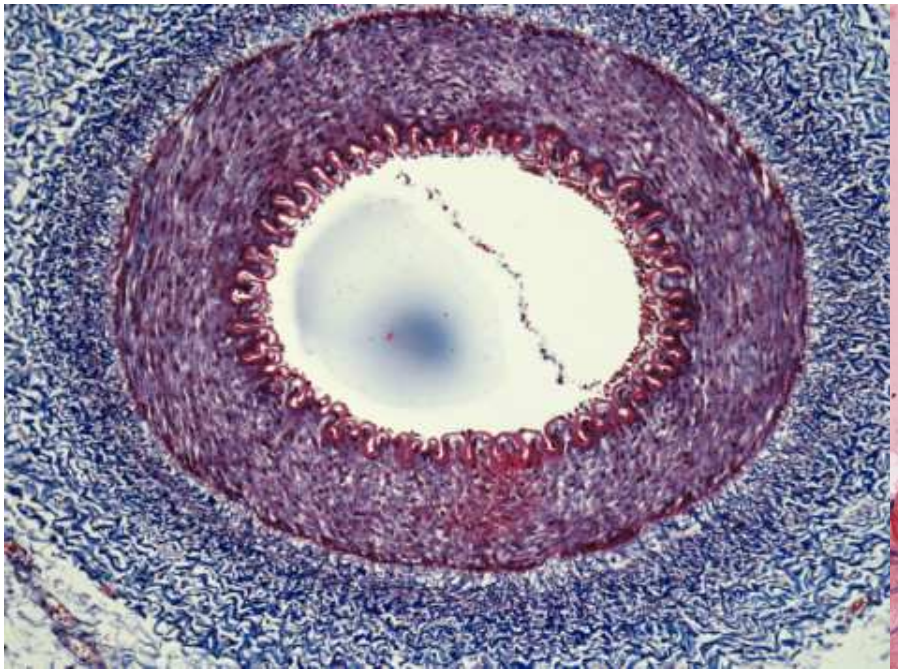
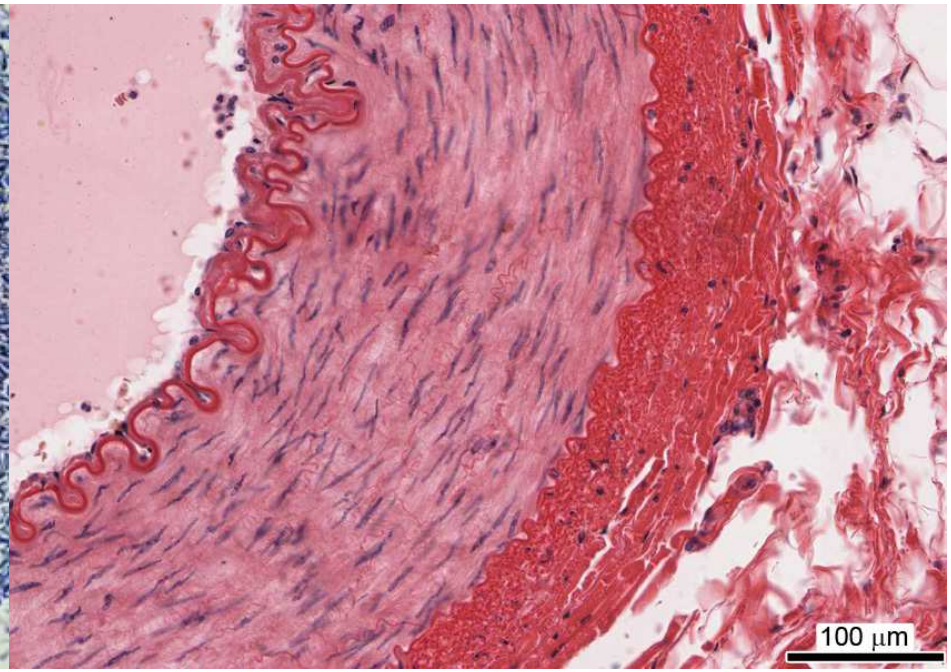
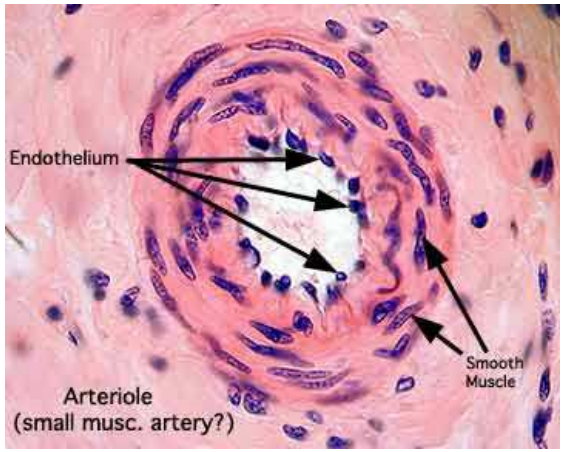
Calciphylaxis

