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History in Nephrology

True Legends are immortal through their deeds and memories.!

CKM Syndrome

Dr. Paul Kimmeslstiel

Dr. Clifford Wilson



CKM Syndrome was formally introduced by the American Heart Association in 2023.

Characteristic renal lesions had been described by different pioneers over more than a century

The Kimmelstiel–Wilson Renal Lesions

A Landmark in Diabetic Kidney Disease and the CKM Spectrum



Paul Kimmelstiel
(1900 – 1970)



Clifford Wilson
(1906 – 1997)

Their Landmark Contribution – 1936

- Described intercapillary glomerulosclerosis in diabetic nephropathy.
- Identified the characteristic nodular glomerular lesions, now called **Kimmelstiel–Wilson nodules.**



Legacy & Relevance Today

A classic lesion of Diabetic Kidney Disease (DKD) → A key renal manifestation in the **CKM syndrome** → Helps in risk stratification and prognosis → Guides comprehensive CKM management (SGLT2i, GLP-1 RA, RAASi)

Key Take-home

- ✓ Kimmelstiel and Wilson first characterized the nodular renal lesion of diabetes (1936).
- ✓ It remains a prototype of CKM-related kidney injury.
- ✓ Highlights the early link between metabolic disease, kidney damage and cardiovascular risk.

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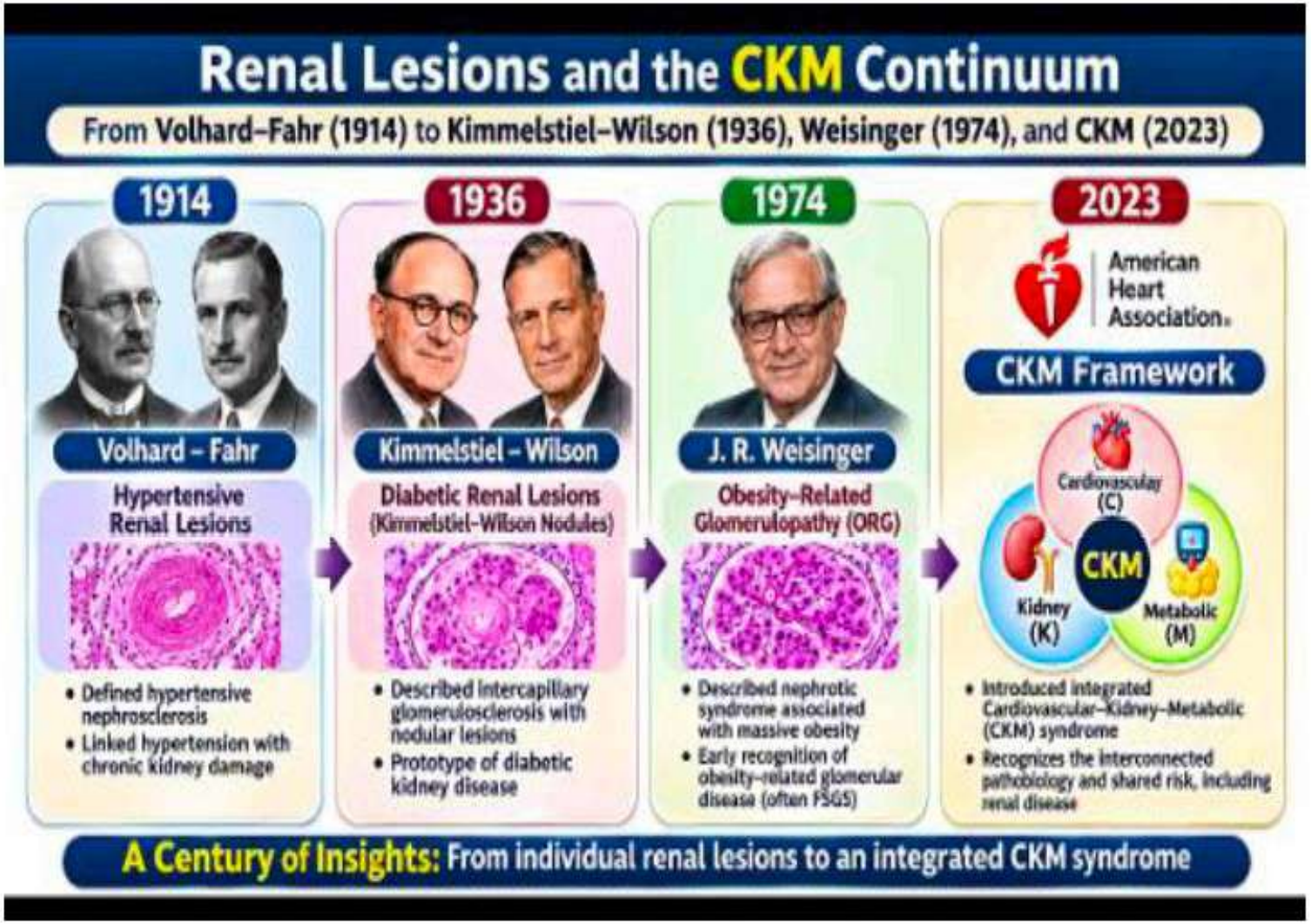


