Amyloidosis

Lab 4

MS.C. Fadhela Nafi ALRAWI

Amyloidosis

- Amyloid denotes irregular protein clusters that create insoluble fibrils and accumulate in tissues. These deposits are linked to a range of diseases, such as Alzheimer's, Parkinson's, and systemic amyloidosis. Amyloid fibrils mainly consist of misfolded proteins that are resistant to degradation, resulting in cellular dysfunction and toxicity.
- The Material Method is used for precise tissue examination to identify amyloid deposits
- Commonly Affected Organs: Kidneys, heart, liver, nervous system, and gastrointestinal tract.
- Symptoms: Fatigue, weight loss, swelling, organ dysfunction, and nerve damage

Causes & Types of Amyloidosis

Causes

-Genetic factors (e.g., hereditary amyloidosis)

- Chronic inflammatory diseases (e.g., rheumatoid arthritis)

- Malignancies (e.g., multiple myeloma)

Types

-AL Amylo idosis (Primary): Caused by abnormal plasma cells.

-AA Amyloidosis (Secondary): Results from chronic inflammatory conditions.

- Hereditary Amyloidosis: Genetic mutations cause amyloid deposits.

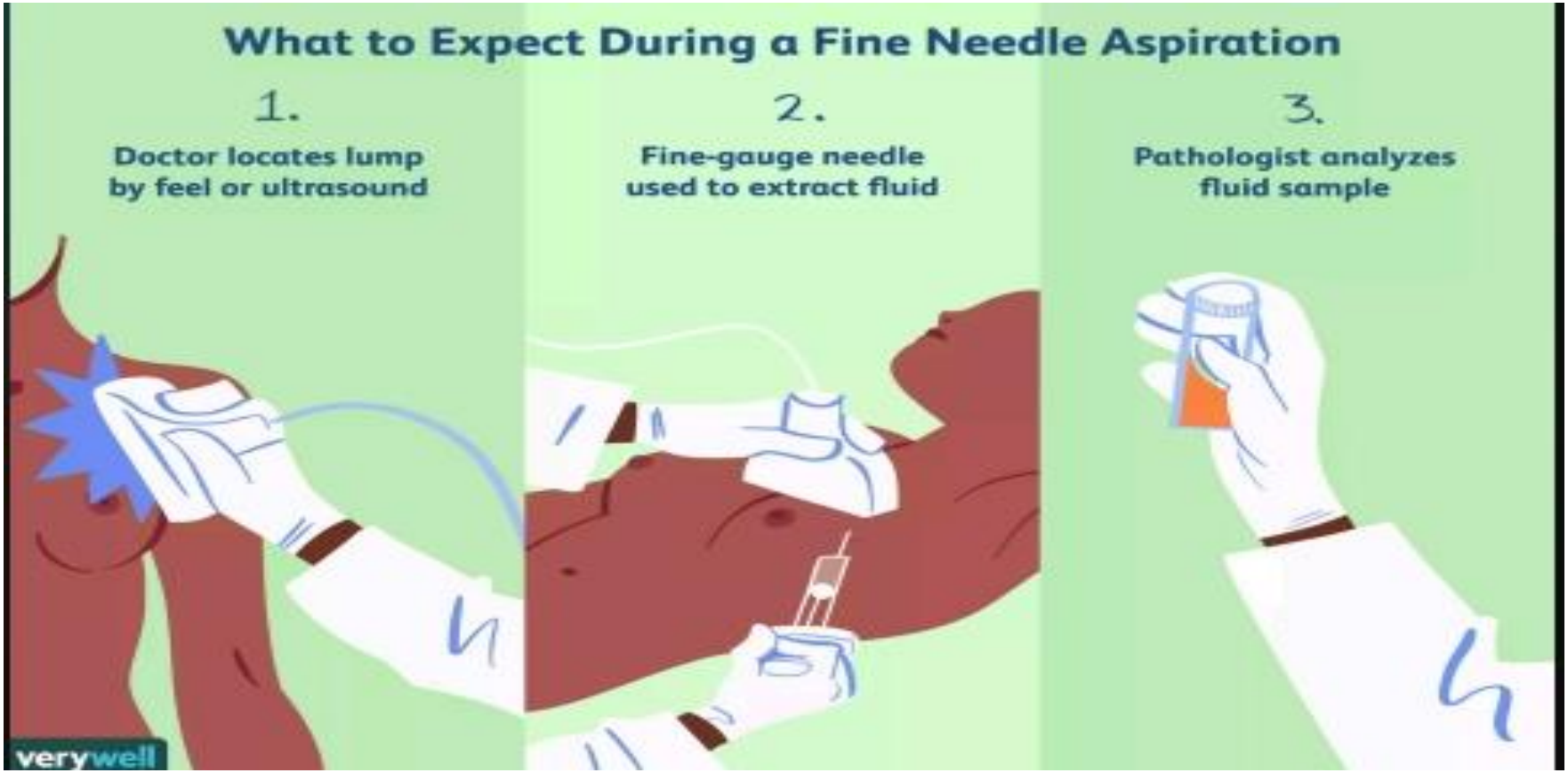
-Wild-Type ATTR (TTR) Amyloidosis: Involves the transthyretin protein