SKC In-service April 2015

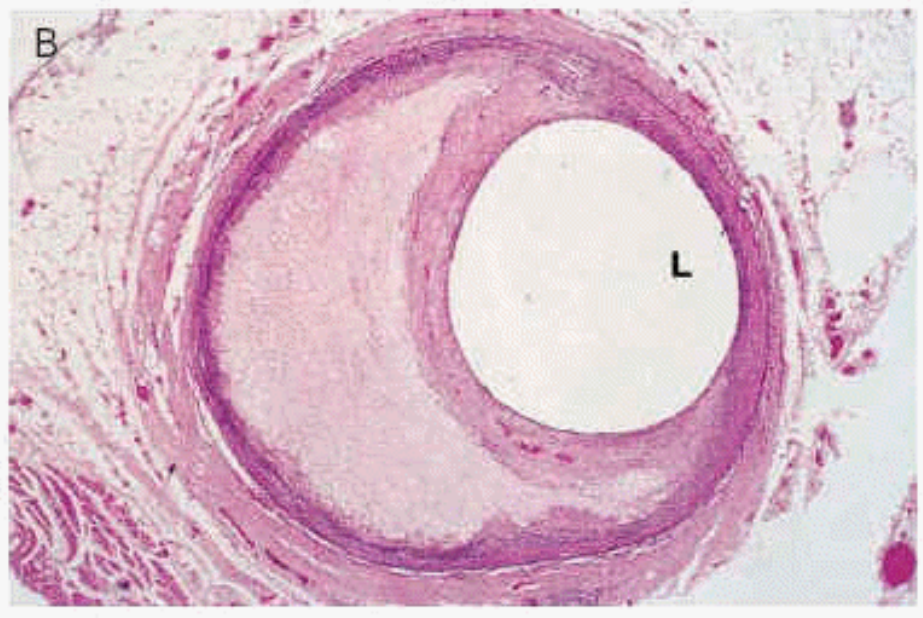
Normal Artery

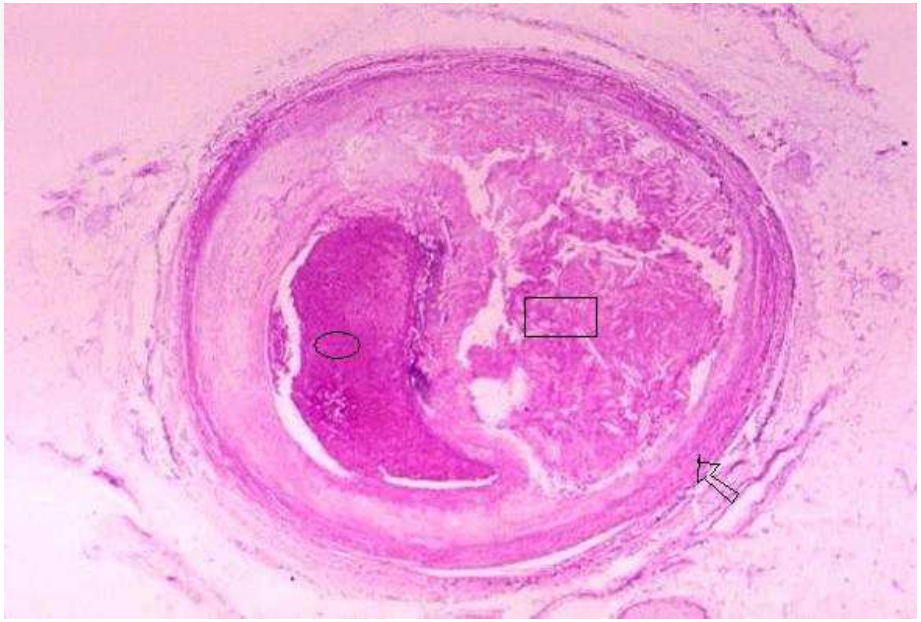




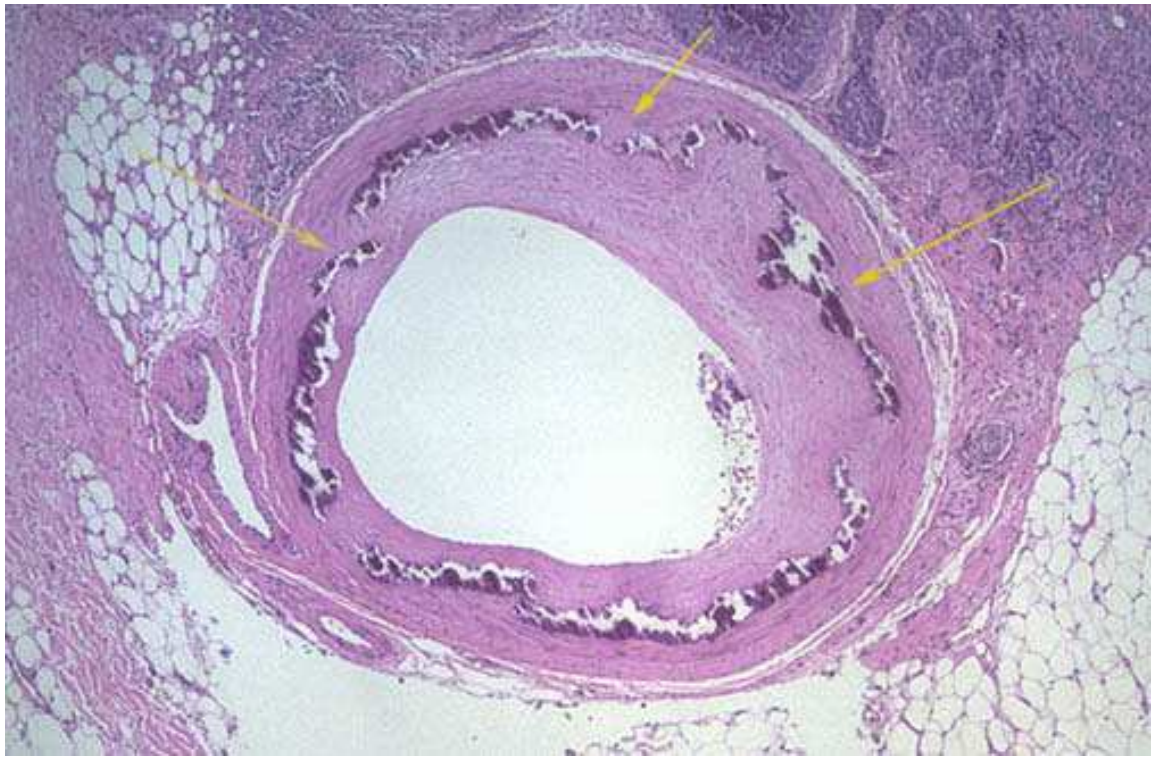


Atherosclerotic Vascular Disease

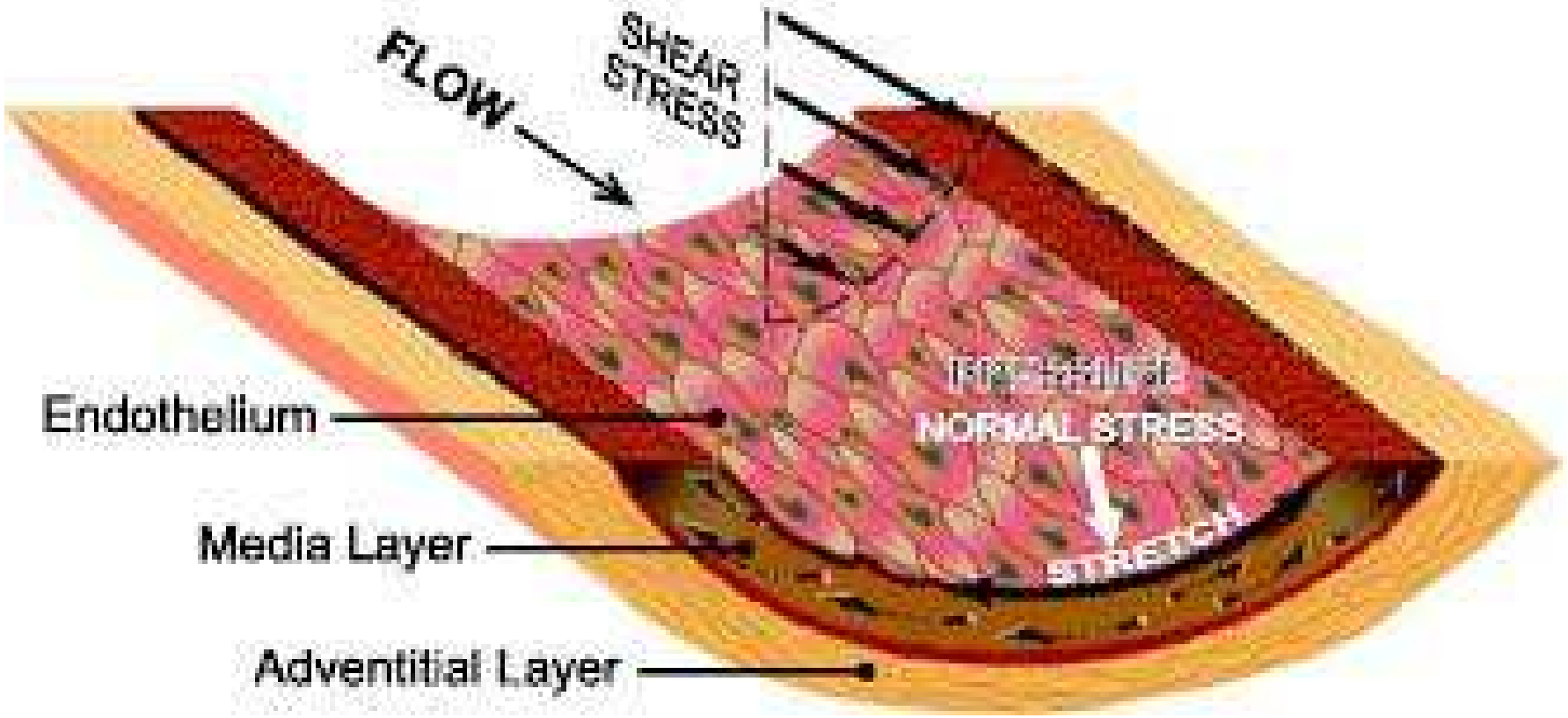


