Microvascular Complications

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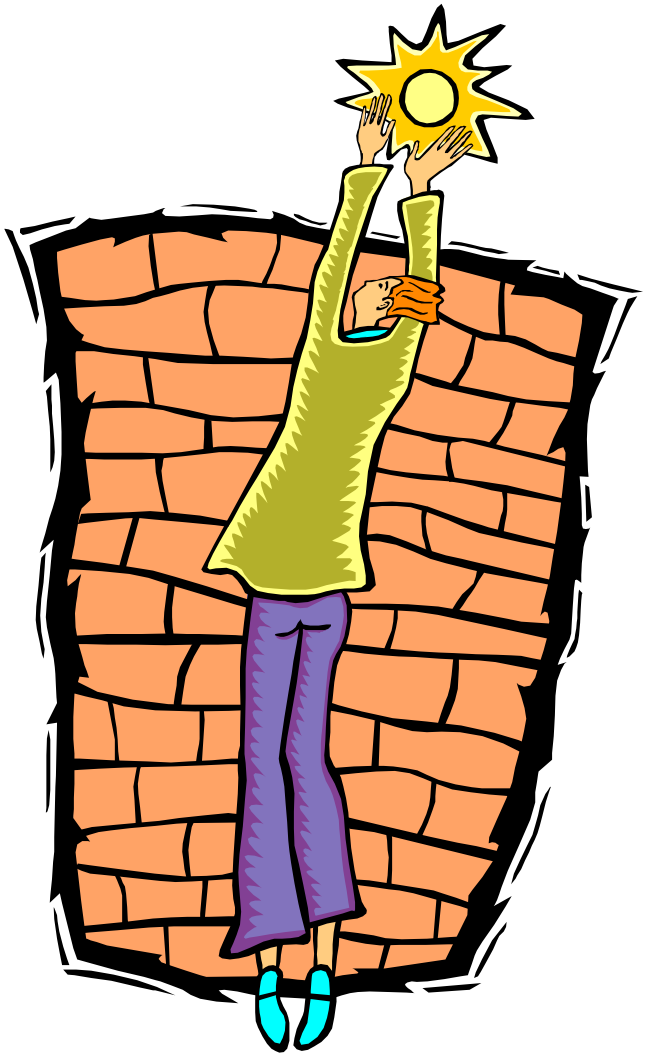
Conflict of interest disclosure

None

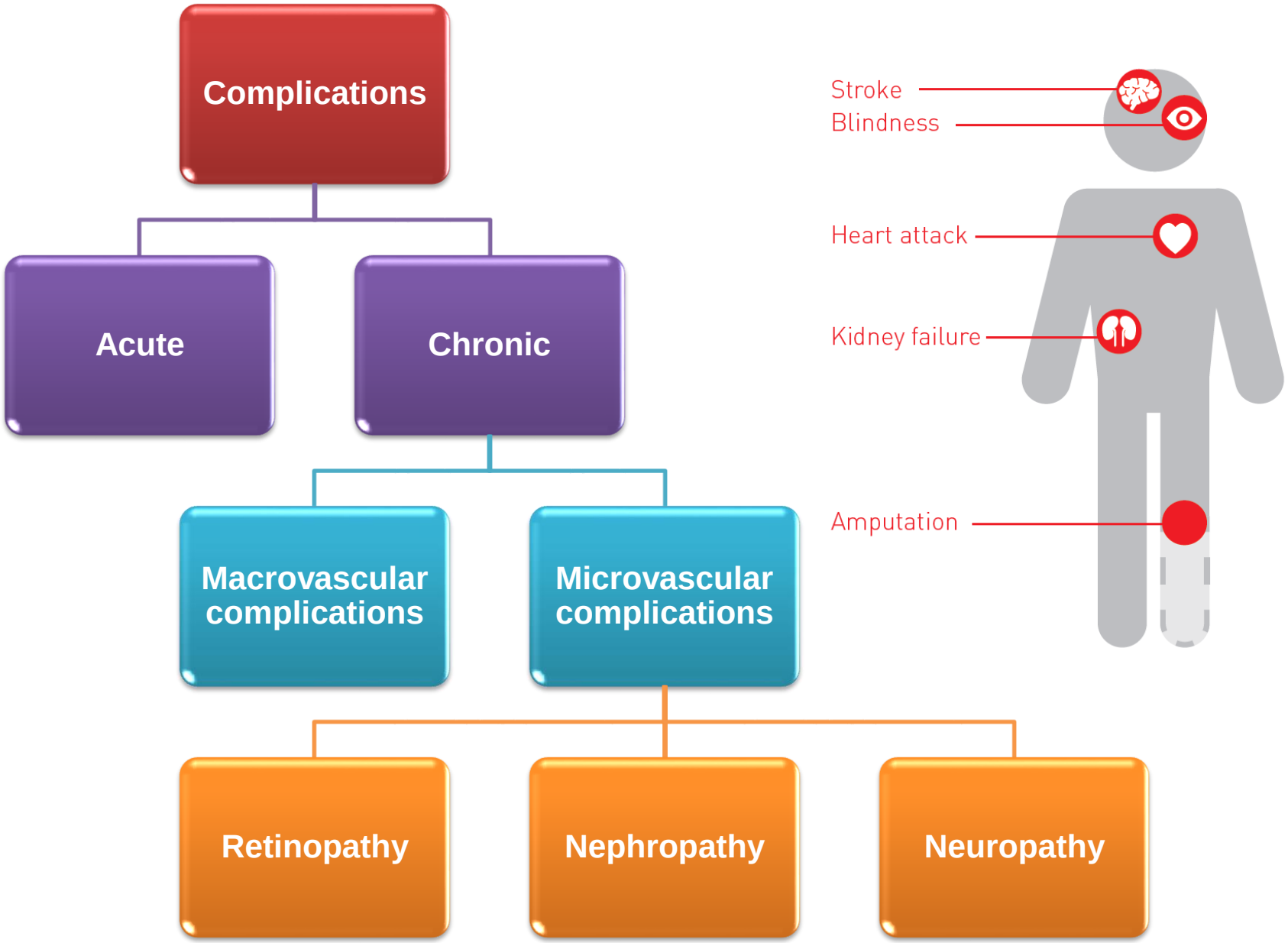
Committee of Scientific Affairs

Goals of the treatment of diabetes



- Eliminate symptoms related to hyperglycemia
- Reduce or Eliminate the long term microvascular and macrovascular complications of DM
- Allow the patient to achieve as normal a life style as possible