Diagnosis

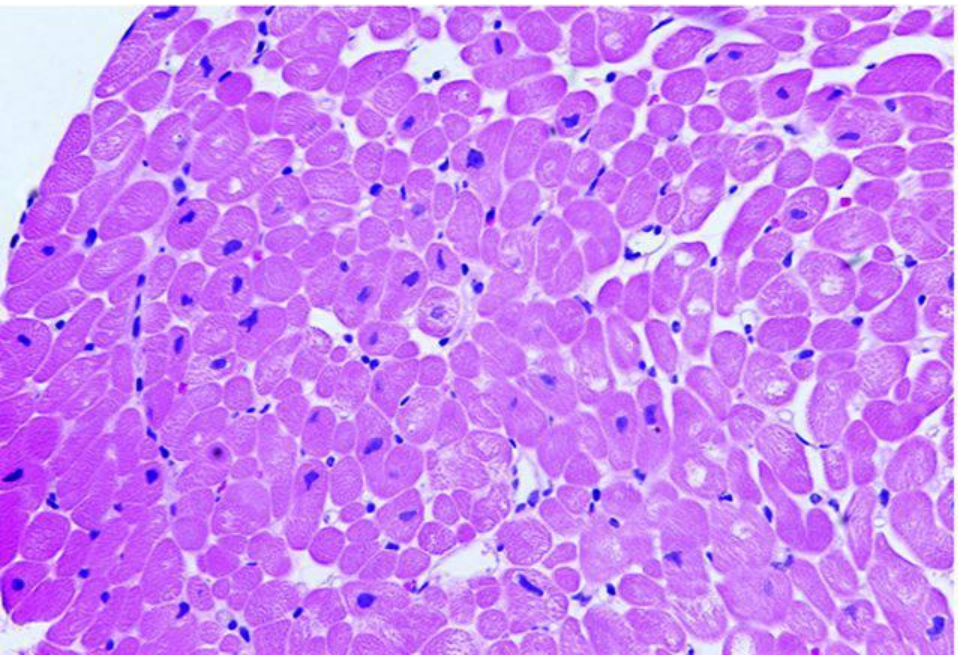
- • Biopsy: Taking tissue samples to detect amyloid deposits.
- • Blood and Urine Tests: To check for abnormal protein levels.
- • Imaging: MRI, CT scans to detect organ involvement.

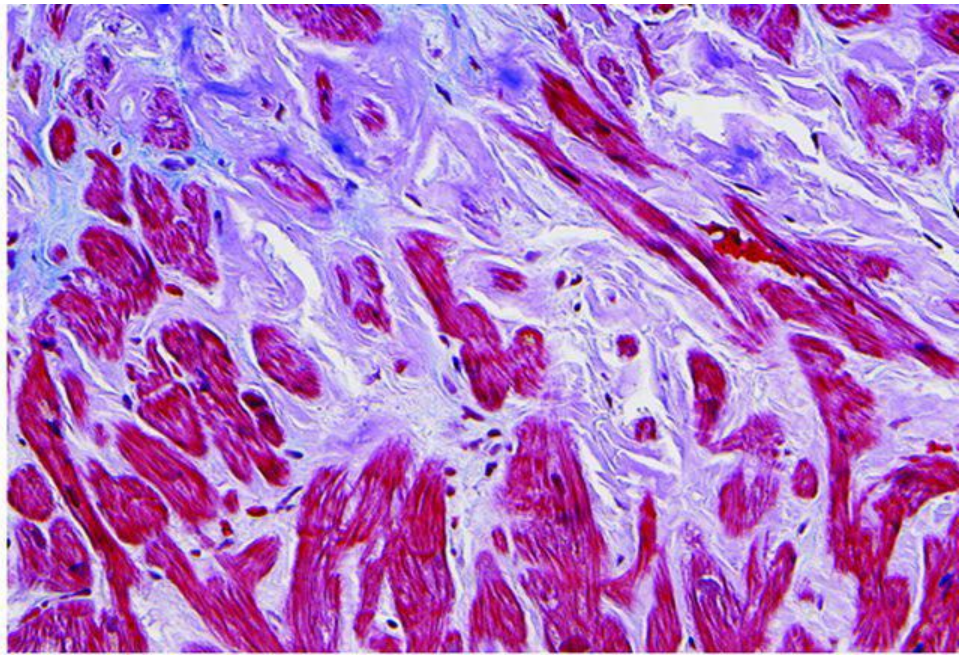
Sample collection

1_ Fine Needle Aspiration (FNA): For superficial tissues such as heart amyloidosis