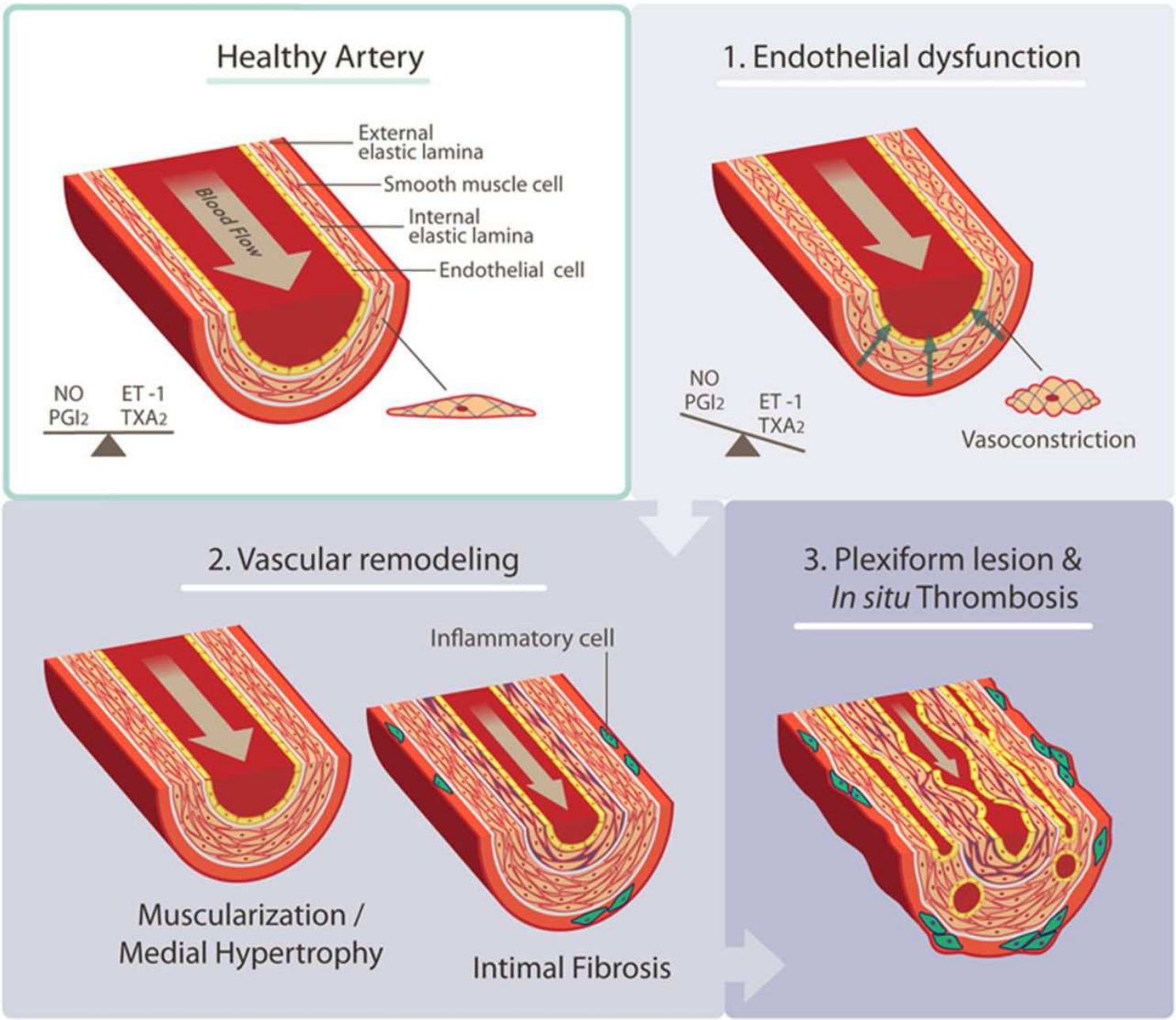


Vascular Disease of ESRD



Sheer Stress




Healthy Artery
External elastic lamina
Smooth muscle cell
Internal elastic lamina
Endothelial cell
Blood Flow
NO
PGI2
ET -1
TXA2
1. Endothelial dysfunction
NO
