Essential Components of Diabetes Disease Management Programme

Associate Professor AC Thai
Diabetes Disease Management Programme

- **Rationale**
- **Components of Care**
  - Overview
  - Glycemic assessment
  - Weight BMI assessment
  - Eye assessment
- **Community Resources**
DIABETES MELLITUS IN SINGAPORE

Trends

High prevalence, high cost
Prevention of Complications
Clinical Studies

• Diabetes Control and Complications Trial (DCCT)
  - Type 1 DM; NEJM 1993
• United Kingdom Prospective Study (UKPDS)
  - Type 2 DM; Lancet 1998
• Steno Type 2 Study
  - Type 2 DM; NEJM 2003
• EDIC - DCCT Study
  - Type 1 DM; JAMA 2002, NEJM Dec 2005
### Table 1. Treatment Goals for the Conventional-Therapy Group and the Intensive-Therapy Group.*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Conventional Therapy</th>
<th>Intensive Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic blood pressure (mm Hg)</td>
<td>&lt;160 &lt;135 &lt;140 &lt;130</td>
<td></td>
</tr>
<tr>
<td>Diastolic blood pressure (mm Hg)</td>
<td>&lt;95 &lt;85 &lt;85 &lt;80</td>
<td></td>
</tr>
<tr>
<td>Glycosylated hemoglobin (%)</td>
<td>&lt;7.5 &lt;6.5 &lt;6.5 &lt;6.5</td>
<td></td>
</tr>
<tr>
<td>Fasting serum total cholesterol (mg/dl)</td>
<td>&lt;250 &lt;190 &lt;190 &lt;175</td>
<td></td>
</tr>
<tr>
<td>Fasting serum triglycerides (mg/dl)</td>
<td>&lt;195 &lt;180 &lt;150 &lt;150</td>
<td></td>
</tr>
<tr>
<td>Treatment with ACE inhibitor irrespective of blood pressure</td>
<td>No Yes Yes Yes</td>
<td></td>
</tr>
<tr>
<td>Aspirin therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For patients with known ischemia</td>
<td>Yes Yes Yes Yes</td>
<td></td>
</tr>
<tr>
<td>For patients with peripheral vascular disease</td>
<td>No No Yes Yes</td>
<td></td>
</tr>
<tr>
<td>For patients without coronary heart disease or peripheral vascular disease</td>
<td>No No No Yes</td>
<td></td>
</tr>
</tbody>
</table>

* To convert values for cholesterol to millimoles per liter, multiply by 0.02586. To convert values for triglycerides to millimoles per liter, multiply by 0.01129. ACE denotes angiotensin-converting enzyme.

**Conventional:**
Danish Medical Association
Recommendation 1988 Revised 2000

**Intensive:**
Steno Diabetes Center
STENO TYPE 2 STUDY
figure 1 Patients achieving treatment goals for glycaemia, lipids and blood pressure (BP) in the Steno-2 study (20). Intensive
Multi- Risk Factors Intensive Intervention
STENO TYPE 2 DIABETES STUDY

Reduction in Complications

• **Microvascular**
  Relative risk reductions = 40-60%

• **Cardiovascular**
  Relative risk reduction = 53%
  Absolute risk reduction = 20%
  Numbers to treat to prevent one event = 5 patients
DCCT- EDIC STUDY

Sustained Benefit of Early Intensive Control

Graphs showing the comparison of conventional therapy and intensive therapy for glycosylated hemoglobin and progression of retinopathy.
Clinical Outcome Indicator of Management Programme
→ Reduction in Complications Rates
DIABETES DISEASE MANAGEMENT

Primary Aim - prevent acute complications and reduce the risk of chronic complications

- Diabetes care is complex, requires continuing medical care and patient self-management education

- Many issues, besides glycemic control, need to be addressed

- Large body of evidence supports a range of interventions to improve diabetes outcome
Essential Components of Diabetes Disease Management Programme

• Rationale

• Components of Care
  - Overview
  - Glyceamic assessment
  - Weight BMI assessment
  - Eye assessment

• Community Resources
Diabetic Complications  Strategies to Prevent Development and Progression

- No complications
- Preclinical
- Early Clinical
- Late Advanced
Strategies to Prevent Development and Progression

