

Diabetic Nephropathy

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Outline

- Definition
- Importance/Epidemiology
- Pathogenesis
- Natural History
- Risk factors and prevention
- Treatment strategies

Definition

- ***Diabetic nephropathy:***
 - Functional and structural renal changes that happen in the context of Diabetes mellitus.
- ***Functional:***
 - Albuminuria
 - Progressive loss of renal function
- ***Structural:***
 - Mesangial expansion, GBM thickening and glomerulosclerosis

Definition

- Microalbuminuria = 30-300 mg/d
 - ACR > 3 mg/mmol creatinine
- Albuminuria = > 300 mg/d

Importance

- The leading cause of ESRD in our society

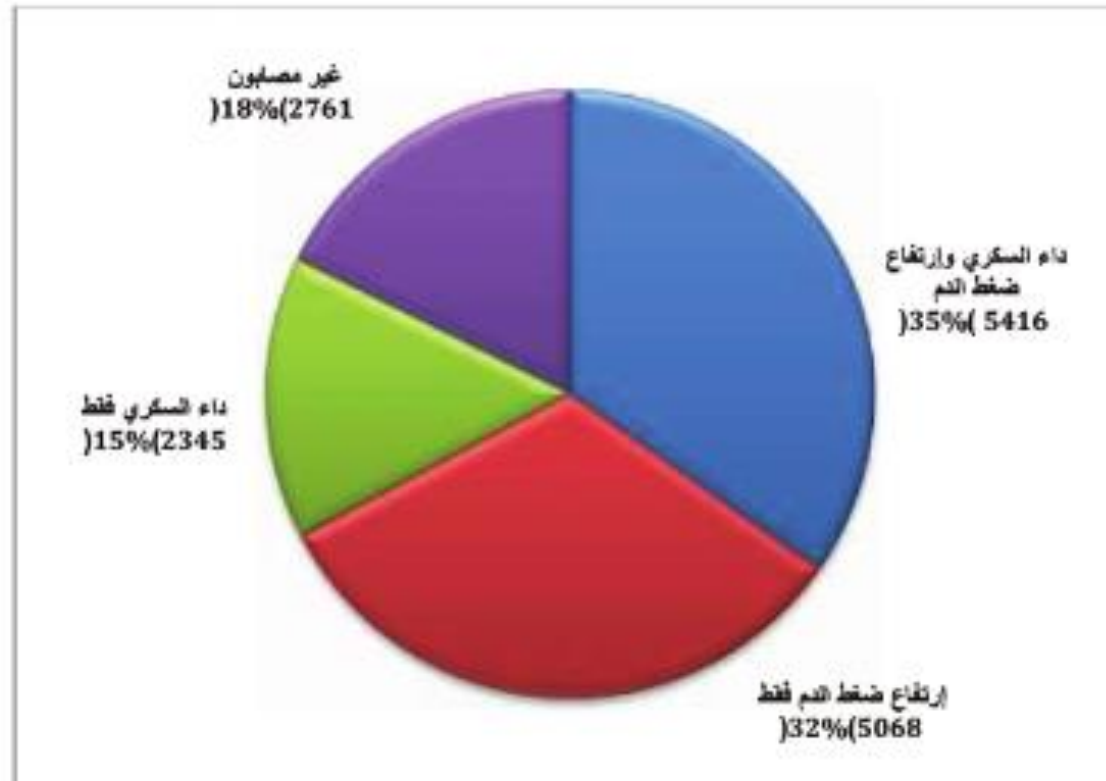
أسباب الفشل الكلوي النهائي عند مرضى التنقية الدموية
بيانات نهاية عام 2015م

SCOT 2015

النسبة المئوية %	العدد	سبب الفشل الكلوي
39%	6081	إعتلال كلوي بارتفاع ضغط الدم
<u>38.8%</u>	6055	إعتلال كلوي بداء السكري
7.4%	1158	مجهول السبب
3.7%	570	إعتلال كبيبات الكلى البدئي
2%	364	إعتلال كلوي انسدادى
2%	259	إلتهاب الأوعية
1.7%	270	الأفات الكلوية الوراثية
1.4%	214	تشوهات خلقية
1%	129	إعتلال أنبوبي خلالي مزمن
0.5%	74	عواقب الحمل
2.5%	416	أخرى
100%	15590	المجموع



انتشار داء السكري وارتفاع ضغط الدم عند مرضى التنقية الدموية بيانات نهاية عام 2015



Importance

- Diabetic nephropathy is a risk factor for cardiovascular disease

Importance

- Prevalence of Diabetes in Saudi Arabia:
 - 23.7% DM
 - 14.1 % impaired fasting glucose
 - In total 37.8% have abnormal glucose metabolism (age 30-70 year)

Epidemic

Prevalence of Diabetic Nephropathy in Type II

- 11.5% in UK
- 42.9% in Thailand

- ***Saudi Arabia:***

- **10.8%**

- the Saudi National Diabetes Registry (SNDR), Al-Rubeaan et al 2014.

