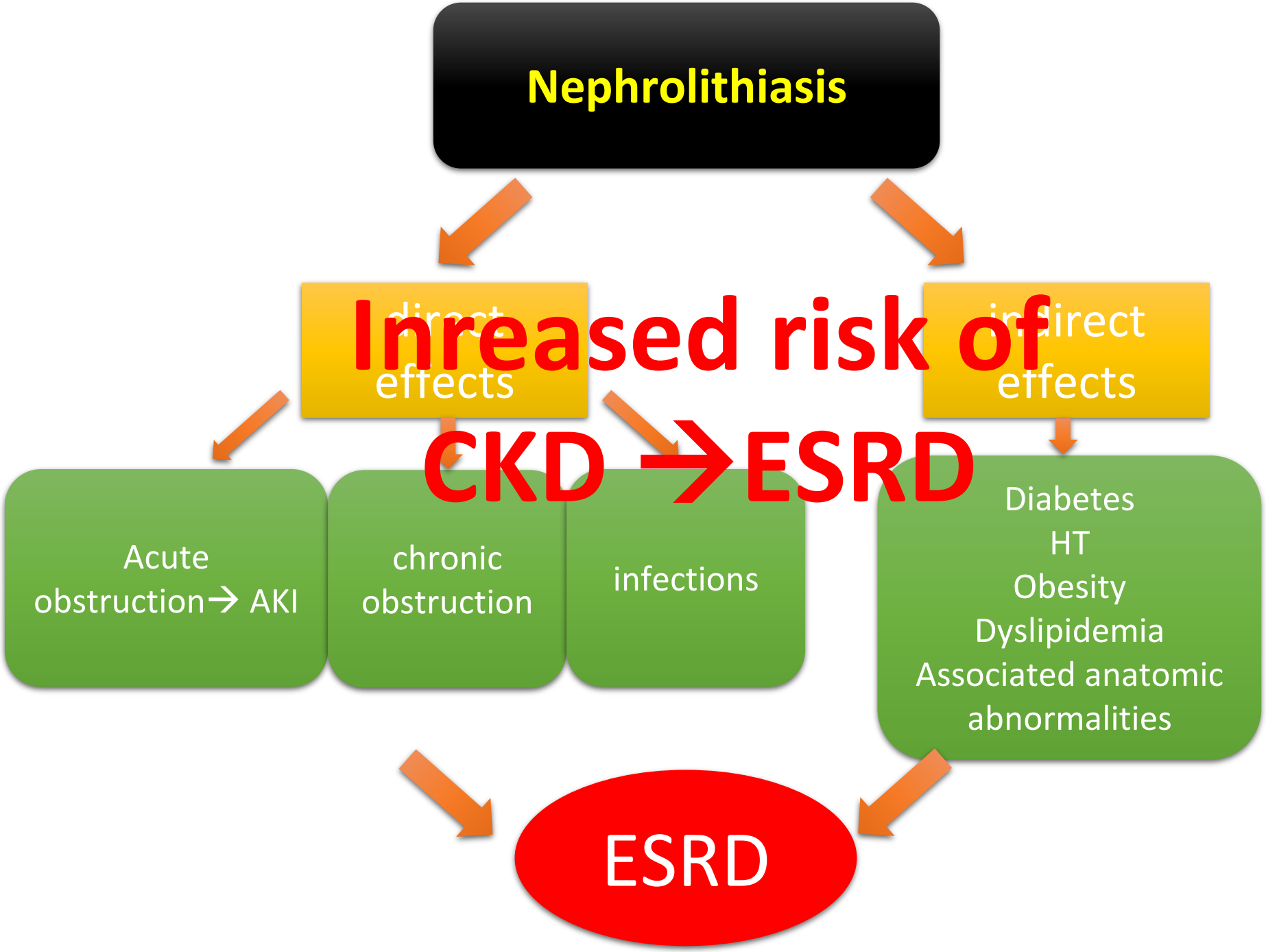
Year following initial stone event	Risk of recurrence
2	11%
5	20%
10	31%
15	39%

