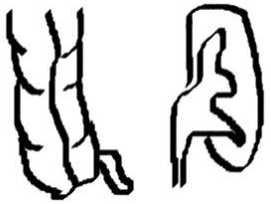

Inflammatory bowel disease and the kidney – causes and consequences

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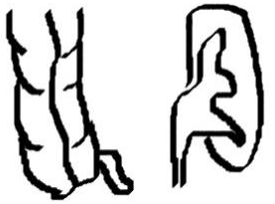
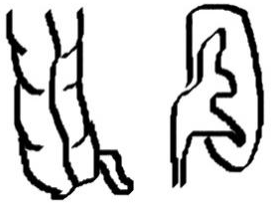
Inflammatory bowel disease



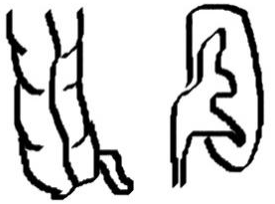
- Inflammatory bowel disease (IBD): chronic inflammatory disease of the gastrointestinal tract.
- Crohn disease (CD) and ulcerative colitis (UC).
- Occurs in genetically susceptible individuals after an exaggerated immune response to a normal stimulus, such as food and intestinal flora.
- Extraintestinal manifestations in 6-46%:
  - Skin,
  - Joints,
  - Eyes,
  - Kidneys - 4-23%.

IBD – extraintestinal manifestations



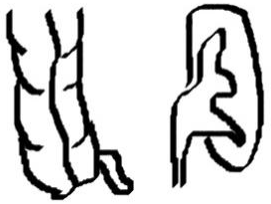
- Systemic reactive manifestations – arthritis.
- Autoimmune diseases independent of IBD – SLE, thyroiditis.
- Deposition of circulating or *in situ* formation of immune complexes – GN, TIN.
- Secondary to metabolic derangement – AKI in dehydration, renal stones, nephrocalcinosis, TIN.
- Secondary to anatomic derangement – urinary tract obstruction, fistulae.
- Side effects of treatment – TIN, GN, endothelial damage.

Renal involvement in IBD

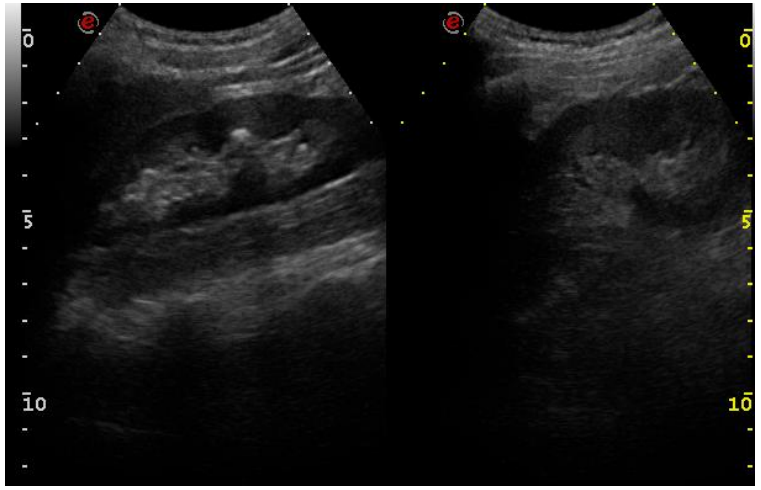


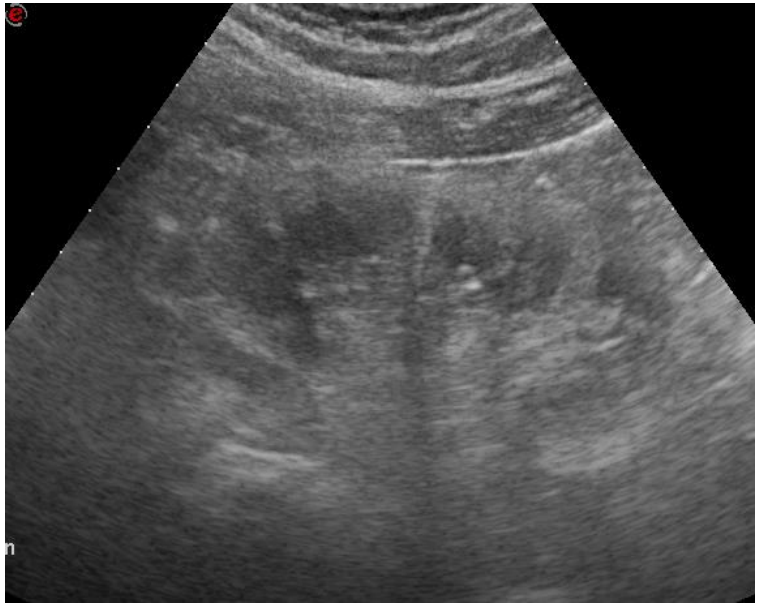
- Nephrolithisis – CaP, CaOx, Urate, crystalization of medications (sulphasalazine).
- UT obstruction – stones, adhesions, RPF.
- Urinary tract infections – with or without stones/obstruction.
- GN – IgA GN, minimal change, FSGS, MPGN, MGN, anti-GBM.
- Amyloidosis (AA).
- TIN: acute TIN – toxic or allergic, granulomatous, immune.
- Acute kidney injury / acute renal failure.
- Chronic kidney disease / chronic renal failure.

