

FDG-PET Scan

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Case Study

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ABSTRACT

The hepatocellular carcinoma (HCC) is the most frequent primary liver cancer and its prevalence is rising with a modest improve in survival in the last years. This tumor is an important cause of cancer-related death worldwide. Chronic liver diseases are risk factors in development of this tumor and the final stage of fibrosis, cirrhosis, is often the context of HCC diagnosis. The early diagnosis is the endpoint of radiologic tests like ultrasound, computerized tomography (CT) and magnetic resonance imaging. The recurrence outside the liver is still a less studied topic with sub optimal imaging exams accuracy. This case report presents a 60 year old male who had a nodal recurrence of hepatocellular carcinoma diagnosed by FDG-PET scan and confirmed by the histopathological analysis. The aim of this case report describes and demonstrates how the nuclear medicine can help in the metastasis scenario of HCC diagnosis recurrence after curative resection surgery.

INTRODUCTION

The hepatocellular carcinoma (HCC) is the most frequent primary liver cancer. The trend of prevalence of this tumor is rising and survival hasn't changed enough ^[1]. Its unique characteristics make a challenge for surgeons and physicians since a chronic liver disease often coexists. Cirrhosis remains the most important risk factor and the treatment is driven by tumor size, extrahepatic disease and underlying liver dysfunction. The early diagnosis is the key for outcome and prognosis in cirrhotic patients although very difficult in setting of cirrhosis. However, radiologic imaging advances brought many advantages ^[2]. The typical HCC is an arterial enhance contrast nodule (wash-in) at scan followed by disappearance of the contrast in venous phase or wash-out pattern. The arterial vascularization of the tumor is important for the diagnosis as its neoangiogenic properties. The high liver metabolic uptake in normal parenchyma makes the diagnosis of primary hepatocellular carcinoma by FDG-PET scan not sensitive enough. There are few studies published that discuss the role of FDG-PET scan in metastatic HCC ^[3-5]. Thus, in the purpose of addressing a horizon in relapsed and metastatic HCC disease diagnostic tests we report a case of nodal recurrence after three years of treatment with liver resection diagnosed only by FDG-PET scan. Magnetic resonance imaging and computed tomography did not diagnose the HCC recurrence and FDG-PET scan demonstrated nodal involvement. The aim of this case report is describe a patient with HCC recurrence outside the liver only diagnosed by nuclear medicine new methods.

CASE DESCRIPTION

GMS, 60 years old, married, white, businessman. He had hepatitis C diagnosed in 2000, probably acquired in a previous transfusion (1978). Physical examination demonstrated spiders on the trunk and splenomegaly. Laboratory tests revealed bicytopenia (leuco and thrombocytopenia) and aminotransferases increased (AST 5 X ULN and ALT 3 X ULN). Albumin and TAP/INR were in normal range. First of all, he was submitted to treatment with conventional interferon and ribavirin after splenectomy (severe thrombocytopenia), at that time, with no sustained virological response and in 2007 the treatment was reinstated by pegylated interferon and ribavirin and he experienced sustained virology response. The clinical follow up at the end of 2009 detected levels of alpha-fetoprotein increasing until 601 ng/ml. The resonance imaging showed only a solitary small nodular lesion, less than 5 cm, in the fifth segment. In May 2010, he underwent surgical resection, hepatectomy, and evolved well in the postoperative period without liver decompensation and decrease of alpha-fetoprotein to below 20. From 2012, the serum levels began to steadily increase from insignificant amounts to 120, 125 to 1980 ng/ml (**Figure 1**) accompanied only by portal hypertension with medium-sized esophageal varices and portal hypertensive gastropathy. Serial resonances were carried on only

with signs of chronic liver disease and hepatectomy. A chest CT scan was normal and less specific tumor markers, namely CEA and CA 19-9 were normal. The team opted then for conducting pet-scan to assess the presence of HCC recurrence. The medical report of the FDG-PET scan concluded on the presence of nodal disease recurrence (**Figure 2**). Initially, the patient was submitted to a surgery and nodal resection concluded the histopathological HCC recurrence. The histopathological **Figures 3-5**, described disorganized trabeculae, absence of portal tracts and atypia's with immunohistochemistry showing hepatocellular carcinoma recurrence. In this way, the patient had no indication for transplant, surgery, local ablation or transarterial chemoembolization therapy but systemic therapy for the tumor spread through the lymphatic system. Finally, sorafenib was presented as the best option to suppress tumor growth with systemic spread and he had a good response over one year when he deceased.