Sample collection

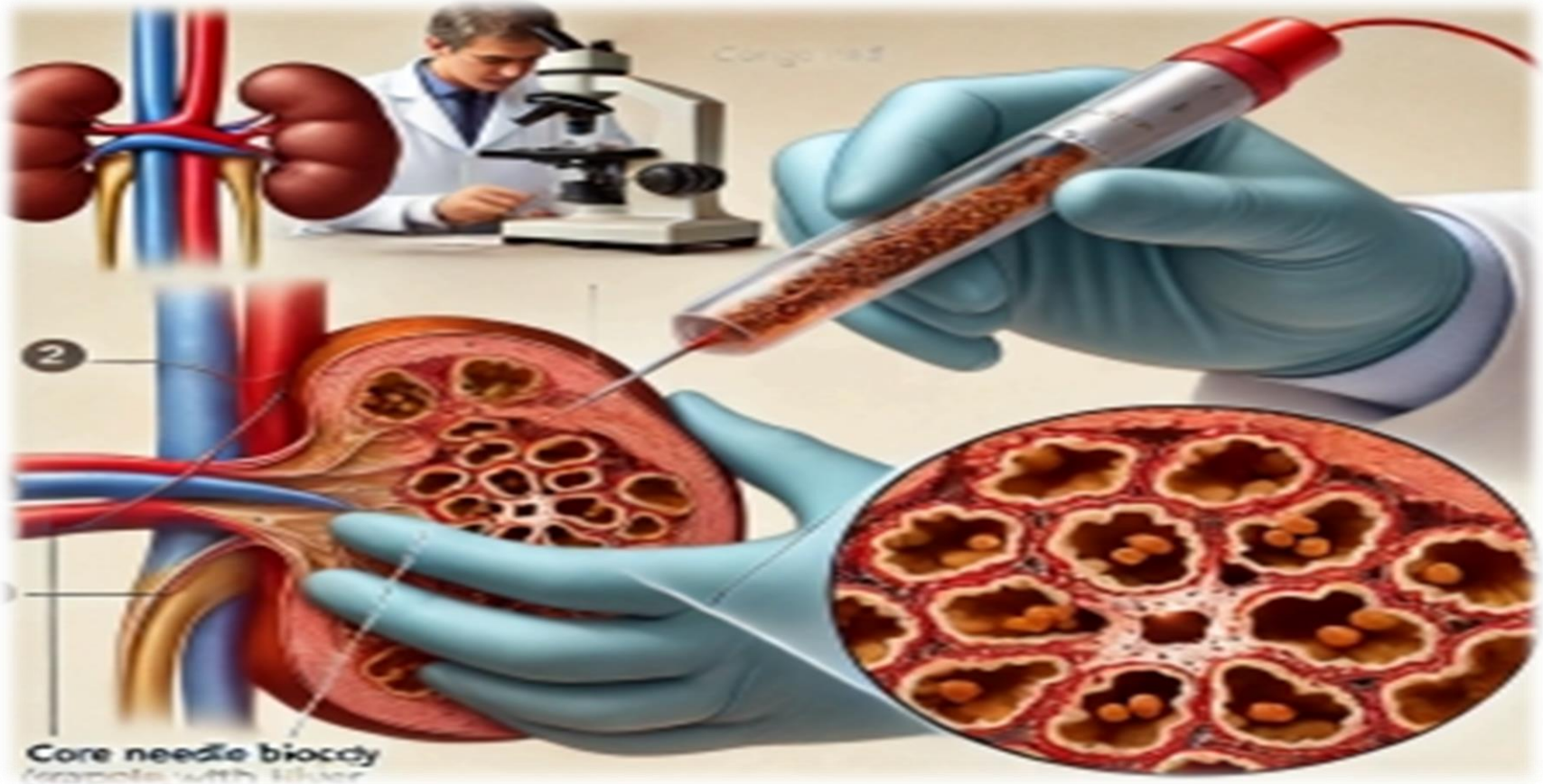




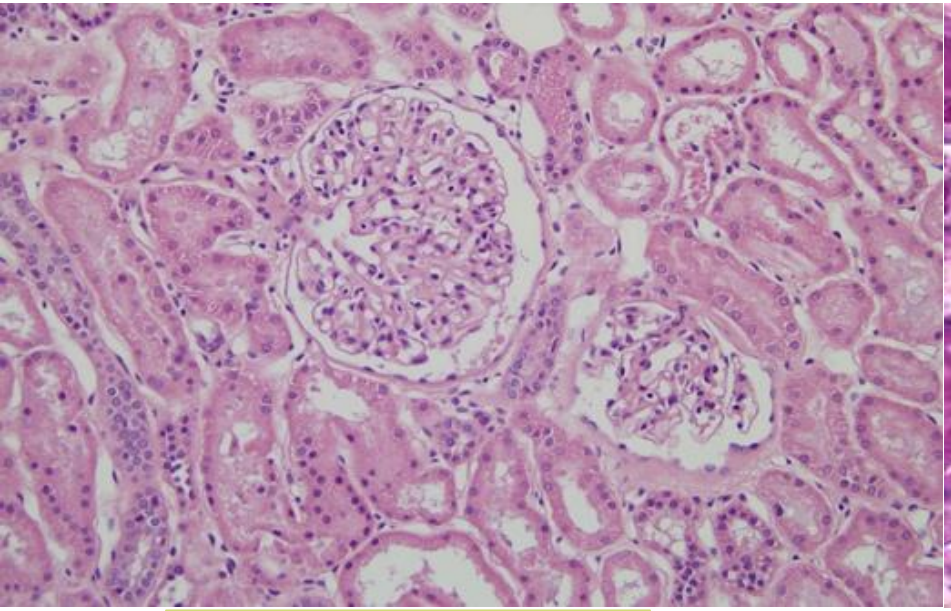
- Cardiac biopsies (original magnification ×400) showing normal findings (left) and extensive amyloid infiltration (right). In the normal heart, the muscle fibers (stained pink in this slide) are close together with little space between them. In the patient with