Diffusion-weighted MRI in Localization of Insulinoma

Sir,

Insulinomas are rare pancreatic neuroendocrine tumors. A diagnosis of insulinoma is made when spontaneous recurrent hypoglycemia is documented with Whipple's triad in the presence of endogenous hyperinsulinemia with the exclusion of presences of insulin autoantibodies and spurious use of sulfonylurea. Sporadic insulinomas are small, solitary, benign, encapsulated tumors measuring less than 2 cm in the majority (>90%) of cases.[1] As surgical removal is the treatment of choice, accurate preoperative localization of insulinomas is useful as it eliminates the need for blind distal pancreatectomy and avoids re-exploration. Invasive localization modalities with intra-arterial calcium stimulation are more sensitive than non-invasive modalities, though seldom used, except when non-invasive modalities fail.[2]

The sensitivity of CT scans varies from 63 to 83% and the sensitivity of dynamic MRI ranges from 85% to 95%in the detection of insulinomas.[3]

Small lesions particularly those without hypervascular patterns are not picked up on CT scans and usual dynamic MRI images. Here, we report a case of small intra-pancreatic sporadic insulinoma, which was localized successfully with diffusion-weighted MRI.

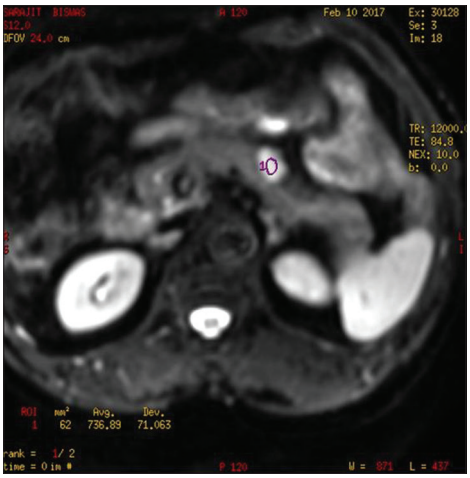

Figure 1: Axial Diffusion weighted MRI shows a well defined oval lesion (20 × 12.2 mm) in the body of pancreas showing restricted diffusion

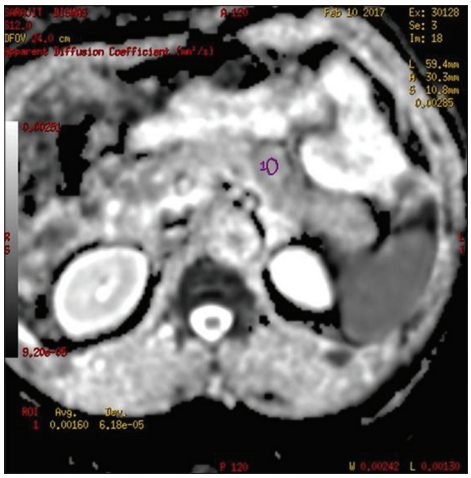

Figure 2: Corresponding ADC (Apparent diffusion coefficient) map image showing mild hypointensity in the lesion

A 58-year-old male presented with spontaneous recurrent hypoglycemia documented by Whipple's triad. Endogenous hyperinsulinemia was documented (during a 72 h fasting the plasma glucose dropped to 42 mg/dL and in the same blood sample serum insulin was 12.7 mU/L and C-peptide was 1.01 nmol/L). Blood ketones, insulin autoantibody were negative. Trans-abdominal ultrasound, contrast-enhanced CT did not reveal any lesion. The endoscopic US suggested the possible presence of an ill-defined heterogeneous lesion in the body of the pancreas. ^{68}Ga-DOTANOC-PET failed to localize any lesion. Axial Diffusion weighted MRI of the abdomen revealed a well defined oval space occupying lesion (20 × 12.2 mm) in the body of pancreas showing restricted diffusion [Figures 1 and 2].

The patients underwent surgery of the identified lesion and post-operatively clinical and biochemical cure was documented.

Conventional contrast-enhanced CT scan and dynamic MRI scans detect insulinomas because of the tendency of insulinomas to present intense and early contrast enhancement with a washout phenomenon.[4] However, in cases of insulinomas that are not hypervascular, CT and conventional MRI may fail to detect such lesions. This false-negative result may be related to the fact that these lesions are small and masked by the contrasting blush of adjacent structures or isovascular to the pancreas.[5]

Diffusion is referred to as the random microscopic motion of water molecules. The diffusion of water in tissues is different from free water and pathological conditions result in changes in the diffusion coefficient. This principle is utilized by diffusion-weighted imaging and may particularly be useful for small lesions particularly those without hypervascular patterns.[6]

The patient underwent surgery and recovered well without any hypoglycemic features subsequently after surgery.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Neha Agrawal, Suvrendu Sankar Kar[1], Archana Singh[2], Samiran Samanta[2], Pradip Mukhopadhyay[3], Sujoy Ghosh[3]

Department of Endocrinology, NRS Medical College, [1]Department of Medical College, 1, Khudiram Bose Sarani, [2]Department of Radiodiagnosis, I.P.G.M.E and R, 244 AJC Bose Road, [3]Department of Endocrinology and Metabolism, I.P.G.M.E and R, 244 AJC Bose Road, Kolkata, West Bengal, India

Address for correspondence:
Dr. Sujoy Ghosh,
Department of Endocrinology and Metabolism, I.P.G.M.E and R,
244 AJC Bose Road, Kolkata, West Bengal, India.
E-mail: drsujoyghosh2000@gmail.com

References

1. Shin JJ, Gorden P, Libutti SK. Insulinoma: Pathophysiology, localization and management. Future Oncol 2010;6:229-37.
2. Guettier JM, Kam A, Chang R, Skarulis MC, Cochran C, Alexander HR, *et al*. Localization of insulinomas to regions of the pancreas by intraarterial calcium stimulation: The NIH experience. J Clin Endocrinol Metab 2009;94:1074-80.
3. Cheng W, Xuesong X, Jianping G. Diagnosis and surgical treatment of insulinoma in sixteen cases. Am J Cancer Prev 2016;4:8-12.
4. Iglesias A, Arias M, Casal M, Paramo C, Fiano C, Brasa J. Unusual presentation of a pancreatic insulinoma in helical CT and dynamic contrast-enhanced MR imaging: Case Report. Eur Radiol 2001;11:926-30.
5. Fink IJ, Krudy AG, Shawker TH, Norton JA, Gorden P, Doppmen JL.

Demonstration of an angiographically hypovascular insulinoma with intraarterial dynamic CT. AJR Am J Roentgenol 1985;144:555-6.
6. Bammer R. Basic principles of diffusion-weighted imaging. Eur J Radiol 2003;45:169-84.

Submitted: 13-Dec-2019 **Accepted:** 16-Dec-2019
Published: 30-Apr-2020

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online

Quick Response Code:

Website: www.ijem.in

DOI: 10.4103/ijem.IJEM_636_19

How to cite this article: Agrawal N, Kar SS, Singh A, Samanta S, Mukhopadhyay P, Ghosh S. Diffusion-weighted MRI in localization of Insulinoma. Indian J Endocr Metab 2020;24:222-4.

© 2020 Indian Journal of Endocrinology and Metabolism | Published by Wolters Kluwer - Medknow