Diabetes Complications
Recognition and Treatment

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Medical Director Diabetes Master Clinician Program
Diabetes is the most difficult of all chronic diseases for both the patient and the physician!!

For the patient--Multiple medications, finger sticks, injections, frequent visits to your physician, exercise is no longer optional, food is now a potential enemy, counting carbs, fear of complications heart attacks, strokes and premature death, the unknown??—Diabetes Distress

For the physician—Multiple responsibilities, concern about complications conflicting guidelines, new medications, metabolic defects, pathophysiology, not enough time, confusing goals, various levels of literacy, limited time and limited compensation
Goals

• Understand how natural history and progression impact treatment.

• Macrovascular complications and Importance of reaching all three goals (A1C-LDL-B/P) simultaneously

• Recognition and treatment of microvascular complications

• Pharmacological Rx and Guidelines to prevent progression and complications

• Achieving quality goals through registries, and empowered teams —becoming a “participatory office”
Agenda

• Understand how natural history and progression impact treatment.
β-Cell failure in T2 Diabetes - Prevention and Treatment

Halban et al. β-Cell Failure in Type 2 Diabetes: Postulated Mechanisms and prospects for Prevention and Treatment. Diabetes Care 2014;37:1751-1758

Early aggressive, continued, Rx Preserves β Cell Function by decreasing lipotoxicity, glucotoxicity and inflammation—Stunned β-α Cells?

Rx with physical activity and nutrition—Metformin Insulin, GLP-1 agonist and TZD’s may preserve β and Alpha cells?
Agenda

• Macrovascular complications and Importance of reaching all three goals (A1C-LDL-B/P) simultaneously
Cause of Complications in Diabetes

• An increase of 1% in A1c is associated with an increased risk of 18% in Cardio-Vascular Disease

• However A1C is much stronger indicator of Microvascular disease- 37% increase in the risk of retinopathy or renal failure associated with a 1% increase in A1c.

• Lack of Control of Blood pressure and Lipids account for the majority of the increased risk of CVD

Hypertension, Insulin Resistance, Diabetes, Dyslipidemia, Inactivity, Obesity, Tobacco and Inflammation Drive Endothelial Dysfunction and Lesion Initiation

Inflammatory process is a result of insult from Hyperglycemia, Dyslipidemia, Hypertension and other elements of CMR

HDL Anti-inflammatory and removes LDL

Ruptured plaque

Plaque in arterial wall

CMR = cardiometabolic risk.


- 4,926 adults aged ≥20 years with self-reported diabetes who completed the household interview and physical examination NHANES
- 52.5% achieved A1C <7.0%,
- 51.1% achieved BP <130/80, 70% if B/P goal <140/90,
- 56.2% achieved LDL <100 mg/dL, and
- 18.8% achieved all three goals simultaneously
- Most risk reduction comes from Blood Pressure Control

Patients Reaching All Three ADA Goals for Diabetes at the Same Time

DF = diabetes forward; DMCP = diabetes master clinician program NHANES = national health and nutrition examination survey.

RECOGNITION AND TREATMENT OF MICROVASCULAR COMPLICATIONS
Microvascular Complications


- **Nephropathy** - diabetes leading cause of kidney failure, accounting for 44% of all new cases of renal failure—Most will die from a Cardiovascular event before they require dialysis.

- Other—hearing loss—dental

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Neuropathy-

- *Peripheral neuropathy*, the most common type of neuropathy, pain or loss of feeling in the toes, feet, legs, hands, and arms. (early)

- *Autonomic neuropathy* changes in digestion, bowel and bladder function, sexual response, and perspiration. It can also affect the nerves that control heart rate and blood pressure, -- hypoglycemia unawareness, (late)

- *Proximal neuropathy* pain in the thighs, hips, or buttocks and leads to weakness in the legs—balance??

- *Focal neuropathy* results in the sudden weakness of one nerve or a group of nerves, causing muscle weakness or pain.

- Treatment induced Neuropathy-rapid drop A1C > 3%

Agenda

• Pharmacological Rx and Guidelines to prevent progression and complications
Management of Hyperglycemia in Type 2 Diabetes

A Patient-Centered Approach: Position Statement of the American Diabetes Association

<table>
<thead>
<tr>
<th>Monotherapy</th>
<th>Healthy eating, weight control, increased physical activity, and diabetes education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficacy*</td>
<td>Metformin</td>
</tr>
<tr>
<td>Hypo risk</td>
<td>high</td>
</tr>
<tr>
<td>Weight</td>
<td>low risk</td>
</tr>
<tr>
<td>Side effects</td>
<td>neutral / loss</td>
</tr>
<tr>
<td>Costs*</td>
<td>GI / lactic acidosis</td>
</tr>
<tr>
<td>Costs</td>
<td>low</td>
</tr>
</tbody>
</table>

If A1C target not achieved after ~3 months of monotherapy, proceed to 2-drug combination (order not meant to denote any specific preference—choice dependent on a variety of patient- and disease-specific factors):