amyloidosis, the muscle fibers, staining here in red, are disrupted by a large amount of amyloid deposited between them (staining light pink-purple). (Images courtesy of Dr Paul VanderLaan, Brigham and Women's Hospital Department of Pathology).

Sample collection

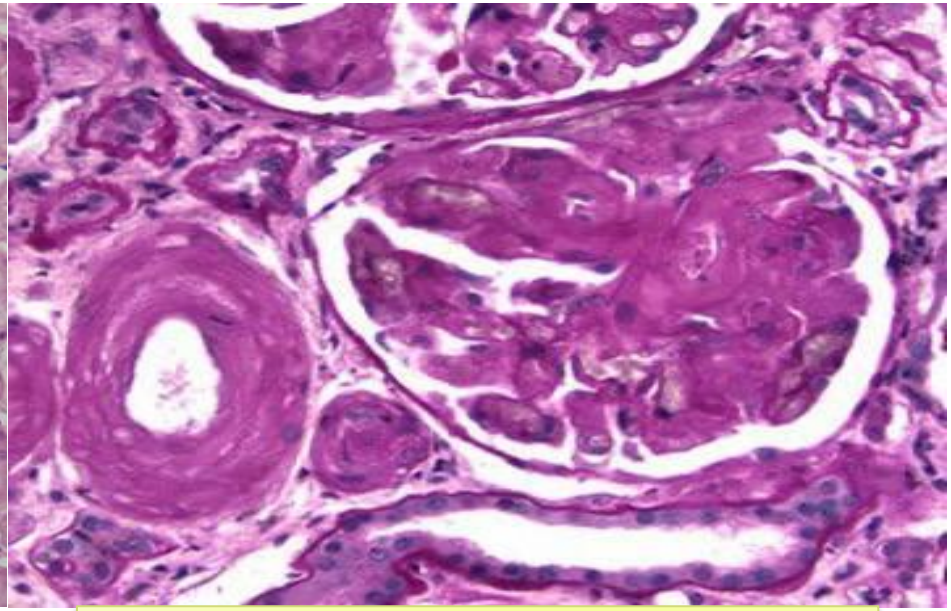
2_ Core Needle Biopsy: Obtains a larger tissue Sample such as kidney