PGI2
ET -1
TXA2
Vasoconstriction
2. Vascular remodeling
Inflammatory cell
Muscularization / Medial Hypertrophy
Intimal Fibrosis
3. Plexiform lesion & *In situ* Thrombosis

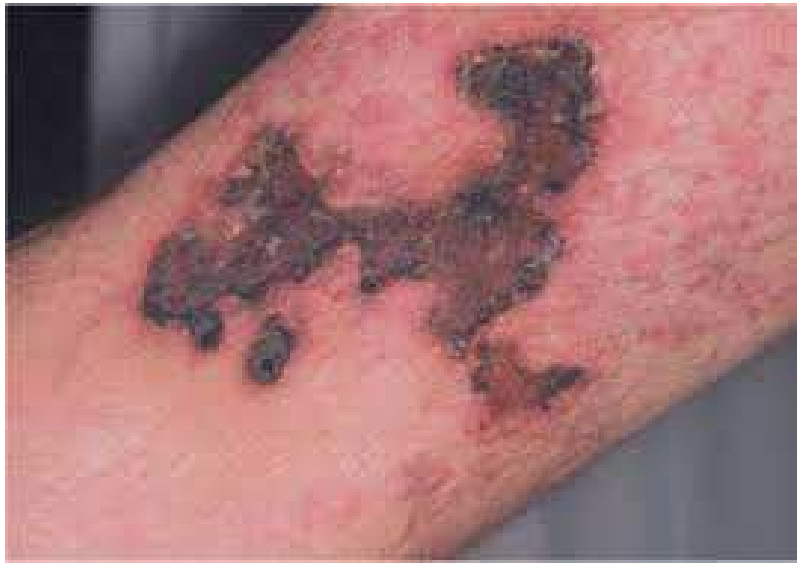
Why do arteries calcify in ESRD?

