



Corso di Nefrologia

Corso di laurea

Triennale

FISIOTERAPIA

Prof. Carlo Manno

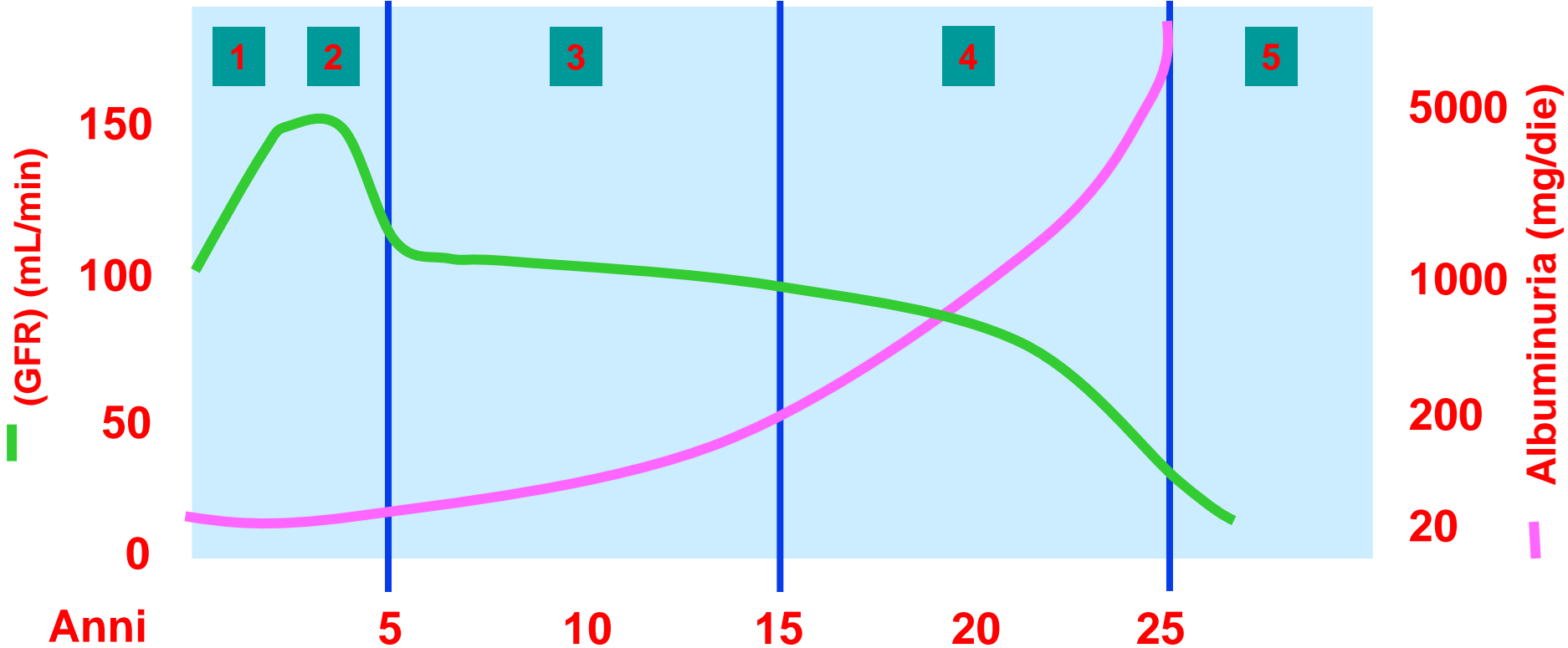
**LA NEFROPATIA
DIABETICA**

NEFROPATIA DIABETICA

- ❑ **Caratterizzata dalla presenza di albuminuria persistente (>300 mg/24h o >200µg/min, valutata in almeno due occasioni a 3-6 mesi di distanza)**
- ❑ **Sviluppo di ipertensione, progressivo aumento della proteinuria, declino del GFR e progressione della malattia renale cronica (MRC)**

