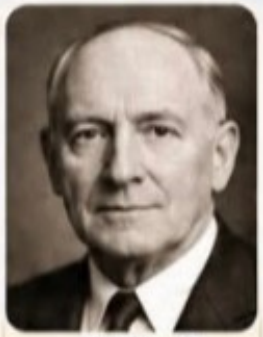
Diabetic Nephropathy in Type 1 Diabetes Mellitus

From Discovery to Prevention

The Discovery



Paul Kimmelstiel
(1900 – 1970)



Clifford Wilson
(1906 – 1997)

1936

First described the characteristic nodular glomerulosclerosis in diabetes – the **Kimmelstiel–Wilson lesion.**

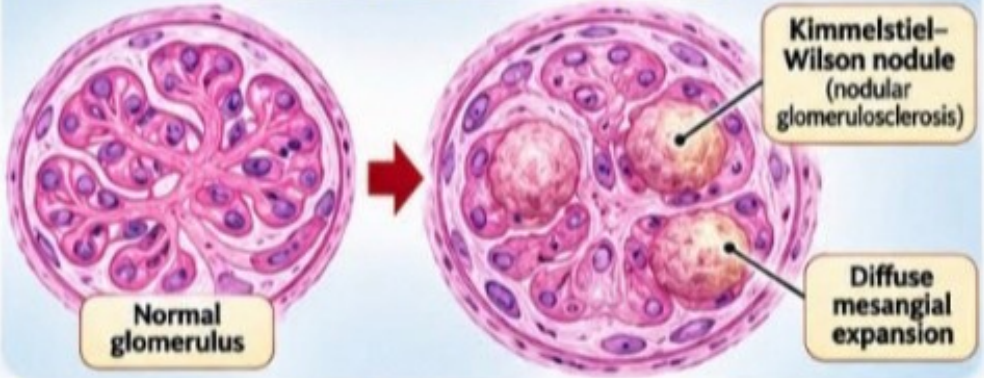
Epidemiology in Type 1 DM

Affects ~ **25–40%** with ≥ **20–25 years** duration of Type 1 DM.

Pathogenesis

- Chronic hyperglycemia
- Glomerular hypertension & hyperfiltration
- AGEs — Advanced glycation end products
- Inflammation & oxidative stress
- Fibrosis (ECM deposition)

Renal Pathology



Clinical Features & Monitoring

- Microalbuminuria (UACR ≥ 30 mg/g)
- Progressive decline in eGFR
- Often coexists with hypertension & retinopathy
- Strong association with diabetic retinopathy

Natural History in Type 1 DM

Year 0 – 5	Normal or ↑ GFR (hyperfiltration)
5 – 10 years	Microalbuminuria (30 – 300 mg/day)
10 – 20 years	Overt proteinuria (> 300 mg/day)
> 20 years	Progressive fall in eGFR → CKD / ESKD

Management (Kidney Protection)

- **Tight glycemic control** (HbA1c ~7% or individualized)
- **Blood pressure control** (ACEi / ARB – first line)
- **SGLT2 inhibitor*** (benefit in T1DM with albuminuria)
- **Lipid management** (statin)
- **Lifestyle:** no smoking, healthy weight, regular exercise
- **Early detection & regular monitoring** (UACR and eGFR)

* Use per regulatory guidance; monitor for euglycemic DKA in T1DM.

Key Takeaways

- Diabetic nephropathy in Type 1 DM was first characterized by Kimmelstiel and Wilson in 1936.
- A common, progressive microvascular complication, typically after > 10 years of diabetes.
- Early detection, optimal glycemic and blood pressure control, and renal-protective therapies can slow progression to kidney failure.