Sample collection

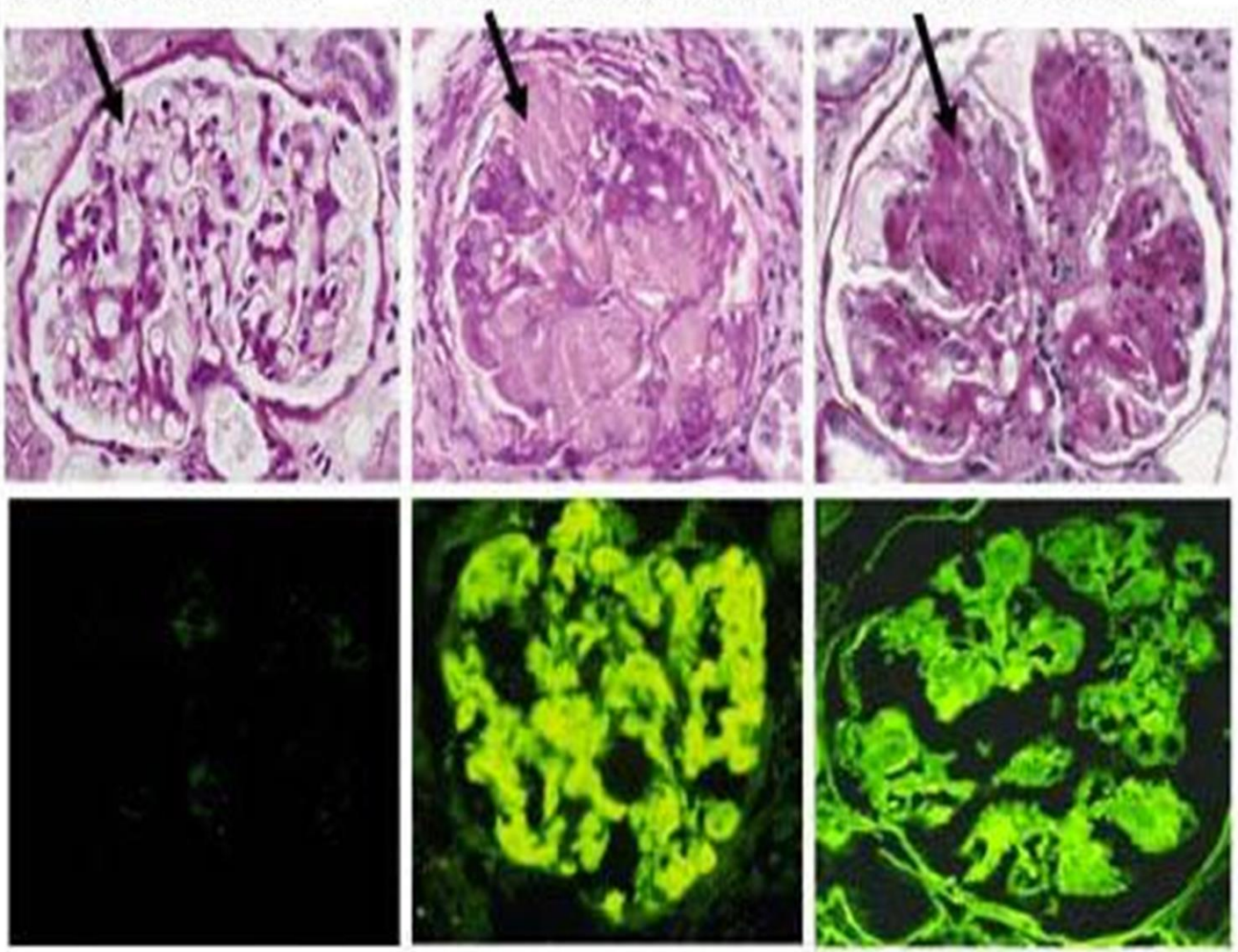


Normal glomerulus



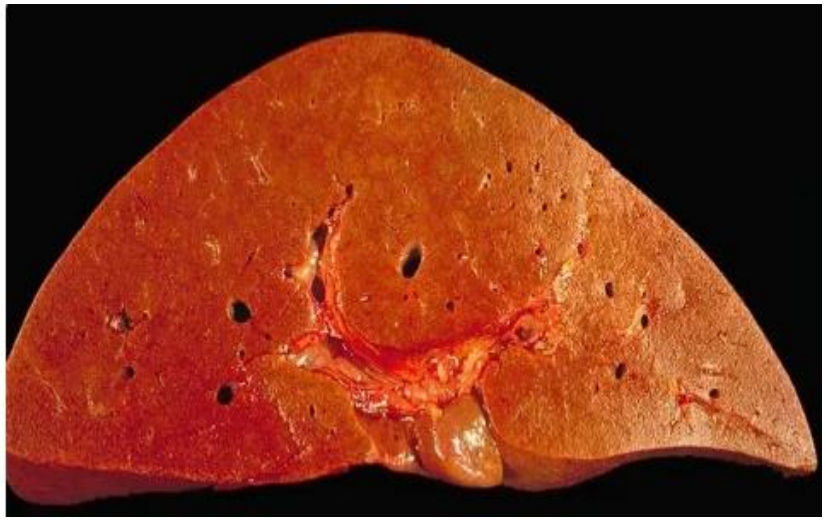
Glomerulus affected by amyloidosis

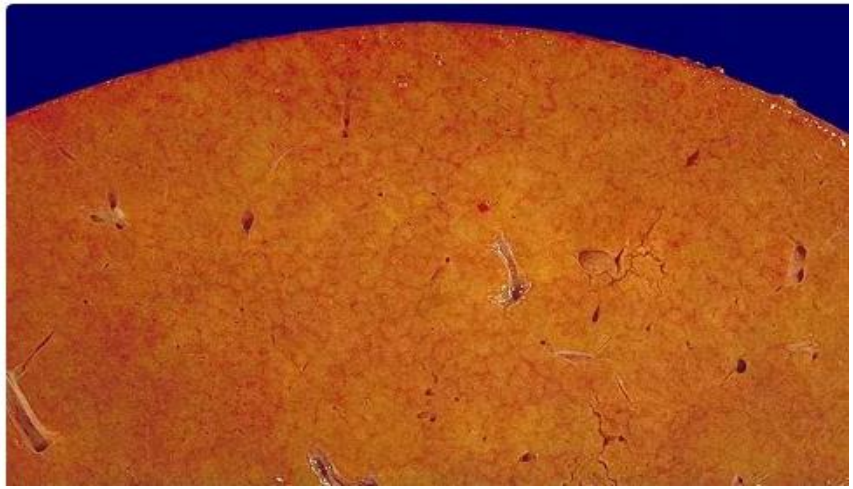
Shown above are two glomeruli, or kidney filters, as they look under a microscope. The normal filter is on the left, and the filter damaged by this disease is on the right. In the normal filter (left), there are many open “loops” scattered throughout- these are all small blood vessels seen in a small piece cut from the kidney. In the affected filter on the right, almost all of these loops have flattened because of all the built up of amyloid protein.

