

Experience based on 193 ¹⁸F-DOPA PET CTs in patients with congenital hyperinsulinism: Pearls and pitfalls in imaging diagnostics in patients with CHI

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Introduction:

In congenital hyperinsulinism (CHI) ¹⁸F-DOPA PET CT plays an essential role in differentiating between focal and non-focal CHI forms and in the analysis of the localization of a potential focus before surgery. The aim of this retrospective analysis was the evaluation of the ¹⁸F-DOPA PET CT efficacy in a large cohort of CHI patients.

Patients and Method: In the last few years 193 ¹⁸F-DOPA PET CTs were performed in our centre in CHI patients and we performed a retrospective analysis of specificity and sensitivity based on the results of the histological evaluation of the samples after surgery, clinical course of the patient and molecular genetic findings.

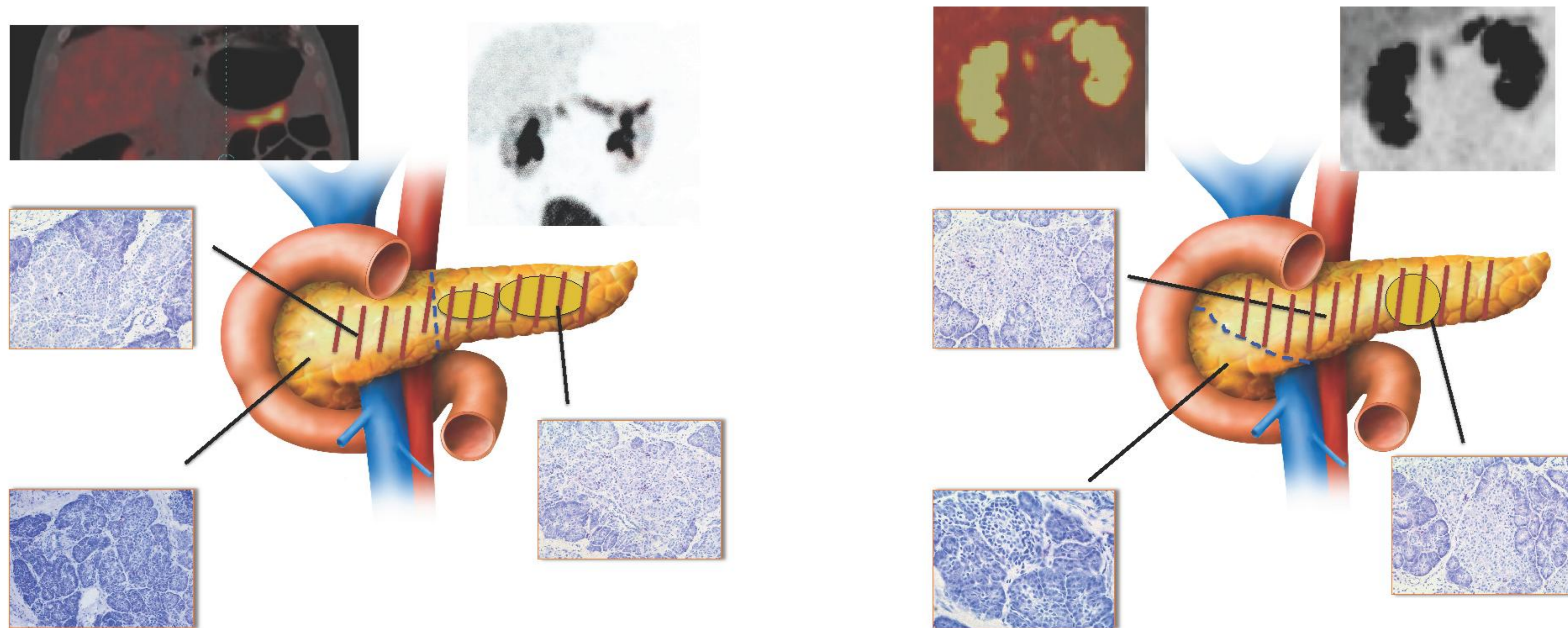


Figure 1: Examples of two CHI patients in which the ¹⁸F-DOPA PET-CT failed to visualize the complete focus size. The PET result is marked with yellow circles. The red lines represent the real expansion of the focus after histological examination of the surgical samples. Blue dashed lines mark the resection point during surgery.

Results:

With one exception it was possible in all cases with the ¹⁸F-DOPA PET CT to differentiate between focal and non-focal CHI forms in addition to the molecular genetic results. However, in three cases the ¹⁸F-DOPA PET CT failed to visualize the complete expansion of the affected region and the giant spreading of the focus was identified during surgery (Figure 1). Finally, in three cases the CHI patients received in addition to the ¹⁸F-DOPA PET CT scan a DOTATOC PET CT. Thereby one focus was additionally identified, which would have been missed with the traditional approach using only the ¹⁸F-DOPA PET CT (Figure 2).

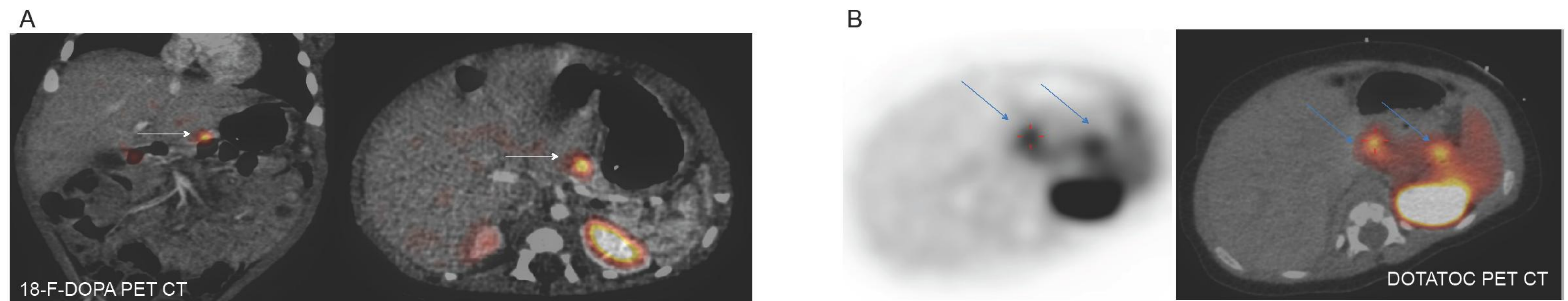


Figure 2: A ¹⁸F-DOPA PET scan of a CHI patient with a focal form. The white arrow marks the enhances tracer accumulation in the head. B A second DOTATOC PET CT was performed and thereby an additional focus was identified in the tail (blue arrow). Both focus parts were verified by histological analysis.

Conclusion:

The imaging diagnostics is a critical step in the work up of patients with CHI. Being aware of the advantages and pitfalls of this method is an important step to improve the quality of the diagnostic and finally the therapeutic regime in patients with congenital hyperinsulinism. Although the initiation of ¹⁸F-DOPA PET led to a dramatic improvement of the final outcome of CHI patients, there is still a limitation especially in focal forms with a giant focus. In the future further PET tracer will be an option to further improve the quality of the diagnostic and treatment of CHI patients.