- **31.8%**

- Alwakeel et al, Ann Saudi Med 2011; 31(3): 236–242.

- ESRD in DM II:
- - **1.5% of type II DM**

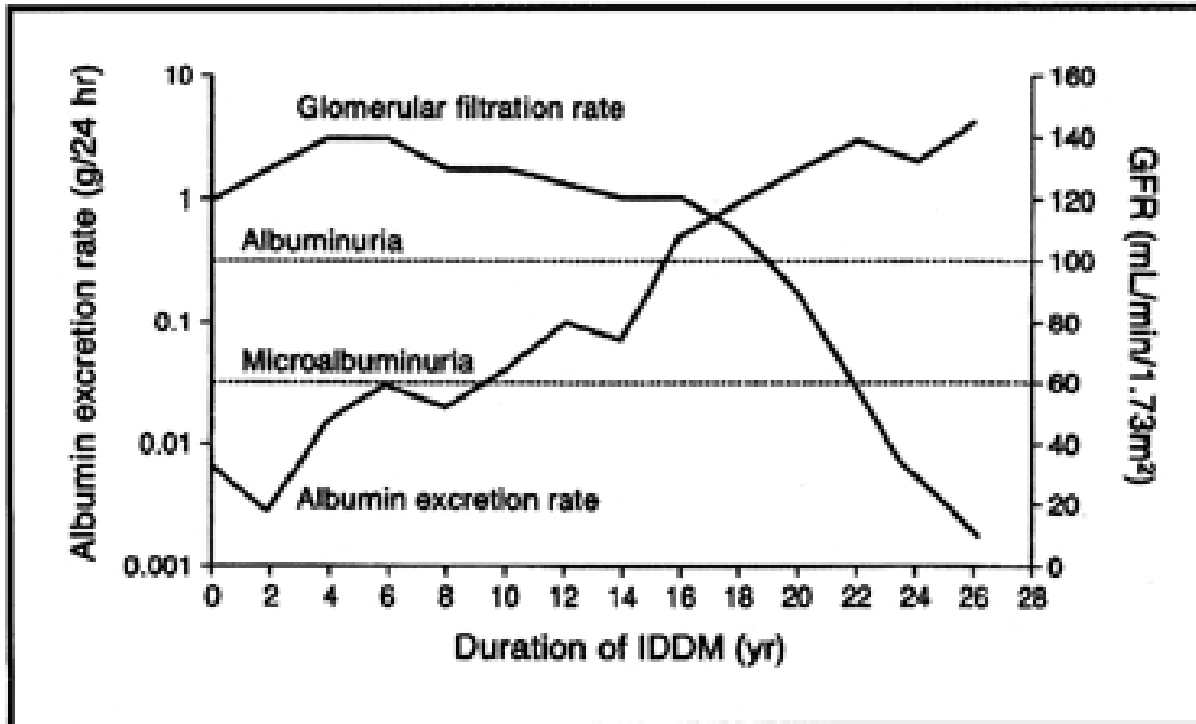
the Saudi National Diabetes Registry (SNDR), Al-Rubeaan et al 2014.

- **5% of type II DM**

Alwakeel et al, Ann Saudi Med 2011; 31(3): 236–242.

- Type 2
 - 10 years: 25% MA, 5% proteinuria and 0.8% Cr \geq 175 or renal replacement therapy
- Adler AI, et al. Kidney Int 2003; 63:225.
- Type 1
 - 7-10% → ESRD after 20-30 year

