Nutritional Management of Type 3c Diabetes

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Overview

- What is Type 3c Diabetes
- Prevalence
- Characteristics
- Diagnosis
- Common issues experienced
- Nutritional management

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Classification of DM

Type 3c DM

American Diabetes Association: Diagnosis and classification of diabetes. Diab Care 2011;34(suppl 1): S62-S69

Topic Highlight

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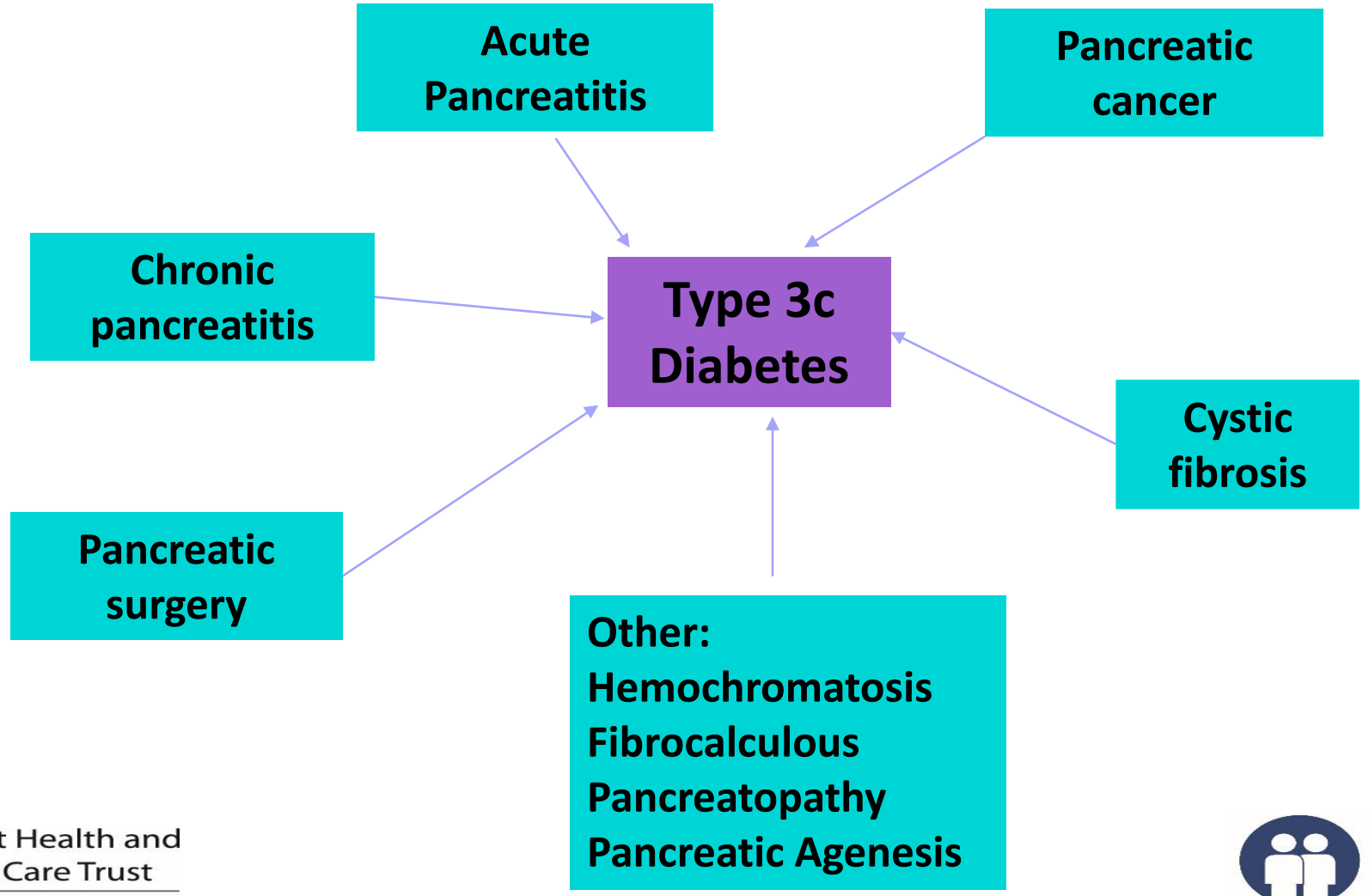
Diagnosis and treatment of diabetes mellitus in chronic pancreatitis

