Diabetes Case Studies

A. Paul Chous, MA, OD, FAAO
Private Practice, Tacoma, WA
Specializing in Diabetes Eye Care & Education
Adjunct Professor, Western University of Health Sciences
Email: dr_chous@diabeticeyes.com

Disclosures

- I have spoken for, consulted for, or been paid honorarium by the following:
  AI Optics, American Diabetes Association, Bausch & Lomb, EyeNuk, Genentech, NovoNordisk, Optos, Regeneron, Risk Medical Solutions, VSP, ZeaVision, Zeiss
- These associations did not unduly influence the content of this presentation or my patient care recommendations

Increasing Prevalence of DM

34.2 million Americans now have diabetes
2018 incidence rate was 1.5 million

NHANES analysis (2012) suggested ≥50% of American adults had diabetes or prediabetes
Up to 100 million have NAFLD (largely associated with insulin resistance)

You won't lose vision to DR if you don't develop diabetes

Mean Estimate: 100 million Americans by 2050

2012

2050

1 in 10

1 in 3–5

Significant increase in prevalence of total diagnosed and undiagnosed diabetes in adults over the next 30 years


It's a little late....

- Up to 60% of pancreatic beta cells are non-functional AT Dx of T2DM
  Diabetesologia 2001;44:932–945
- Estimated duration of T2DM AT Dx is a mean of 6.2 YEARS!
  Diabetes Care. 2014 Jun;37(6):1668-74
- 1 in 5 patients with newly Dx T2DM has DR/DME! (3% have CSME) and both entities are associated with increased CV mortality
  For Cardiology Outcomes. 2015 Mar;82(3):269-7

Diabetes Rates Have Climbed During the Pandemic

- 15% increase in pediatric T1DM & 187% increase in pediatric T2DM
- Meta-analysis shows 14.4% of COVID hospitalized pts received a new diabetes diagnosis
  Increase in the Diagnosis and Severity of Presentation of Pediatric Type 1 and Type 2 Diabetes during the COVID-19 Pandemic. Horm Res Pediatr. 2021;94(2):272-284.
When Should I Refer a Diabetes Patient?

- It depends on your comfort level
- My Answer:
  - When the patient needs or may likely benefit from treatment of DR/DME
  - When the patient has chronic, sub-optimal metabolic control or is receiving decidedly sub-optimal care
  - With unexplained VA loss
  - When I am unsure of the diagnosis

Refer???

Moderate NPDR
- A1c = 10%
- BCVA = 20/15
- Metformin
- Monotherapy
- PCP said to recheck x 1 year

Retinopathy Lesions
- Microaneurysms (MA)
- Dot & Blot Hemorrhages
- Hard Exudates
- Retinal Thickening
- Cotton Wool Spots
- Vein Beading
- Intra-retinal Microvascular Abnormalities (IRMA)
- Neovascularization (of disk, retina or iris/angle)
  - Foveal Ischemia

Which of these cause significant vision loss?

Sight-threatening DR
- PDR
- DME

Severe NPDR

Foveal Ischemia on OCTA

Thanks to Steave Ferrucci, OD, FAAO for this Image

Who Needs Immediate Referral?

- Any diabetes patient with neovascularization of the optic disk (NVD) and pre-retinal/vitreous hemorrhage or retinal detachment should be referred to a retinal specialist within 24-48 hours

AOA Clinical Practice Guidelines for Care of Patients with Diabetes Mellitus, 2020
When to Worry About NPDR

- When there is associated DME
- When it qualifies as Severe NPDR
  - The 4-2-1 Rule (Hmg/MA; Venous Beading; IRMA)
  - 15% to PDR in 1 yr
  - 45% to PDR in 1 yr if 2 severe findings
  - 60-75% to high-risk within 5 yrs

Per ETDRS

Who Would Benefit From Earlier Referral to an RS

- Studies show that ODs, general ophthalmologists & even retina specialists tend to under-grade severity of DR compared with image reading centers
- Recent evidence shows that anti-VEGF therapy (aflibercept or ranibizumab) can significantly improve DR severity, especially when ETDRS level 47 (moderately severe NPDR) or worse

Per ETDRS, 2018 Oct, 2013;88:9-66
Wykoff CE. Intravitreal aflibercept for Moderately Severe to Severe Non-Proliferative Diabetic Retinopathy (NPDR): 2-Year Outcomes of the Phase 3 PANORAMA Study. Data presented at Angiogenesis, Exudation and Degeneration Annual Meeting; February 20, 2015; Miami, Fl.

