

Chronic Calcified Pancreatitis with Type 3C DM: A Complex Case Report

Vankodoth Sireesha^{1*}, Faiqua Fatima², Shafeen Sultana³, Shiva Sai Kumar⁴, sumaya⁵, Y. Pravarsha⁶

^{1*}Assistant professor, CMR College of pharmacy, Hyderabad, Telangana
^{2, 3, 4, 5, 6}Pharm D intern, CMR College of Pharmacy, Hyderabad, Telangana
Email address: ¹Sireeshaganesh59@gmail.com

Abstract- This case presentation highlights the complexities of managing chronic calcified pancreatitis with type 3C diabetes mellitus (T3cDM) accompanied by exocrine insufficiency and a pancreatic pseudocyst. T3cDM is a secondary form of diabetes resulting from various exocrine pancreatic conditions, with chronic pancreatitis being the most common underlying illness. The patient, a 38-year-old male with a history of chronic alcoholism and smoking, presented with abdominal pain, greasy oily stools, and facial swelling. Diagnosed with T3cDM and chronic calcified pancreatitis, imaging revealed multiple intra-pancreatic and intraductal calcifications. Treatment involved insulin therapy, metronidazole, ondansetron, antioxidant supplements, and a beta-blocker. Managing T3cDM is challenging due to its unique metabolic characteristics, including limited glycogen storage and altered hormone levels. This case underscores the importance of early diagnosis and tailored treatment approaches to optimize patient outcomes and prevent complications. Further research is needed to advance our understanding of T3cDM and develop targeted therapies for this specific form of diabetes.

Keywords- Abdominal pain; Chronic calcified pancreatitis; Chronic pancreatitis; Chronic alcoholism; Exocrine pancreatic conditions; Facial swelling; Greasy oily stools; Pancreatic pseudocyst; Secondary diabetes mellitus; Type 3C diabetes mellitus (T3cDM).

I. INTRODUCTION

The American Diabetes Association and the World Health Organisation classify pancreatogenic diabetes mellitus, also known as pancreoprivic or pancreatic diabetes mellitus, as type 3c diabetes mellitus (T3cDM). It is a secondary kind of diabetes brought on by a number of exocrine pancreatic conditions, such as pancreatic cancer, pancreatic trauma, hemochromatosis, cystic fibrosis, fibrocalculous pancreatopathy, pancreatic trauma, recurrent pancreatitis, and cystic fibrosis.^[1,2] The most frequent underlying illness in people with T3cDM is chronic pancreatitis, which accounts for 78.5% of cases. Pancreatic cancer accounts for 8% of cases. According to other research findings, benign illnesses, excluding cancer, account for around 85% of all instances of T3cDM.^[3] In Western countries, type 3c diabetes mellitus (T3cDM) is a clinically significant disease that affects 5–10% of all diabetic people.^[4]

The probability of developing DM3c is increased by smoking, pancreatic calcifications, and chronic illness.^[5] Due to a number of metabolic characteristics, including limited glycogen storage and normal glycated haemoglobin, the management of DM3c is frequently more difficult than that of DM types 1 and 2. Due to the degeneration of beta and alpha cells, respectively, glucagon and insulin levels are both low. The destruction of beta cells that produce insulin can cause hyperglycemia, whereas the destruction of glucagon-producing alpha cells can cause hypoglycemia.^[6,7] Due to the degeneration of beta and alpha cells, respectively, glucagon and insulin levels are both low. The destruction of beta cells that produce insulin can cause hyperglycemia, whereas the destruction of glucagon-producing alpha cells can cause hypoglycemia. Because glucagon, which ordinarily would

facilitate ketone formation, is lacking in patients with DM3c, the development of diabetic ketoacidosis (DKA) becomes an uncommon process in these people.^[8]

II. CASE PRESENTATION

A 38 year old male patient was admitted to the general medicine department. The patient presented with a chief complaint of pain in abdomen since 2 months which was of insidious onset gradually progressive moderate intensity and squeezing type of pain. The patient mentioned of pain radiating to the back and the pain being increased on food intake and subsided on fasting and medication. Additionally greasy oily stools and facial swelling was also reported by the patient which was seen since two months. The patient had a history of diabetes mellitus since 1 and half year for which 20 units of insulin has been administered twice a day along with DM patient had a history of acute pancreatitis which was diagnosed 4 years ago. The patient was apparently a chronic alcoholic for the past 6 years and had a history of smoking since 8 years which was stopped 4 months ago. On Examination the patient was conscious coherent and oriented to time place and person blood pressure was found to be 120/80mmhg pulse rate 86bpm the Ultrasonography of abdomen showed normal liver size whereas the gall bladder being over distended (8.4mm dilated showing smooth tapering at distal end) USG scan of pancreas visualised multiple intra pancreatic calcification at body with 9.4mm dilation and intraductal calcification. Along with USG GRBS was found to be 570gm/dl. Considering the clinical and laboratory findings the patient was diagnosed with CHRONIC CALCIFIED PANCREATITIS WITH TYPE 3C DM WITH EXOCRINE INSUFFICIENCY AND PANCREATIC PSEUDOCYST. To manage these conditions the physician

prescribed injection NPH 10U, injection metrogyl 100mg/iv inj zofer 4mg tablet antoxid p and tablet tapendalol 50 mg.