Ziemba JB et al *IC Urol* 2017

Risk of ESRD is in stone formers versus matched controls

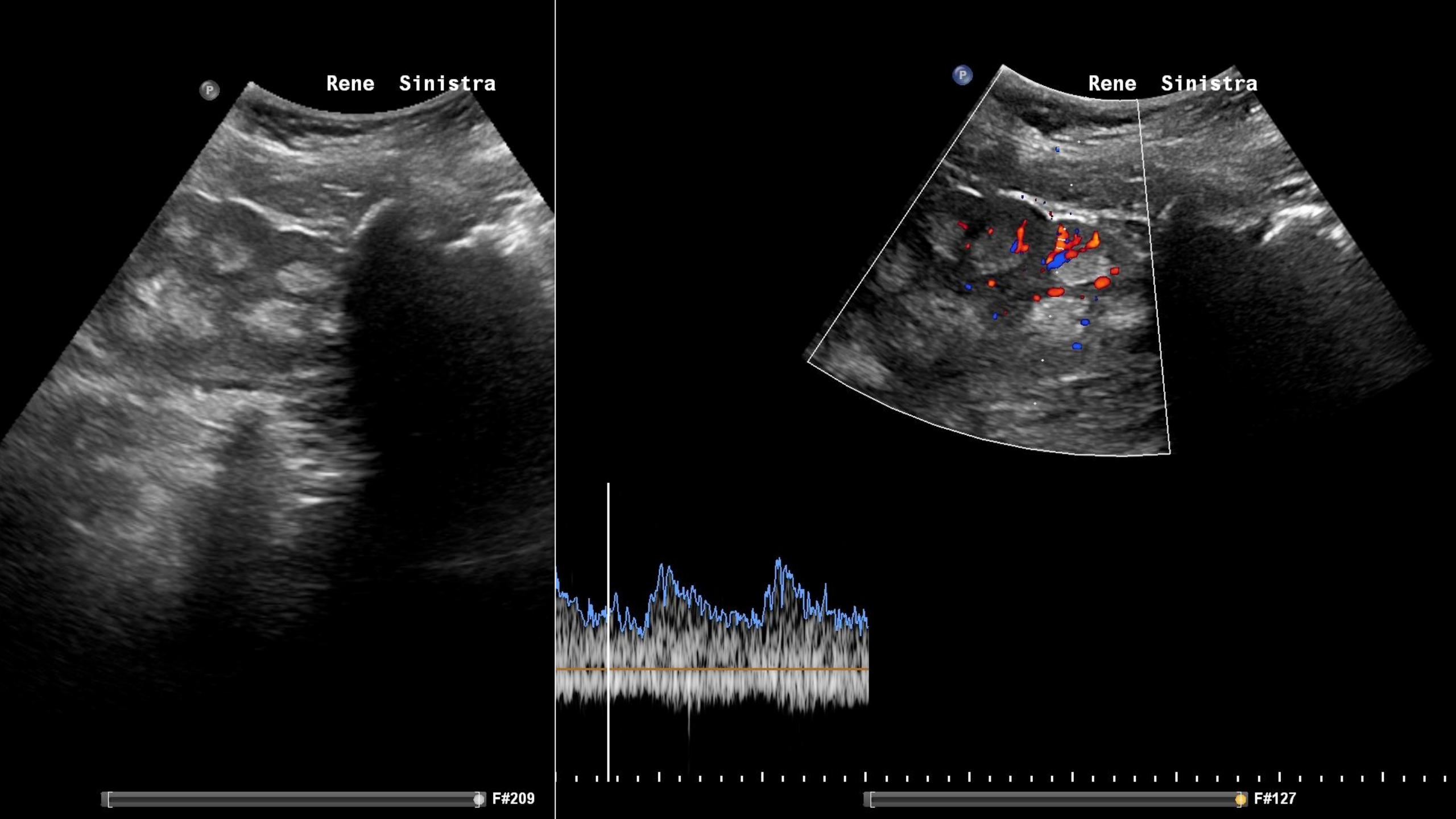
Incidence (no. at risk)						
Controls	0 (17,465)	0.1 (13,670)	0.4 (7,788)	0.6 (4,096)	0.9 (1,665)	0.9 (10)
Stone formers	0 (4,899)	0.5 (3,908)	0.8 (2,233)	1.3 (1,201)	2.1 (489)	2.4 (5)