A Few Good Cases.....

Patient CK

- 27 yo male with T1DM x 16 years • 5’7”/204 lbs
- "I lost my vision in the right eye 3 months ago and now my left eye is a red fog – I got ‘lasered’ at the hospital yesterday"
- CK has had no eye exam in 2 years ("my last eye doctor said I had some early damage")
- “My last A1c was bad – above 8”
- CK takes 18-30 units Humulin R with meals and 50 units Humulin N BID (154 – 190 units)

Here are his fundus photos...

CK - Diagnosis

- High-risk PDR OU with vitreous hemorrhage s/p PRP OS only
- Significant fibrovascular traction OD
- Uncontrolled T1DM

What Else Is Wrong?
- Untreated HTN
- Obesity
- IR with Hyperinsulinemia
  - (insulin ↑ IGF-1/VEGF, BP, cancer risk)

Metabolic Syndrome has up to 43% prevalence In T1DM
J Diabetes Res. 2015; 2015:

HM
In-office Hba1c = 11.1%
BP measured 140/95
In-office glucose = 391 mg/dl
Slow to dilate
IOP = 12 OD/OS

20/80
CK - Treatment

- Patient education
- Refer to a retinal specialist
  - PRP, Vitrectomy
- Call PCP – recommend referral to endocrinology – f/u with letter & images
- Refer to an endocrinologist
  - Started on Novolog + Lantus, ACEI
  - Diabetes self-management education class

CK - Outcome

- Vitrectomy with endolaser OD, more PRP OS (resulted in 20/60 OD and 20/20 OS)
- Placed on insulin pump with CGMS
  - Last A1c = 7.5% and BP = 118/75
  - Stable DKD
  - Cardiology consult normal

CK – Outcome

20/60 20/20

....And 7 years later

- LTFU (lost to follow-up) x 2 years
- Recurrent NVD with Traction Retinal Detachment, right eye → more PRP & surgery
- Latest HbA1c = 7.2%
- Now 20/800 OD
- 20/20 OS
- Would anti-VEGF therapy have helped?

Anti-VEGF for PDR

- DCRR.net Protocol S showed ranibizumab is non-inferior to PRP for PDR
  - Better Visual Field (+372 db)
  - Lower risk of DME and need for vitrectomy
  - % vs 28% (p < 0.001)
- CLARITY trial showed similar results for aflibercept
- Decision should be individualized
  - Pros & Cons: better VF, night vision but requires serial treatment

Lucentis® & Eylea® are both now FDA-approved to treat any level of DR with or without DME

Patient RC: Short & Sweet

- 21 yo male with T1DM x 12 years
- Recent HbA1c = 7% but pt reports had been as high as 13% for ‘many years’
- Saw OMD 14 months earlier and was told he had “some early changes” but could be seen Q2 years if he kept his A1c in range
- Complaining of reduced vision in the right eye for a few days
- 20/400 and 20/20 NI with pinhole
Patient RC
- Referred to retinal specialty
- Consult letter reports PRP and ranibizumab (Lucentis®) delivered at 1st/2nd visits
  - REMEMBER, Good A1c doesn’t protect from VTC once NPDR is > moderate (>DRSS Level 43)
- This patient represents a strong argument AGAINST less frequent eye examination intervals for higher risk patients: Young males, T1DM, Hx of initial, chronic, poor control, diabetes duration > 10 years

Patient JF
- T2DM x 6 years
- HbA1c = 7.2% (had been as high as 9%)
- metformin + basal/bolus insulin (Lantus + Novolog) → 190 total units/d
- CABG

PDR 5 Years After Dx of T2DM
- 71k patients
  - 1.74% (1,249 of 71,817) developed PDR, 0.25% TRD, and 0.14% NVG.
- Any insulin use was greatest risk factor for PDR at 3.6x risk
- A1c over 9.0 was 2.1x risk
- Protective factors appeared to be
  - Young age (age 18–23)(OR 0.46), Medicare insurance (OR 0.60), morbid obesity (OR 0.72), and smoking (OR 0.84)

Patient SV
How bad is her DR?