No complications

Preclinical

Early Clinical

Late Advanced

Risk Factors:
- Hyperglycaemia
- Hypertension
- Hyperlipidaemia
- Obesity

1) Screen and aggressive intervention

2) Screen and specific intervention
MOH Diabetes Mellitus Disease Management Programme

Aim

To deliver evidence-based care to patients with diabetes that have been shown to favourably affect health outcomes.
MOH Diabetes Clinical Practice Guideline

Provide Clinicians with Standards of Care in Diabetes

- Components of diabetes care
- Treatment goals
- Tools to evaluate quality of care
### MOH Clinical Programme: Diabetes

<table>
<thead>
<tr>
<th>Essential components</th>
<th>Recommended frequency*</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 Glycated haemoglobin (HbA1c)</td>
<td>At risk: 6 monthly High risk: 3-4 monthly</td>
</tr>
<tr>
<td>D2 Blood pressure measurement</td>
<td>At risk: 3-4 monthly High risk: as clinically indicated</td>
</tr>
<tr>
<td>D3 BMI and Weight assessment</td>
<td>At risk: 3-4 monthly High risk: as clinically indicated</td>
</tr>
<tr>
<td>D4 Lipid profile</td>
<td>At risk: annual High risk: as clinically indicated</td>
</tr>
</tbody>
</table>

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<thead>
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<th>Recommended frequency*</th>
</tr>
</thead>
<tbody>
<tr>
<td>D5 Eye assessment</td>
<td>At risk: annual High risk: as clinically indicated</td>
</tr>
<tr>
<td>D6 Nephropathy assessment</td>
<td>At risk: annual High risk: as clinically indicated</td>
</tr>
<tr>
<td>D7 Foot assessment</td>
<td>At risk: annual High risk: as clinically indicated</td>
</tr>
<tr>
<td>D8 Cardiac assessment</td>
<td>At risk: as clinically indicated High risk: as clinically indicated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Essential components</th>
<th>Recommended frequency*</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>D9 Self-management education</td>
<td>At risk: annual High risk: as clinically indicated</td>
<td>Provide patient with a chronic disease continuing care booklet or equivalent. Self-management education should include nutrition counselling, weight management, exercise, smoking cessation, medication compliance, foot care, self-blood glucose monitoring for insulin treated and high risk non-insulin treated patients.</td>
</tr>
<tr>
<td>D10 Medical consultation and follow-up of abnormalities detected</td>
<td>As clinically indicated</td>
<td></td>
</tr>
</tbody>
</table>
D1 Glycated haemoglobin (HbA1c)

Recommend Frequency
- At risk: 6 monthly
- High risk: 3-4 monthly
# Glycated Haemoglobin

<table>
<thead>
<tr>
<th>Test Method</th>
<th>Reference Range</th>
<th>Precision (CV%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPLC (Reference)</td>
<td>4.0 - 5.2%</td>
<td>3%</td>
</tr>
<tr>
<td>DCA2000 (Immunoassay)</td>
<td>4.1 - 5.3%</td>
<td>2%</td>
</tr>
<tr>
<td>Minicolumn</td>
<td>4.5 - 8.5%</td>
<td>1 - 16%</td>
</tr>
<tr>
<td>Electrophoresis</td>
<td>5.0 - 7.6%</td>
<td>4 - 10%</td>
</tr>
<tr>
<td>Affinity chromatography</td>
<td>5.3 - 7.6%</td>
<td>3%</td>
</tr>
</tbody>
</table>
Rapid HbA1c Test
DCA 2000 (Bayer Diagnostics)
## GLYCAEMIC TARGETS

<table>
<thead>
<tr>
<th></th>
<th>Ideal (non-diabetic levels)</th>
<th>Optimal (target goal for majority of patients)</th>
<th>Suboptimal (adequate goal for some patients)†</th>
<th>Unacceptable (action needed in all patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em><em>HbA1c</em>(%)</em>*</td>
<td>4.5-6.4</td>
<td>6.5-7.0</td>
<td>7.1-8.0</td>
<td>&gt;8.0</td>
</tr>
<tr>
<td><strong>Pre-meal glucose</strong></td>
<td>4.0-6.0</td>
<td>6.1-8.0</td>
<td>8.1-10.0</td>
<td>&gt;10.0</td>
</tr>
<tr>
<td></td>
<td>5.0-7.0</td>
<td>7.1-10.0</td>
<td>10.1-13.0</td>
<td>&gt;13.0</td>
</tr>
<tr>
<td><strong>2h post-meal glucose</strong></td>
<td>5.0-7.0</td>
<td>7.1-10.0</td>
<td>10.1-13.0</td>
<td>&gt;13.0</td>
</tr>
</tbody>
</table>