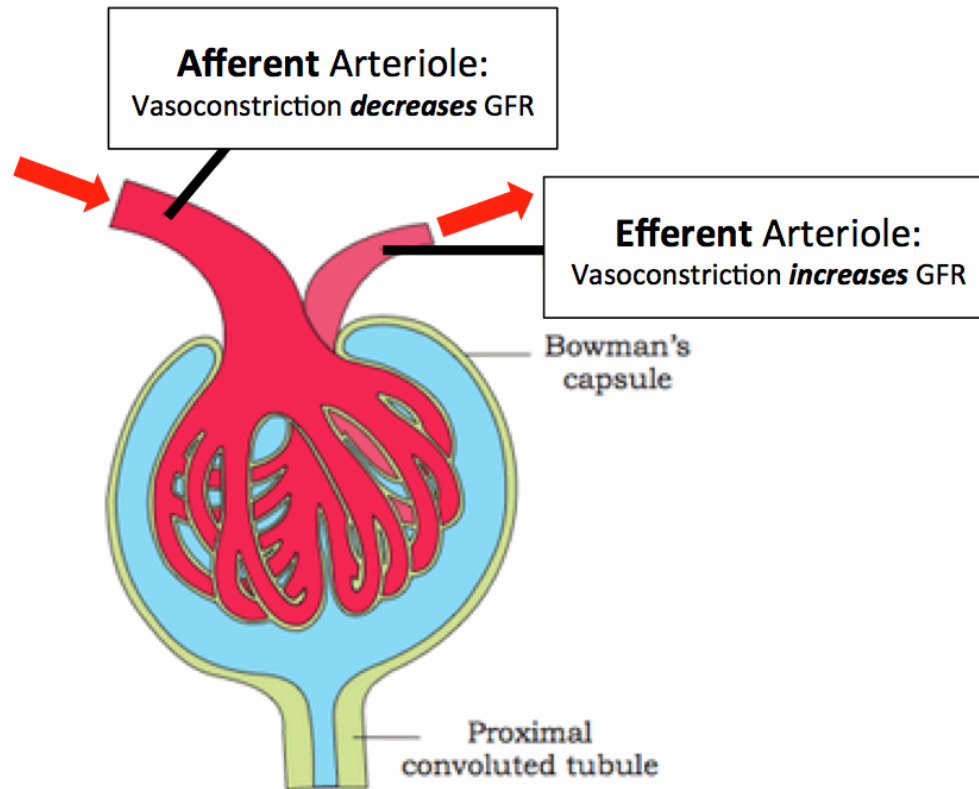
Natural Hx in Type I DM



Stengal et al, Mayo Clin Proc, 2000

Pathophysiology

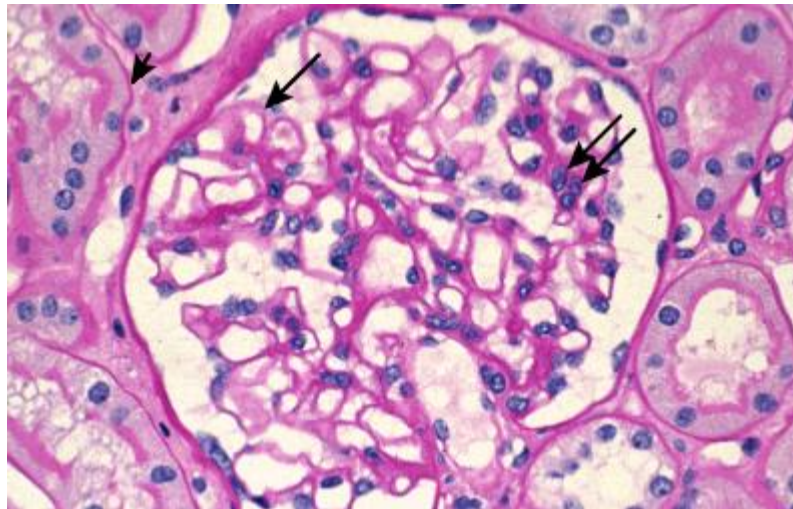
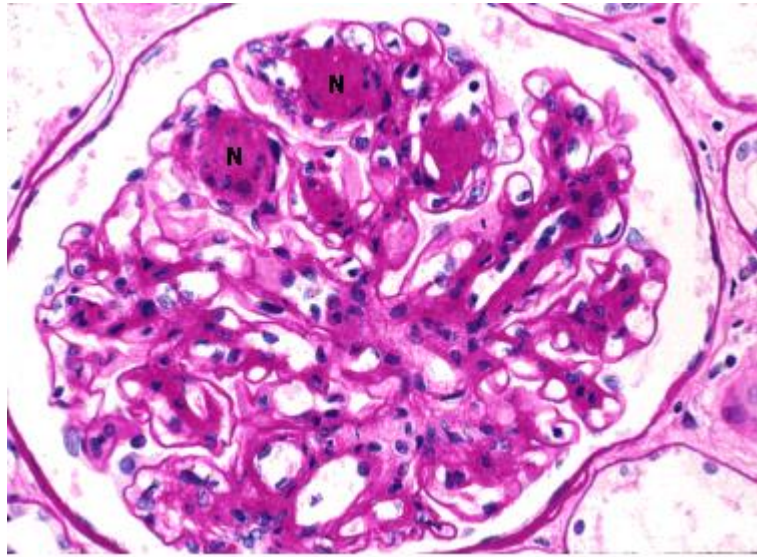
- Hyperfiltration