Nephrolithiasis in IBD

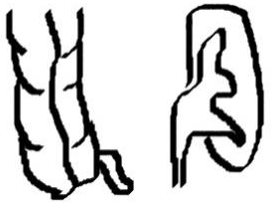


- Uric acid – crystalization due to:
  - Low urine pH,
  - Low urine volume (dehydration in diarrhea),
  - Increased UA levels – dehydration, inflammation, CS treatment.
- Calcium oxalate – hypercalciuria + enteric hyperoxaluria:
  - Bile acid malabsorption,
  - Increased mucosal permeability for oxalates in the colon,
  - Decolonization of Oxybacter formigenes (uses OxAc as energy source).
- Calcium phosphate – mainly in CHILDREN, hypercalciuria + hyperphosphaturia due to:
  - Hypovitaminosis D (malabsorption) → increased PTH → hypercalciemia + hyperphosphaturia.
  - Nephrocalcinosis.
- Crystalization of medications - sulphasalazine.

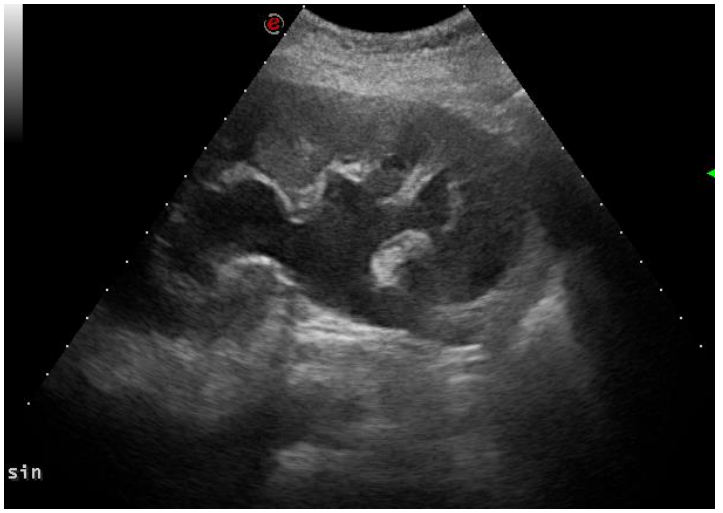


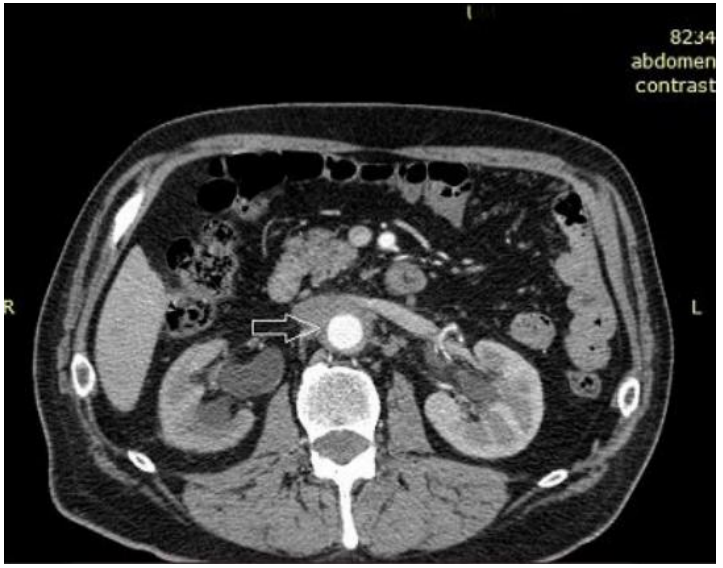


UT obstruction in IBD

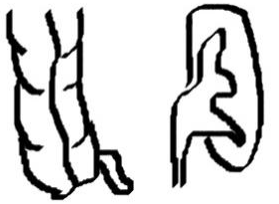


- Nephrolithiasis – due to migration of the stone
- RPF – entrapment of the ureters in fibrous tissue.
- Adhesions and fistula formation.