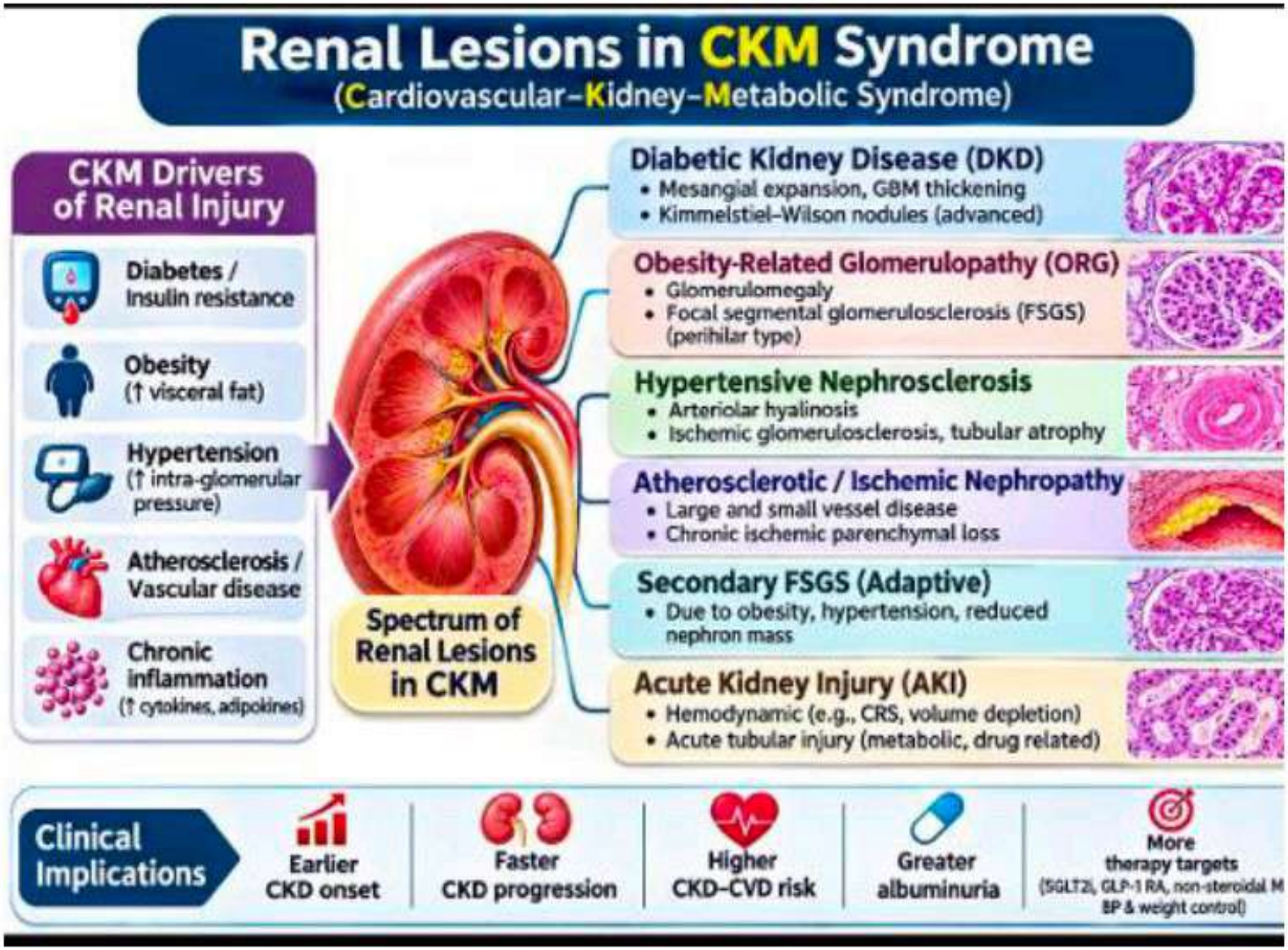
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Renal Lesions and the CKM Continuum
From Volhard–Fahr (1914) to Kimmelstiel–Wilson (1936), Weisinger (1974), and CKM (2023)
1914
Volhard – Fahr
Hypertensive Renal Lesions
• Defined hypertensive nephrosclerosis
• Linked hypertension with chronic kidney damage
1936
Kimmelstiel – Wilson
Diabetic Renal Lesions (Kimmelstiel-Wilson Nodules)
• Described intercapillary glomerulosclerosis with nodular lesions
• Prototype of diabetic kidney disease
1974
J. R. Weisinger
Obesity-Related Glomerulopathy (ORG)
• Described nephrotic syndrome associated with massive obesity
• Early recognition of obesity-related glomerular disease (often FSGS)
2023
American Heart Association.
CKM Framework
Cardiovascular (C)
CKM
Kidney (K)
Metabolic (M)
• Introduced integrated Cardiovascular–Kidney–Metabolic (CKM) syndrome
• Recognizes the interconnected pathobiology and shared risk, including renal disease
A Century of Insights: From individual renal lesions to an integrated CKM syndrome