Complications of Diabetes

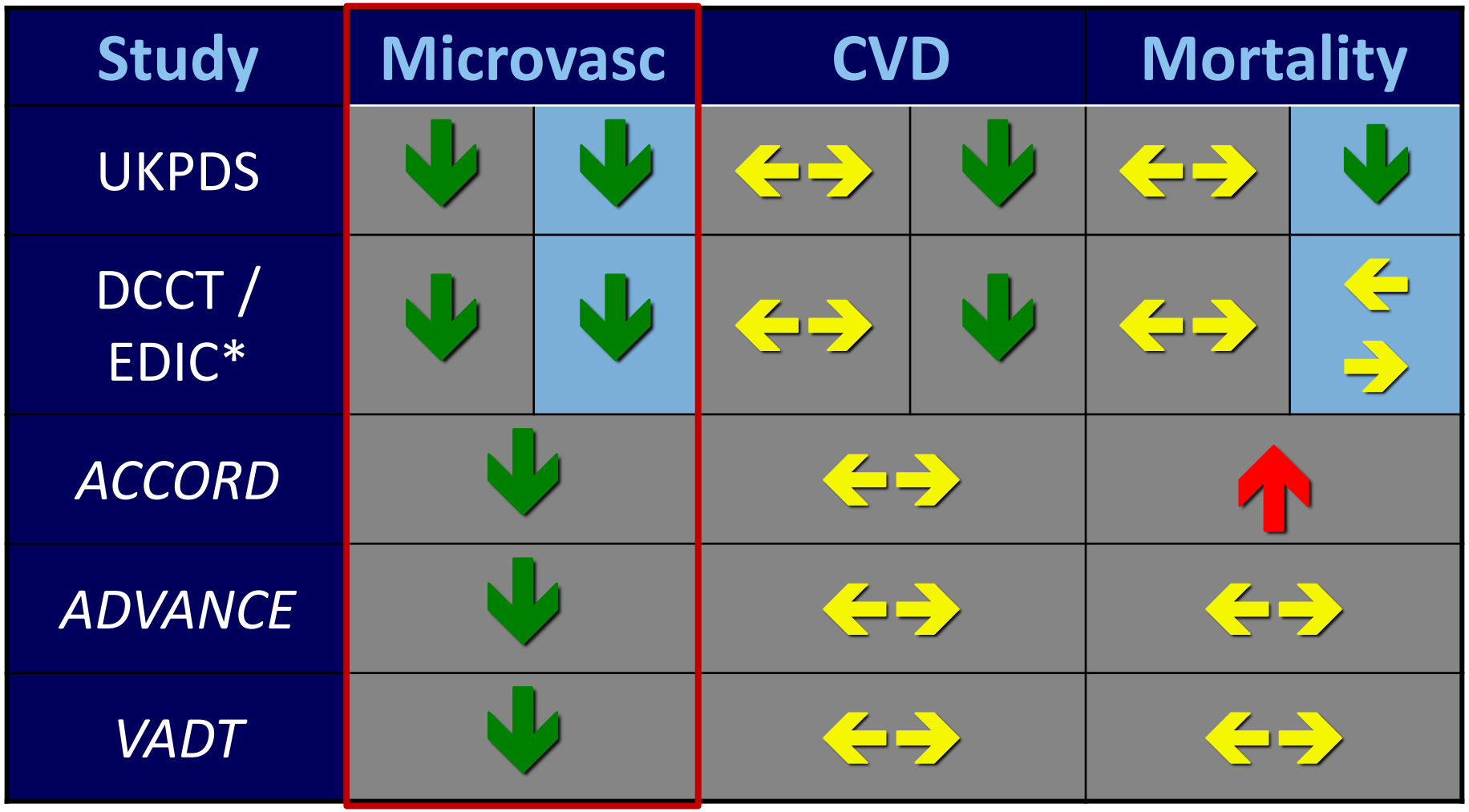


Microvascular complications

- Newly diagnosed T2DM patients
  - Above 50% : more than one complications
    - Retinopathy : 21%
    - Nephropathy : 7%
    - S-Cr ≥ 1.4 mg/dL : 3%
    - Erectile dysfunction : 20%

1.UKPDS Group. Diabetes Research 1990, 2.Gross JL et al. Diabetes Care, 2005,

Impact of Intensive Therapy for Diabetes



Kendall DM, Bergenstal RM. © International Diabetes Center 2009

UK Prospective Diabetes Study (UKPDS) Group. *Lancet* 1998;352:854.
Holman RR et al. *N Engl J Med*. 2008;359:1577. DCCT Research Group. N Engl J Med 1993;329;977.
Nathan DM et al. *N Engl J Med*. 2005;353:2643. Gerstein HC et al. *N Engl J Med.* 2008;358:2545.
Patel A et al. N Engl J Med 2008;358:2560. Duckworth W et al. N Engl J Med 2009;360:129. (erratum: Moritz T. *N Engl J Med* 2009;361:1024)

Initial Trial

Long Term Follow-up

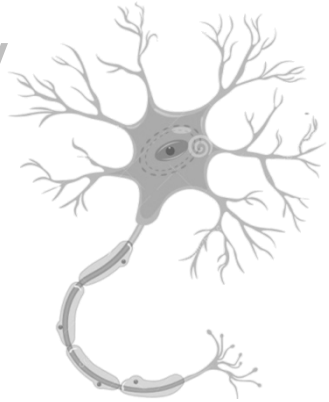
* in T1DM

Microvascular complications

- Diabetic Retinopathy

- Diabetic Kidney Disease

- Diabetic Neuropathy



Diabetic Retinopathy

- The most frequent cause of new cases of blindness among adults aged 20–74 years in developed countries.

- Risk factors
  - Duration of diabetes
  - Level of glycemic control
  - Nephropathy
  - Hypertension
  - Dyslipidemia

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Diabetic Retinopathy

General Recommendation

- Optimize glycemic control
- Optimize blood pressure
- Serum lipid control

Reduce the risk
or
slow the progression

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Diabetic Retinopathy

Screening

Initial dilated and comprehensive eye examination

Type 1	• Within 5 years after the onset of diabetes
Type 2	• At the time of the diagnosis

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Diabetic Retinopathy

Screening of pregnant women

- Women with **preexisting** type 1 or type 2 diabetes who are planning pregnancy or pregnant should be counseled on the risk of development and/or progression of diabetic retinopathy

- Eye examinations should occur
  - before pregnancy or
  - in the first trimester in patients
- Monitoring
  - every trimester and for 1 year postpartum as indicated by the degree of retinopathy

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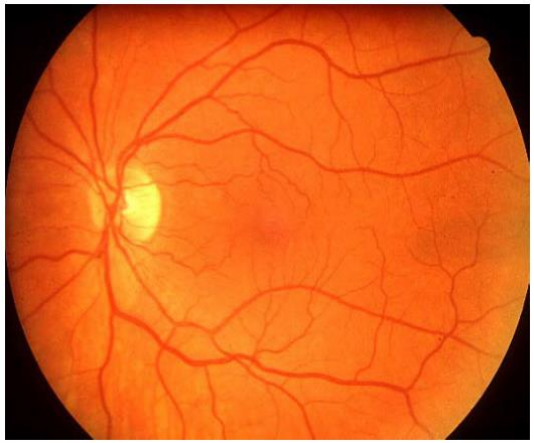
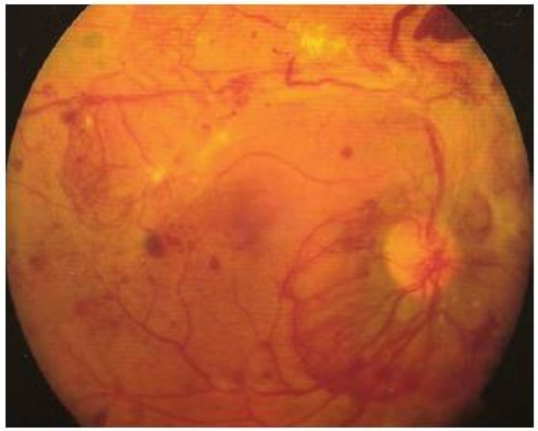
Diabetic Retinopathy

Normal



Nonproliferative

Proliferative



Retinal Hemorrhage

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Diabetic Retinopathy

With no retinopathy

- Repeat the examination every 2 years

With retinopathy

- Refer to ophthalmologist
  - Examinations will be required more frequently depending on the severity
- Promptly refer to ophthalmologist
  - Any level of macular edema
  - Severe nonproliferative diabetic retinopathy
  - Proliferative diabetic retinopathy

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Diabetic Retinopathy

Treatment

- Laser photocoagulation therapy
  - in patients with high-risk proliferative diabetic retinopathy
  - in some cases, severe nonproliferative diabetic retinopathy
- Intravitreal injections of anti–vascular endothelial growth factor
  - for central-involved diabetic macular edema
- The presence of retinopathy is not a contraindication to aspirin therapy for cardioprotection, as aspirin does not increase the risk of retinal hemorrhage.

