Nutrition Therapy in Diabetes Mellitus.

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What is diabetes mellitus?

- A condition of chronic raised blood glucose level or hyperglycaemia
- A condition of impaired carbohydrate metabolism
- Earliest definition in Ebers papyrus dating 1550 BC
Diagnosis.
Carried out by identifying chronic hyperglycaemia.

WHO Criteria.

- The presence of symptoms + one of the following:

  - A random venous plasma glucose of $\geq 11.1\text{mmol/l}$ OR
  
  - Fasting venous plasma glucose $\geq 7\text{mmol/l}$ (whole blood $\geq 6.1\text{mmol/l}$) OR
  
  - 2hr vpg $\geq 11.1\text{mmol/l}$ after ingesting 75g anhydrous glucose in an OGTT.

- With no symptoms, 2 tests to be done on different days.
Symptoms

- POLYURIA (excessive urination)
- POLYDIPSIA (excessive thirst)
- WEIGHT LOSS (significantly in T₁DM)
- LETHARGY (extreme tiredness)
- BLURRED VISION
- THRUSH (oral, genital)
Classification

Based on aetiology of the disease.

4 MAIN CATEGORIES:

1. **T<sub>1</sub>DM** - Caused by β-cell destruction → lack of insulin. (accounts for approx. 15% of diabetes cases in Europe and America.)

2. **T<sub>2</sub>DM** - Caused by insulin resistance and/or impaired β-cell function. (rep 85% of diabetes cases)

3. **GDM** - Occurs for the 1<sup>st</sup> time in pregnancy (OGTT 2hr value >7.8mmol/l)

4. **Other specific types of diabetes.**

E.g. LADA (latent autoimmune diabetes in adults) & MODY (Maturity onset Diabetes in the Young)
### T₁ or T₂ Diabetes?

**T₁DM**
- Sudden onset.
- Severe symptoms incl ketoacidotic coma
- Recent weight loss
- Usually lean
- Spontaneous ketosis
- Absent C peptide
- Markers of autoimmunity present.

**T₂DM**
- Gradual onset
- May be no symptoms
- Often no weight loss
- Usually obese
- Non ketotic
- C peptide present
- No markers of autoimmunity detected
Care Pathway for T2DM

- Is patient overweight or underweight?
- Weight, height, BMI, WC.
- Lifestyle intervention considered?
- Has lifestyle measures failed to improve control?
- Is HbA1C more than 6.5%?
Risk Factors For T2DM

1. Genetics/Race/Ethnicity/Geo location
2. Sedentary Lifestyle
3. Obesity/ Central obesity/Metabolic syndrome
4. Age
5. Previous Gestational diabetes.
6. Foetal Programming?
Drug Management of T2DM

- OHAs initiation based on pathophysiology of T2DM.

  - β- cell impairment → to insulin insufficiency
  - Overweight /Obesity → insulin resistance.

- There is progressive decline in β- cell function & insulin sensitivity in T2DM → deteriorating glycaemic control over time. ∴ treatments need to be revised and intensified.

- When OHAs are ineffective, insulin must be initiated to achieve glycaemic control.
COMPLICATIONS.

SHORT TERM
- Hypoglycaemia
- Diabetic Ketoacidosis/ HONK

LONG TERM
- Retinopathy
- Nephropathy
- Neuropathy Or Nerve damage (PVD, Gastroparesis, Erectile Dysfunction)
- CVD (accounts for about 75% of deaths in T2DM)
- Stroke
Targets and Monitoring.

Guided by:

- NICE Guidelines
- JBS$_2$ Guidelines
- All Wales Consensus Guidelines.
| **Blood Glucose (mmol/l)**                  | Pre-meal: between 4 – 7  
|                                          | (tight control below 5.5 mmol/l)  
|                                          | 2 hrs after meal: less than 10  
|                                          | (tight control below 7.5 mmol/l) |
| **HbA1c (%) (Average blood glucose)**    | Less than 6.5% is tight control  
|                                          | 6.5-7.0% is good  
|                                          | 7.0-7.5% is OK  
|                                          | Above 7.5% is poor control  
| **Blood Pressure (mmHg)**                | Below 130/80 is good  
|                                          | Between 140/80 and 160/90  
|                                          | lifestyle changes / medication?  
|                                          | Above 160/90 lifestyle change and medication needed |
| **Total Cholesterol (mmol/l)**           | Less than 4.0 |
| **HDL (mmol/l) (good cholesterol)**      | Men: 1.0 or above  
|                                          | Women: 1.2 or above |
| **LDL (mmol/l) (bad cholesterol)**       | Less than 2.0 |
| **Triglycerides (mmol/l)**               | Less than 1.7 excellent  
|                                          | Less than 2.3 good |
| **ACR (mg/mmol) (albumin : creatinine ratio)** | Men: Less than 2.5  
|                                          | Women: Less than 3.5 |
Aims of Dietary Treatment.