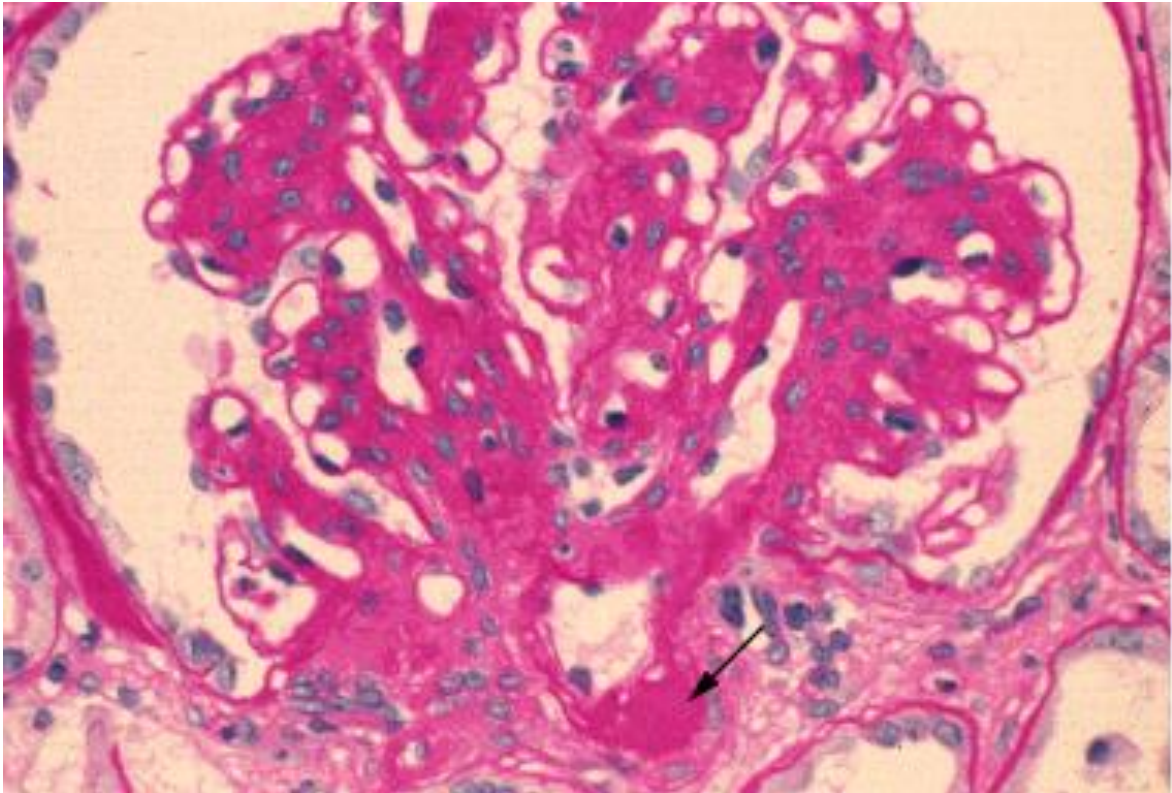
Microvascular modulation of glomerular filtration rate (GFR)

Pathophysiology

- Hyperglycemia increases the expression of transforming growth factor-beta (TGF-beta)
- Hyperglycemia and AGEs (advanced glycation end products)
- Hyperglycemia Increases VEGF expression (vascular endothelial growth factor)
- HTN