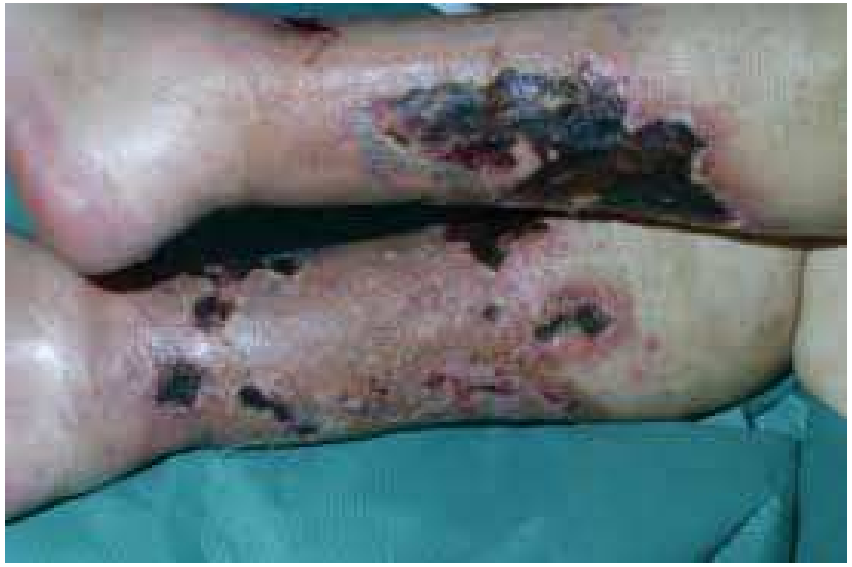
- High phosphorus → Ca/Phos deposition in tissues
- Uremic toxins
- Imbalance of vascular regulators
- Hypertension
- Inflammation
- ?Dysregulation of coagulation system

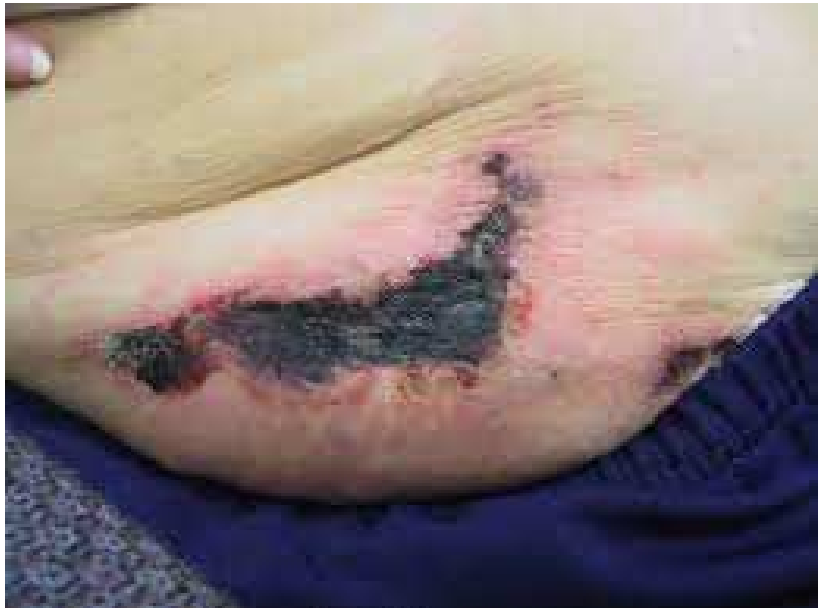
What is Calciphylaxis?

- Calcific uremic arteriopathy
  - Systemic medial calcification of the arteries, tunica media. Unlike other forms of vascular calcifications (e.g., intimal, medial, valvular), calciphylaxis is characterised also by small vessel mural calcification with or without endovascular fibrosis, extravascular calcification and vascular thrombosis, leading to tissue ischemia (including skin ischemia and, hence, skin necrosis).
- Incidence in dialysis patients < 1% per year
- Mortality rate from 40-80% at 1 year