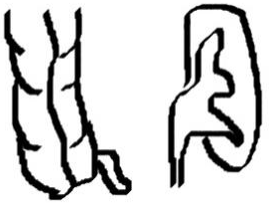
Glomeprulonephritis in IBD

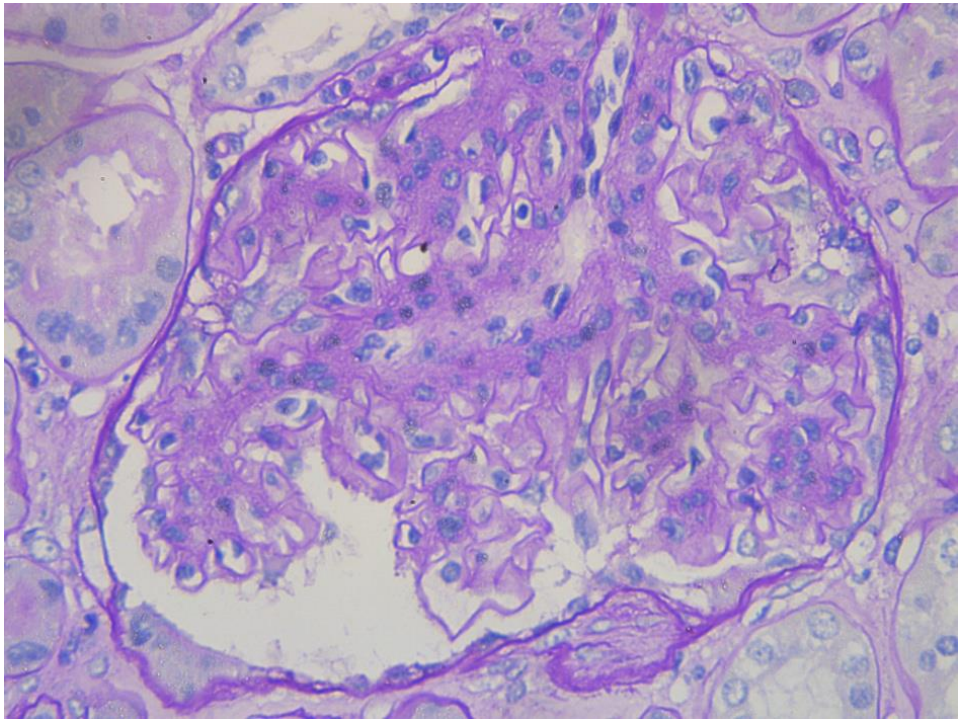


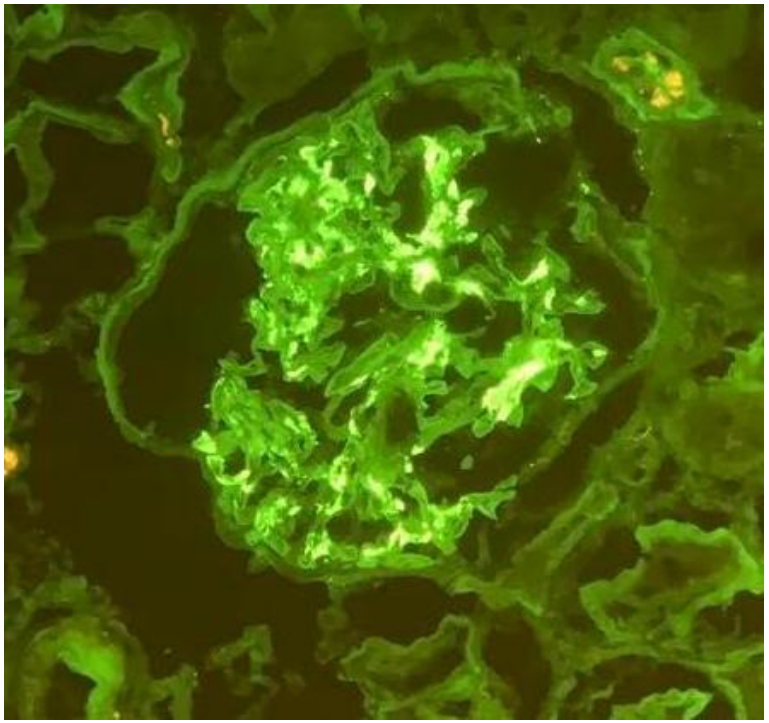
- IgA GN:
  - Common genetic background – HLADR1 in IgA GN and HLA DR1/DQw5 in CD (*Takemura et al., Forshaw et al.*).
  - Increased production of dimeric IgA (Peyer's plaques),
  - Impaired clearance of IgA.
- Minimal change nephropathy and FSGS – often due to treatment, esp. with anti-TNF agents. Anti-TNF agents bind podocytes and induce apoptosis (*Ramos-Casals et al.*). Anti –TNF agents can cause cell destruction and generation of ANA, DNA, ANCA Ab and subsequent SLE, ANCA-vasculitis, immune complex GN (*Charles et al.*).
- C3 GN.
- Anti-GBM GN.
- Membranous GN – usually associated with treatment (secondary).
- Membranoproliferative GN – HCV should be investigated.
- ANCA-associated vasculitis.
- SLE.

- Takemura T, et al. Pediatr Nephrol. 2002 Oct;17(10):863-6.
- Forshaw MJ, et a. Int J Colorectal Dis. 2005 Sep;20(5):463-5.
- Charles PJ, et al. Arthritis Rheum. 2000 Nov;43(11):2383-90.
- Ramos-Casals M, et al. Medicine (Baltimore). 2007 Jul;86(4):242-251.