III. DISCUSSION

Pancreatogenic diabetes mellitus, specifically type 3C diabetes mellitus (T3cDM), is a secondary form of diabetes resulting from various exocrine pancreatic conditions. Chronic pancreatitis is the most common underlying illness associated with T3cDM, accounting for 78.5% of cases, followed by pancreatic cancer at 8% of cases.^[1,2] Other benign pancreatic diseases contribute to approximately 85% of T3cDM instances.^[3] In this case presentation, the patient had a history of chronic calcified pancreatitis, which likely played a significant role in the development of T3cDM.

Several factors increase the likelihood of developing T3cDM, including smoking, pancreatic calcifications, and chronic illnesses.^[5] The patient in this case had a history of smoking for eight years and chronic alcoholism for six years, which are known risk factors for pancreatitis. Smoking cessation four months prior to admission is a positive change that can potentially mitigate further pancreatic damage.

Managing T3cDM presents unique challenges compared to type 1 and type 2 diabetes due to metabolic characteristics and hormonal imbalances. In T3cDM, there is a degeneration of both beta cells (insulin-producing) and alpha cells (glucagon-producing), resulting in low levels of both hormones. Consequently, patients may experience both hyperglycemia and hypoglycemia.^[6,7] The absence of glucagon, which typically promotes ketone formation, makes the development of diabetic ketoacidosis (DKA) uncommon in T3cDM patients.^[8]

Diagnosis of T3cDM requires a comprehensive evaluation of clinical symptoms, medical history, and imaging studies. In this case, the patient presented with abdominal pain of insidious onset, radiating to the back, and aggravated by food intake. Greasy oily stools and facial swelling were also reported. The history of diabetes mellitus, along with a previous episode of acute pancreatitis, raised suspicion for T3cDM. Ultrasonography revealed multiple intra-pancreatic calcifications, dilation, and an over-distended gall bladder. These findings, combined with a significantly elevated random blood sugar level, led to the diagnosis of chronic calcified pancreatitis with T3cDM, exocrine insufficiency, and a pancreatic pseudocyst.

Treatment for T3cDM focuses on managing both diabetes and the underlying pancreatic condition. Insulin therapy is crucial for glycemic control in T3cDM patients, as seen in this case where the patient was prescribed NPH insulin injections. Additionally, management involves addressing exocrine insufficiency with enzyme replacement therapy, as well as treating complications such as pancreatic pseudocysts. The

patient received metronidazole to manage any potential infection, ondansetron for nausea, antioxidant supplements to support pancreatic function, and a beta-blocker (tapendalol) for blood pressure management.

IV. CONCLUSION

This case highlights the complexities of managing chronic calcified pancreatitis with type 3C diabetes mellitus, exocrine insufficiency, and a pancreatic pseudocyst. T3cDM is a clinically significant disease that requires early diagnosis and tailored treatment approaches to optimize patient outcomes and prevent complications. Smoking cessation and alcohol cessation are important lifestyle modifications to minimize further pancreatic damage.

Further research is necessary to deepen our understanding of T3cDM and develop targeted therapies for this specific form of diabetes. Improved diagnostic methods and treatment strategies could enhance the management of T3cDM, ultimately improving the quality of life for affected individuals.

ABBREVIATIONS

- T3cDM-Type 3C diabetes mellitus
- DKA-Diabetic ketoacidosis
- USG-Ultrasonogram
- NPH-neutral protamine hagedorn

REFERENCES

1. Expert Committee on the Diagnosis and Classification of Diabetes mellitus. Report of the expert committee on the diagnosis and classification of diabetes mellitus. *Diabetes Care* 2003;26:5–20.
2. American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care* 2011;34:62–9.
3. Price S, Cole D, Alcolado JC. Diabetes due to exocrine pancreatic disease—a reviewOf patients attending a hospital-based diabetes clinic. *QJM* 2010;103:759–63
4. Ewald N, Bretzel RG. Diabetes mellitus secondary to pancreatic diseases (Type 3c)—are we neglecting an important disease? *Eur J Intern Med.* 2013;24(3):203–206. Doi: 10.1016/j.ejim.2012.12.017. [PubMed] [CrossRef] [Google Scholar]
5. Duggan SN, Ewald N, Kelleher L, Griffin O, Gibney J, Conlon KC. The nutritional management of type 3c (pancreatogenic) diabetes in chronic pancreatitis. *Eur J Clin Nutr.* 2017;71(1):3–8. Doi: 10.1038/ejcn.2016.127. [PubMed] [CrossRef] [Google Scholar]
6. Andersen DK, Korc M, Petersen GM, Eibl G, Li D, Rickels MR, Chari ST. et al. Diabetes, pancreatogenic diabetes, and pancreatic cancer. *Diabetes.* 2017;66(5):1103–1110. Doi: 10.2337/db16-1477. [PMC free article] [PubMed] [CrossRef]
7. Cui Y, Andersen DK. Pancreatogenic diabetes: special considerations for management. *Pancreatology.* 2011;11(3):279–294. Doi: 10.1159/000329188. [PubMed] [CrossRef] [Google Scholar]
8. Melki, Gabriel et al. “Chronic Pancreatitis Leading to Pancreatogenic Diabetes Presenting in Diabetic Ketoacidosis: A Rare Entity.” *Gastroenterology research* vol. 12,4 (2019): 208-210. Doi:10.14740/gr1203