And now looking at the nerve more carefully?

OCTA look at the ONH neo

Patient DT – DR or Not DR?

- 13 years T2DM
- My last A1c was “good” on no meds
- Previous eye exam x 1 year showed no DR
- New exam reveals significant retinopathy, including white-centered hemorrhage
  - 15% of severe NPDR/PDR patients have white-centered hmg
- Corrects to 20/20
- No DME

Patient DT: DR or Not DR?

- In-office HbA1c displays error message: “too little Hb in the blood sample” (A1cNOW™)
- Patient notes extreme fatigue and dypsnea when asked
- Referred to endocrinology then hematology
- Dx idiopathic aplastic anemia
- Tx with prednisone and cyclosporine
- Patient died within 3 weeks from cerebral hemorrhage
Patient KS - 2018
- 62 yo female with T2DM x 7 years  
- A1c = 8% 
- BCVA 20/50 OD  IOP = 18 mm  metformin 
- CST = 426 μ  uses CPAP  Lantus

Patient referred & treated – RTO in 2019
- Avastin x 4  →  Lucentis x 4  →  Eylea x 4 
- Vision 20/100  →  IV Ozurdex placed 
- A1c = 7.2% 
- BCVA = 20/40  CST = 334μ  * IOP = 47 mm

KS 2021 Follow-up
- IVT aflibercept Q 4-8 weeks x 24 mos 
- A1c = 6.8%  * sleep report shows 6+ hrs nightly use 
- ECCE → BCVA 20/80  * CST = 465 μ  
- IOP = 24 on Cosopt

KS Key Points
- Not everyone responds well to anti-VEGF 
- Add-on IV steroids are often helpful, but can result in significant ocular HTN/glaucoma

Patient JQ
- T2DM x 8 years; 72 yo Latino male 
- A1c 6% on insulin (Novolog + Lantus) 
- Asymmetric NPDR without DME (OD > OS) 
- Emmetropia  *IOP 17/17 mmHg 
- Review of medical record shows A1c 11.3% at diagnosis and not reduced < 8% until year 5 when PCP referred to endocrinology
Asymmetric NPDR

- Associated with carotid artery stenosis both ipsilateral and contralateral to the eye with worse DR
  Ophthalmology 1990; 97(7):869-74
- Eyes with lower IOP may have increased risk of sight-threatening DR due to increased blood flow in compromised retinal capillary bed
  Brit J Diab Vasc Dis 2001; 1(1):80-87
- Protection also associated with prior chorioretinal scarring and high myopia
  Retina. 2017 Jul;37(7):1270-1276

For Patients with Asymmetric DR

- In the absence of HIGH IOP, high myopia and/or chorioretinal scarring in the eye with LESS severe DR...
- It is prudent to rule out
  - Carotid artery stenosis
  - Venous Stasis Retinopathy or Ocular Ischemic Syndrome

What Else Is of Concern in this Eye?

- Over 4 years, eyes with predominantly peripheral DR lesions (PPL) were
  - 3.2 X more likely to have a 2-step ETDRS severity progression
  - 4.7 X more likely to develop PDR
  - PPL are associated with non-perfusion on ultrawide field fluorescein angiography
  Ophthalmology. 2015 Feb 19.
  Ophthalmology. 2015 Sep 6

No bruit was detected.......But

- Referred for carotid ultrasound
- 90% stenosis of the left common carotid artery

What Else?

- GN - Simple Stuff that Matters
  - 68 yo man with T2DM x 15 years; CHF
  - 250 units of insulin daily (Levemir + Novolog)
  - A1c has not been below 8% since starting insulin
  - Patient and his endocrinologist are frustrated with each other
  - Fasting glucose is never > 150 (log book) BUT
  - 2-4 hour post-prandial glucoses are always > 200

- Referred for carotid ultrasound
- 90% stenosis of the left common carotid artery
Mild NPDR without macular edema

The Glucose Log Book

• Pre-prandial numbers 110-150 mg/dl
• Post-prandial numbers 250-350 mg/dl

A Simple Question

• When are you taking your Novolog insulin?