Alphafetoprotein

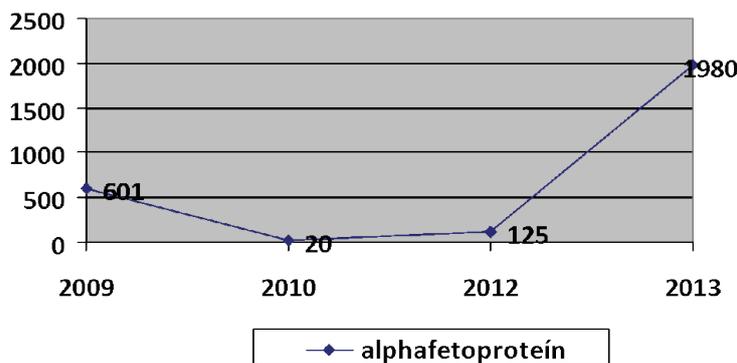


Figure 1. Blood alpha-fetoprotein values before and after surgery.

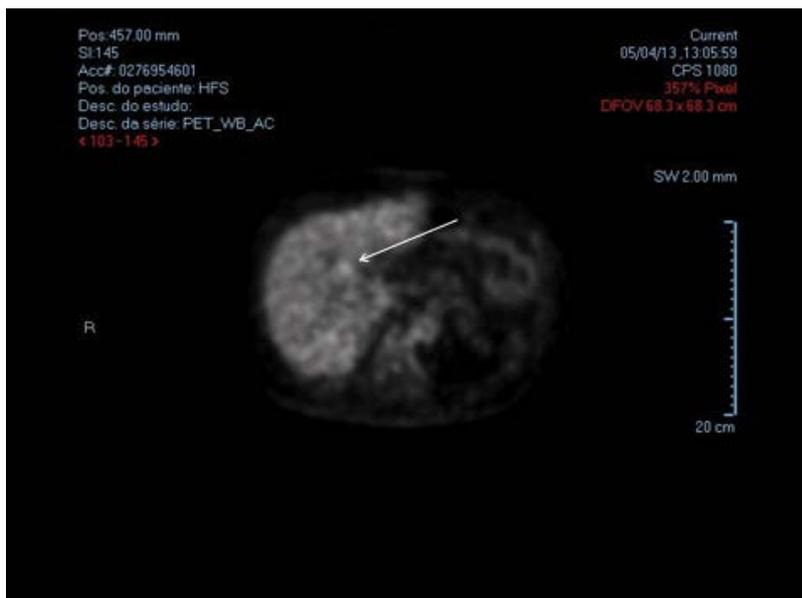


Figure 2. Focal 18F-FDG uptake in a small area in hepatic hilar region (arrow). The uptake was moderately increased compared to the rest of the liver. Surgery and nodal resection, confirmed HCC recurrence.

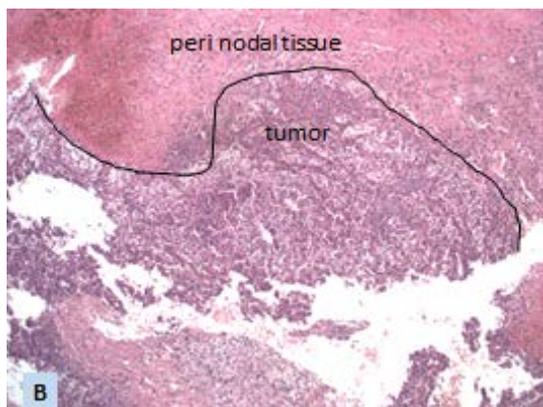


Figure 3. Perinodal tissue-lymphoid and fibrovascular tissue with tumor recurrence (hematoxylin and eosin stain-40x).