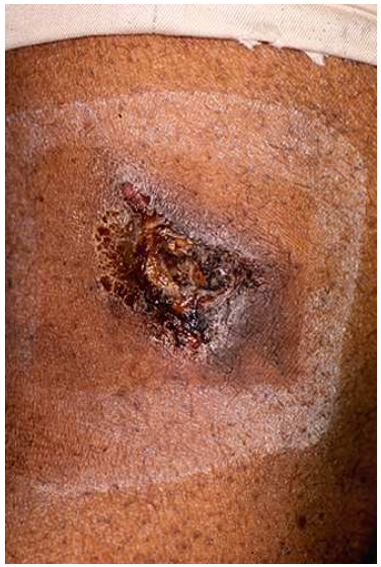
Classic pictures of calciphylaxis

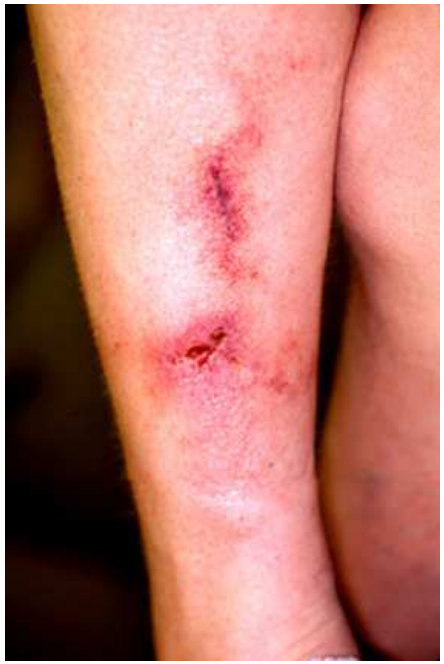


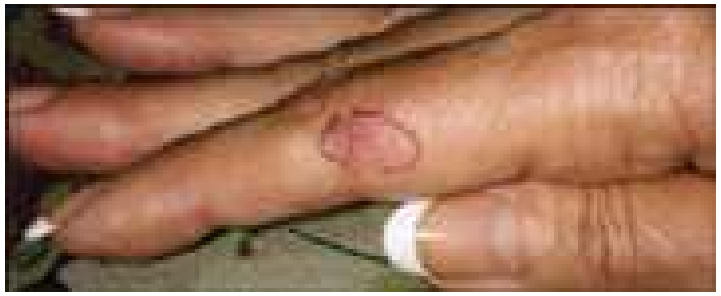


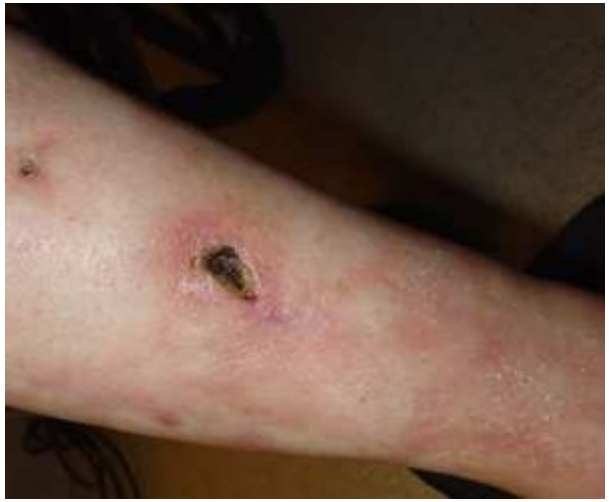


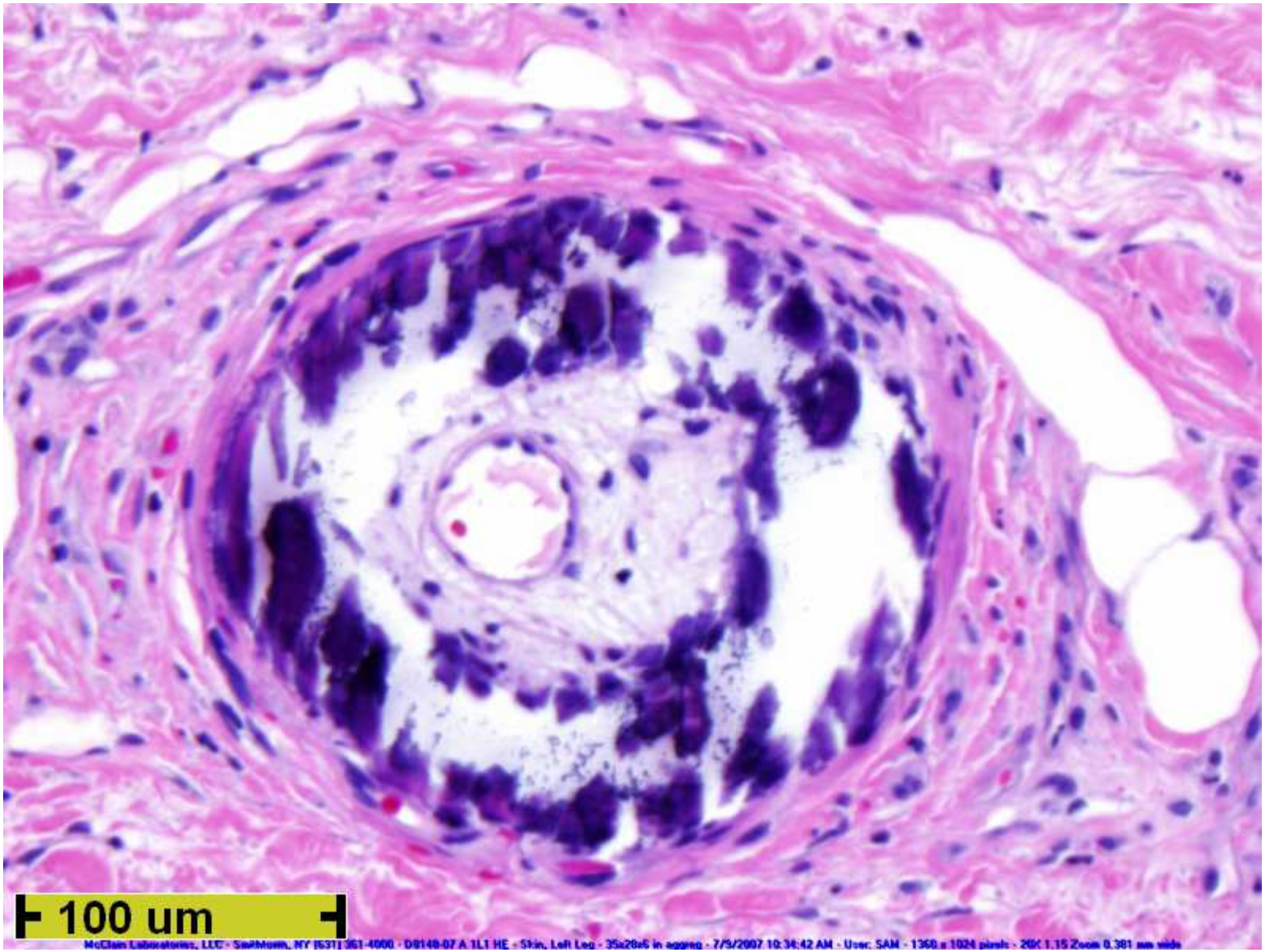
Presentation can be subtle / not classic…