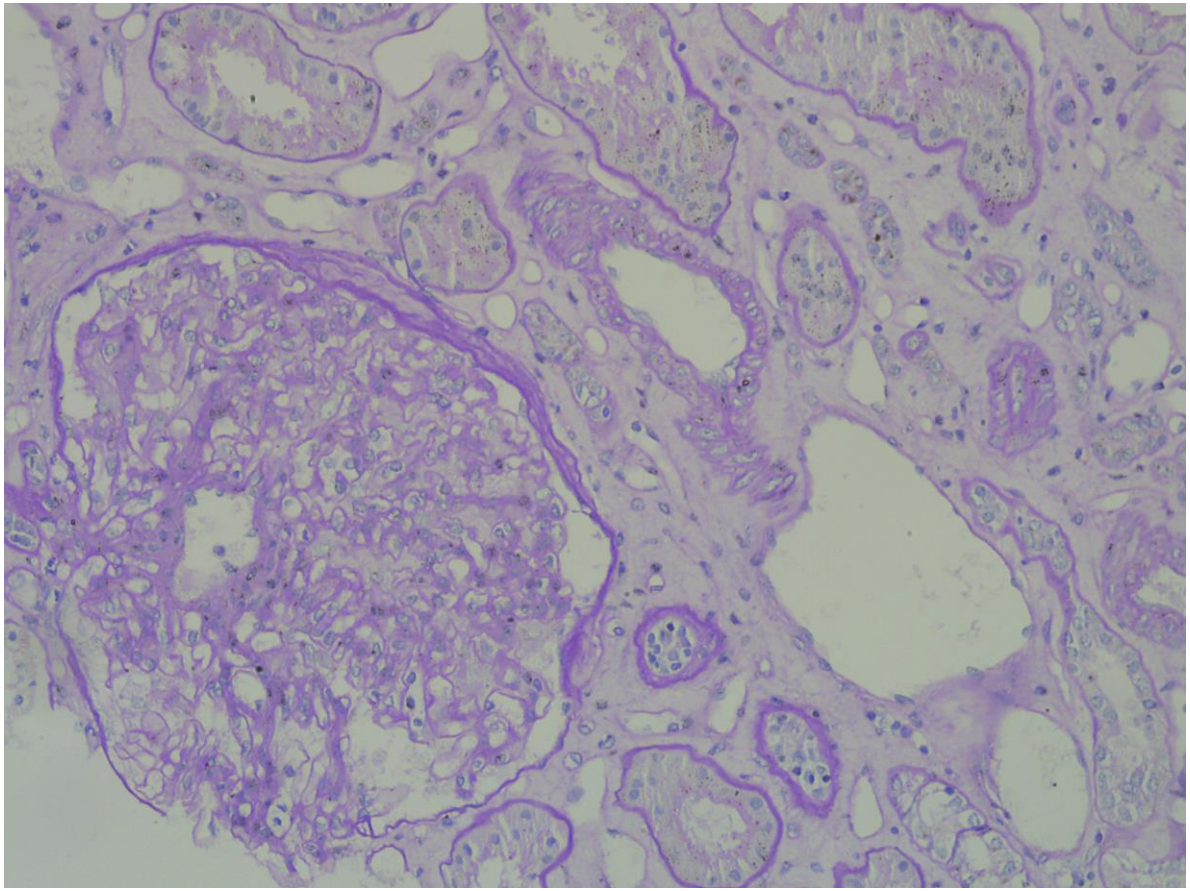
IgA



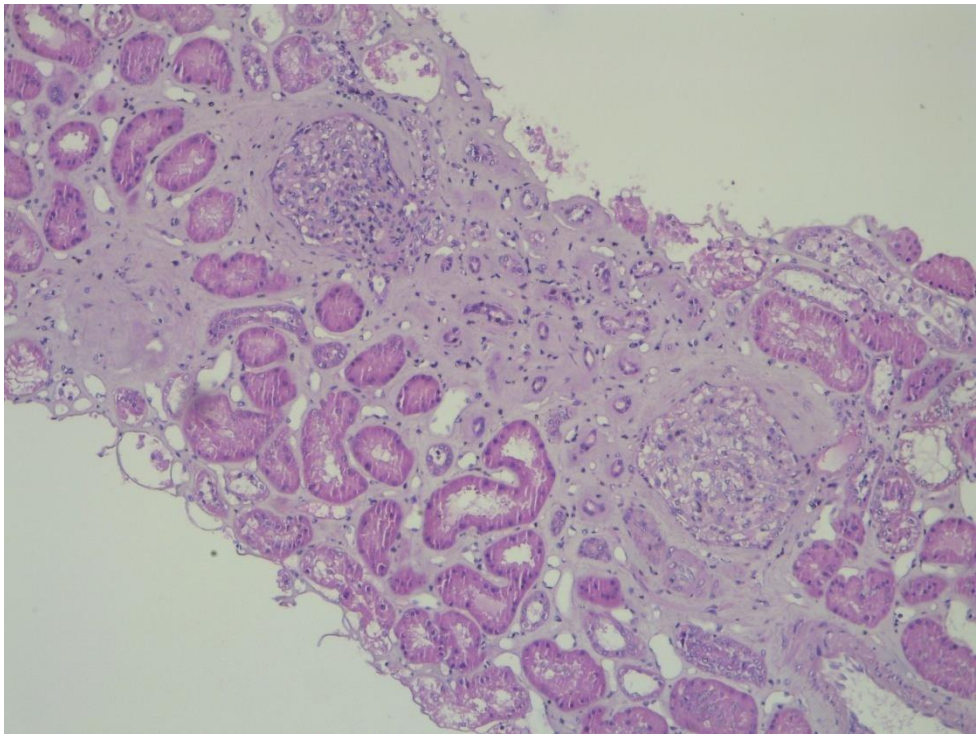




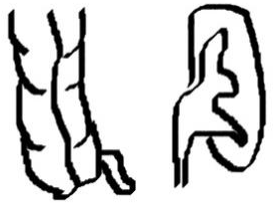
Minimal change GN

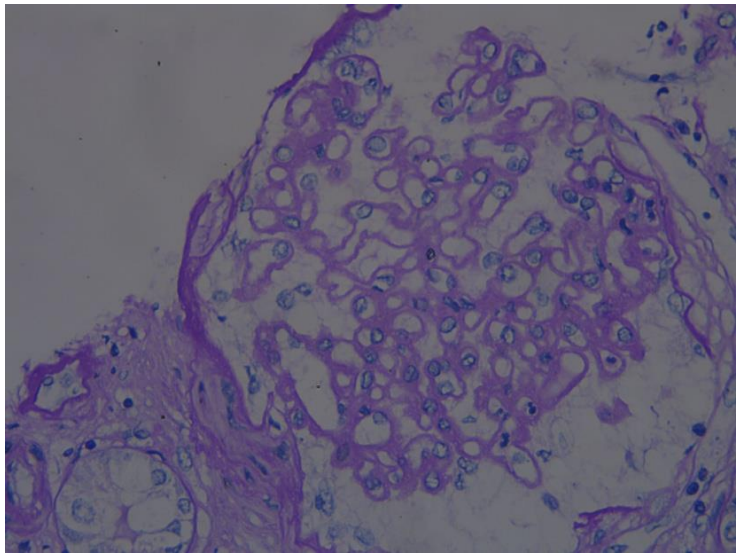


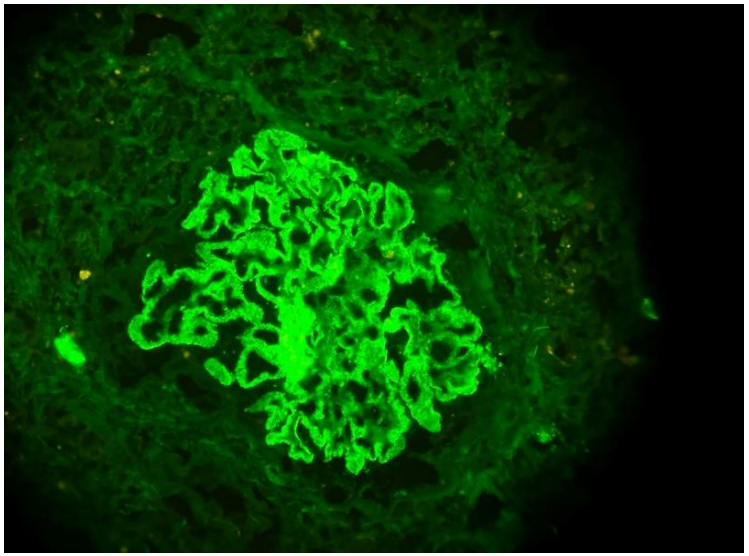
FSGS