Answer:
• “About an hour after I eat……Why? Is that important?”

Outcome for GN

• HbA1c dropped from 8.7% to 6.9% within 3 months
• Insulin dosage reduced from 250 to 150 units
• Diabetic retinopathy stable x 12 years → worsening CHF → LVAD

LVAD for end-stage CHF (left-ventricular assist device)

When Should Patients See an Endo?

• Sub-optimal glycemic control with progressive DR despite current therapy
• Children with newly Dx T1DM
• Patients with frequent hypoglycemia
• Any patient < 60 years of age put on a sulfonylurea as first-line therapy for T2DM
Hypoglycemia

- Always have a rapid-acting carbohydrate in the office (juice, sugared soda, glucose gel)

15gm CHO will ↑ BG ~ 30-40 mg/dl (1.7-2.2 mmol/L)

Patient RS – Unlucky Bull’s Eye

- 22 yo woman with T1DM x 5 years
- 6 months pregnant
- “I scratched my eye with my insulin syringe”

- Q: “why was the syringe near your eye?”
- A: “I was re-capping the syringe and I missed”

Exam Findings

- 20/400 OD, 20/20 OS
- Pinhole: NI
- Slit lamp exam shows an inferior central perforating corneal wound and a dense cortical cataract OD
- Seidel negative - IOP 17/15
- A/C clear

Treatment

- Call to local co-management center
  - Advised against ECCE until after delivery
- Scheduled appointment next day
  - “My eye is throbbing”
  - IOP = 62mm OD
- Pt referred for immediate ECCE
  - diagnosed with lens particle glaucoma
  - IOP normalized after cataract surgery
  - A healthy baby was delivered 13 weeks later

What I learned from this case

- Don’t recap syringes
- If you do, point the business end away from your face
- Insulin pens & sharps containers reduce risk of a ‘stick’
**KW - Simple Stuff that MATTERS**

- 36 yo with T1DM x 25 years
- Basal-Bolus MDDI therapy (Humalog + Lantus)
- Mild NPDR (a few microaneurysms)
- Excellent glycemic control x 15 years (HbA1c ranging 6.5%-7%)
- A1c has increased x 1 year from 7.2% to 8.5%
- Last HbA1c = 9.1%

**KW – What Happened?**

- Total daily insulin dose has increased from 50 units to 190 units but “I’m always high”
- Patient swears no change in diet, exercise or adherence to insulin; glucose log shows no pre- or post-prandial patterns
- (Excellent & famous) endocrinologist is unhappy
- What Happened?

**Questions**

- Where do you inject?
- “The left side of my stomach because I’m right handed and always driving”
- May I take a look at where you inject?????

**Injection Site Lipohypertrophy**

**With Rotation of Injection sites:**

- A1c dropped to 6.4% within 3 months
- Insulin dosage dropped from 190 units/day to 50 units/day

“*The patient’s optometrist noted injection site lipohypertrophy, recommended site rotation and the glucoses have improved appreciably*”

**Patient JT – Home Alone**

- 79 yo man with T2DM x 21 years
- Treated initially with Glyburide – worsening A1c prompted insulin therapy
- Apidra (with meals) + Lantus (at bedtime)
- Last A1c = 7.1% (176 mg/dl average)
- Meds: lisinopril, Crestor, 325 mg ASA
- Pt lives alone, but next door to his son
- Minimal NPDR - No Hx of CV disease

**Flag**

- JT is asked about his home blood glucose readings, and reports that he experiences some low blood sugars at night and keeps candy next to his bed “just in case”
- I recommended that he consult his PCP about a continuous glucose monitor (CGMS) and get a home glucagon kit
- F/U exam scheduled in 6 months
6 month F/U
- JT no shows
- Call to patient’s son:
  - “My dad was found in bed unconscious two days ago. The paramedic checked his sugar and it was under 20” (< 1.1 mmol/L)
  - Paramedic administered glucose gel
- Patient died at local hospital that day

“Dead In Bed”
- 6-8% of deaths in DM patients under age 40
  - Fatal arrhythmia caused by acute hypoglycemia
- Occurring more often in older T2DM patients on insulin therapy, who have reduced sensitivity to acute hypoglycemia

Diabetes Care. 2009 Aug;32(8):1513-7
JAMA Intern Med. 2019 Dec 1;179(12):1633-1641.