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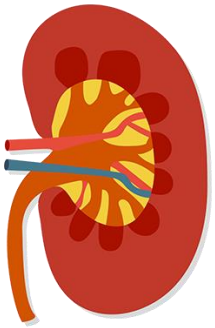
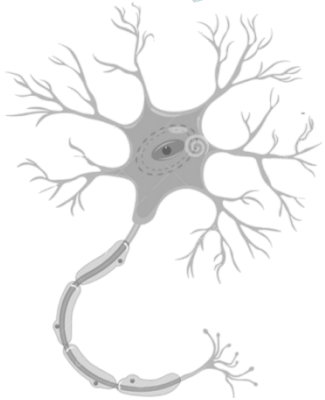
Microvascular complications

- Diabetic Retinopathy

- Diabetic Kidney Disease



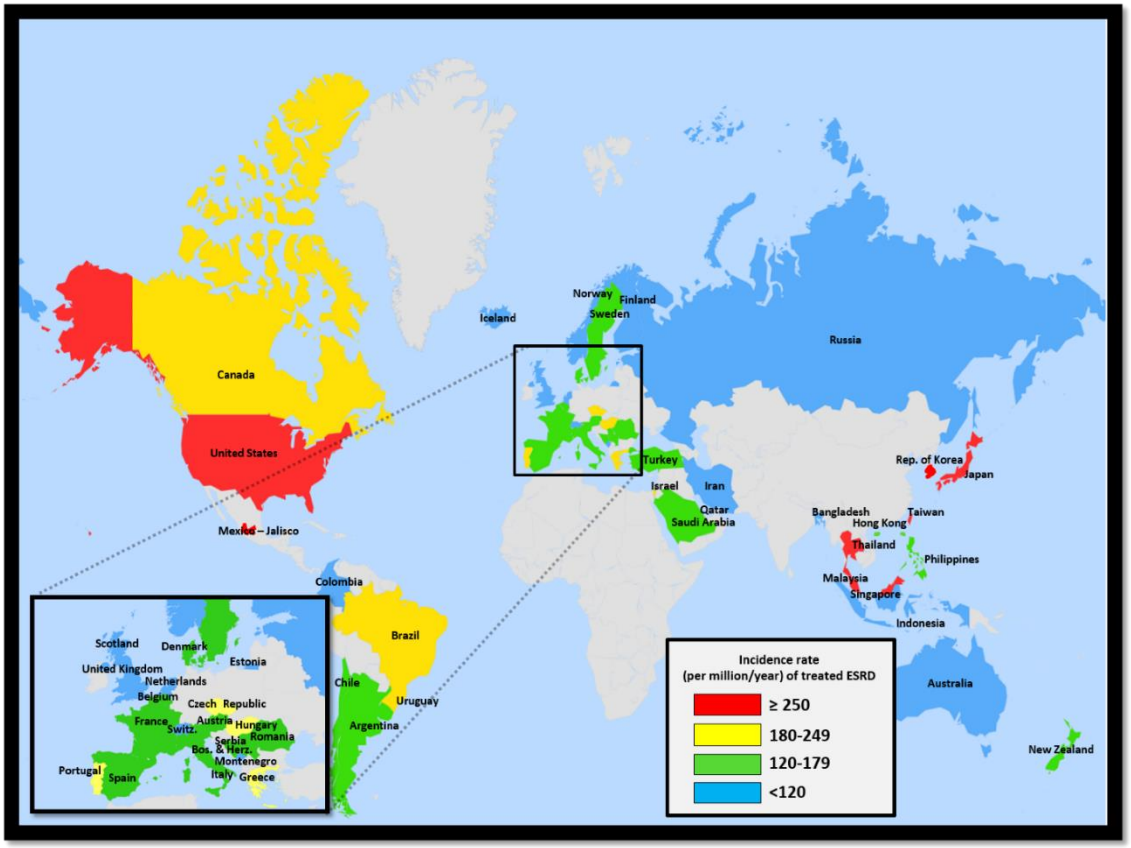
- Diabetic Neuropathy



Diabetic Kidney Disease

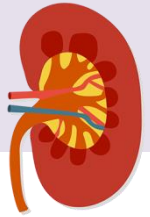
- The single most common cause of End Stage Renal Disease in the world

Geographic variations in the incidence rate of treated ESRD (per million population/year),by country, 2014



USRDS 2016 Annual Data Report, Vol 2, ESRD

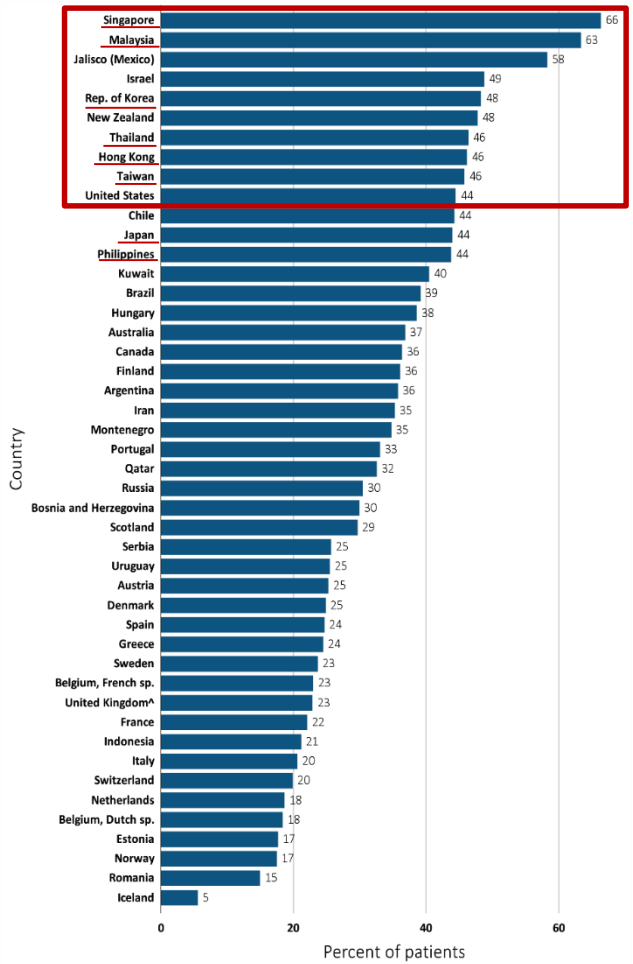
Diabetic Kidney Disease



- The single most common cause of End stage Renal Disease in the world

Percentage of incident ESRD patients with diabetes as the primary cause of ESRD, by country, 2014

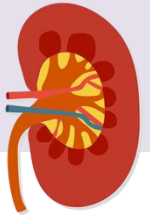
In 2014, diabetes mellitus was reported as the primary cause of ESRD for greater than 50% of incident treated ESRD patients in Singapore, Malaysia, and the Jalisco region of Mexico,



Data Source: Special analyses, USRDS ESRD Database. Data pre sented only for countries from which relevant information was available. ^United Kingdom: England, Wales, Northern Ireland (Scotland data reported separately). Data for Spain include 18 of 19 regions. Data for France include 22 regions. Data for Indone sia represent the West Java region. Data for Italy includes 6 regi ons. Data for Canada excludes Quebec. Abbreviations: ESRD, en d-stage renal disease; sp., speaking

USRDS 2016 Annual Data Report, Vol 2, ESRD

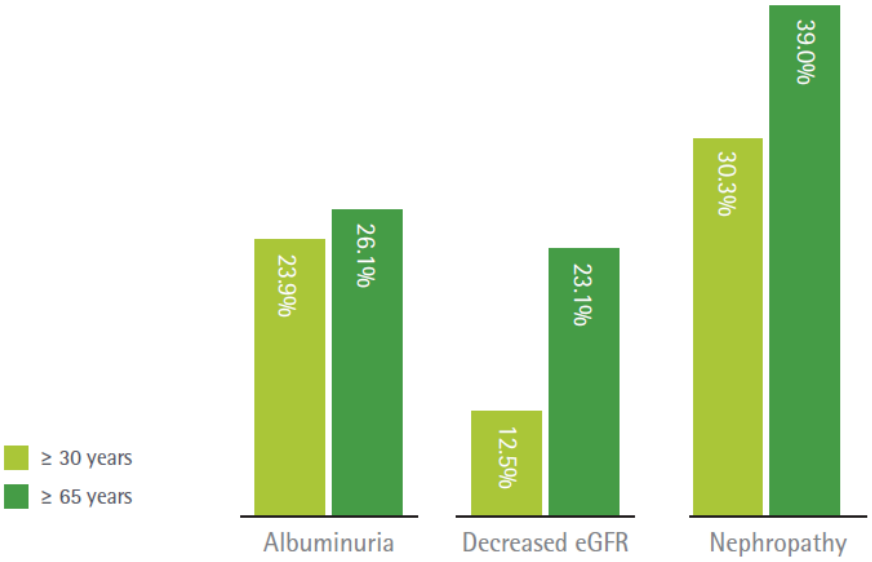
Diabetic Kindy Disease



Nephropathy in Diabetes

The prevalence of diabetic nephropathy (albuminuria or decreased eGFR) is 30.3%.

"Three among 10 persons with diabetes have albuminuria or decreased renal function"



The definition of nephropathy is increased albuminuria determined by albumin-creatinine ratio > 30 ug/mg of creatinine and/or estimated glomerular filtration rate (estimated GFR, eGFR) < 60 mL/min/1.73 m^2. GFR (mL/min/1.73 m^2) by MDRD equation = $175 \times (S_{Cr})^{-1.154} \times (Age)^{-0.203} \times (0.742 \text{ if female})$.