LA STORIA NATURALE DELLA NEFROPATIA DIABETICA

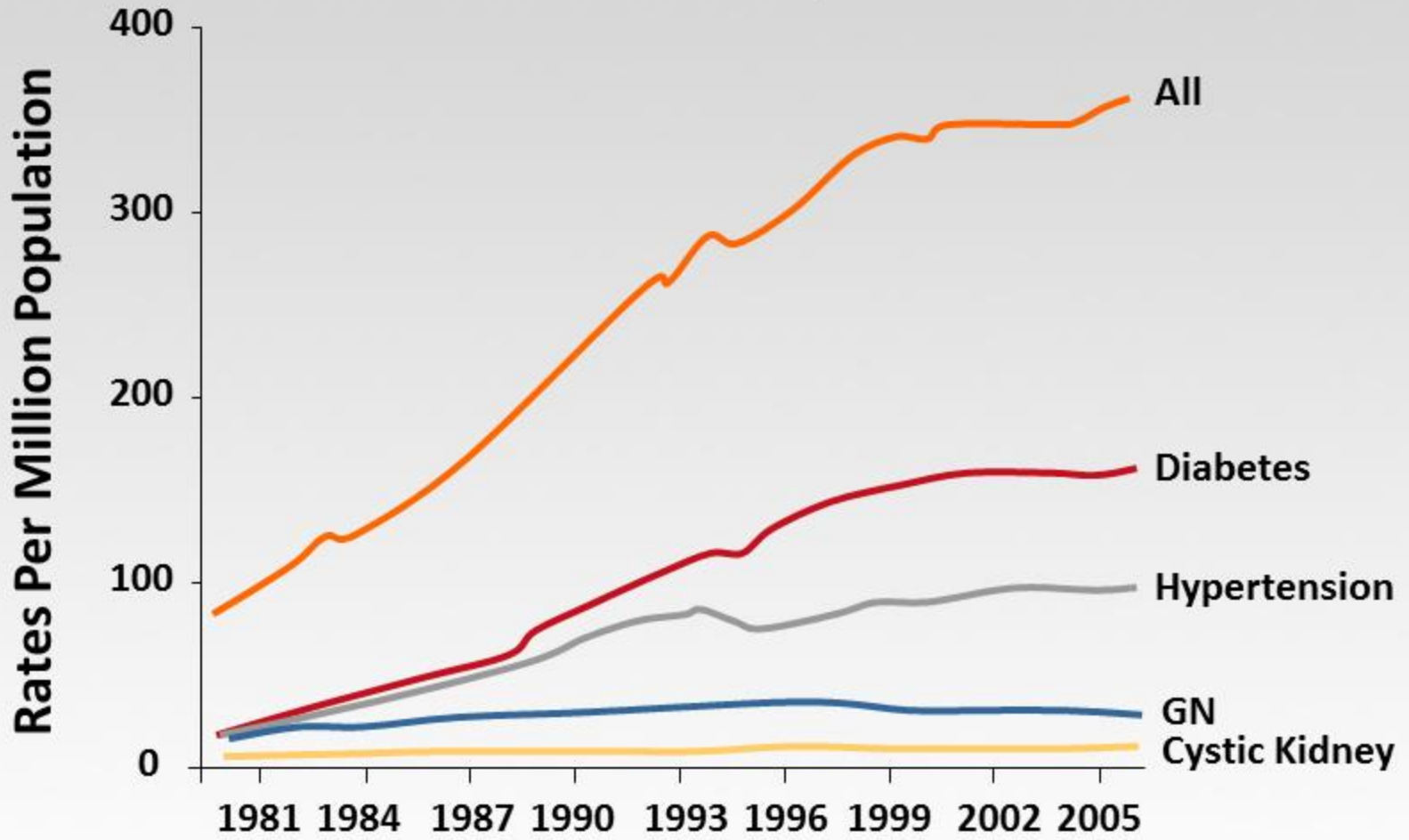
Pre Nefropatia incipiente Nefropatia conclamata End-stage renal disease



Alterazioni funzionali	GFR ↑	Microalbuminuria, Ipertensione	Macroalbuminuria, sindrome nefrosica, GFR↓
Alterazioni strutturali	Ipertrofia renale	Espansione mesang., Ispessimento GBM, Ialinosi arteriolare	Noduli mesangiali (Kimmesteil-Wilson) Fibrosi tubulo-interstiziale