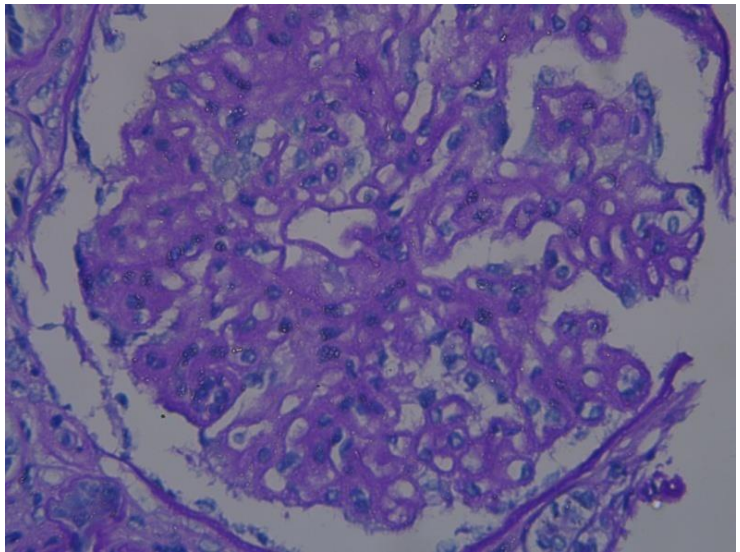


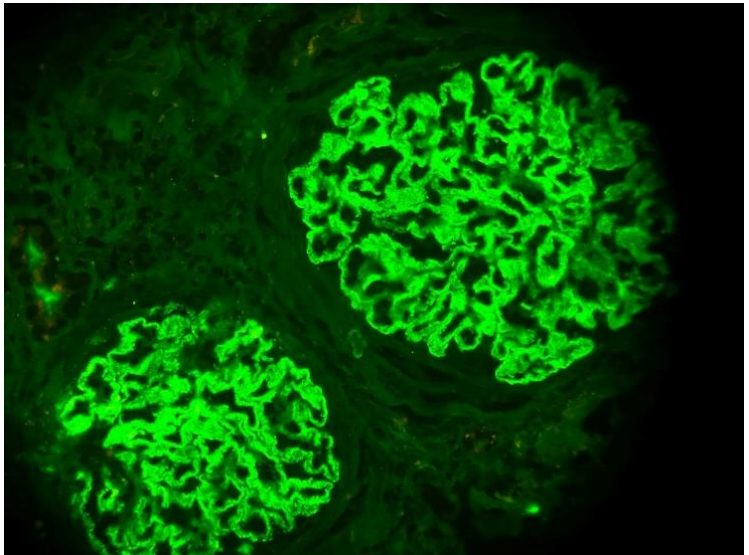
Membranous GN



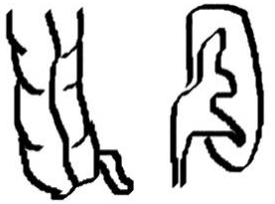






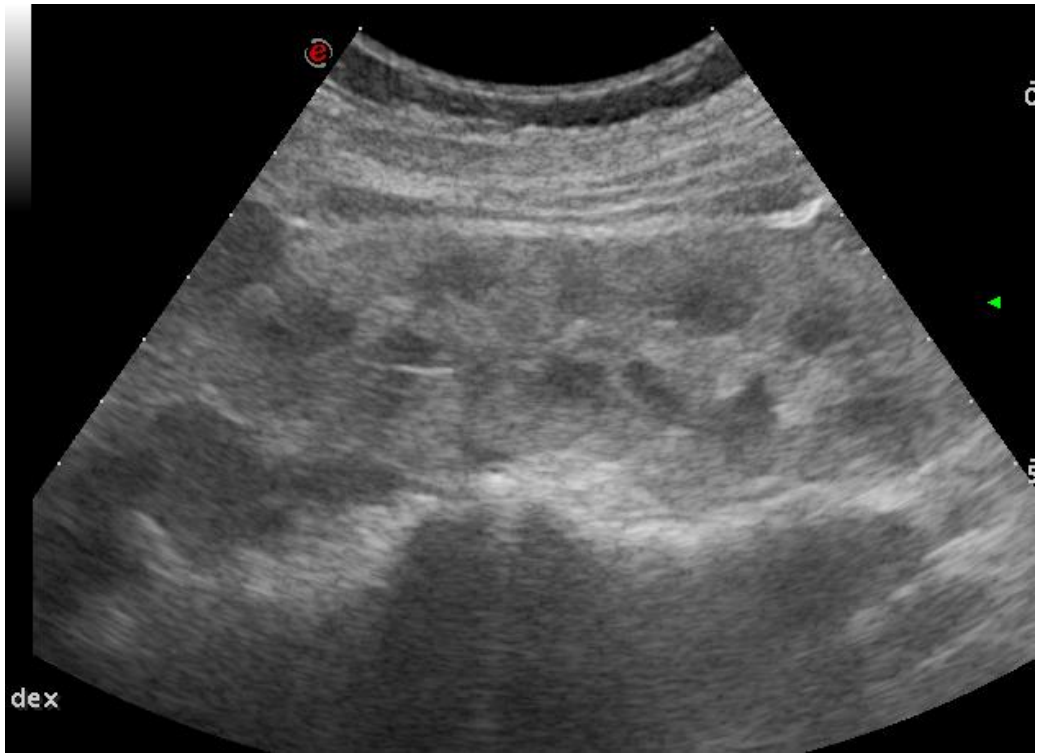


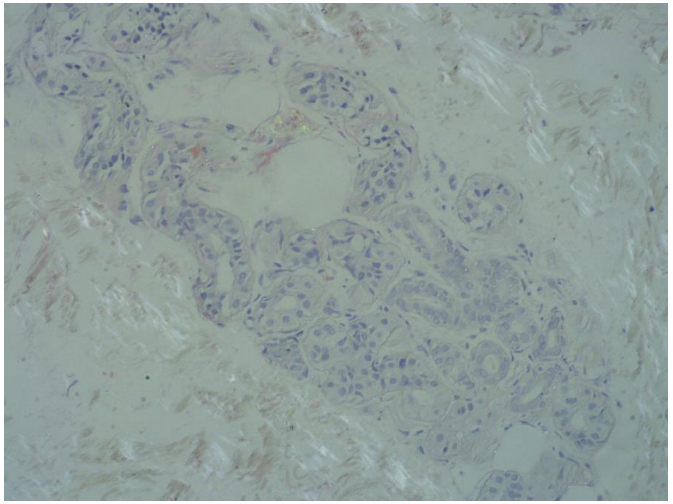
Amyloidosis in IBD