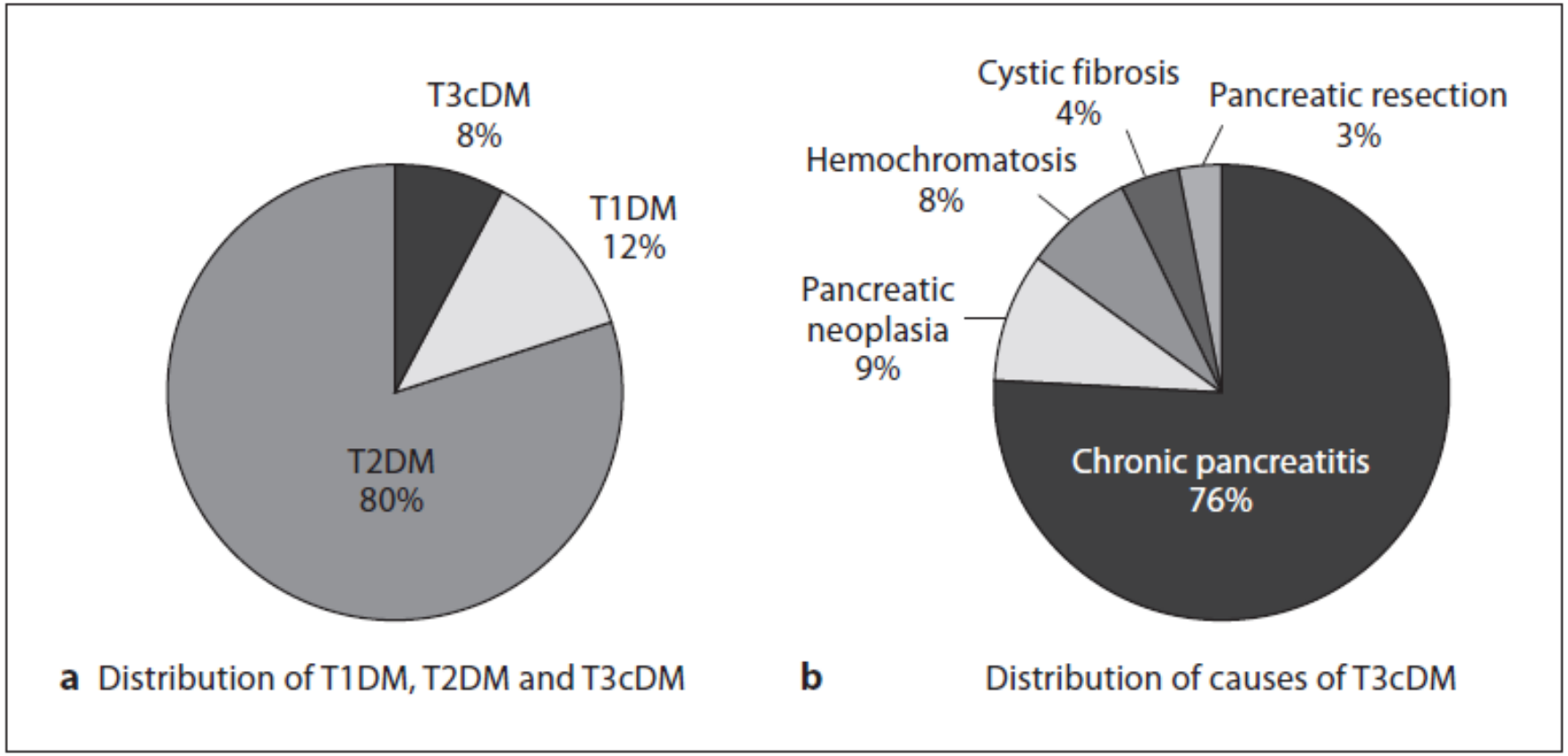
Table 1 Current classification of diabetes mellitus

