

# Insulinoma Co-existing with Type 2 Diabetes Mellitus Treated with Endoscopic Ultrasound Guided Radiofrequency Ablation



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## Background

- Insulinoma is an uncommon condition with an incidence of 4 cases per 1 million person-years (1).
- Although the pathology underlying insulinoma and type 2 diabetes mellitus (T2DM) may seem contradictory, their coexistence has been reported infrequently in the literature.
- In a retrospective study conducted in Mayo clinic, out of 313 patients of insulinoma over a 65-year period, there was only one case of insulinoma with concomitant T2DM (2).
- Traditionally, the recommended treatment of insulinoma is laparoscopic or open resection, which is invasive and carries anaesthetic risks.
- Endoscopic ultrasound (EUS) guided radiofrequency ablation (RFA) is a non-surgical alternative for definitive treatment of insulinoma (3).

## Objective

We described a case of concomitant T2DM and insulinoma, in which the insulinoma was treated with EUS guided RFA.

## Case Presentation

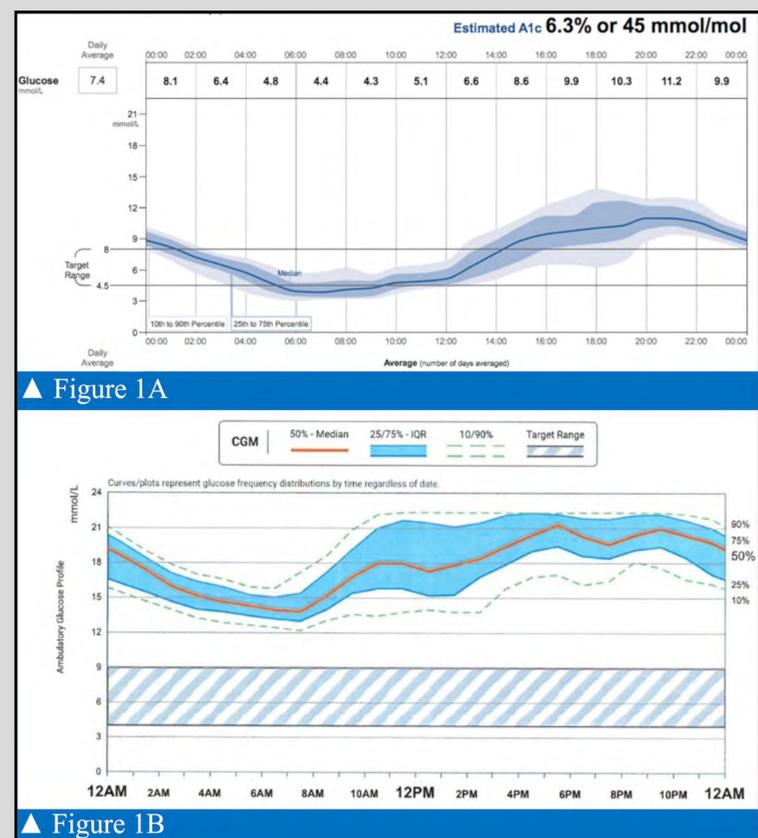
- Mr. Lai is a 72-year-old Chinese.
- Pre-clinic blood tests during follow-up for coronary artery disease incidentally showed raised glycated hemoglobin (HbA1c) of 7.1% but a low fasting glucose level of 3.0 mmol/L.
- Further history revealed recurrent hypoglycemic symptoms for 3 years.
- Continuous glucose monitoring showed recurrent fasting hypoglycemia and significant postprandial glucose excursions.
- Biochemical workup revealed:
  - ▶ Fasting glucose 2.5mmol/L
  - ▶ Paired insulin level 26mIU/L (5-10mIU/L)
  - ▶ C-peptide 1.2nmol/L (0.27-1.27nmol/L)
  - ▶ Beta-hydroxybutyric acid <0.05mmol/L
  - ▶ Cortisol 483nmol/L
  - ▶ Growth hormone 2.7ng/ml (<8ng/ml)
  - ▶ Urine toxicology did not show presence of sulfonylurea

Endogenous hyperinsulinemic hypoglycemia was confirmed.