Management of Hyperglycemia in Type 2 Diabetes

<table>
<thead>
<tr>
<th>Dual therapy†</th>
<th>Efficacy*</th>
<th>Hypo risk</th>
<th>Weight</th>
<th>Side effects</th>
<th>Costs*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metformin +</td>
<td>high</td>
<td>moderate risk</td>
<td>gain</td>
<td>hypoglycemia</td>
<td>low</td>
</tr>
<tr>
<td>Metformin +</td>
<td>high</td>
<td>low risk</td>
<td>gain</td>
<td>edema, HF, fx</td>
<td>low</td>
</tr>
<tr>
<td>Metformin +</td>
<td>intermediate</td>
<td>low risk</td>
<td>neutral</td>
<td>rare</td>
<td>high</td>
</tr>
<tr>
<td>Metformin +</td>
<td>intermediate</td>
<td>low risk</td>
<td>loss</td>
<td>GU, dehydration</td>
<td>high</td>
</tr>
<tr>
<td>Metformin +</td>
<td>GLP-1 receptor agonist</td>
<td>high</td>
<td>low risk</td>
<td>loss</td>
<td>GI</td>
</tr>
<tr>
<td>Metformin +</td>
<td>Insulin (basal)</td>
<td>highest</td>
<td>high risk</td>
<td>gain</td>
<td>hypoglycemia</td>
</tr>
</tbody>
</table>

Management of Hyperglycemia in Type 2 Diabetes

Guide for Determining HbA1c Goal for Individual Patients

<table>
<thead>
<tr>
<th>Most Intensive</th>
<th>Less Intensive</th>
<th>Least Intensive</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 HbA1c</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

**Psychosocial**
- Less depression and distress, good support, motivated, more resources, self-confident
- Depression, distress, few resources, not confident, poor support

**Hypoglycemia Risk**
- Low
- High

**Frail /Life Expectancy**
- Longer life expectancy, active
- Less active/frail/needs help with ADL

**Comorbidities/CV complications**
- None
- Multiple/severe


Standards of Medical Care in Diabetes—2015 Abridged for Primary Care Providers. Clinical Diabetes 2015;33:97-113 DOI: 10.2337/diaclin.33.2.97
Agenda

- Achieving quality goals through registries, and empowered teams—becoming a “participatory office”
Creating a Participatory Office Practice For Diabetes Care

J Participatory Medicine April 2011

Diabetes is a chronic condition that requires active participation by both the patient and various members of the physician’s office staff to achieve optimum outcomes. By creating an office environment in which the staff and patients function as a “participatory village,” where everyone involved in the care process is actively involved in important clinical management tasks, better outcomes can be achieved. This paper describes the structure and function of a primary care practice that is functioning as a “participatory village” in caring for its diabetic patients.

Diabetes Related Activities
Participatory Office Team

• Delegate tasks that do not require a Physician

• Certain tasks should belong to the Nurse or Medical Assistant—Immunizations, Urine albumin to creatinine ratio—Empower them to be more than a medical waitress

• Empower patients with key words and useful patient handouts—patient portals

Guidelines Standards?
What is recommended
Registry?
What we actually do
### Impact of Team Care, 8-Month Period in 140 Patients

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Frequency</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>EyeCheck</td>
<td>Once a yr</td>
<td>2%</td>
<td>59%</td>
</tr>
<tr>
<td>FootCheck</td>
<td>Once a yr</td>
<td>10%</td>
<td>82%</td>
</tr>
<tr>
<td>HbA1c&lt;</td>
<td></td>
<td>7.8</td>
<td>7.4</td>
</tr>
<tr>
<td>Total Chol</td>
<td></td>
<td>189</td>
<td>184</td>
</tr>
<tr>
<td>LDL</td>
<td></td>
<td>112</td>
<td>106</td>
</tr>
<tr>
<td>HDL</td>
<td>(M: &gt;40 F: &gt;50)</td>
<td>43</td>
<td>45</td>
</tr>
<tr>
<td>Non-HDL</td>
<td>&lt;100</td>
<td>146</td>
<td>139</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>&lt;150</td>
<td>175</td>
<td>166</td>
</tr>
<tr>
<td>U Micro Alb</td>
<td>Once a yr</td>
<td>6%</td>
<td>63%</td>
</tr>
<tr>
<td>Pneumovax</td>
<td>Once</td>
<td>32%</td>
<td>76%</td>
</tr>
<tr>
<td>FluShot</td>
<td>Once a yr</td>
<td>1%</td>
<td>66%</td>
</tr>
<tr>
<td>Daily ASA</td>
<td>100%</td>
<td>45%</td>
<td>65%</td>
</tr>
</tbody>
</table>

1. Sat down as a team and discussed gap reports; created Team decisions
2. Emails, phone calls (4 a day)
3. Improved use of patient report cards
4. Protocols developed for MA to use for foot exam, microalbumin and Immunizations

Shahady E, Personal Experience Diabetes Master Clinician Program
Questions-Comments?

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Web Sites
www.diabetesmasterclinician.org
www.diabetesuniversitydmcp.com
www.familymedicineteams.org