GF – Too Low – Disaster Averted
- 72 yo with T2DM x 15 years
- No DR or DME
- CVD s/p CABG
- Meds include Toprol, lisinopril, metformin, ASA, Lantus (50 units BID) * No CGM
- GF gets a little confused during the eye exam
- In-office blood sugar measures 52 mg/dl

GF
- Q: Do you get a lot of low blood sugars?
  A: Ever since I started taking insulin
- In-office A1c = 4.2% (mean glucose = 72 mg/dl)
- Phone Call to PCP: “GF’s last A1c was 8%, so I put him on Lantus”
- What Dose: “15 units morning & night”

GF- conclusions
- Measuring GF’s A1c allowed us to immediately adjust his insulin dose
- It may have saved his life
- A single episode of acute hypoglycemia in a susceptible patient with heart disease can be fatal
**Patient MLH – “Routine Exam”**

- "I was told I might have prediabetes"
  - He has not visited a physician in > 5 years
  - Recently gained 20 pounds during pandemic
- Meds: none  
- Physical exam:
  - BP 152/95  
  - Height 5’5”  
  - Weight 226 Lbs.
  - BMI 33 & Waist 40”
  - Reports being tired all the time  

Ocular Dx: 

1+ NS  

Presbyopia & Retina appears normal  

IOP = 17/16

+ ESAP = Easy Sleep Apnea Predictor

+ 1 cm gap  

**In-office Random Blood Glucose =212 mg/dl**

⇒ Refer to primary care physician

**HbA1c of 8.2%**

**Diagnoses:**

- Elevated LFT’s  
  
  7NAFLD

**Metabolic Syndrome:**

- High TG/Low HDL
  - HTN (>150/90)
  - FBS >100
  - Waist >40 inches

**Diabetes mellitus**

**DKD**

**In-home polysomnography (PSG)**

- Apnea-Hypopnea Index: 32 events/hour

**Severe OSAS**

Mild = 5-15  
Moderate = 15-30  
Severe > 30

**What You Gonna Do?**

- Pharmacotherapy for hyperglycemia/HTN/lipids  
  - Why? Prevent MACE, ESRD and eye disease  
  - Probable: metformin, lisinopril, high potency statin

- Sleep therapy  
  - Why? Increased risk of CV events and DR/DME  
  - Weight loss, CPAP+

- Weight loss  
  - Why? Improves all metabolic markers of DM  
  - Not a candidate for bariatric surgery (BMI > 35 w DM)  
  - Discuss Fasting Regimes  
  - Drug therapy - unimpressive until NOW

**Apnea in Diabetic Retinopathy/DME**

- STD rates were 2-2.5X higher in T2DM patients (n = 230) with untreated/under-treated OSA followed for 4 yrs  
- After all adjustments, OSA increased odds of progressing to severe NPDR/PDR 5-fold

- AHI > 11.9 vs = 4.8 increased odds of STD  
  - 7.5-fold

**Retina. 2014 Dec;34(12):2423-30**

**Respiration. 2012;84(4):275-82**

**Am J Resp Pulm Crit Care Med. 2017 Oct 1;196(7):892-900.**

**Respir Care. 2015 Dec;61(12):1923-30**
Newer T2DM Meds to Know

- **GLP-1 Analogs (end in -tide)**
  - Byetta/Bydureon, Victoza/Saxenda, Trulicity, Tanzeum, Ozempic/Rybelsus FDA approved
  - Prandial insulin, glucagon & appetite
  - 10-20 lbs weight loss
  - Lower A1c about 1+ point

- **SGLT2 Inhibitors (end in -flozin)**
  - Invokana, Farxiga, Jardiance – all are oral
  - Block renal resorption of glucose, lower BP
  - 9-12 lbs weight loss, drop A1c about 0.8

