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In This Issue…

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This Bulletin is a free quarterly periodical issued by the Drug Information Center (DIC) located at Faculty of Pharmacy, Assiut University

Type 3c diabetes

What is type 3c diabetes?

Type 3c diabetes (or Pancreatogenic Diabetes) can develop when the pancreas stops producing enough of insulin hormone. This can happen due to an illness or condition that affects or damages the pancreas. It can also occur if you have had surgery on your pancreas or if it is removed.

Functions of the pancreas

The pancreas has two main functions:

- **Exocrine function**: produces enzymes that help with digestion.
- **Endocrine function**: sends out hormones (mainly insulin and glucagon) that control the amount of sugar in our bloodstream.

Pancreas damage that leads to type 3c diabetes often also affects your pancreas's ability to produce the enzymes that help with digestion. This condition is called exocrine pancreatic insufficiency (EPI).

How Type 3c differs from other types of diabetes?

Type I diabetes: People with type 1 diabetes produce very little or no insulin because the immune system attacks the insulin producing cells in the pancreas.
Type 2 diabetes: People with type 2 diabetes can't properly use the insulin their pancreas produces, which is called insulin resistance.
Type 3c diabetes: Caused by physical damage to the pancreas. Patients produce few of all pancreatic hormones, including insulin and glucagon, as well as fewer digestive enzymes. The main problem is reduced hormone production, not insulin resistance.

What causes type 3c diabetes?

The most common conditions that cause diabetes by damaging the pancreas are acute pancreatitis ,chronic pancreatitis, cancer of the pancreas, surgery of the pancreas, cystic fibrosis and haemochromatosis.

What are the symptoms of type 3c diabetes?

The symptoms of type 3c diabetes are the same as other forms of diabetes. They include: Increased thirst (polydipsia), dry mouth, frequent urination, fatigue, blurred vision, unexplained weight loss, numbness or tingling in your hands or feet, slow-healing sores or cuts and frequent skin and/or vaginal yeast infections.
Type 3c patients also have symptoms of exocrine pancreatic insufficiency, which include:
Abdominal pain, gas and bloating, constipation, diarrhea, fatty stools (pale, oily, foul-smelling poop that floats) and unexplained weight loss.

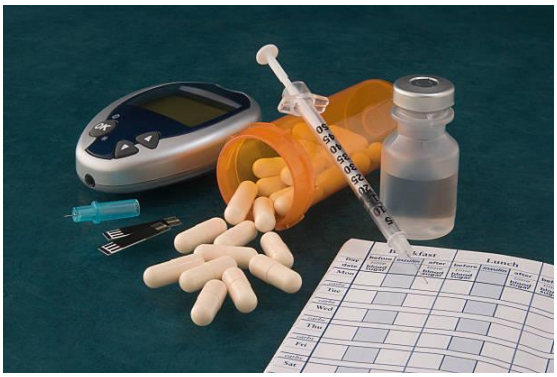
How is type 3c diabetes diagnosed?

Type 3c diabetes is often mistaken for type 2 because it is uncommon and less recognized. Diagnosis requires proving diabetes, confirming pancreatic damage and rule out other types of diabetes.

Key tests include:

- **Fasting blood glucose test**: fast for at least eight hours before the test. A result of 126 mg/dL or higher typically indicates diabetes.
- **A1C**: This blood test, also called HbA1C or glycated hemoglobin test, provides your average blood glucose level over the past two to three months. A result of 6.5% or higher typically indicates diabetes.
- **Imaging tests**: Imaging tests, such as a computed tomography (CT) scan, can help your provider see damage to your pancreas.
- **Pancreas blood tests**: These tests can check pancreas function. They measure the levels of certain digestive enzymes your pancreas produces such as amylase, lipase and trypsinogen. If the results are abnormal, they can confirm pancreas damage.
- **Diabetes autoantibody panel**: This is a blood test that checks if you have the autoantibodies that cause Type 1 diabetes. Your provider may order this test to rule out Type 1. If you already have a pancreatic condition, it is usually easier for doctors to suspect and confirm type 3c diabetes.

How is type 3c diabetes treated?



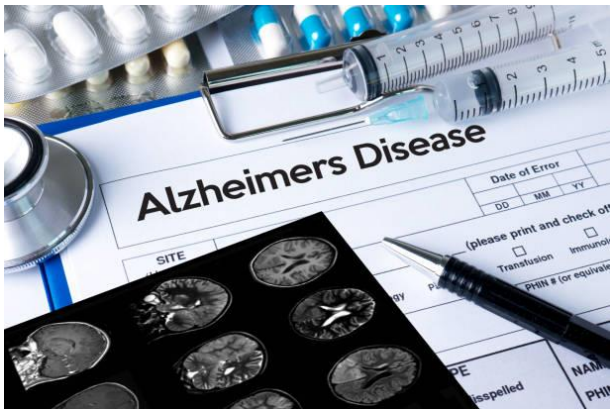
Treatment for type 3c diabetes depends on how much the pancreas is damaged. Some people may start with oral medicines like metformin to improve the way the body responds to insulin, but many will eventually need insulin injections or pumps as the pancreas produces less insulin over time.