Ziad M. El-Zoghby et al *CJASN* 2012



Inreased risk of CKD →ESRD

Add. Renale
C5-1
47Hz
RS
2D
56%
R din. 48
P Basso
AGen
TIS0.2
MI 1.3
Rene Sinistra
M3
X
10cm
Dist 0.752 cm
F#488
23/04/2021 13:01


Rene Sinistra
Rene Sinistra
F#209
F#127

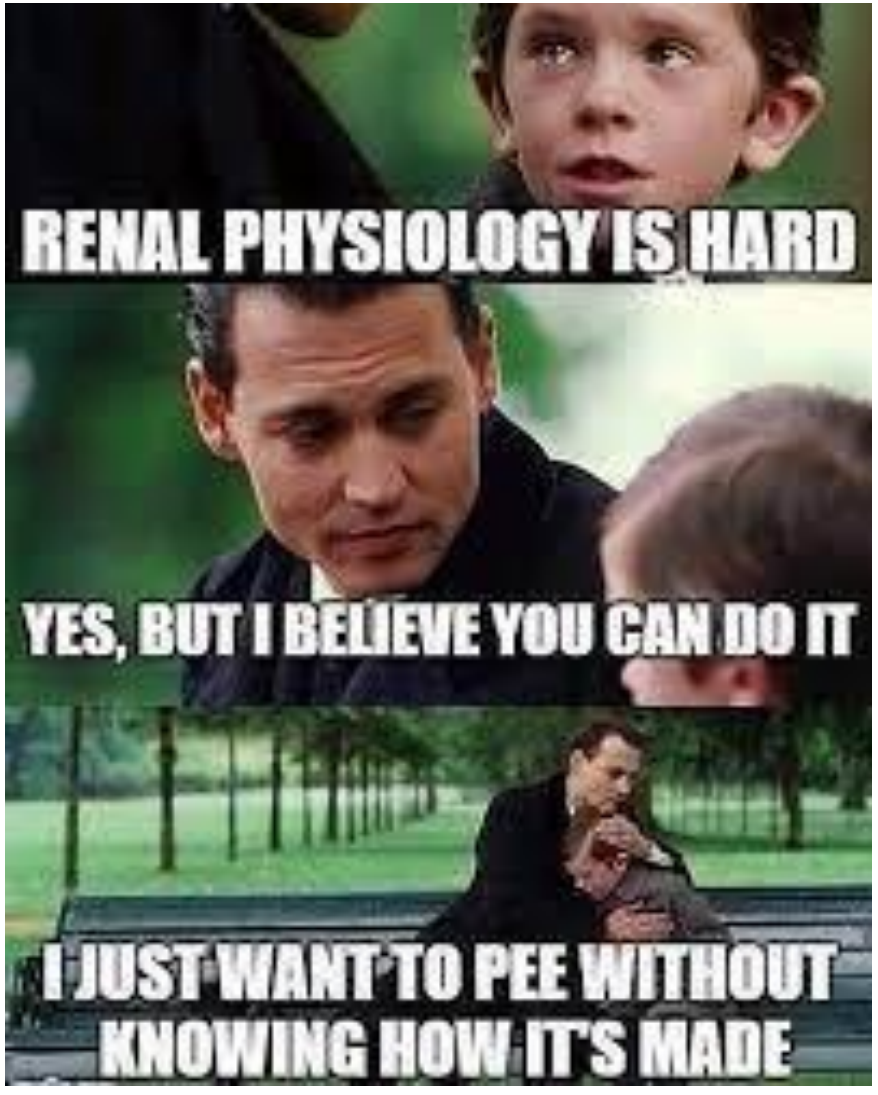
Percorso diagnostico-terapeutico per il paziente con calcolosi renale: update 2020