Diabetes Fact Sheet in Korea 2016

Diabetic Kidney Disease

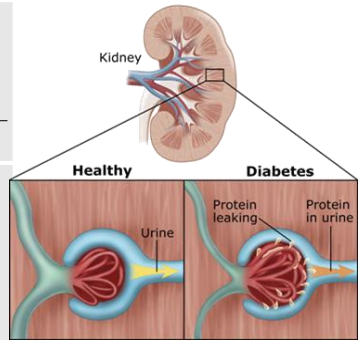
Diagnosis

- Urinary albumin
  - e.g., spot urinary albumin–to–creatinine ratio(UACR)

Table 11—Definitions of abnormalities in albumin excretion

Category	Spot collection (μg/mg creatinine)
Normal	<30
Increased urinary albumin excretion*	≥30

*Historically, ratios between 30 and 299 have been called microalbuminuria and those 300 or greater have been called macroalbuminuria (or clinical albuminuria).



- Two of three specimens of UACR collected within a 3- to 6-month period should be abnormal before considering a patient to have albuminuria.

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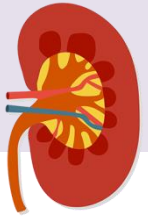
Diabetic Kidney Disease



Diagnosis

- estimated Glomerular Filtration Rate(eGFR)

Stage	Description	GFR (ml/min per 1.73 m^2 body surface area)
1	Kidney damage* with normal or increased GFR	≥90
2	Kidney damage* with mildly decreased GFR	60–89
3	Moderately decreased GFR	30–59
4	Severely decreased GFR	15–29
5	Kidney failure	<15 or dialysis

GFR = glomerular filtration rate

*Kidney damage defined as abnormalities on pathologic, urine, blood, or imaging tests.

http://www.nkdep.nih.gov.

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for Children (Conventional Units)

for Children (SI Units)

NKDEP

Contact Us

Health Information Center

- Phone: 1-800-860-8747
- TTY: 1-866-569-1162
- Email: healthinfo@niddk.nih.gov
- Hours: 8:30 a.m. to 5 p.m. eastern time, M-F

For Patients and Families

For Health Care Professionals

$$GFR = 141 \times \min(S_{cr}/\kappa, 1)^{\alpha} \times \max(S_{cr}/\kappa, 1)^{-1.209} \times 0.993^{Age} \times 1.018\ [\text{if female}] \times 1.159\ [\text{if black}]$$

where:
S_{cr} is serum creatinine in mg/dL,
κ is 0.7 for females and 0.9 for males,
α is -0.329 for females and -0.411 for males,
min indicates the minimum of S_{cr}/κ or 1, and
max indicates the maximum of S_{cr}/κ or 1.

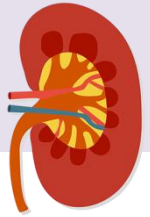
The equation does not require weight because the results are reported normalized to 1.73 m^2 body surface area, which is an accepted average adult surface area.

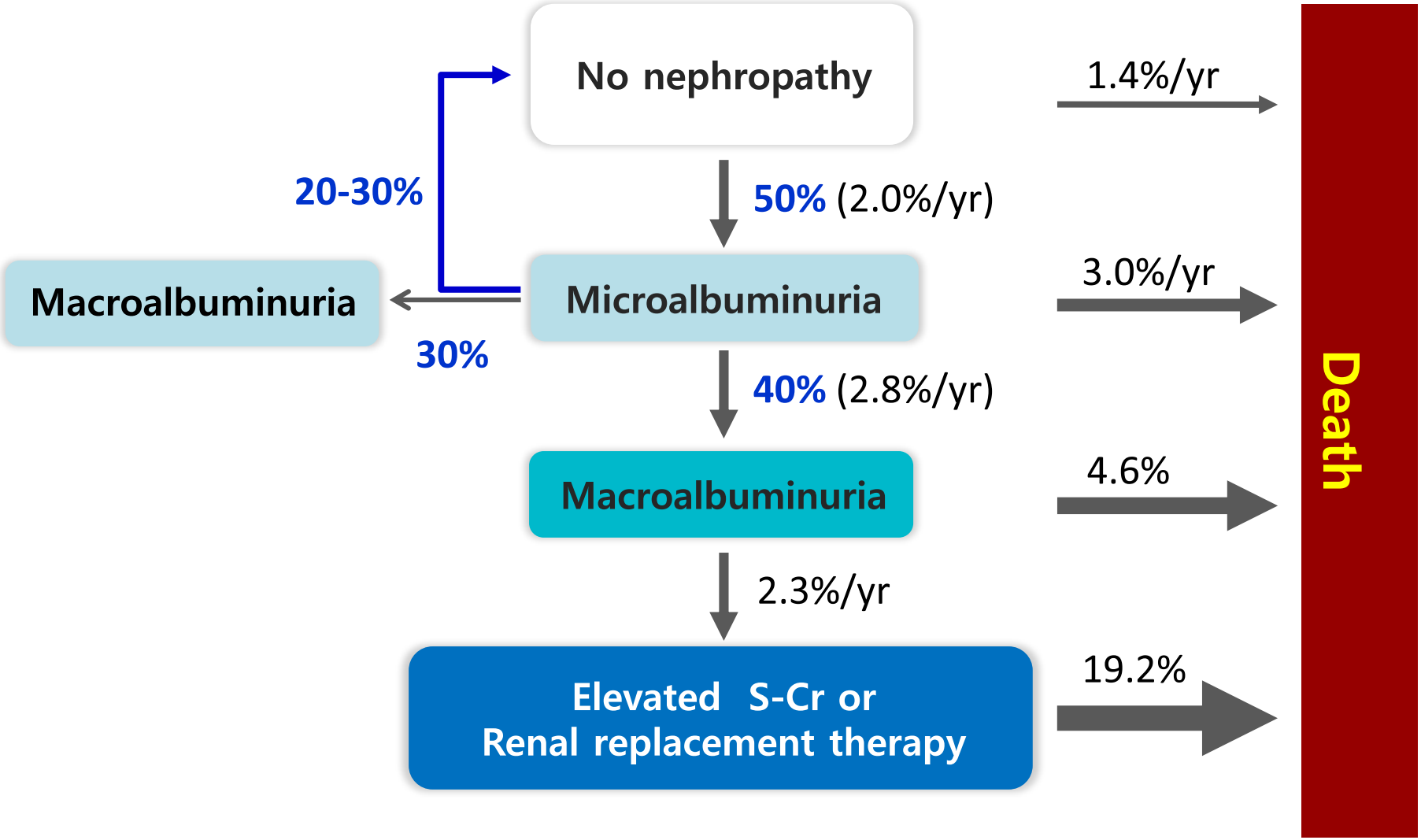
Serum creatinine	1.2	**(mg/dL)**
Age*	65	
African American	○ Yes ◉ No	
Gender	◉ Male ○ Female	
	Calculate Clear	
GFR value:	**Above 60**	**mL/min/1.73 m^{2}****

*This equation should only be used for patients 18 and older.

The NKDEP presently recommends reporting estimated GFR values ***greater than or equal to 60 mL/min/1.73 m^2* simply as "≥60 mL/min/1.73 m^2", not an exact number.

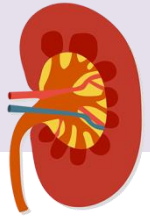
Diabetic Kidney Disease





UKPDS 64: Kidney Int 2003; 63:225-232

Diabetic Kidney Disease



Screening

At least once a year

Type 1	• ≥ 5 years after the onset of diabetes
Type 2	• At the time of the diagnosis.