Management also includes:

- **Regular blood sugar monitoring** with a glucose meter or continuous monitor to determine how well the current treatment plan is working
- **Healthy diet and meal planning**, often with guidance from a dietitian.
- **Exercise**, which improves insulin action and overall health.

Because diabetes affects each person differently, treatment plans are personalized and may change over time. Ongoing follow-up with healthcare providers is important to keep blood sugar in the right range and prevent complications.

Type 3 diabetes and Alzheimer's disease



Type 3 diabetes is a lesser-known type linked to insulin resistance within the brain, which may play a central role in the development of Alzheimer's disease (AD). Impairments in cerebral glucose utilization and energy metabolism represent very early abnormalities that precede or accompany the initial stages of cognitive impairment, supporting the idea that AD can be considered "type 3 diabetes."AD has no current cure, but treatments for symptoms are available and research continues. Neurotransmitter deficits, degenerated neurons, synaptic dysfunction, extracellular buildup of β-amyloid (Aβ) and intracellular neurofibrillary tangles (NFT) are the major crude disfigurements present in AD.

Both diabetes and Alzheimer's are rising global health challenges. Diabetes is already the seventh leading cause of death and is expected to affect nearly half a billion people worldwide by 2045. Environmental and genetic factors contribute to both conditions, but a common link is insulin resistance. Studies show that poor insulin action in the brain disrupts memory, learning, and communication between neurons, while damage to the hippocampus specifically leads to severe memory problems. Scientists now describe Alzheimer's as a metabolic disorder of the brain, where hyperinsulinemia and insulin resistance impair signaling pathways, leading to toxin buildup, oxidative stress, inflammation, and accelerated neurodegeneration. Research in both humans and animals confirms that insulin dysfunction contributes directly to the structural and functional brain changes seen in AD.

Furthermore, research has also shown that people with type 2 diabetes are at a much higher risk of developing Alzheimer's disease, underlining the role of insulin resistance as a shared mechanism

Future directions in therapy

The connection between type 3 diabetes and Alzheimer's is especially evident in how impaired insulin signaling reduces amyloid clearance and increases amyloid toxicity. This dual effect strongly contributes to the neurodegenerative process. Current research is exploring insulin-related therapeutic strategies as potential treatments for Alzheimer's disease. The aim is to restore brain insulin sensitivity, reduce amyloid accumulation, and slow the progression of neurodegeneration. If successful, these therapies may not only delay Alzheimer's but also halt its complications, offering hope for managing one of the most challenging diseases of aging. Example of these therapies are intranasal insulin and GLP-1 receptor agonists.

Type 5 diabetes mellitus:

In April 2025, type 5 diabetes was officially recognised by the International Diabetes Federation (IDF) as a type of diabetes related to malnutrition It mainly affects people with a lean body mass index (BMI <18.5 kg/m²) from low-income countries where malnutrition is common. It is also known as malnutrition-related diabetes (MRDM), it is distinct from both type 1 diabetes and type 2 diabetes, and is primarily caused by chronic undernutrition, especially during childhood or adolescence. It is characterised by elevated levels of insulin deficiency and poor metabolic control. It is believed to stem from impaired pancreatic development due to long-term nutrient deficiencies. The IDF estimates that type 5 diabetes affects between 20-25 million people worldwide, primarily in Asia and Africa. Patients are usually diagnosed young, show no ketosis.

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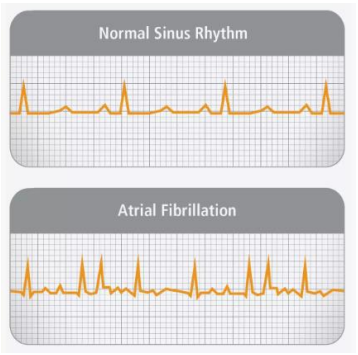
The Impact of Obesity on Atrial Fibrillation

What is Atrial Fibrillation?



Atrial fibrillation is a supraventricular arrhythmia that carries a significantly high rate of cerebrovascular morbidity and mortality. This cardiac arrhythmia is due to abnormal electrical activity within the heart atrium, causing atrial fibrillation. Characteristics of atrial fibrillation include every rapid tachyarrthmias through electric remodeling, fibrosis, and autonomic neural remodeling. Risk of developing atrial fibrillation is associated with increased age and comorbidities such as diabetes, high blood pressure, and other heart disease.