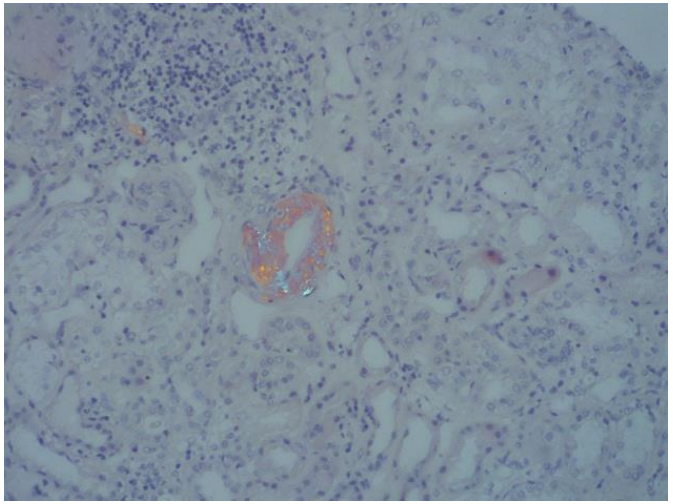


- Secondary (AA) type – chronic persistent inflammation.
- CD is the fourth leading cause of AA amyloidosis worldwide.
- Nephrotic syndrome WITH progressive renal failure +/- cardiac involvement.
- Hemorrhagic diathesis.