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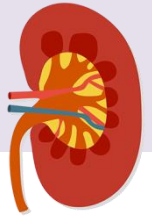
Diabetic Kidney Disease



Treatment

- Optimize glucose control (A)
- Optimize blood pressure control (A)

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Evidence of renoprotection of glucose control

Table 1 | Evidence of renoprotection in studies of antihyperglycaemic therapy for T2DM

Study	Duration of T2DM (years)	Number of patients	Primary agent(s)*	Follow-up (years)	Outcome parameters (risk)
UKPDS (1998)[38]	New onset	3,867	Sulphonylurea or insulin	10.0	Microalbuminuria (RR 0.76‡) Macroalbuminuria (RR 0.67‡) Doubling of SCr (RR 0.40‡) ESRD (RR 0.73)
ADVANCE (2008)[43]	8	11,140	Gliclazide (90.5%)	5.0	Microalbuminuria (HR 0.91‡) Macroalbuminuria (HR 0.70‡) Doubling of SCr (HR 1.15) ESRD or death (HR 0.64)
ACCORD (2008 and 2010)[41,42]	10	10,251	Metformin (86.9%) and sulphonylurea (73.8%)	3.5§	Microalbuminuria (HR 0.79‡) Macroalbuminuria (HR 0.69‡) Doubling of SCr (HR 1.07‡) ESRD (HR 0.95)
VADT (2009 and 2011)[44,45]	12	1,791	Rosiglitazone plus metformin (in patients with BMI ≥27 kg/m^2) or Rosiglitazone plus glimepride (in patients with BMI <27 kg/m^2)	5.6	Microalbuminuria (RR 0.74) Macroalbuminuria (RR 0.56‡) Doubling of SCr (RR 1.00) ESRD (RR 0.64)

*Numbers in brackets refer to the percentage of patients that used the glucose-lowering drug at the end of follow-up. ‡Indicates significant result. §Study stopped early due to excess mortality in the intensive treatment arm. Abbreviations: ESRD, end-stage renal disease; HR, hazard ratio; RR, relative risk; SCr, serum creatinine; T2DM, type 2 diabetes mellitus.

Muskiet MHA et al. Nat.Rev. Nephrol 2014

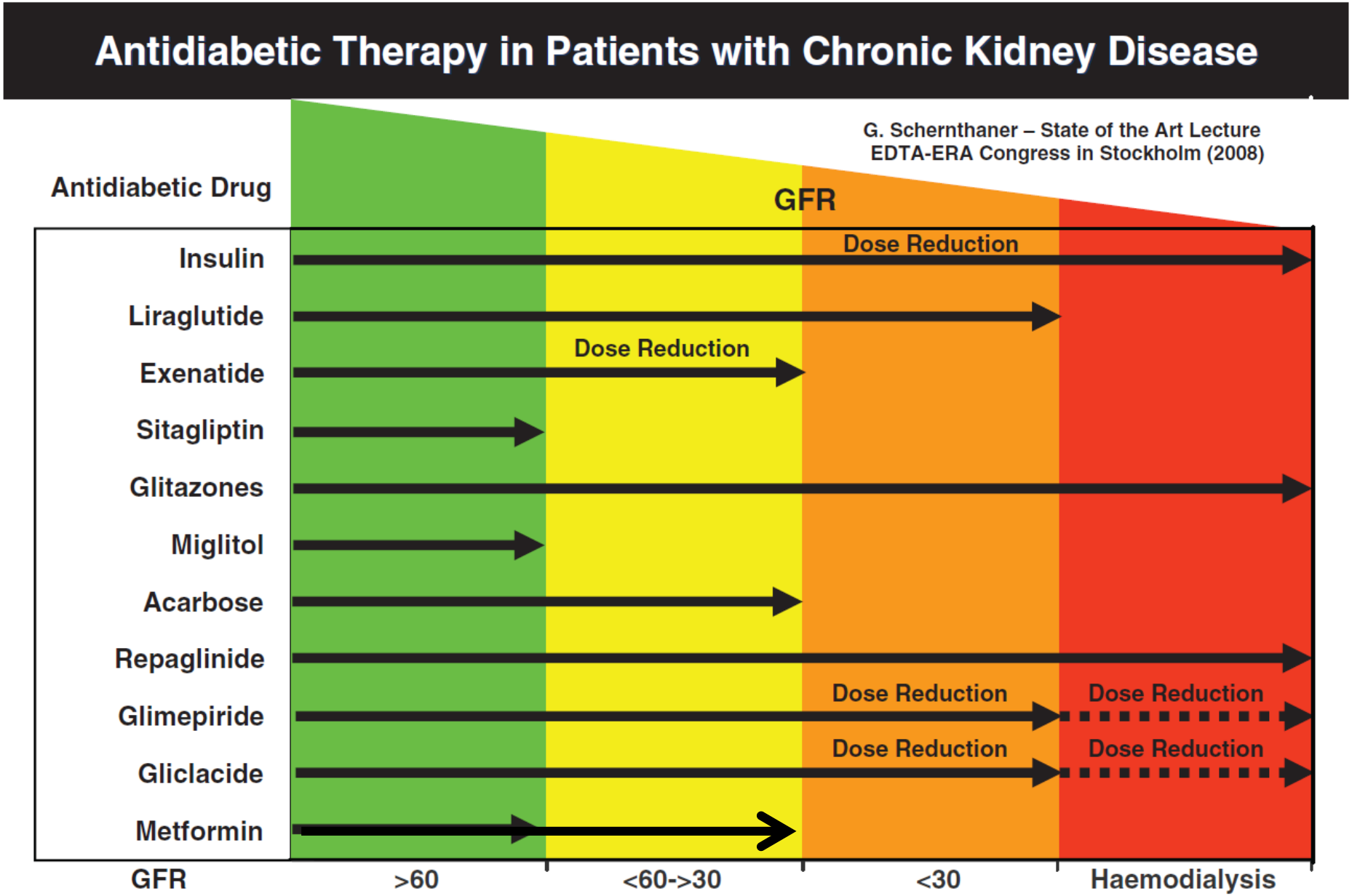
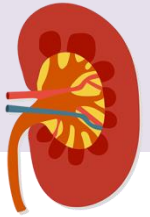


Fig. 1. Antidiabetic therapy in patients with chronic kidney disease

Diabetic Kidney Disease



Treatment

- Optimize blood pressure control

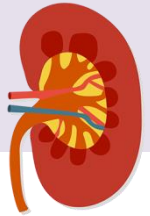
Table 2 | Evidence of renoprotection in studies of antihypertensive therapy for T2DM

Study	Duration of T2DM (years)	Number of patients	Treatment arms	Follow-up (years)	Outcome parameters (renal risk)
UKPDS (1998)[49]	2.6	1,148	Intensive versus standard	8.4	Microalbuminuria (RR 0.87) Macroalbuminuria (RR 1.06) ESRD and death (RR 0.58)
ADVANCE (2007)[51]	8.0	11,140	Intensive versus standard	4.3	Microalbuminuria (RRR 21%)* Macroalbuminuria (RRR 18%)
ACCORD (2010 and 2012)[52,53]	1.1	4,733	Intensive versus standard	4.7	Microalbuminuria (HR 0.84)* Macroalbuminuria (HR 0.81) ESRD (HR 1.00)
HOPE and MICRO-HOPE (2000)[60]	11.0	3,577	Ramipril versus placebo	4.5‡	Microalbuminuria (RRR 9%) Macroalbuminuria (RRR 24%)* ESRD (RRR −20%)
BENEDICT (2004)[61]	8.0	1,204	Trandolapril versus placebo	3.6	Microalbuminuria (AF 0.47)*
ROADMAP (2011)[62]	6.0	4,447	Olmesartan versus placebo	3.2	Microalbuminuria (HR 0.77)* Doubling of SCr (RR 1.0)
IRMA-2 (2001)[63]	10.0	590	Irbesartan versus placebo	2.0	Restore albuminuria (RRR 34%‖)* Macroalbuminuria (HR 0.30)*
IDNT (2001)[64]	NR	1,715	Irbesartan versus placebo	2.6	Doubling of SCr (RR 0.67)* ESRD (RR 0.77)
RENAAL (2001)[65]	NR	1,513	Losartan versus placebo	3.4§	Composite end point (RRR 16%)* Doubling of SCr (RRR 25%)* ESRD (RRR 28%)*
TRANSCEND (2008)[66]	NR	5,926	Telmisartan versus placebo	4.7	Renal abnormalities (RR 1.86) Cardiorenal end point (HR 0.85)* Doubling of SCr (HR 1.60)* ESRD (HR 0.67)
DIRECT-Protect 2 (2009)[59]	9.0	1,905	Candesartan versus placebo	4.7	Microalbuminuria (HR 1.01¶ and 0.76#) Increase in UAE (HR 0.95¶ and 0.93#)

*Indicates significant result. ‡Study stopped early owing to consistent benefit of ramipril compared with placebo. §Study stopped early because of new evidence suggesting ACE inhibitors might be effective in reducing cardiovascular events in T2DM. ‖Normalization of urinary albumin. ¶Use of antihypertensive medication at baseline. #Normotensive at baseline. Abbreviations: AF, acceleration factor (quantifies the effect of one treatment relative to another treatment in accelerating or slowing the progression of the disease); ESRD, end-stage renal disease; HR, hazard ratio; NR, not reported; RR, relative risk; RRR, relative risk reduction; SCr, serum creatinine; T2DM, type 2 diabetes mellitus; UAE, urinary albumin excretion.

