Diabetes Mellitus – case studies

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Definition of diabetes (metabolic disorder)

- Chronically raised blood glucose (hyperglycaemia)

- Insulin/Glucagon
  - Insulin is responsible for lowering glucose levels
  - Glucagon is responsible for increasing glucose levels

- Two major subtypes
  - Type 1 diabetes – absolute insulin deficiency (5-15%)
  - Type 2 diabetes – impaired insulin secretion and insulin resistance (85-95%)
    - Prevalence: 8% of population
Diagnostic criteria

FPG – fasting plasma glucose
DM > 7 mmol/l

PPG – postprandial glucose
DM > 11.1 mmol/l

HbA1c – glycated hemoglobin
DM ≥ 6.5% (48 mmol/mol)

CZ HbA1c (mmol/mol) | US/studies HbA1c (%)
---|---
31 | 5
42 | 6
53 | 7
64 | 8
75 | 9
86 | 10
97 | 11
108 | 12
Natural history of type 2 diabetes

Kendall DM, Bergenstal RM ©2003 International Diabetes Center, Minneapolis, MN. All rights reserved.
Macrovascular and microvascular complication of diabetes

Diabetes

Microvascular complications
- Diabetic retinopathy
- Diabetic nephropathy
- Diabetic neuropathy
- Limb amputation

Macrovascular complications*
- Coronary heart disease
- Ischaemic stroke
- Congestive heart failure

*The most common cause of death in patients with diabetes

Diabetes is a vascular disease

Adapted from Grobbee DE. Metabolism. 2003;52:24-8.
Lowering HbA1c Correlates to a Lower Rate of Cardiovascular Complications

Epidemiological extrapolation showing the potential benefit of a 1% reduction in mean HbA1c on cardiovascular risk factors:

- 21% Deaths related to diabetes*
- 37% Microvascular complications, eg, kidney disease and blindness*
- 14% Heart attack*
- 43% Amputation or fatal peripheral blood vessel disease*
- 12% Stroke**

*P<0.0001
**P=0.035
Stratton 2000
Treatment options

- Metformin – basal treatment
- SU derivates
- Incretins:
  - GLP-1 agonists
  - DPP-4 inhibitors (gliptins)
- SGLT2 inhibitory (gliflozins)
- Pioglitazon
- Repaglinid
- Insulins
New/modern drugs

• DPP4 inhibitors (gliptins)
  – Alogliptin, linagliptin, saxagliptin, sitagliptin, vildagliptin

• GLP1 receptor agonists
  – Exenatide, liraglutide, lixisenatide

• SGLT2 inhibitors (gliflozins)
  – Canagliflozin, dapagliflozin, empagliflozin
Case study 1
– patient with a newly diagnosed type 2 diabetes

Family anamnesis: parents and brother – treated T2D

Personal anamnesis: 75 years, 67 kg, 164cm, hypertensis, after cataract surgery

Current diseases: during autumn 2013 spontaneously lost weight 3 kg/3 month; September 2013 polyuria especially et night hours, after checking with GP hyperglycaemia 19,6 mmol/l – sent to hospitalization in internal medicine

Which testing would you suggest?
Blood tests – glycaemia, liver function tests, lipids, thyroid hormones

- Hyperglycaemia 19 mmol/l, glycated hemoglobin 127 mmol/mol, slight increase liver function tests, lipids and thyroid hormones normal

Renal function

- Mikroalbuminuria 4,0 g/l

Blood pressure

Abdominal ultrasound scan

- Liver steatosis

Eyes examinations

Which treatment would you suggest?

Case study 1
– patient with a newly diagnosed type 2 diabetes
Case study 1
– patient with a newly diagnosed type 2 diabetes

- Intensified insulin regimen (48IU/day)
- Education – lifestyle modification – food and exercise, glycaemia self-monitoring and insulin application, complications of T2D

- There has been a satisfactory compensation of diabetes
  - Weight 60kg, BMI 22,3
  - Fasting plasma glucose 6,7 mmol/l, postprandial glucose 8,9 mmol/l

- What is the next step?
Case study 1
– patient with a newly diagnosed type 2 diabetes

• Release into outpatient care

Would you do some additional testing?
What tests?
Case study 1
– patient with a newly diagnosed type 2 diabetes

• Concentration of C-peptid

What is the parametr?
What is it says?
Case study 1
– patient with a newly diagnosed type 2 diabetes

Would you change the current treatment?
Why?
How?
Case study 1
– patient with a newly diagnosed type 2 diabetes

- Fixed combination of PAD – Janumet 50mg/1 000mg tbl. BID with Glyclada 60 mg BID

What are active ingredients/agents?
Why these drugs?
What is their mechanism of action?
What are their side effects and potential risks?
Case study 1
– patient with a newly diagnosed type 2 diabetes

• Janumet = sitagliptin (DPP-4 inhibitor) + metformin (biguanid)

• Glyclada = gliklazid (sulfonylurea)
Case study 1
– patient with a newly diagnosed type 2 diabetes

Diabetes was compensated:

• Fasting plasma glucose 5,4-6,2 mmol/l a and then 4,1-5,2 mmol/l
• Postprandial glucose up to 8,7 mmol/l and then maximally 8 mmol/l
• Glycated hemoglobin 59 mmol/mol

What is the next step?
Case study 1
– patient with a newly diagnosed type 2 diabetes

Withdrawal of sulfonylurea

With adherence to lifestyle fixed combination (DPP4i and metformin) is adequate treatment for diabetes control
Case study 2
– patient with type 1 diabetes

Family anamnesis: father – impaired glucose tolerance

Personal anamnesis: 54 years, 65 kg, 170 cm, HbA1c 7,5%, chronic pancreatitis, T1D diagnosed in 2005, hypertension without treatment, after amputation of the thumb and the second toe of the left foot, stopped smoking 2002

Current diseases: BP 135/85, long-term not-healed defect on left leg – fifth toe, hyperkalemia (6,1 mmol/l), microalbuminuria

What treatment would you suggest?
Case study 2
– patient with type 1 diabetes

• Humulin R 6-8-6 IU + Lantus 8 IU et 7 p.m.

What is the next treatment step?
Case study 2
– patient with type 1 diabetes

• Furon 40mg ½-0-0, Lusopress 20 mg 1-0-0
  • What are this mediactions? Their active ingredient and mechanism of action?

• Vitar soda a NaHCO3 patenteraly
  • What is the cause of hyperkalemia?

• Amputation of the fifth toe + ATB based on culturing + local treatment
Thank you for your attention