

WCU DIABETES EDUCATION SUMMIT

MICROVASCULAR COMPLICATIONS

By: Brenda Lee Lillard RD, MHS, CDE

MICROVASCULAR COMPLICATIONS

- The following presentation is a review from the American Diabetes Association. Microvascular complications and foot care. Sec. 9. In *Standards of Medical Care in Diabetes—2015*. *Diabetes Care* 2015;38(Suppl. 1):S58-S66

MICROVASCULAR COMPLICATIONS

“The importance of protecting the body from hyperglycemia cannot be overstated; the direct and indirect effects on the human vascular tree are the major source of morbidity and mortality in both type 1 and type 2 diabetes.”

Michael J. Fowler MD

Clinical Diabetes. Volume 26.

November 2, 2008

MICROVASCULAR COMPLICATIONS

- ◉ Both type 1 and type 2 diabetes are strongly associated with microvascular complications (damage to small blood vessels) including retinopathy, nephropathy and neuropathy.
- ◉ These complications can lead to blindness, kidney failure, impotence, and foot disorders leading to amputations.

RETINOPATHY

- ◉ Diabetic retinopathy is a highly specific vascular complication of both type 1 and type 2 diabetes, with prevalence strongly related to the duration of diabetes.
- ◉ Diabetic retinopathy is the most frequent cause of new cases of blindness among adults aged 20-74 years.
- ◉ Glaucoma, cataracts, and other disorders of the eye occur earlier and more frequently in people with diabetes.

RETINOPATHY-DEFINED

- ◉ Diabetic retinopathy is the result of damage to the tiny blood vessels that nourish the retina. They leak blood and other fluids that cause swelling of retinal tissue and clouding of vision. The condition usually affects both eyes. The longer a person has diabetes, the more likely they will develop diabetic retinopathy. If left untreated, diabetic retinopathy can cause blindness.

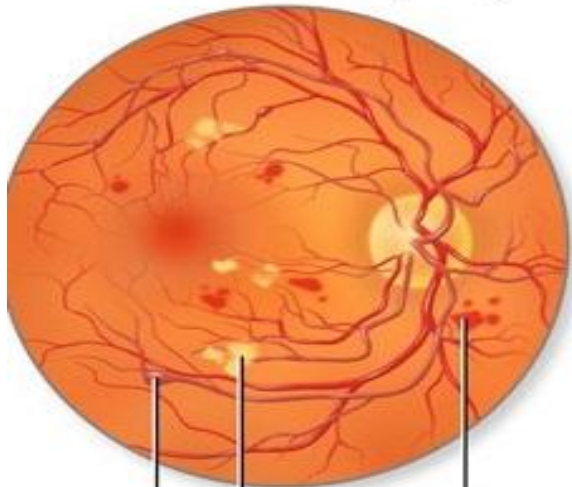
RETINOPATHY

Symptoms of diabetic retinopathy include:

- ◉ Seeing spots or floaters in your field of vision
- ◉ Blurred vision
- ◉ Having a dark or empty spot in the center of your vision
- ◉ Difficulty seeing well at night

RETINOPATHY (WWW.STUDYBLUE.COM)

Non-proliferative
diabetic retinopathy



Aneurysm
Hard exudate
Hemorrhage

Proliferative
diabetic retinopathy



Growth of abnormal
blood vessels

RETINOPATHY-PREVENTION

- ◉ Optimize glycemic control to reduce the risk or slow the progression of retinopathy.
- ◉ Optimize blood pressure control to reduce the risk or slow the progression of retinopathy.

RETINOPATHY - SCREENING

- ◉ Adults with type 1 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist within 5 years after the onset of diabetes.
- ◉ Patients with type 2 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist shortly after the diagnosis of diabetes.
- ◉ If there is no evidence of retinopathy for one or more eye exams, then exams every 2 years may be considered. If diabetic retinopathy is present, subsequent examinations for patients with type 1 and type 2 diabetes should be repeated annually by an ophthalmologist or optometrist. If retinopathy is progressing or sight-threatening, then examinations will be required more frequently.

RETINOPATHY-SCREENING

- ◉ High-quality fundus photographs can detect most clinically significant diabetic retinopathy.
- ◉ Interpretation of the images should be performed by a trained eye care provider.
- ◉ While retinal photography may serve as a screening tool for retinopathy, it is not a substitute for a comprehensive eye exam, which should be performed at least initially and at intervals thereafter as recommended by an eye care professional.