MOH Clinical Practice Guidelines 2006

* normal reference range from NUH and SGH Labs using BioRad Variant (HPLC method)*
<table>
<thead>
<tr>
<th>HbA1c %</th>
<th>Mean plasma glucose over 2-3mths (mmol/lmg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>7.5 (135)</td>
</tr>
<tr>
<td>(ideal)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>9.5 (170)</td>
</tr>
<tr>
<td>(optimal)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>11.5 (205)</td>
</tr>
<tr>
<td>(suboptimal)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>13.5 (240)</td>
</tr>
<tr>
<td>(unacceptable)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>15.5 (275)</td>
</tr>
<tr>
<td>11</td>
<td>17.5 (310)</td>
</tr>
<tr>
<td>12</td>
<td>19.5 (345)</td>
</tr>
</tbody>
</table>

Mean blood glucose is 10-15% lower
Most glucose meters are calibrated to plasma glucose
Setting Glycemic Goals

• Goals should be *individualized*
• Certain populations (children, pregnant women, elderly) require special considerations.
• Less intensive goals may be indicated in patients with severe or frequent hypoglycemia or those with limited life-expectancy
Improving HbA1C and Reduction in Risk of Complications

Any improvements are beneficial whether or not target is reached.

FIGURE 6
Improvement in risk associated with a 1% reduction in HbA1c, from 10% to 9%, and from 7% to 6%.
D3 : BMI and Weight Assessment

Recommended Frequency
- At risk: 3-4 monthly
- High risk: as clinically indicated
BMI and Weight

- **Body mass index (BMI)** is the recommended index to define overweight and obesity

- **Body weight** alone can be used to follow weight loss and to determine efficacy of therapy

 *(Grade B, level III, MOH Obesity CPG 2004)*
BMI and Weight

• BMI (kg/m²)
  ➢ Ideal <= 23    Optimal <= 25

• Weight
  ➢ Set realistic goals for weight loss
  ➢ Modest weight loss 5-10% over 6 months rather than aiming for weight reduction to ideal weight

(Grade C, Level IV, MOH Obesity CPG 2004)
D5: Eye assessment

Recommended Frequency:
  At risk: annual
  High risk: as clinically indicated

Assess for Visual Acuity and retinopathy
DON'T GO BLIND FROM DIABETES

INTRODUCING...

EYE SCREENING FOR DIABETICS

Community Health Service
EYE CLINIC
National University Hospital

DIABETIC EYE SCREENING

NO DIABETIC RETINOPATHY

RECOMMEND REVIEW IN _______ MONTHS TIME

OTHER COMMENTS:

VISION RIGHT: 6/6

VISION LEFT: 6/6

Chua Siew Gek
Senior Ophthalmic Nurse

2/11/00

Doctor's Signature & Stamp

Date: 11/01/00
Diabetes Disease Management Programme

• Rationale
• Components of Care
  - Overview
  - Glyceamic assessment
  - Weight BMI assessment
  - Eye assessment
• Community Resources
Community Resources

(1) Comprehensive Diabetic Care
- Diabetic Society of Singapore
- NKF Prevention Centre
- Jurong Medical Centre
  *(Chronic Disease Management Centre, CCMC)*
- Care Management Centre (CMC)

(2) Diabetic Retinal Photography
- NEW Optometry and Ocular Care Centre (NOCC)
- The Eye Institute @ Tan Tock Seng Hospital Mobile DRP Service

*New DRP machine in the market - non-mydriatic type – used by a small no. of centres and institutions.*
(3) **Foot screening/Podiatry services**
- Singapore Footcare Centre
  - Toa Payoh SFC
  - Bedok SFC
- Podiatry Services in SingHealth
  - Geylang Polyclinic (SGH Rehab)

(4) **Nutrition & Dietetics**
- AH (self-referral possible but referral encouraged)
- NUH, TTSH (Dr referral required)