I	Type 1 Diabetes Mellitus (β-cell destruction, usually leading to absolute insulin deficiency)
	A: Immune mediated
	B: Idiopathic
II	Type 2 Diabetes Mellitus (may range from predominantly insulin resistance with relative insulin deficiency to a predominantly secretory defect with insulin resistance)
III	Other Specific Types Of Diabetes Mellitus
	A: Genetic defects of β-cell function
	B: Genetic defects in insulin action
	C: Diseases of the exocrine pancreas
	1: Pancreatitis
	2: Trauma/pancreatectomy
	3: Neoplasia
	4: Cystic fibrosis
	5: Hemochromatosis
	6: Fibrocalculous pancreatopathy
	7: Others
	D: Endocrinopathies
	E: Drug- or chemical-induced
	F: Infections
	G: Uncommon forms of immune-mediated diabetes
	H: Other genetic syndromes sometimes associated with diabetes
IV	Gestational Diabetes Mellitus

Conditions Associated with Type 3c Diabetes



Prevalence



Based on Hardt *et al*, Diab Care. Feb 2008; 31

- Pancreatic Surgery: depends on which part and how much is removed

- Pancreatic cancer: at diagnosis, nearly 50% had diabetes and nearly 40% had impaired fasting glucose

  (Pannala et al, Gastroenterology 2008)

Proposed Diagnostic Criteria

Table 2 Proposed diagnostic criteria for type 3c diabetes mellitus

Major criteria (must be present)
Presence of exocrine pancreatic insufficiency (monoclonal fecal elastase-1 test or direct function tests)
Pathological pancreatic imaging (endoscopic ultrasound, MRI, CT)
Absence of type 1 diabetes mellitus associated autoimmune markers
Minor criteria
Absent pancreatic polypeptide secretion
Impaired incretin secretion (*e.g.*, GLP-1)
No excessive insulin resistance (*e.g.*, HOMA-IR)
Impaired beta cell function (*e.g.*, HOMA-B, C-Peptide/glucose-ratio)
Low serum levels of lipid soluble vitamins (A, D, E and K)

MRI: Magnetic resonance imaging; CT: Computed tomography; GLP-1: Glucagon-like peptide-1; HOMA-IR: Homeostasis model assessment of insulin resistance; HOMA-B: Homeostasis model assessment of beta-cell.

Ewald and Hardt (2013) World Journal of Gastroenterology

Characteristics

Table 1. Clinical and laboratory findings in types of diabetes mellitus

Parameter	Type 1 IDDM juvenile onset	Type 2 NIDDM adult onset	Type 3c pancreatogenic postop. onset
Ketoacidosis	common	rare	rare
Hyperglycemia	severe	usually mild	mild
Hypoglycemia	common	rare	common
Peripheral insulin sensitivity	normal or increased	decreased	increased
Hepatic insulin sensitivity	normal	normal or decreased	decreased
Insulin levels	low	high	low
Glucagon levels	normal or high	normal or high	low
PP levels	normal or low (late)	high	low
GIP levels	normal or low	normal or high	low
GLP-1 levels	normal	normal or high	normal or high
Typical age of onset	childhood or adolescence	adulthood	any

IDDM = Insulin-dependent diabetes mellitus; NIDDM = non-insulin-dependent diabetes mellitus.
Modified from Slezak and Andersen [13], with permission.