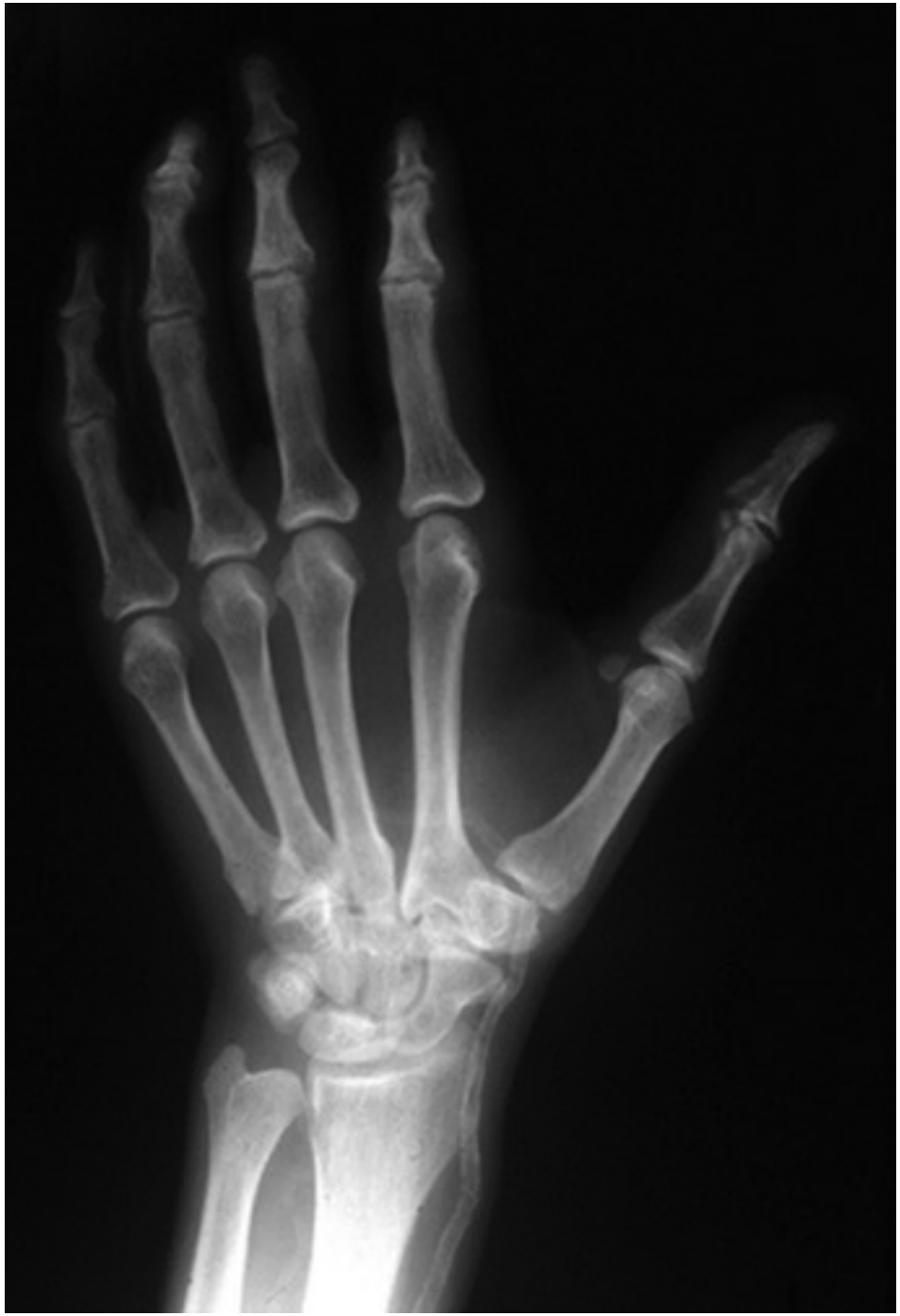







100 um
McClain Laboratories, LLC - Smithtown, NY (631) 361-4000 - D0148-07 A 1L1 HE - Skin, Left Leg - 35x28x6 in approx - 7/5/2007 10:36:42 AM - User: SAM - 1360 x 1024 pixels - 20X 1.15 Zoom 0.381 um wide