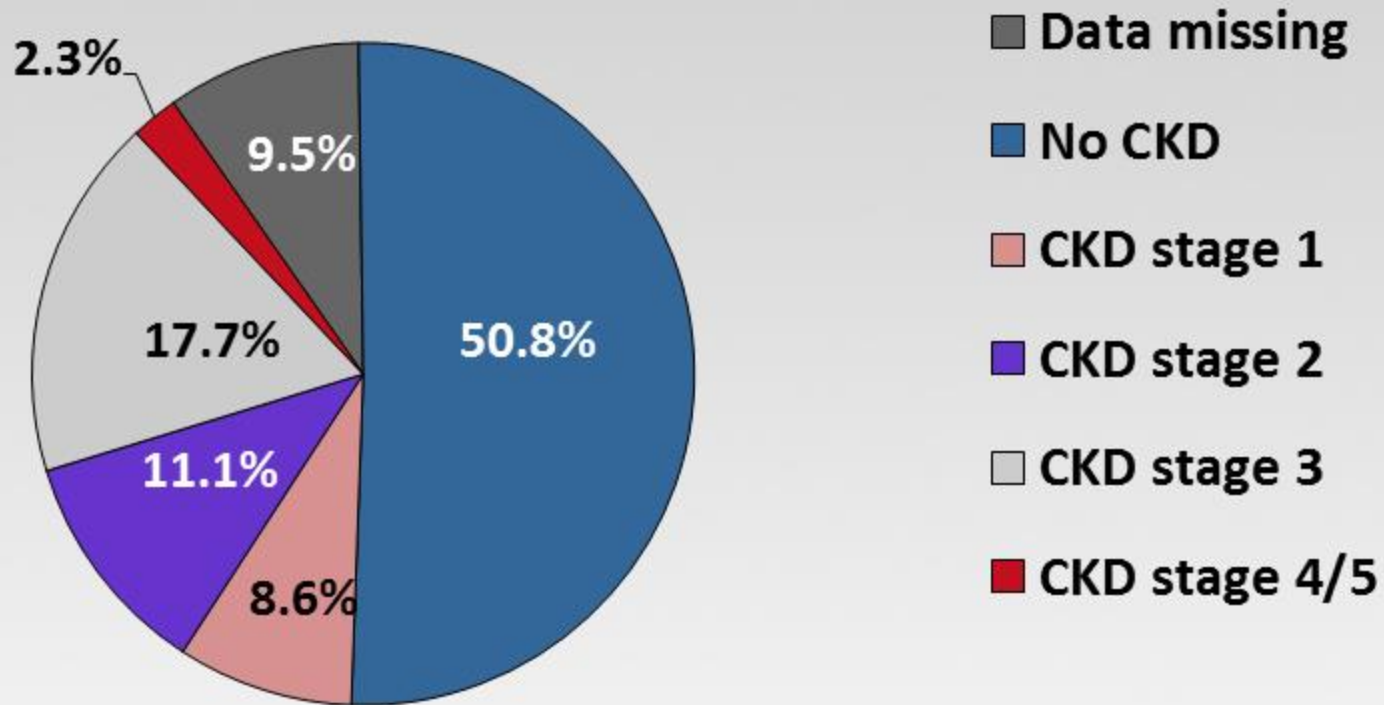
Diabetes Is the Major Cause of ESRD

Rates in the ESRD Population



ESRD = end-stage renal disease; GN = glomerular nephritis

Renal Dysfunction is Common in US Patients with T2DM

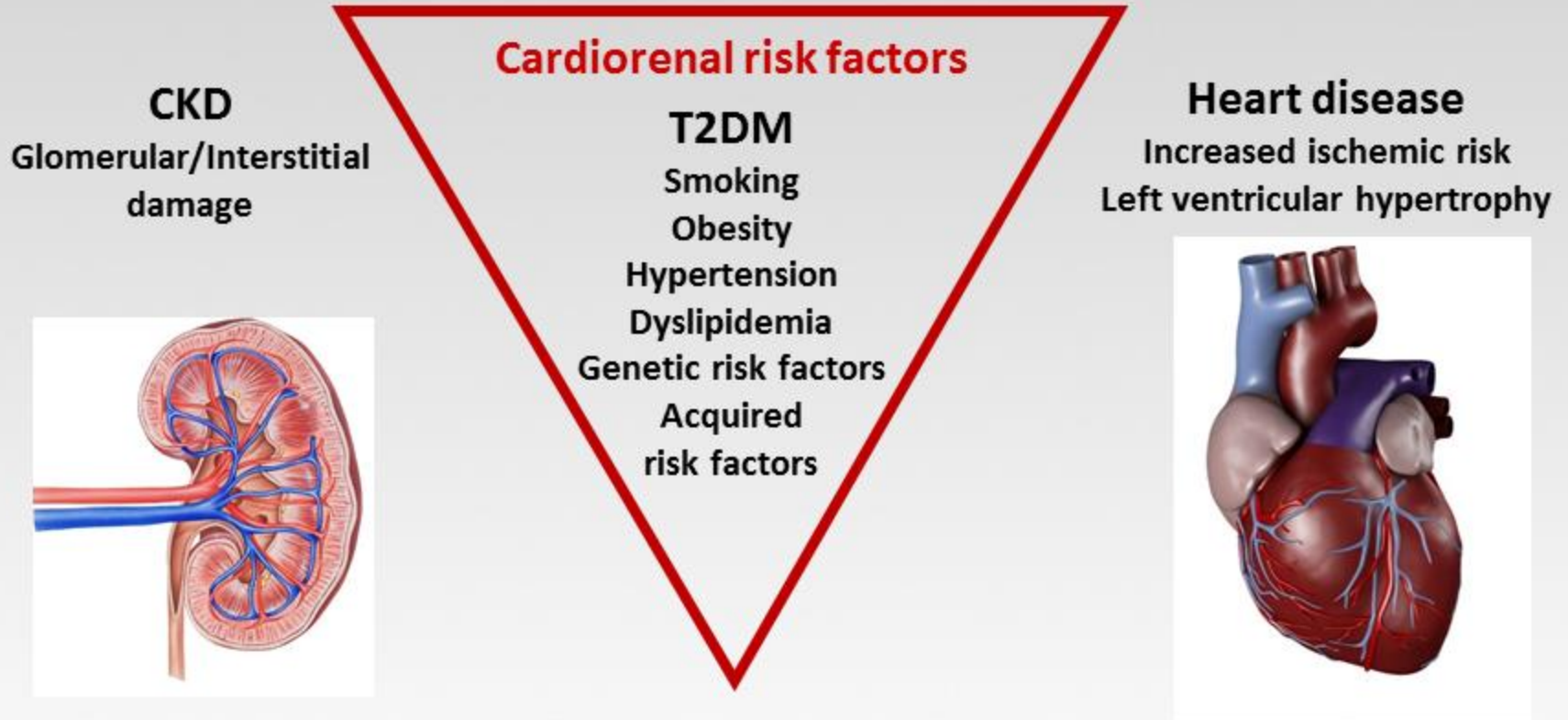


Approximately 40% of patients with T2DM show signs of CKD*

CKD = chronic kidney disease; T2DM = type 2 diabetes mellitus

*Based on US data from 1462 patients aged ≥ 20 yrs with T2DM who participated in the Fourth National Health and Nutrition Examination Survey (NHANES IV) from 1999 to 2004.

A Close Relationship Exists Between Cardiac and Renal Pathophysiology in T2DM



COSA ESPRIME LA MICROALBUMINURIA?

- 1) Microalbuminuria come espressione di iperfiltrazione glomerulare**
- 2) Microalbuminuria come espressione di danno endoteliale sistemico**

Recognition, Pathogenesis, and Treatment of Different Stages of Nephropathy in Patients With Type 2 Diabetes Mellitus

TABLE 1. Definitions of Abnormalities in Albumin Excretion

Category	Spot collection (mg/g creatinine)	24-h collection (mg/24 h)	Timed collection ($\mu\text{g}/\text{min}$)
Normal	<30	<30	<20
Microalbuminuria (low-level albuminuria)	30-299	30-299	20-199
Albuminuria	≥ 300	≥ 300	≥ 200

From *Diabetes Care*,² with permission from the American Diabetes Association.

Mayo Clin Proc. 2011;86(5):444-456

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Prevenzione della Nefropatia Diabetica

- **Primaria: prevenzione della microalbuminuria**
- **Secondaria: bloccare/ridurre la progressione dalla micro- alla macro-albuminuria**
- **Terziaria: rallentare la progressione dell'insufficienza renale**

Recognition, Pathogenesis, and Treatment of Different Stages of Nephropathy in Patients With Type 2 Diabetes Mellitus