Muskiet MHA et al. Nat.Rev. Nephrol 2014

Diabetic Kidney Disease



Treatment

- Target of Blood Pressure
  - Diabetes : BP<140/90mmgHg
  - Diabetes with albuminuria : BP< 130/80 mmHg
    - Avoid diastolic BP <60-70mmHg

Kitada M et al.World J Diabetes. 5(3);342-356,2014

Diabetic Kidney Disease

Treatment

- ACE inhibitor or angiotensin receptor blocker

Periodically monitor serum creatinine and potassium levels for the development of increased creatinine or changes in potassium when ACE inhibitors,angiotensin receptor blockers, or diuretics are used.

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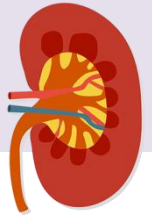
Diabetic Kidney Disease



Treatment

- Nutrition
  - For people with nondialysis-dependent diabetic kidney disease, dietary protein intake should be approximately 0.8 g/kg body weight per day (the recommended daily allowance)
  - For patients on dialysis, higher levels of dietary protein intake should be considered.

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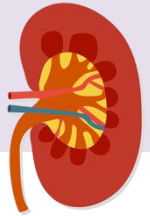
Diabetic Kidney Disease



When to refer

- Patients should be referred for evaluation for renal replacement treatment if they have an estimated glomerular filtration rate<30 mL/min/1.73 m^2.

- Promptly refer to a physician experienced in the care of kidney disease for uncertainty about the etiology of kidney disease, difficult management issues, and rapidly progressing kidney disease.

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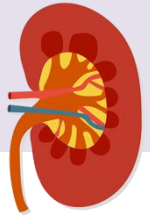
Diabetic Kidney Disease



When to refer

- Alternative or additional causes of kidney disease
  - An active urinary sediment (containing red or white blood cells or cellular casts)
  - rapidly increasing albuminuria or nephrotic syndrome,
  - rapidly decreasing eGFR,
  - the absence of retinopathy (in type 1 diabetes)

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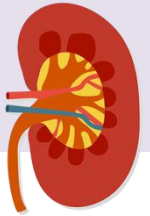
Diabetic Kidney Disease



Managements

eGFR (mL/min/ 1.73 m^2)	Monitoring 1yrs	Monitoring 6M	Monitoring 3M	
All	UACR, sCr,K			
45-60	electrolytes, bicarbonate, hemoglobin, Ca/P, PTH	eGFR		Dose adjustment Assure Vit D Vaccination of HBV Consider BMD
30-44		electrolytes, bicarbonate, hemoglobin, Ca/P, PTH	eGFR	Dose adjustment
<30	Referral to a nephrologist			

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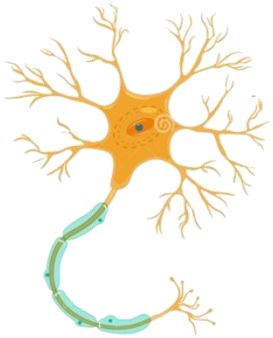
Microvascular complications

- Diabetic Retinopathy

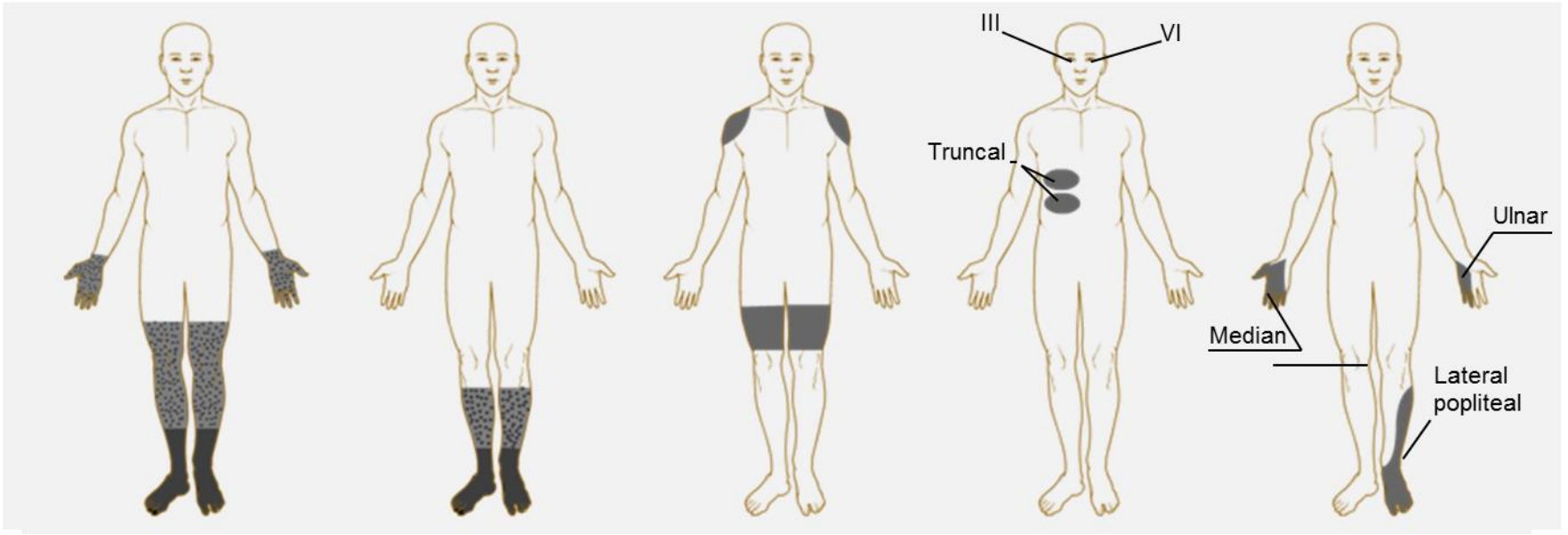
- Diabetic Kidney Disease

- Diabetic Neuropathy



Diabetic Neuropathy

- At least one third of patients with type 1 or type 2 diabetes
- Heterogeneous condition that manifests in different forms

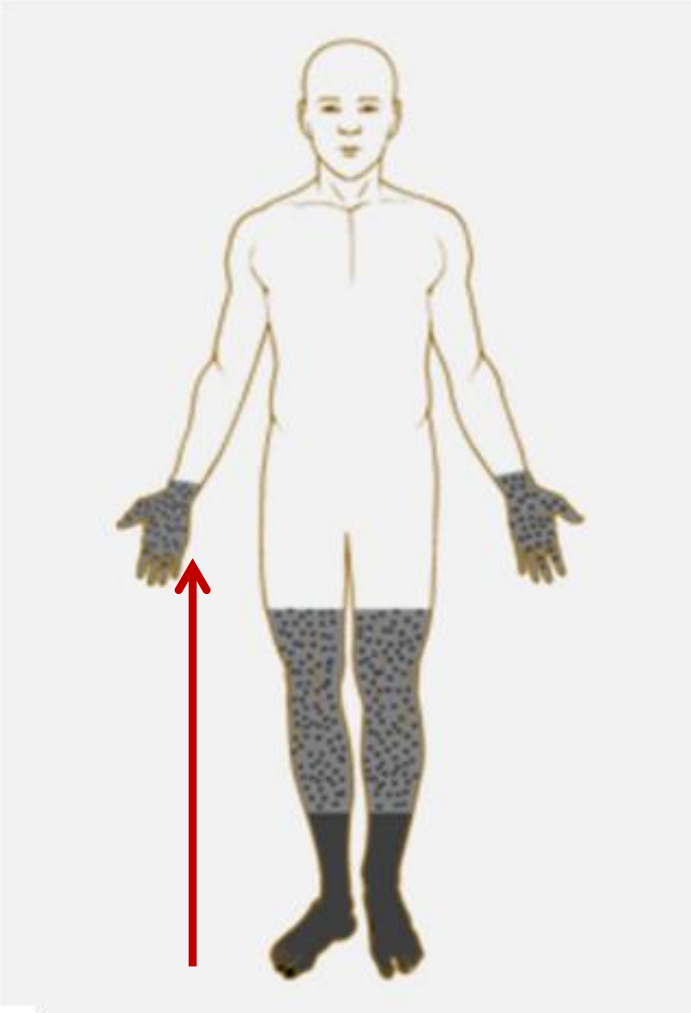


Large-fiber Neuropathy	Small-fiber Neuropathy	Proximal Motor Neuropathy	Acute Mononeuropathies	Pressure Palsies
Sensory loss: 0→+++ (touch, vibration)	Sensory loss: 0→+ (thermal, allodynia)	Sensory loss: 0→+	Sensory loss: 0→+	Sensory loss in nerve distribution: +→+++
Pain: +→+++	Pain: +→+++	Pain: +→+++	Pain: +→+++	Pain: +→++
Tendon reflex: N→↓↓↓	Tendon reflex: N→↓	Tendon reflex:↓↓	Tendon reflex: N	Tendon reflex: N
Motor deficit: 0→+++	Motor deficit: 0	Proximal motor deficit: +→+++	Motor deficit: +→+++	Motor deficit: +→+++