200 um



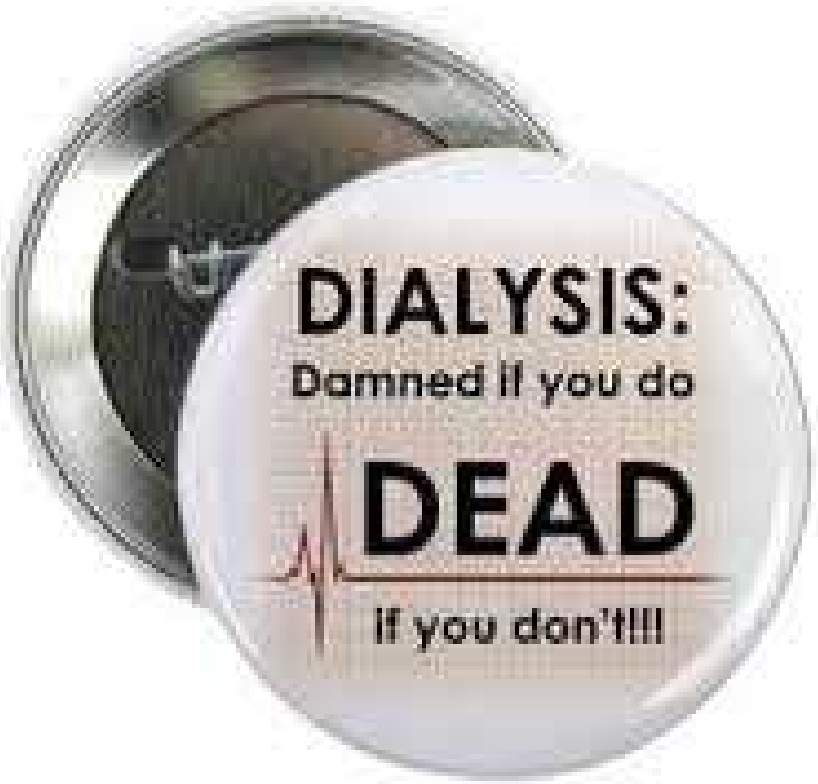
Risk Factors For Calciphylaxis

Table 2. Case-Control Studies Identified the Following Parameters and Clinical Conditions as Risk Factors for Calciphylaxis

Obesity, liver disease, and systemic corticosteroid use[4]
Low albumin levels and previous warfarin application[8]
High serum phosphate, high calcium-phosphate product, previous calcium, and vitamin D therapy[9]
Female sex, low albumin levels, high alkaline phosphatase level, and high serum phosphorus levels[10]
Low albumin level, previous calcitriol therapy, not using statins, high serum calcium levels, and previous warfarin use[11]

Table 3. Summary of treatment options in calciphylaxis

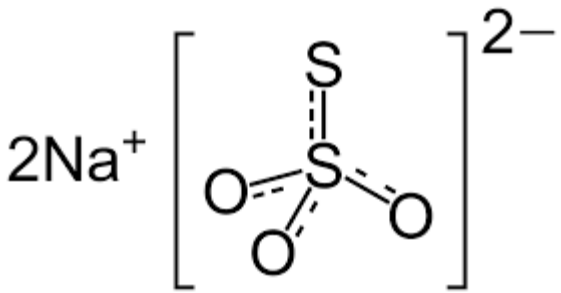
- Intensification of dialysis therapy
  - Increasing dialysis length, frequency (weekly dialysis dose)
  - Switch from hemodialysis to hemodiafiltration
  - Switch from peritoneal dialysis to hemodialysis/ hemodiafiltration
- Reduction of calcium supply and calcium intake
  - Switch to calcium-free or calcium-reduced phosphate binders (such as sevelamer or lanthanum, magnesium-based, or iron-based binders)
  - Reduction of active vitamin D dose
- Stop vitamin K antagonist treatment and start vitamin K supplementation instead
  - Use alternative long-term anticoagulation therapy such as intravenous heparin or low-molecular-weight heparin in a reduced dose
- Therapy of hyperparathyroidism without induction of adynamic bone disease
  - Application of cinacalcet
  - Parathyroidectomy
  - Optimal CKD-MBD therapy including native vitamin D supplementation (ergocalciferol, cholecalciferol)
- Reduction of calcification pressure (Table 4)
- Improve oxygen supply (eg via hyperbaric O_2 therapy)
- Supportive therapy
  - Wound management
  - Treat local and systemic infection, regular wound swabs
  - Pain management according to World Health Organization standards
  - Limb amputation in uncontrolled clinical settings
  - Psychological care for patients and family



Treatment Options

Table 4. Specific Interventions in CUA Patients Aimed at New Balance Between Procalcifying and Anticalcifying Facto

Sodium-thiosulfate (STS)
Bisphosphonates
Parathyroidectomy/cinacalcet



Meet Mr. Bates, our perfect patient. He controls his fluid levels by not drinking and his potassium, cholesterol and phosphates by not eating.