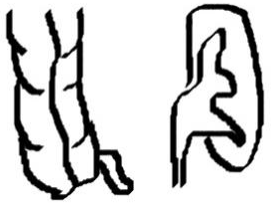
Amyloidosis

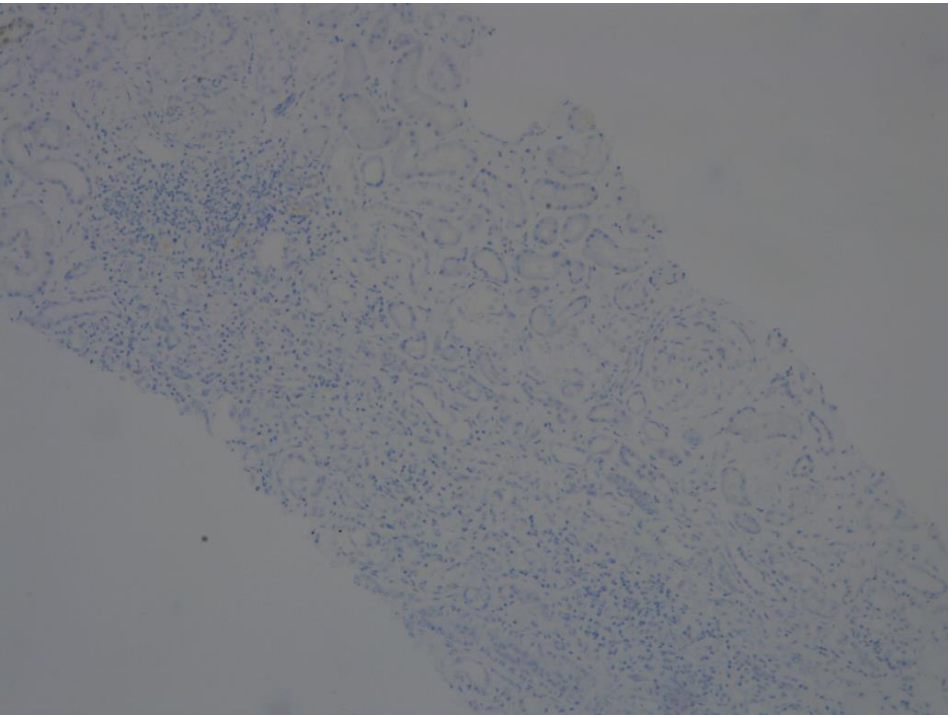


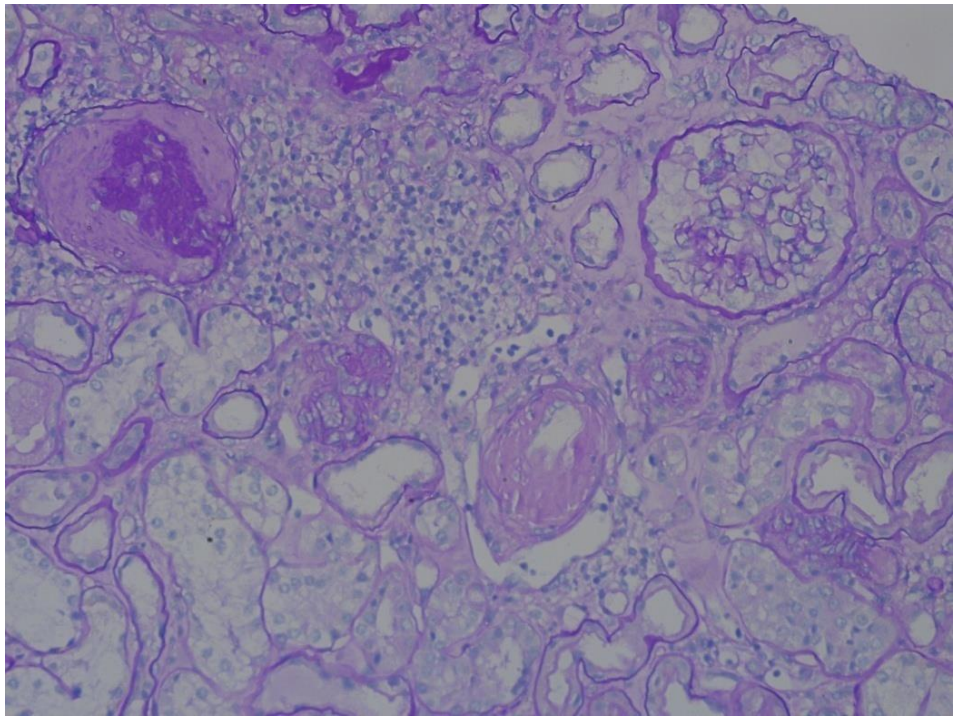




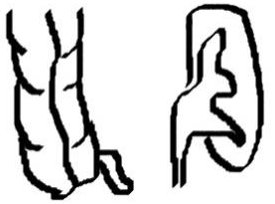
CTIN





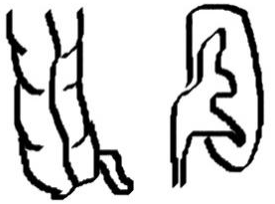


Drug-induced kidney injury in IBD



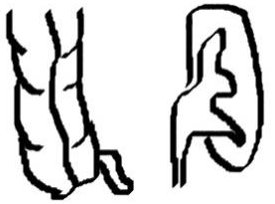
- Sulphosalazine – crystallization inside the tubular lumen.
- 5-ASA and sulphasalazine – acute and chronic TIN.
- Azathioprine – TIN and urinary tract infections.
- Anti-TNFa – granulomatous TIN, minimal change nephropathy, membranous GN, drug-induced SLE/ANCA-positive disease.
- CsA and TAC – endothelial damage → AH, thrombotic microangiopathy, constriction of the afferent arteriole and decreased GFR; TIN.
- Acute and chronic renal failure.

Acute kidney injury in IBD



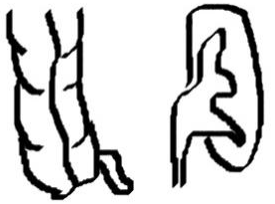
- TIN – usually in response to treatment (toxic or allergic), or in dehydration with high uric acid.
- GN – in proliferative GN, vasculitis.
- Urinary tract obstruction – stones, RPF, intraabdominal adhesions.
- Ischemic – CsA/TAC, low renal perfusion pressure.
- Comorbidities.

Chronic kidney disease in IBD



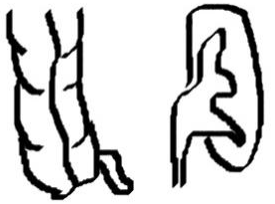
- TIN – toxic, allergic, granulomatous, or in dehydration with high uric acid.