RETINOPATHY-SCREENING

- ◉ Women with preexisting diabetes who are planning pregnancy or who have become pregnant should have a comprehensive eye examination and be counseled on the risk of development and/or progression of diabetic retinopathy.
- ◉ Eye examination should occur in the first trimester with close follow-up throughout pregnancy and for 1 year postpartum.

RETINOPATHY-TREATMENT

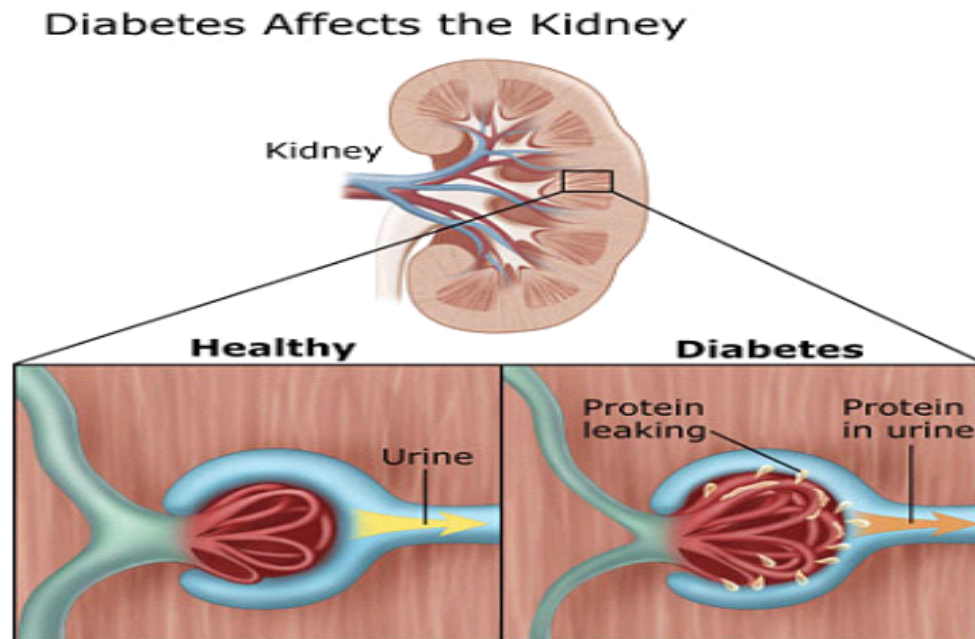
- Promptly refer patients with any level of macular edema, severe nonproliferative diabetic retinopathy (NPDR), or any proliferative diabetic retinopathy (PDR) to an ophthalmologist who is knowledgeable and experienced in the management and treatment of diabetic retinopathy.
- Laser photocoagulation therapy is indicated to reduce the risk of vision loss in patients with high-risk PDR, clinically significant macular edema, and, in some cases, severe NPDR.

RETINOPATHY - TREATMENT

- Antivascular endothelial growth factor (VEGF) therapy is indicated for 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.

NEPHROPATHY (WWW.HOUSTONENDOCRINE.COM)

- Diabetic kidney disease occurs in 20-40% of patients with diabetes and is the leading cause of end-stage renal disease (ESRD).



NEPHROPATHY - PREVENTION

- ◉ Optimize glucose control to reduce the risk or slow the progression of diabetic kidney disease.
- ◉ Optimize blood pressure control to reduce the risk or slow the progression of diabetic kidney disease.

NEPHROPATHY - SCREENING

- At least once a year, quantitatively assess urinary albumin (e.g., urine albumin-to-creatinine ratio [UACR]) and estimated glomerular filtration rate (eGFR) in patients with type 1 diabetes duration of ≥ 5 years and in all patients with type 2 diabetes.

NEPHROPATHY - TREATMENT

- An ACE inhibitor or angiotensin receptor blocker (ARB) is not recommended for the primary prevention of diabetic kidney disease in patients with diabetes who have normal blood pressure and normal UACR (<30 mg/g).
- Either an ACE inhibitor or ARB is suggested for the treatment of the nonpregnant patient with modestly elevated urinary albumin excretion (30-299 mg/day) and is recommended for those with urinary albumin excretion >300 mg/day.

NEPHROPATHY - TREATMENT

- ◉ When ACE inhibitors, ARBs, or diuretics are used, monitor serum creatinine and potassium levels for the development of increased creatinine or changes in potassium.
- ◉ Continued monitoring of UACR in patients with albuminuria is reasonable to assess progression of diabetic kidney disease.

NEPHROPATHY - TREATMENT

- ◉ When eGFR is <60 mL/min/1.73 m², evaluate and manage potential complications of chronic kidney disease (CKD).
- ◉ Consider referral to a physician experienced in the care of kidney disease when there is uncertainty about the etiology of kidney disease, difficult management issues, or advanced kidney disease.