TABLE 4. Multifactorial Approach to Treatment in Patients with Diabetic Nephropathy^a

Lifestyle modifications

Avoidance or cessation of smoking

Weight reduction (maintain normal body weight [BMI, 18.5-24.9])

Physical activity (engage in regular aerobic physical activity, such as brisk walking for ≥ 30 minutes per day, most days of the week)

Low protein diet (limit protein intake to 0.8-1.0 g/kg body weight per day in early-stage CKD and to ≤ 0.8 g/kg per day in late-stage CKD)

Adopt DASH eating plan (consume a diet rich in fruits, vegetables, and low-fat dairy products, with a reduced content of saturated and total fat)

Dietary sodium reduction (reduce dietary sodium intake to ≤ 100 mmol/d (2.4 g of sodium or 6 g of sodium chloride))

Moderate alcohol intake (limit consumption to ≤ 2 drinks per day for most men or 1 drink/day for women and lighter-weight individuals)

Achieve glycemic control ($< 7\%$ HbA_{1c})^b

Achieve blood pressure $< 130/80$ mm Hg, using an ACE inhibitor or ARB as first-line treatment

Achieve LDL-C < 100 mg/dL (< 70 mg/dL is an alternative therapeutic option for very high-risk patients), using statins as first-line treatment

Prevent anemia with erythropoietin

Antiplatelet therapy: low-dose aspirin 75-162 mg/d in selected individuals according to clinical judgment

^a ACE = angiotensin-converting enzyme; ARB = angiotensin receptor blocker; BMI = body mass index; CKD = chronic kidney disease; DASH = Dietary Approaches to Stop Hypertension; HbA_{1c} = hemoglobin A_{1c}; LDL-C = low-density lipoprotein cholesterol.

^b The American Association of Clinical Endocrinologists guidelines recommend a glycemic goal of $< 6.5\%$.

Data from *Endocr Pract*.²⁵

Current Treatments for T2DM Have Limitations When Renal Function Declines