In Depth Review

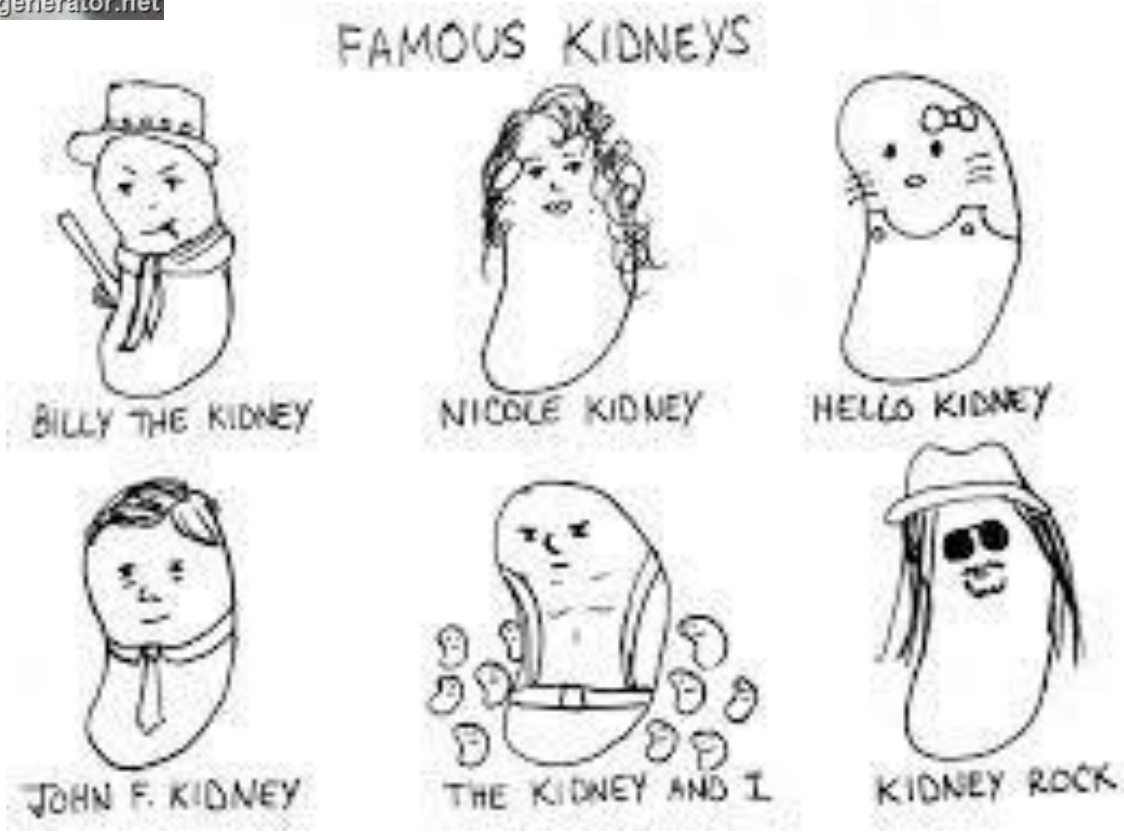
Adamasco Cupisti[1], Alberto. Trinchieri[2], Marco Lombardi[3], Simone Agostini[4], Teresa Arcidiacono[5], Paolo Beltrami[6], Elisa Berri[7], Luigi Bevilacqua[8], Salvatore Campo[9], Rossella Cannavò[10], Emanuele Croppi[11], Giuseppe Casarrubea[12], Cosimo Caviglioli[13], Alfonso Crisci[14], Alessandro D'Addessi[15], Marco De Sio[16], Annalaura Fantuzzi[17], Maria Fusaro[18], Giovanni Gambaro[19], Marco Garofalo[20], Salvatore Micali[21], Martino Marangella[22], Michele Petrarulo[23], Gaetano Piccinocchi[24], Alberto Sessa[25], Andrea Tasca[26], Giuseppe Vezzoli[27], Corrado Vitale[28], Filiberto Zattoni[29] a nome del Gruppo di Studio Multidisciplinare per la Calcolosi Renale

GRUPPO MULTIDISCIPLINARE PER LO STUDIO DELLA CALCOLOSI URINARIA

Società Italiana Nefrologia


RENAL PHYSIOLOGY IS HARD
YES, BUT I BELIEVE YOU CAN DO IT
I JUST WANT TO PEE WITHOUT KNOWING HOW IT'S MADE

NEPHROLOGY
memegenerator.net


FAMOUS KIDNEYS
BILLY THE KIDNEY
NICOLE KIDNEY
HELLO KIDNEY
JOHN F. KIDNEY
THE KIDNEY AND I
KIDNEY ROCK