**MOA for SGLTIs**

- ↑Renal and urinary excretion of glucose
- ↓Risk of CV events, hospitalization for CHF, progressive kidney disease

**MOA of GLP-1 Analogs**

- ↑Appetite
- ↑Glucagon Release
- ↑Insulin Secretion
- ↓CV Events

**Breaking News: Wegovy® approved June 2021**

- Semaglutide 2.4 mg weekly + lifestyle intervention (LI) used in patients with BMI ≥ 30 (or ≥ 27 with 1+ weight-related comorbidities) versus LI + placebo injection (n=1961 without diabetes)
  - 2.4X FDA-approved dose in T2DM
  - Nausea/vomiting in 80%/40% of treatment vs control subjects
  - Mean weight loss = 33 lbs at 68 weeks
- 1/3 of subjects lost > 55 lbs

**A Lot of People Have Dysglycemia**

- 50+% of US adults have diabetes or prediabetes
- 7.5 million/76 million Americans have **undiagnosed** diabetes/prediabetes
- ODs can and do diagnose a lot of diabetes and prediabetes

**Should ODs Concern Ourselves With Diabetes Prevention?**

- We are largely a primary care profession
- ODs are frequently an entry point into the health care system
- Diabetes is epidemic and will bankrupt the US health care system
- Ocular findings are not uncommon in undiagnosed type 2 diabetes
Patient GM – At Risk
- 58 yo male with recently Dx pre-diabetes
- A1c = 6.3%  Fasting glucose = 118 mg/l
- ‘My PCP recommended more exercise and weight loss’
- Meds include atenolol, HCTZ, d/c lisinopril (‘made me cough’), ranitidine, rosuvastatin
- BMI = 36 kg/m²  Waist Circumference = 42”
- Smokes 1 pack/day
- Eats 1 serving of fruits/vegetables/day
- Mom developed T2DM in her 70s

Why Should ODs Care About Diabetes Prevention?
- Every day, 55 Americans with diabetes go blind
- You won’t go blind from diabetes if you don’t develop diabetes

Evidence-Based Tips To Avoid Diabetes
- Exercise 30 minutes per day (after waking) & minimize added sugars
- Eat a predominantly plant-based diet including a variety of fruits and vegetables and more vegetables
- Minimize processed meats
- Drink coffee or tea  • Avoid hi-dose thiazide diuretics
- Sleep > 6 hours per night and < 9 hours
- Get your serum vitamin D > 40 ng/ml
- Don’t smoke
- Live away from smog
- Breast Feed
- Turn down the thermostat
- Reduce Light at Night
- Fast if you’re obese

WHAT ARE GM’S RISK FACTORS FOR T2DM?
• Has Prediabetes  • Abdominally obese  • Smoker
• Male > 50 yo  • Thiazide Diuretic  • Potent statin
• Little Plant Food  • First Order Relative had T2DM

Diabetes Prevention Program Outcomes Study (DPP) Incidence of Diabetes

Most Effective for Patients > 60 yrs old
Why Fast?

- T2DM is a PROGRESSIVE Disease
- Medical-Nutrition Therapy (MNT) including drugs/dieting/exercise RARELY results in disease remission
- Remission DOES occur after bariatric surgery or with fasting + reduced carbohydrate diet

My Plan For GM

- Send a note to his PCP
- Copy the patient on the note
- Give him my handout titled “Practical Tips to Avoid Diabetes”
- Give him a card for a local smoking cessation program
- Have GM write down my recommendations and pick 1 or 2 things he wants to fix before his next eye exam – circle those and enter in record

GM Outcome

- 55 lb weight loss using alternate daily fasting
- Walking 10K steps each day
- Last A1c = 5.0%
- Taken off HCTZ and now using low dose ARB (valsartan)
- Discontinued smoking
- MPOD increased from 0.28 to 0.60 on DVS
- GM says “this was the best thing I’ve ever done”

ST – the unexpected

- 63 yo female with T2DM x 18 yrs w blurred DVA
- Last HbA1c = 10.3% on metformin, lisinopril, simvastatin
- 15 lb weight gain during pandemic (BMI = 34 Kg/M²)
- BP = 162/104
- 3 diopter myopic shift → 20/20 OD/OS
- Minimal cataract, no DR or DME
- Advised to see PCP for intensified Tx & RTO when A1c < 8% and spot glucose < 180 mg/dl
- “Can’t I just have new glasses now?”