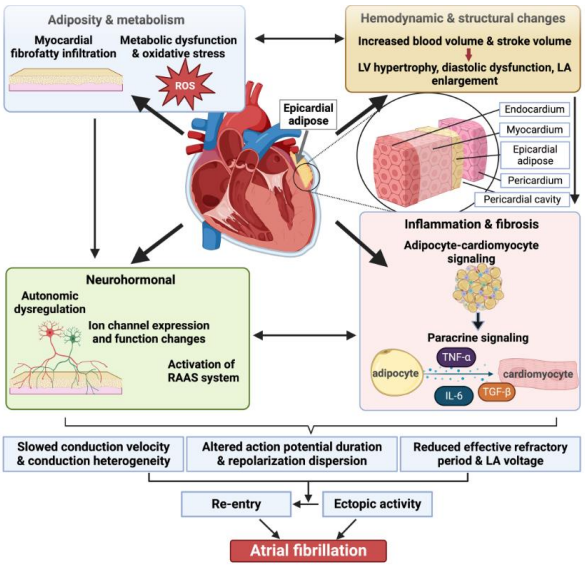
People with atrial fibrillation are at heightened risk of thrombosis, increasing the risk of stroke, coronary heart disease, peripheral artery disease, cognitive impairment, and physical disability.

What is obesity ?

Obesity is characterized by excessive body fat accumulation, with body mass index (BMI) of 30 or higher being considered obese. However, BMI does not fully encompass all aspects of obesity. Waist circumference, Waist-to-Hip Ratio, and body fat percentage provide a more comprehensive definition of obesity in patients. Obesity is associated with atrial fibrillation development and worsening outcomes. It contributes to atrial fibrillation development through multiple mechanisms, including structural and electrical remodeling of the heart, systemic inflammation, and metabolic dysfunction. Ectopic cardiac adipose tissue deposits, particularly epicardial adipose tissue (EAT), appear to play a central role and, hence, provide an attractive target for novel therapies.

Mechanisms of obesity promoting AF

Although epidemiological studies have established the role of obesity in independently predicting the occurrence and progression of AF, the pathophysiological mechanisms associated with AF in obese patients are complex and remain unclear. Obese patients are susceptible to AF, which may be related to systemic changes caused by obesity, such as hemodynamic changes, hypertension, diabetes, and the obstructive sleep apnea syndrome (OSA). Additionally, in terms of molecular biology, adipose tissue secretes a variety of pro-inflammatory and pro-fibrotic factors that can accelerate the structural and functional remodeling of the left atrium and induce and maintain electrical conduction abnormalities. Oxidative stress induced by adipose tissue and activated autonomic nerves in the ganglion plexus are also involved in the occurrence of AF.



The effect of weight reduction on AF

In clinical trials, weight reduction has been shown to improve outcomes of AF ablation by reversing structural and electrical remodeling. Bariatric surgery reduced the risk of new-onset AF and AF recurrence after ablation. It also lowered insulin resistance, systolic blood pressure, and epicardial adipose tissue volume, associated with reduced AF recurrence.

Real Enquiries

At the " Drug Information Center" we respond to enquiries from the professional health team as well as from others. Here's one of the enquiries received at the center

Inquiry: How are Centrum, Glucosamine and CH Alpha administered with regard to meals?

The answer:

Centrum multivitamins should be administered as one tablet daily with food. You definitely should take your multivitamin with food, though, since some of the vitamins in it most likely are fat-soluble. Some larger multivitamin supplements can cause stomach upset if taken on an empty stomach, as well.

CH-Alpha can be taken with or without food, and may be mixed with other beverages such as orange juice or grapefruit. Intake should ideally take place in the morning at breakfast, since during the day the metabolism is more active and so the nutrients in the body are better distributed.

Glucosamine is recommended by some experts to be taken with meals to prevent an upset stomach.

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Test Your Knowledge

1-Anticholinergic agents may aggravate which of the following?

A. Narrow angle glaucoma
B. GI obstruction
C. Genitourinary tract disease
D. Severe cardiac disease
E. All of the above

2-Side effects of heparin include

A. thrombocytopenia
B. gingivitis
C. glaucoma
D. hyperglycemia
E. none of the above

3-Which of the following drugs may interact with digoxin?

A. Quinidine
B. Antacids
C. Cholestyramine
D. A and B
E. A, B, and C

4-Which of the following drugs interferes with theophylline?

A. Cimetidine
B. Erythromycin
C. Ciprofloxacin
D. Oral contraceptives
E. All of the above

Ask the expert

Do herbs have a role in the management of type 2 diabetes?

Plant-based remedies have been used traditionally and are increasingly studied for their potential to help manage blood sugar levels. Several herbs have shown promising effects in improving insulin sensitivity and reducing glucose absorption. As:

Cinnamon has been shown to improve insulin sensitivity and may help lower fasting blood glucose levels.
Fenugreek seeds, high in soluble fiber, can help control blood sugar by slowing down carbohydrate digestion and absorption.
Berberine, a compound found in plants like goldenseal and barberry, has demonstrated significant glucose-lowering effects in studies, sometimes comparable to prescription medication.

Answers:

1.(E) 2.(A) 3.(E) 4.(E)