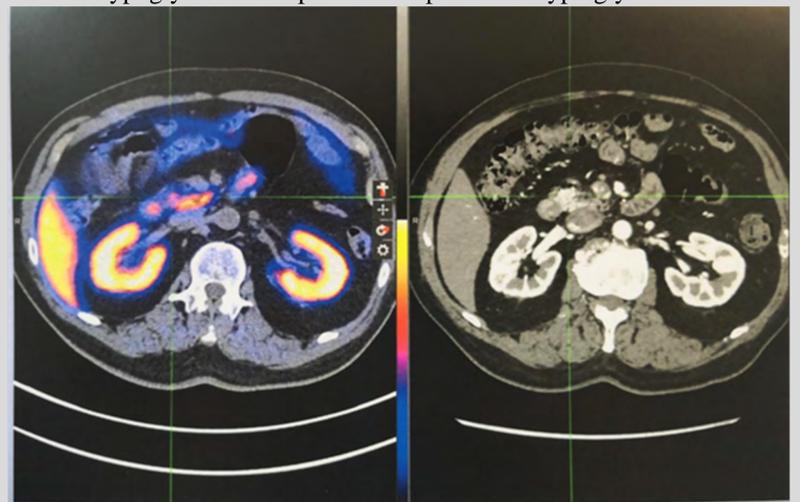
- CT abdomen showed a 1.2x0.9cm arterial enhancing lesions at the pancreatic head. The remaining pancreas appeared mildly atrophic.
- PETCT showed a vague DOTATE-avid lesion of size 1.26x0.94cm (SUV max 9.7) at the pancreatic head, suggestive of a neuroendocrine tumour.
- Patient was initially managed with dietary modification and corn-starch overnight, followed by EUS-guided RFA of insulinoma as curative therapy.
- Post-treatment continuous glucose monitoring showed resolution of hypoglycemia. There was persistent hyperglycemia with glucose readings of 15-16mmol/L.
- Patient was subsequently stabilized on prolonged release metformin 1g with dinner and premixed insulin (Insulin human isophane + neutral 70%/30%) 14 units before breakfast and 8 units before dinner.

## Discussion

- Traditionally, in patients with coexisting insulinoma and T2DM, resection of the insulinoma is crucial. Followed by standard treatment of diabetes mellitus.
- RFA of pancreatic lesions was less commonly performed due to concerns on sensitivity of pancreatic tissue to thermal injury and the risk of vasculature and biliary injury due to anatomical proximity.
- Intraoperative and percutaneous RFA are effective but are relatively invasive. Transabdominal ultrasound guided percutaneous RFA is often limited by poor visualization of the retroperitoneal pancreas.
- EUS guided RFA allows localization of pancreatic lesion and real time guidance for the procedure. It is proven to be feasible and safe for the treatment of pancreatic lesions. Rapid and complete normalization of serum hormone levels could be achieved (4).
- Side effects include mild abdominal pain and transient, asymptomatic rise in serum amylase and lipase levels (5).



▲ Figure 1. The ambulatory glucose profile before and after radiofrequency ablation of the pancreatic head insulinoma. A. (Before) Showing a pattern of recurrent fasting hypoglycemia and subsequent glucose surge up to 14mmol/L. B. (After) Showing the absence of hypoglycemia and presence of persistent hyperglycemia.



▲ Figure 2. DOTATATE-PET scan showing the pancreatic head neuroendocrine tumour.

## Conclusion

- Coexisting insulinoma and diabetes mellitus can create diagnostic challenges which require clinical vigilance and thorough investigations in suspicious cases.
- Compared to surgery, endoscopic ultrasound guided radiofrequency ablation provides a less invasive alternative to treat the tumor and to eliminate hypoglycemia.

## References:

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