ST

- Patient returns in 10 mos with HbA1c = 6.8%
- Has lost 11 lbs  BP measures 135/88
- New Meds: semaglutide (Ozempic®), insulin degludec (Tresiba®) and atenolol
- Myopic shift now a mere diopter BUT
  – BCVA now 20/20 and 20/30
- No DR or DME minimal cataract looks the same
- Optic disk swelling OS
What Do You Wanna Know?

- No edema of the right disk
- Normal pupils & visual fields
- What she got?

Diabetic Papillitis/Papillopathy
- A rare variant of AION – may progress to AION
- VA typically better than 20/40
- Associated with rapid reduction in blood glucose levels
- GLP-1 analogs (Ozempic) cause vasodilation
  – May have blocked axoplasmic flow
- Prognosis excellent (referred to RS who referred to neuro-oph)
- Patient had 20/20 BCVA 3 months later with resolution of disk edema OS


Patient DG
- 61 yo with excessive thirst & 3 diopter refractive shift
- BMI = 25
- In-office glucose = 515 mg/dl
- How do we know if this patient has type 1 or type 2 diabetes? Why is that important?

C-peptide: co-secreted with endogenous insulin

DG’s C-peptide
- 1.0 ng/ml
- Normal range = 0.5 to 2.0
- T1DM mean C-peptide = 0.6 at Dx
  – Mean at 5 years is < 0.2
- T2DM mean C-peptide = 5.0 at Dx
- Mean C-peptide in LADA = 1.1
- How do we confirm latent auto-immune diabetes of adulthood (late onset T1DM)?

Diabet Med. 2013 Jul;30(7):803-17

GADA
GLUTAMIC ACID DECARBOXYLASE ANTIBODIES

Hallmark auto-antibody associated with auto-immune diabetes
DG Outcome

• Antibody testing was POSITIVE
  – 1750 U/ml (normal is < 5.0)

• This patient has autoimmune diabetes (LADA) and has been placed on basal/bolus insulin therapy
  – HbA1c 3 months after initiation = 7.2%

PEARL: 4-12% of diagnosed T2DM is T1DM/LADA
42% of T1DM is Dx AFTER Age 30 years


What Severity?

• Severe NPDR OU
• AI confirms VTD
• Pt declines referral as he has no symptoms
• Reviewed photos and AI TDRS stats
• Showed example of improvement with anti-VEGF
• Pt still intransigent

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RL - Why Do I Need Treatment?

• 33-year-old male with T1DM x 19 years
• Referred by endocrinology
• Last eye exam was 5 years ago • BCVA 20/20 in each eye
• Last HbA1C: 7.1%
• Only test glucose when he feels bad
• A1c had been > 8.5% “for years” after Dx
  – Basal/bolus insulin (Novolog/Levemir): 150 units/day
  – In-office glucose: 413 mg/dl

Diabetic Retinopathy Severity Score (DRSS)
Example of 2-Step Improvement

• Severe retinal hemorrhages in 4 quadrants, or
• Venous beading in ≥2 quadrants, or
• Moderately severe intraretinal microvascular abnormalities (IRMAs) in ≥1 quadrant
• Microaneurysms, plus
• Mild IRMAs, or
• Moderate retinal hemorrhages
Treatment with anti-VEGF Pulls Patients with Severe NPDR and PDR Back From the Edge of the Cliff

Patient Perceptions
- Diabetes patients are frequently unaware of:
  - The need for regular eye examinations
  - The recommended frequency of dilated eye examinations
  - The asymptomatic nature of DR/DME at their earliest, most treatable stages

Critical Message for Diabetes Patients
Good Vision On an Eye Chart or Daily Life
≠
Healthy Eyes

My Final Thoughts on Diabetes/DR
AVOID THEM
MITIGATE THEM
MANAGE THEM

Thank You!
Paul Chous
dr_chous@diabieticeyes.com