- Reduce/eliminate acute symptoms of diabetes.
  - Hypoglycaemia and DKA in the T₁DM patient
    - Improving lipid profile
    - Improving blood pressure
  - Improving glycaemic control
  - Losing weight for the overweight
Principles of Dietary Advice for Community Patients

- Reduced added sugar diet (To reduce CHO load)
- Increased fibre diet - ↑wholegrain cereals, vegetables, fruits and pulses (To slow rate of absorption of glucose)
- Reduced fats especially saturated fats (To correct lipid abnormalities)
- Reduced salt (To reduce BP)
Healthy Eating

The eatwell plate

Use the eatwell plate to help you get the balance right. It shows how much of what you eat should come from each food group.

- Fruit and vegetables
- Meat, fish, eggs, beans and other non-dairy sources of protein
- Milk and dairy foods
- Foods and drinks high in fat and/or sugar
- Bread, rice, potatoes, pasta and other starchy foods
Utilisation of food for survival.

FOOD

- Carbohydrates
  - Sugars
  - Starches
  - Fibre
- Protein
- Fats

GLUCOSE  AMINO ACIDS  FATTY ACIDS
Dietary Management.

Summary of Recommendations

Proteins – not more than 1g/kg bodyweight
Total Fats < 35% of total energy intake
SFA & TFA < 10% of total energy intake
n6 PUFA < 10% of total energy intake
N3 PUFA oily fish 1-2x/week. (fish oil supplements not recommended)
Cis MUFA 10-20%
Total Carbohydrate 45-60% 60-70% of energy intake
Sucrose up to 10% of energy intake
Salt ≤ 6g/day
Some causes of hyperglycaemia.

1. Too little insulin/OHA’s OR Diet not working
2. Too much food/ wrong type of food.
3. Too little exercise/ Reduced activity
4. Monthly periods
5. Pregnancy / weight gain
6. Infections/ Illness
7. Injury/Operation
8. Heart Attack
9. Stress
   (Any situation that ↑ adrenalin release can ↑ glucose levels)
10. Drugs/Medicines
    e.g. thiazide (diuretics) / steroids / oral contraceptive pills
Some causes of hypoglycaemia

1. Too little food / Not enough CHO/Delayed meals.
2. Too much or increased insulin or some OHA’s
3. Decrease in other medications that affect glycaemic control e.g. Steroids
4. Missed meals/ Snacks
5. Increased activity or exercise
6. Weight Loss
7. Starting Insulin, some OHA’s or Alcohol.
DM Prevention

Can DM be prevented?

- **T1DM** - No prevention

- **T2DM** – Modifiable risk Factors include:
  - Obesity
  - Body Fat Distribution
  - Physical Inactivity
  - Elevated fasting and 2hr Glucose levels
  - ?? Maternal education.
Diabetes Prevention

**Why Prevent?**

1. High cost to individual, their families & society.
   - In U.K. > 2 million people diagnosed with T2DM with an estimated annual DM spend of £9 billion.
   - Within 20 years of developing DM, 60% of patients will have some degree of retinopathy which leads to blindness. 1 in 3 people develop overt kidney disease.

   - Lower limb amputation 15x higher in diabetic population.

   - Life expectancy reduced by 25% in the diabetic patient
2. Increasing numbers of people being diagnosed year on year. (IDF, 2011)

World wide 366 million cases in 2011 set to ↑ to 552 million by 2030.

Sub-Saharan Africa – from 14.7 million in 2011 to 28 million by 2030. An ↑ of 90%
Diabetes Prevention

HOW?????

Identify High Risk Individuals through simple questionnaire to assess risk.

- Age
- Waist Circumference >102cm for Men, >88cm for Women
- Family History
- Cardiovascular History
- Gestational History
Diabetes Prevention

Preventing T$_2$DM has a positive effect on overall wellbeing, QOL and saves money!

THANK YOU!

ANY ????????