- GN – GN, vasculitis.
- Urinary tract obstruction – stones, RPF, intraabdominal adhesions, UTI.
- Ischemic – CsA/TAC, low renal perfusion pressure.
- Amyloidosis.
- Comorbidities.

Our series with kidney changes in IBD

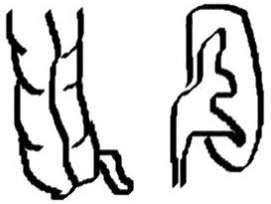


- 37 consecutive patients with IBD:
  - 16 female and 21 male,
  - mean age 47 years,
  - 19 CD and 18 UC,
  - observed for 6 years from January 2017 to January 2023.
- The most prevalent type of renal involvement was:
  - GN in 13 (minimal change GN - 6, focal and segmental glomerulosclerosis - 4, IgA GN - 2, membranoproliferative glomerulonephritis - 1), followed by
  - tubulointerstitial nephritis - 12,
  - nephrolithiasis – 8,
  - diabetic nephropathy - 6,
  - renal amyloidosis - 4 (the total number is > 37 because several patients had >1 type of renal involvement).

Our series with kidney changes in IBD



- The most common type of renal involvement in our series was GN, but also non-immune changes were observed.
- The presence of erythrocyturia, proteinuria > 500 mg/day and renal failure should prompt the physician to perform renal biopsy in order to distinguish immune from non-immune mediated renal injury in IBD and to undertake timely and adequate treatment.



THANK YOU FOR YOUR ATTENTION!