Common issues

- PEI – absence of PERT, inadequate dosing, not taking correctly
- Hypos – malabsorption, deficiency in glucagon secretion, poor dietary intake, alcohol intake

  *remember PERT needed with all hypo treatment

Nutritional Management

Principles of Management	Management Strategies
Prevent: • Hypoglycemia • Hyperglycemia • Exacerbation of malnutrition • Co-morbidities associated with diabetes (e.g. retinopathy, renal disease)	• Do not skip meals • Take small, frequent meals • Measure glucose levels frequently, particularly after physical activity, and if diet is poor • Avoid alcohol • Ensure adequacy of enzyme therapy • Minimize high-sugar/ high-glycemic index food or fluids • Consider a diary to record diet, glucose levels, enzymes, exercise, at least until acceptable glucose control is maintained • Dietitian assessment/ monitoring

(Duggan & Conlon, 2013)

NICE Guidelines - Pancreatitis

- Offer people with chronic pancreatitis monitoring of HbA1c for diabetes at least every 6 months (80% lifetime risk of developing diabetes)
- Assess people with Type 3c diabetes every 6 months for potential benefit of insulin therapy
- For people who are not using insulin therapy – refer to NICE guidelines on Type 2 diabetes
- For people who need insulin – refer to NICE guidelines on Type 1 diabetes

Case Study 1

- 49 year old female, history of chronic pancreatitis (gallstones), takes Creon 50,000 with main meals and 25,000 with snacks, now developed Type 3c diabetes, HbA1c 62mmol/mol, commenced Metformin1g BD, BMI 33kg/m2, no alcohol taken.

Assessment:

- Chronic pancreatitis – 15 year history, last flare up 1 year ago, currently feeling well
- Diabetes – no symptoms, picked up during routine bloods at GP surgery
- PERT – taking with all meals and snacks, no signs of malabsorption
- Weight history – weight loss during flare up last year (half stone) but has since gained 1 stone
- Diet history – regular meal pattern but occasionally skips breakfast, snacking on biscuits/crisps/buns

Dietary management – as per dietary guidance for Type 2 diabetes

Case Study 2

- 32 year old male, chronic pancreatitis (alcohol related), prescribed Creon 75,000 with main meals and 50,000 with snacks, Type 3c diabetes for 3 years, HbA1c 86mmol/mol, blood glucose levels in the high teens, BMI 22kg/m2. Plan – commence basal bolus insulin (Novorapid with meals and Lantus OD)

Assessment:

- Chronic pancreatitis – 10 year history, currently abstaining from alcohol but admits to occasional binges which causes flare ups
- Diabetes – irregular BG monitoring, feeling thirsty, polyuria
- PERT – occasionally forgets to take which leads to symptoms
- Weight history – has noticed some weight loss recently
- Diet history – irregular meal pattern but tries to avoid sugary snacks

Issues:

- Alcohol intake, PERT, weight, dietary intake, hypos

Plan:

- Education! - explanation of symptoms, risks of alcohol and irregular meal pattern with insulin
- Regular BG monitoring – pre meals and pre bed
- Appropriate use of PERT with all meals and snacks
- Regular meal pattern based on low GI carbohydrates
- Carbohydrate consistency from day to day
- Avoid alcohol
- Hypo advice
- Importance of regular contact with DSN
- Arrange dietetic review

Case Study 3

- 71 year old lady, pancreatic cancer, Whipples procedure 3 months ago, developed Type 3c diabetes following surgery and was commenced on Novomix 30 BD due to hyperglycaemia, HbA1c now 59mmol/mol, blood glucose levels in single figures, prescribed Creon 100,000 with main meals and 75,000 with snacks.
- Continued gradual weight loss since surgery, BMI 20.5kg/m2, poor appetite

Issues

- Feeling unwell, low energy
- Poor appetite and weight loss
- Risk of hypos

Management

- Nutrition support
- Relax dietary restrictions
- Regular carbohydrate intake to avoid hypos – three ‘meals’ plus supper
- Nutritional supplements – remember PERT

Summary

- Awareness largely poor
- Can be more difficult to manage than other types of diabetes
- Important to recognise signs of PEI and treat appropriately
- Individual approach needed for dietary management based on patient's clinical condition

References

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