N Engl J Med 2016;374:1455-64. Vinik et al. Diabetologia 2000;43(8):957-73.

Diabetic Neuropathy

- The most common form of diabetic neuropathy
  - Distal symmetric polyneuropathy
- Up to 50% : asymptomatic
- Symptoms
  - Positive
    - tingling
    - burning
    - stabbing pain
    - abnormal sensation
  - Negative
    - sensory loss
    - Weakness
    - Numbness



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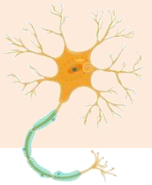
Diabetic Neuropathy



- Autonomic Neuropathy
  - Approximately 50% of diabetic peripheral neuropathy

  - Major clinical manifestations
    - Hypoglycemia unawareness
    - Resting tachycardia
    - Orthostatic hypotension
    - Gastroparesis, constipation, diarrhea, fecal incontinence
    - Erectile dysfunction, neurogenic bladder
    - sudomotor dysfunction with either increased or decreased sweating

Diabetic Neuropathy

- Autonomic Neuropathy
  - **Cardiac Autonomic Neuropathy**
    - Associated with mortality independently
    - Early
      - asymptomatic
      - only by decreased heart rate variability with deep breathing.
    - Advanced
      - resting tachycardia (>100 bpm)
      - orthostatic hypotension
        - » a fall in systolic BP> 20 mmHg or diastolic BP >10 mmHg upon standing without an appropriate increase in heart rate.

Diabetic Neuropathy

- Autonomic Neuropathy
  - **Gastrointestinal Neuropathies**
    - Esophageal dysmotility, gastroparesis,constipation, diarrhea, and fecal incontinence.
    - Suspected in individuals with erratic glycemic control or with upper gastrointestinal symptoms
    - Exclusion of organic causes
    - The diagnostic gold standard
      - the measurement of gastric emptying with scintigraphy of digestible solids at 15-min intervals for 4 h after food intake.

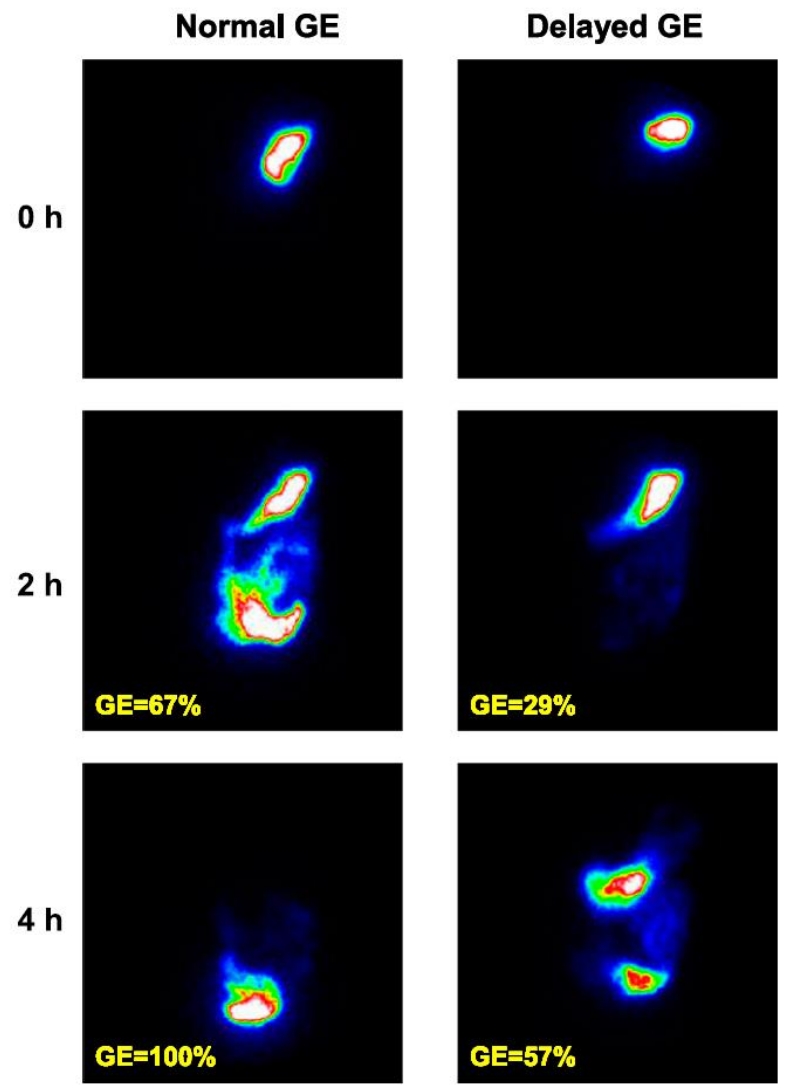
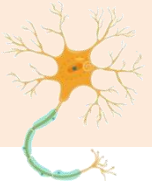


FIG. 1. GES displays normal and delayed GE in a patient with type 1 diabetes.

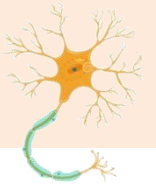
DIABETES, VOL. 62, AUGUST 2013

Diabetic Neuropathy



- Autonomic Neuropathy
  - **Genitourinary Disturbances**
    - Sexual dysfunction
      - Male : erectile dysfunction
      - Female : decreased sexual desire, increased pain during intercourse,decreased sexual arousal, and inadequate lubrication
    - Bladder dysfunction
      - nocturia, frequent urination, urination,urgency, and weak urinary stream
      - Evaluation of bladder function should be performed for individuals with diabetes who have recurrent urinary tract infections,pyelonephritis, incontinence,or a palpable bladder

Diabetic Neuropathy



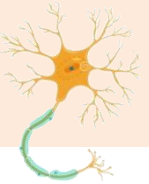
Screening

Assessed for diabetic peripheral neuropathy at least annually

Type 1	• 5 years after the onset of diabetes
Type 2	• At the time of the diagnosis

Diabetes Care 2017;40(Suppl. 1):S88–S98
2015 Treatment Guidelines for Diabetes

Diabetic Neuropathy



Diagnosis

- A careful history

- Other than diabetes should be considered
  - Toxins (alcohol), neurotoxic medications (chemotherapy)
  - Vitamin B12 deficiency
  - Hypothyroidism
  - Renal disease
  - Malignancies (multiple myeloma, bronchogenic carcinoma)
  - Infections (HIV),
  - Chronic inflammatory demyelinating neuropathy
  - Inherited neuropathies
  - Vasculitis

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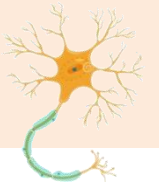
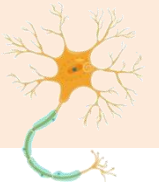
Diabetic Neuropathy