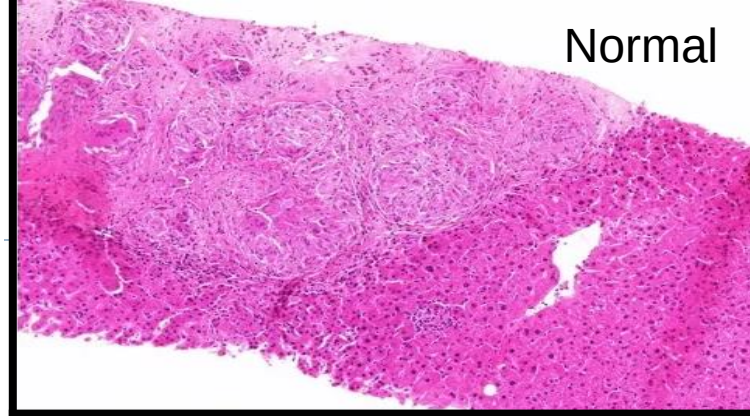

Normal glomerulus with open capillary lumens
Amyloidosis with deposits obliterating the glomerulus
MIDD with deposits distorting the glomerulus
No immunoglobulin deposits detected
Monoclonal light chain dense deposits detected
Monoclonal light or heavy chain deposits detected

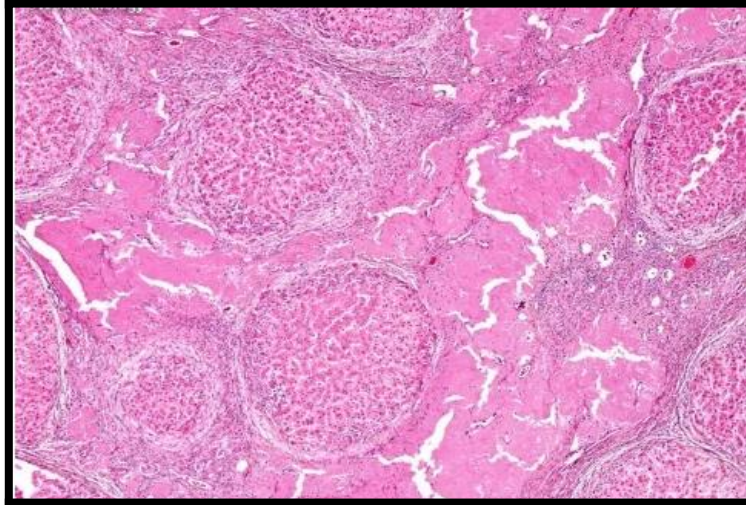
3_ Surgical Biopsy: When a deep tissue sample is required such as Liver

_ Hepatic amyloid deposition may result from either primary (AL) or secondary (AA) amyloidosis. Grossly, the liver cut surfaces contain pale, waxy areas corresponding to the abundant amorphous, lightly eosinophilic amyloid deposits, which can be confirmed by apple green birefringence on Congo Red staining with polarized microscopy. The disease may progress to cause hepatocyte parenchymal atrophy.

