Lipoprotein Glomerulopathy
Approach to diagnosis

1. You recognize it right away because you have seen and solved a case before.
2. You have worked through one of the major textbooks of renal pathology and remember the details.
3. You have no clue – order immunohistochemistry!
DD glomerular thrombi/emboli

- fibrin
- immunoglobulins

other ?!
Unspecific immunohistochemistry

IgM

C5b-9

fibrinogen
Morphological features

- distorted architecture
- widely dilated capillary loops
- large, amorphous thrombi
- thrombi appear layered and have vacuoles
- weak PAS+, trichrome-

- unspecific IHC

- thrombi consist of layered electron dense and lucent deposits with occasional vacuoles
Clinical history

- ♂ 14y, father from Indonesia, mother from Switzerland
- grandfather from Indonesia with kidney transplantation
- elevated blood pressure on routine control
- edema for 3 years
- proteinuria 600mg/mmol creatinine
- microscopic hematuria
- cholesterol 9.5mmol/l
Lipoprotein glomerulopathy

- first case reports from Japan, subsequently also from China and rarely other parts of the world
- thrombi positive for lipids and lipoproteins
- familial occurrence → inherited disease → ApoE mutations

Hum Pathol 18:661-679,1987
Arch Pathol Lab Med 134:279-282, 2010

peripheral tissues

chylomicrons (85% TAG)

VLDL (50% TAG)

LDL (40% cholesterol)

HDL (removal of excess cholesterol)
Lipoprotein glomerulopathy - pathogenesis

- mutations in ApoE proteins
  - structural changes
    - aggregation of lipoproteins
    - glomerular deposition
    - thrombus formation
  - decreased receptor affinity

- other factors important
  - low penetrance
  - macrophage impairment

from: Stryer L: Biochemistry, 3rd Ed., 1988
Laboratory findings in LPG

ApoE

- Total cholesterol
- Total triglyceride
- LDL-cholesterol

Fenofibrate therapy in LPG

renal survival

patient survival

DD of lipid thrombi/emboli

- lipoprotein glomerulopathy
- cholesterol embolism
- fat embolism
- phosphoprotein in LCAT deficiency
A 2-year-old, spayed female Vietnamese potbellied pig (Sus scorfa) was evaluated due to polyuria, polydypsia, lethargy, and hyporexia. ...

Fatal fat embolism following amphotericin B lipid complex injection.

Joshua Lutz, CH (public domain)
LCAT deficiency

Ultrastruct Pathol 35:139-145, 2011
Summary lipoprotein glomerulopathy

- characteristic morphology with widely dilated capillaries and large lipid thrombi
- hereditary disease due to ApoE mutations with low penetrance
- most cases from East-Asia
- therapeutic control of dyslipidaemia improves prognosis
Renal lipidoses

primary lipidoses
• storage diseases (M. Fabry, Nieman-Pick, Gaucher, many others)
• familial hyperlipoproteinemias
• lipoprotein glomerulopathy
• LCAT deficiency

secondary lipidoses
• nephrotic syndrome of any origin
• Alport syndrome
• liver cirrhosis
• drugs