Renal Lesions in CKM Syndrome
(Cardiovascular–Kidney–Metabolic Syndrome)
CKM Drivers of Renal Injury
Diabetes / Insulin resistance
Obesity (↑ visceral fat)
Hypertension (↑ intra-glomerular pressure)
Atherosclerosis / Vascular disease
Chronic inflammation (↑ cytokines, adipokines)
Spectrum of Renal Lesions in CKM
Diabetic Kidney Disease (DKD)
• Mesangial expansion, GBM thickening
• Kimmelstiel–Wilson nodules (advanced)
Obesity-Related Glomerulopathy (ORG)
• Glomerulomegaly
• Focal segmental glomerulosclerosis (FSGS) (perihilar type)
Hypertensive Nephrosclerosis
• Arteriolar hyalinosis
• Ischemic glomerulosclerosis, tubular atrophy
Atherosclerotic / Ischemic Nephropathy
• Large and small vessel disease
• Chronic ischemic parenchymal loss
Secondary FSGS (Adaptive)
• Due to obesity, hypertension, reduced nephron mass
Acute Kidney Injury (AKI)
• Hemodynamic (e.g., CRS, volume depletion)
• Acute tubular injury (metabolic, drug related)
Clinical Implications
Earlier CKD onset
Faster CKD progression
Higher CKD–CVD risk
Greater albuminuria
More therapy targets
(SGLT2i, GLP-1 RA, non-steroidal M
BP & weight control)