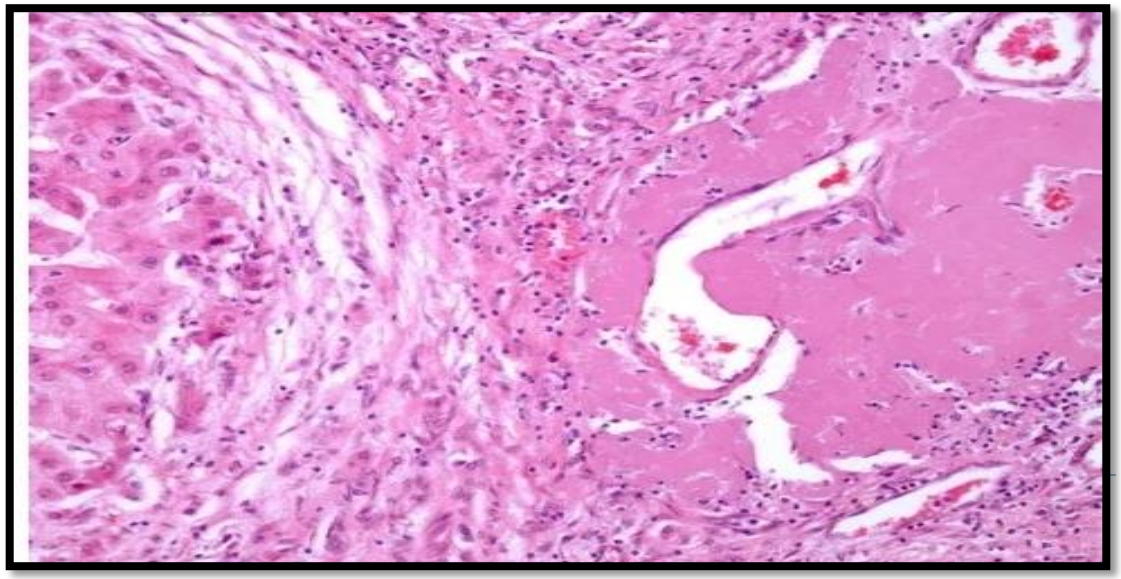


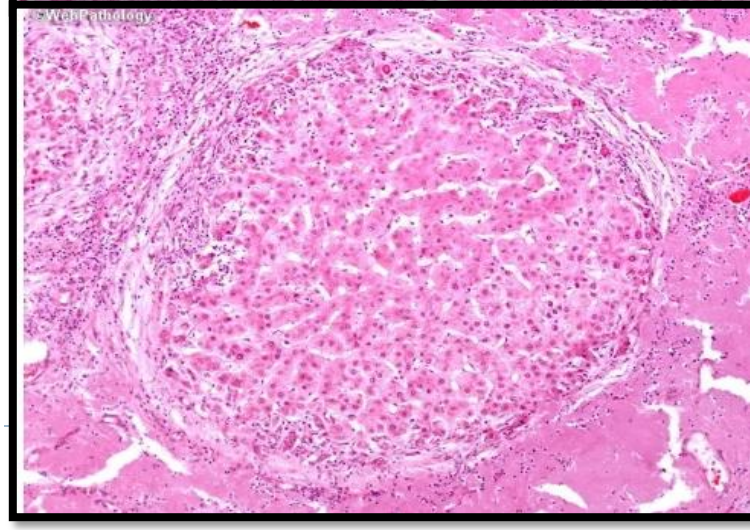






A higher magnification of the shows marked hepatic amyloid deposition, which begins in portal vessels and hepatic sinusoids. With disease progression, the residual liver parenchyma is compressed into nodules separated by abundant amorphous, eosinophilic amyloid deposits. The presence of amyloid can be confirmed by apple green birefringence on Congo Red staining