MICHIGAN NEUROPATHY SCREENING INSTRUMENT

Please take a few minutes to answer the following questions about the feeling in your legs and feet. Check yes or no based on how you usually feel. Thank you.	
1. Are your legs and/or feet numb?	☐ Yes ☐ No
2. Do you ever have any burning pain in your legs and/or feet?	☐ Yes ☐ No
3. Are your feet too sensitive to touch?	☐ Yes ☐ No
4. Do you get muscle cramps in your legs and/or feet?	☐ Yes ☐ No
5. Do you ever have any prickling feelings in your legs or feet?	☐ Yes ☐ No
6. Does it hurt when the bed covers touch your skin?	☐ Yes ☐ No
7. When you get into the tub or shower, are you able to tell the hot water from the cold water?	☐ Yes ☐ No
8. Have you ever had an open sore on your foot?	☐ Yes ☐ No
9. Has your doctor ever told you that you have diabetic neuropathy?	☐ Yes ☐ No
10. Do you feel weak all over most of the time?	☐ Yes ☐ No
11. Are your symptoms worse at night?	☐ Yes ☐ No
12. Do your legs hurt when you walk?	☐ Yes ☐ No
13. Are you able to sense your feet when you walk?	☐ Yes ☐ No
14. Is the skin on your feet so dry that it cracks open?	☐ Yes ☐ No
15. Have you ever had an amputation?	☐ Yes ☐ No
Yes : 1 No: 0	Total: _____

Diabetic Neuropathy



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14. Is the skin on your feet so dry that it cracks open?	☐ Yes ☐ No
15. Have you ever had an amputation?	☐ Yes ☐ No
Yes : 1 No: 0	Total: _____

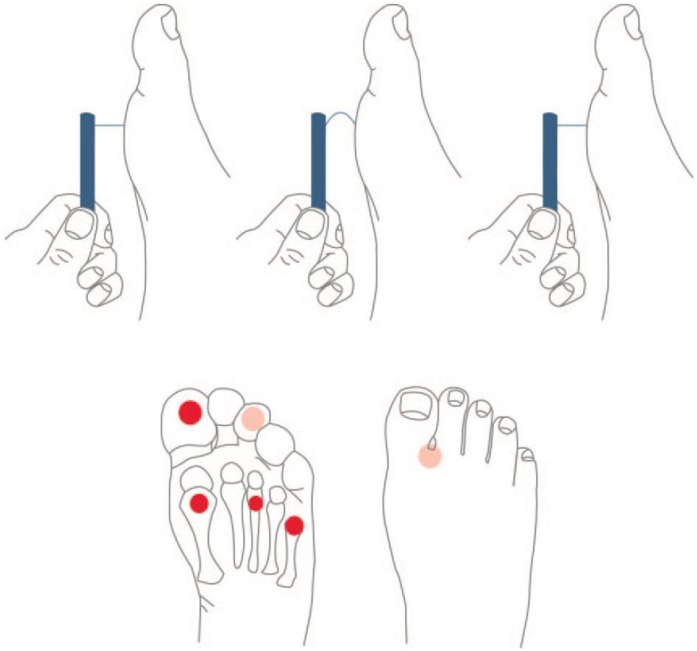
≥ 3 : Suspicious
≥ 7 : Diagnosis

Diabetic Neuropathy

Diagnosis

- A careful history

- All patients should have annual 10-g monofilament testing to identify feet at risk for ulceration and amputation



Upper panel

- To perform the 10-g monofilament test, place the device perpendicular to the skin, with pres sure applied until the monofilament buckles
- Hold in place for 1 second and then release

Lower panel

- The monofilament test should be performed at the highlighted sites while the patient's eyes a re closed

Diabetes Care 2017;40(Suppl. 1):S88–S98

Boulton AJM, et al. *Diabetes Care*. 2008;31:1679-1685.

Diabetic Neuropathy

Diagnosis

- A careful history
- All patients should have annual 10-g monofilament testing to identify feet at risk for ulceration and amputation.
- small-fiber function
  - temperature
  - pinprick sensation
- large-fiber function
  - vibration sensation using a 128-Hz tuning fork
  - 10g monofilament
  - Reflexes
- Symptoms and signs of autonomic neuropathy should be assessed

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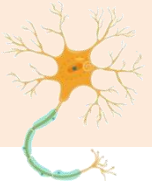
대한당뇨병학회 Korean Diabetes Association

Diabetic Neuropathy



Treatment

- Optimize glucose control

- Assess and treat patients to reduce the pain related to diabetic peripheral neuropathy and symptoms of autonomic neuropathy to improve quality of life.

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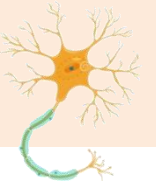
Diabetic Neuropathy



Treatment

- Painful Neuropathy
  - Pregabalin
    - a calcium channel α2-δ subunit ligand
  - Duloxetine
    - selective norepinephrine and serotonin reuptake inhibitor
  - Tapentadol
    - a centrally acting opioid analgesic
  - Tricyclic antidepressants, gabapentin, venlafaxine, carbamazepine, tramadol, and topical capsaicin

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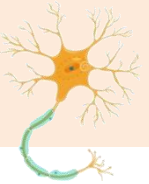
Diabetic Neuropathy



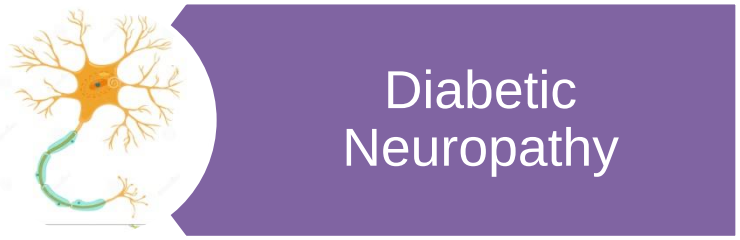
Treatment

- Orthostatic Hypotension
  - Goal : minimize postural symptoms
  - nonpharmacologic measures
    - Ensuring adequate salt intake, avoiding medications that aggravate hypotension, or using compressive garments over the legs and abdomen
  - pharmacologic measures
    - Midodrine and droxidopa
- Gastroparesis
  - Prokinetic agents : Metoclopramide
  - its use in the treatment of gastroparesis beyond 5 days is no longer recommended by the FDA or the European Medicines Agency because of risk of serious adverse effects (Extrapyramidal signs)
- Erectile Dysfunction
  - phosphodiesterase type 5 inhibitors,intracorporeal or intraurethral prostaglandins,vacuum devices, or penile prostheses

Diabetes Care 2017;40(Suppl. 1):S88–S98, IDF, 2012 Clinical Guidelines Task Force

Take Home Message

- General Recommendation
  - Optimize glucose control
- Screening
  - Type 1 :5 years after the onset of diabetes
  - Type 2 :At the time of the diagnosis

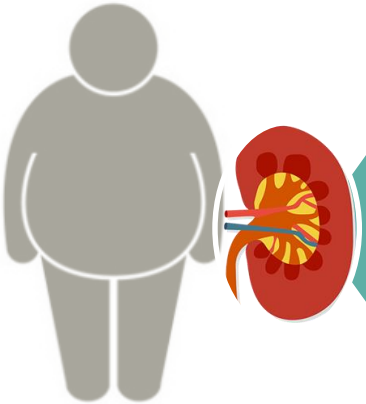


Take Home Message

- General Recommendation
  - Optimize glucose control
- Screening
  - Type 1 :5 years after the onset of diabetes
  - Type 2 :At the time of the diagnosis

Diabetic Retinopahy

Initial dilated & comprehensive eye examination



Diabetic Kidney Disease

Urine albumin
eGFR

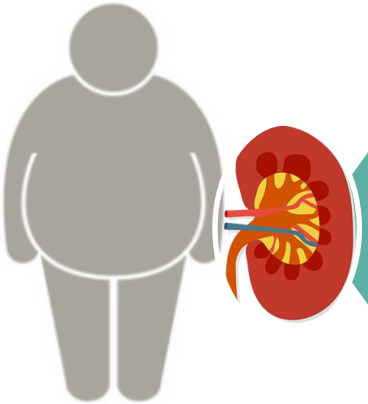
Diabetic Neuropathy

History
10g-monofilament

Take Home Message

- General Recommendation
  - Optimize glucose control
- Screening
  - Type 1 :5 years after the onset of diabetes
  - Type 2 :At the time of the diagnosis

Diabetic Retinopahy → Initial dilated & comprehensive eye examination → Laser photocoagulation Anti-VEGF



Diabetic Kidney Disease → Urine albumin eGFR → ACE inhibitor ARB

Diabetic Neuropathy → History 10g-monofilament → Pregabaline Duloxetin

Thank you for your attention