NEPHROPATHY

- *The terms “microalbuminuria” (30-299 mg/24 h) and “macroalbuminuria” (>300 mg/24 h) will no longer be used, since albuminuria occurs on a continuum. Albuminuria is defined as UACR \geq 30 mg/g.*

NEUROPATHY

- ◉ Diabetes causes nerve damage through different mechanisms, including direct damage by the hyperglycemia and decreased blood flow to nerves by damaging small blood vessels.
- ◉ This nerve damage can lead to sensory loss, damage to limbs, and impotence in diabetic men. It is the most common complication of diabetes. (WHO)

NEUROPATHY

- The symptoms are many, depending on which nerves are affected. For example:
 - numbness in extremities
 - pain in extremities
 - impotence
- Decreased sensation to feet can lead to patients not recognizing cuts and developing foot infections. If not treated early, these can lead to amputation.

NEUROPATHY (REFERENCEMEDSCAPE.COM)

- ◉ **Diabetic foot disease**, due to changes in blood vessels and nerves, often leads to ulceration and subsequent limb amputation. It is one of the most costly complications of diabetes.



NEUROPATHY

- All patients should be screened for diabetic peripheral neuropathy (DPN) starting at diagnosis of type 2 diabetes and 5 years after the diagnosis of type 1 diabetes and at least annually thereafter, using simple clinical tests, such as a 10-g monofilament.
- Screening for signs and symptoms (e.g., orthostasis, resting tachycardia) of cardiovascular autonomic neuropathy (CAN) should be considered with more advanced disease.

NEUROPATHY

- Tight glycemic control is the only strategy convincingly shown to prevent or delay the development of DPN and CAN in patients with type 1 diabetes and to slow the progression of neuropathy in some patients with type 2 diabetes.
- Assess and treat patients to reduce pain related to DPN and symptoms of autonomic neuropathy and to improve quality of life.

NEUROPATHY - FOOT CARE

- For all patients with diabetes, perform an annual comprehensive foot examination to identify risk factors predictive of ulcers and amputations. The foot examination should include inspection and assessment of foot pulses.
- Patients with insensate feet, foot deformities, and ulcers should have their feet examined at every visit.
- Provide general foot self-care education to all patients with diabetes.

NEUROPATHY - FOOT CARE

- Refer patients who smoke or who have a loss of protective sensation (LOPS), structural abnormalities, or a history of prior lower-extremity complications to foot care specialists for ongoing preventive care and lifelong surveillance.
- Initial screening for peripheral arterial disease (PAD) should include a history for claudication and an assessment of the pedal pulses.

NEUROPATHY - FOOT CARE

- A multidisciplinary approach is recommended for individuals with foot ulcers and high-risk feet (e.g., dialysis patients and those with Charcot foot, prior ulcers, or amputation).
- Refer patients with significant claudication or a positive ankle-brachial index (ABI) for further vascular assessment and consider exercise, medications, and surgical options.

NEUROPATHY - FOOT CARE

The risk of ulcers or amputations is increased in people who have the following risk factors:

- Previous amputation
- Past foot ulcer history
- Peripheral neuropathy
- Foot deformities
- Peripheral vascular disease
- Visual impairment
- Diabetic nephropathy (especially patients on dialysis)
- Poor glycemic control
- Cigarette smoking

NEUROPATHY

- Neuropathy can manifest in various body systems:
 - Diabetic Peripheral Neuropathy
 - Diabetic Autonomic Neuropathy
 - Cardiovascular Autonomic Neuropathy
 - Gastrointestinal Neuropathies
 - Genitourinary Tract Disturbances

REFERENCES

1. American Diabetes Association. Foundations of care; education, nutrition, physical activity, smoking cessation, psychosocial care, and immunization. Sec.4. in *Standards of Medical Care in Diabetes- 2015*. *Diabetes Care* 2015;38(Suppl.1):S20-S30
2. National Standards for Diabetes Self-Management Education and Support. *Diabetes Care*. Volume 37, (Suppl.1); January 2014
3. Diabetes Self-Management Education and Support in Type 2 Diabetes. A Joint Position Statement of Diabetes Educators, and the Academy of Nutrition and Dietetics. *The Diabetes Educator Online* First. June 5, 2015.
4. American Diabetes Association. Microvascular complications and foot care. Sec. 9. In *Standards of Medical Care in Diabetes—2015*. *Diabetes Care* 2015;38(Suppl. 1):S58-S66

MICROVASCULAR COMPLICATIONS

Questions?

THANK YOU!