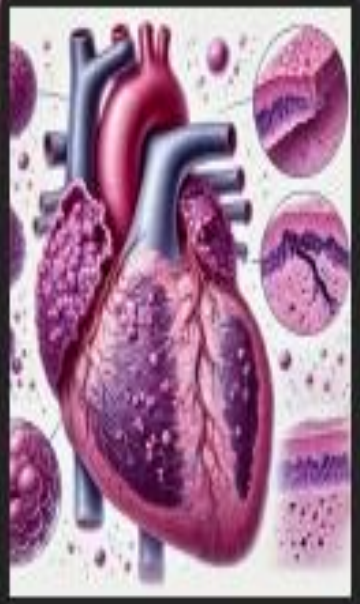


Abdominal fat pad

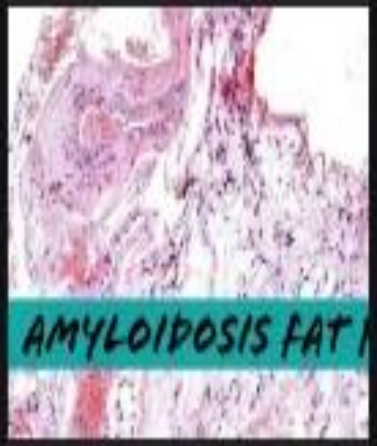
Kidney

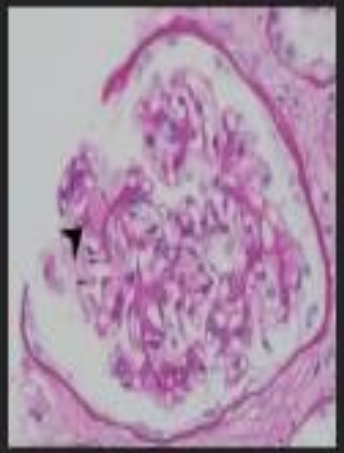
Liver

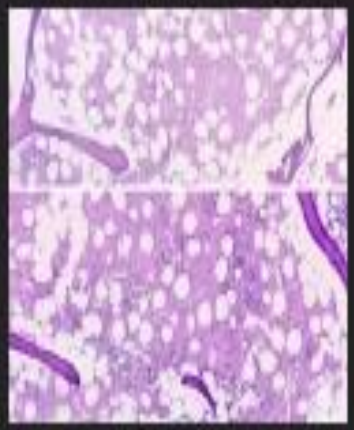
Bone marrow

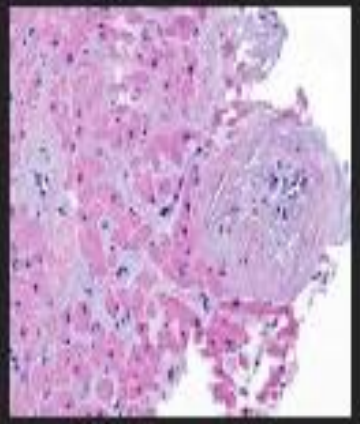


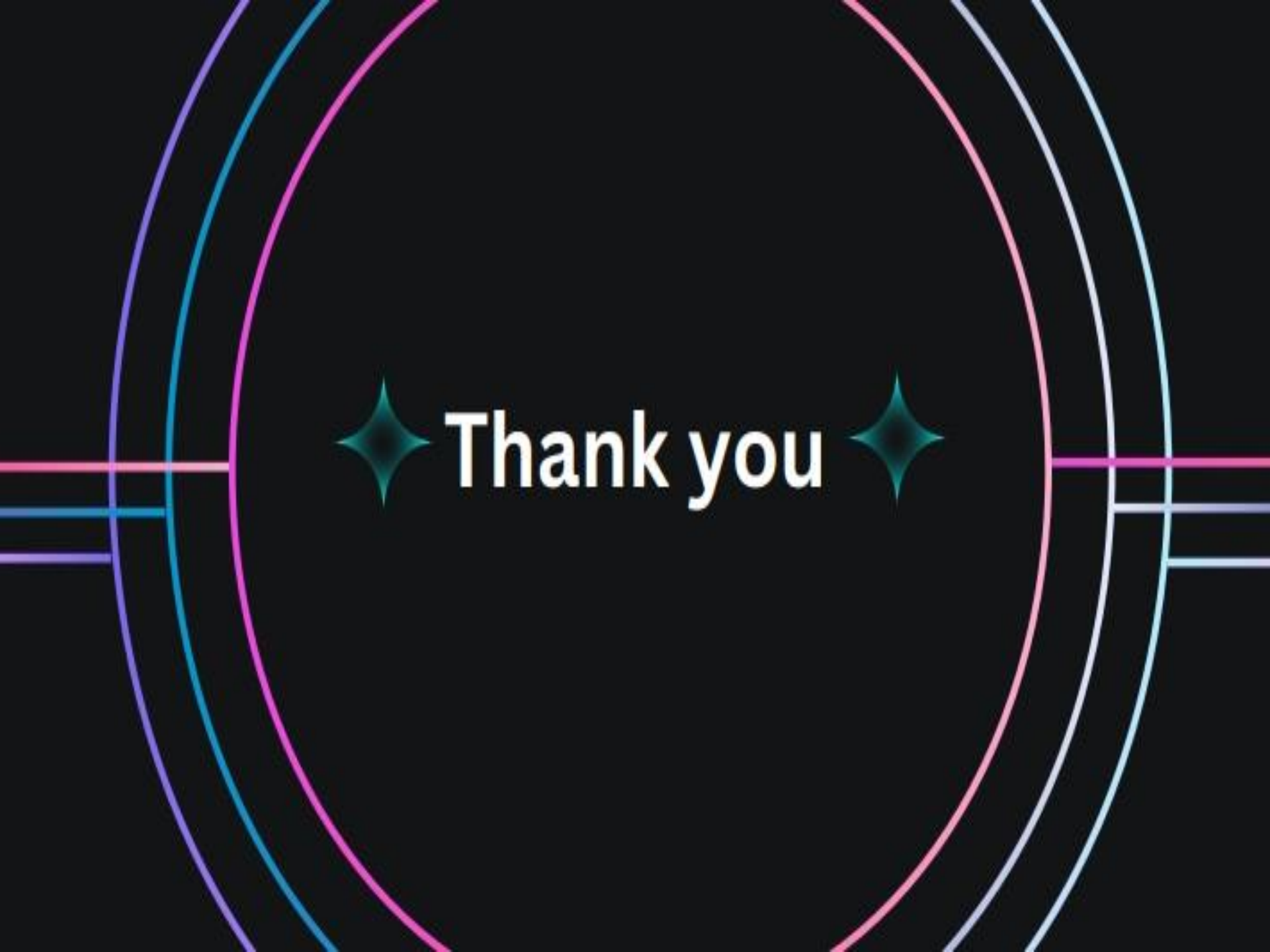
Heart










Thank you