Uptodate 2016



Risk Factors

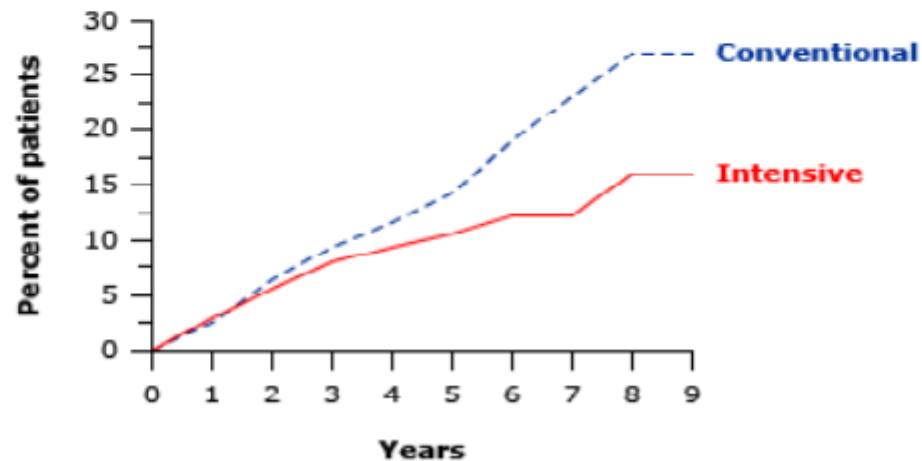
- Duration of DM
- Age
- HTN
- Race
- Genetic factor
- Retinopathy
- Smoking, Hyperlipidemia
- Poor Glycemic control

Treatment Strategies

- Good BP control
 - BP <130/80
- RAS blockade, independent of BP
- Good glycemetic control
 - HgbA₁C <7 %
- Lipid lowering agent
 - LDL-C <2.0 mmol/L
- Diet (protein, sodium)

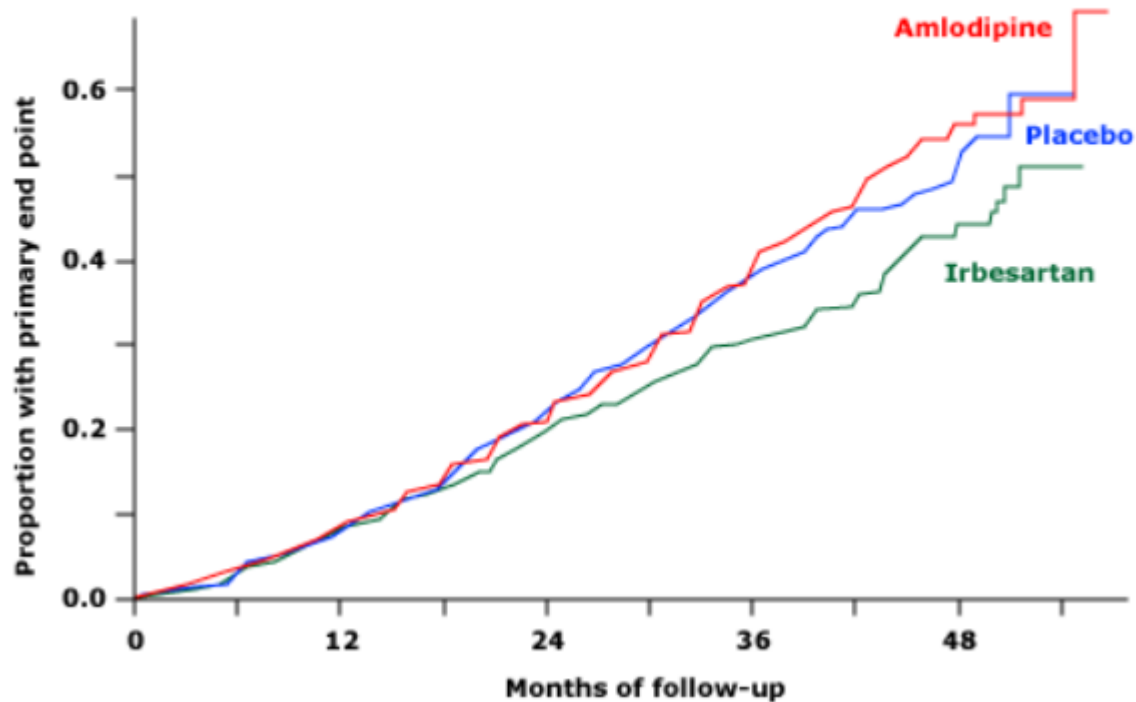
GRAPHICS

Strict glycemic control prevents moderately increased albuminuria (formerly called microalbuminuria) in patients with type 1 diabetes mellitus



The Diabetes Control and Complications Trial
Research Group. N Engl J Med 1993

Irbesartan slows progression of nephropathy in type 2 diabetes



Adapted from data published in: Lewis EJ, Hunsicker LG, Clarke WR, et al. N Engl J Med 2001; 345:851.

Summery

- Prevalence of Diabetic Nephropathy is underestimated.
- Microalbuminuria is a risk of further renal progression.
- DN is a risk for cardiovascular events.
- Half of the Microalbuminuric patient will progress to overt nephropathy.
- DN is a leading cause of ESRD in our society and worldwide.

Treatment Strategies

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Thank you

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