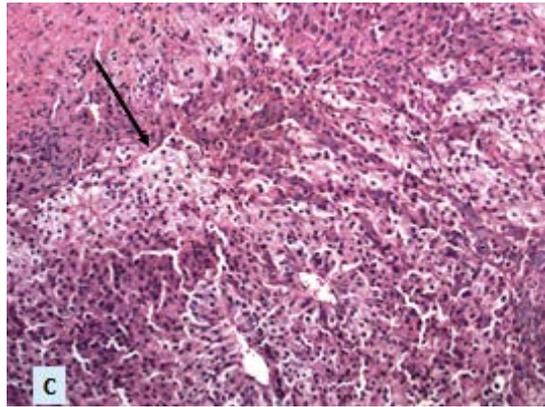


Figure 4. Closer view of hepatocellular carcinoma-disorganized trabeculae, no portal tracts and mild atypia (hematoxylin and eosin stain-100x).

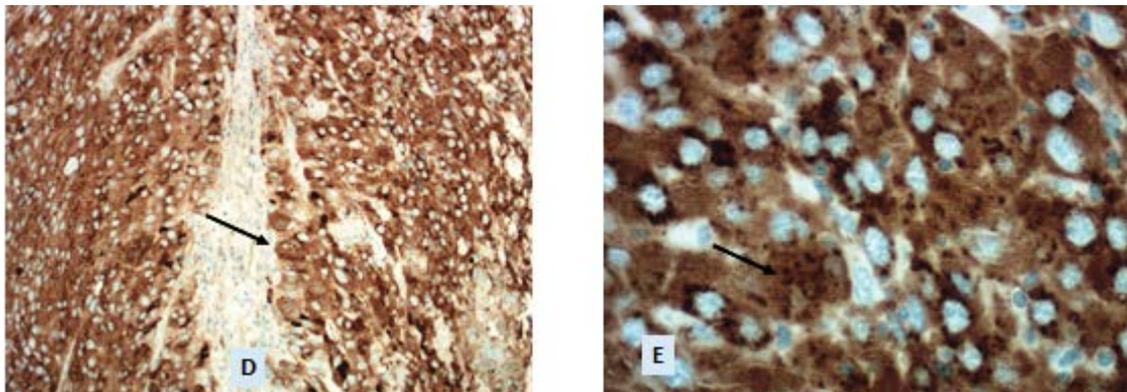


Figure 5. A) 100x and B) 400x alpha-fetoprotein immunohistochemistry in hepatocellular carcinoma-cytoplasm positive.

DISCUSSION

As previously published the FDG-PET scan has many limitations in diagnosis of HCC in cirrhotic patients because of the high metabolic rates of liver parenchyma and so the relatively low sensibility of the test. The conventional imaging methods rely on structural, morphological and anatomic assessment for the purpose of diagnosis. Nevertheless, the metabolic and molecular basis is fast evolving in this field and can in future provide information in prognosis and treatment vulnerability^[6]. Sometimes, the metastasis can be diagnosed without the detection of the tumor recurrence and seems to be a challenging scenario for the imaging methods. Kwee et al. series detected 2 cases with metastasis captation without liver tumor recurrence by FDG-PET scan. Ho et al. studied 121 cases and 97 recurrences. The most frequent organ site of metastasis was lung followed by lymph node and some were detected without the liver primary HCC recurrence^[7].

The differentiation between HCC recurrence and post treatment scarring images and between metastasis and reactive lymph node enlargement, especially in cirrhotic, are very difficult using CT alone. In this case, the differentiation between post treatment scarring and lymph node metastasis was difficult even with resonance imaging and only the FDG-PET scan had good accuracy. Detection of osseous metastatic disease is another known limitation of CT, as most bone lesions spreads from HCC are osteolytic and are evident on CT only as a late manifestation^[8].

Furthermore, another study demonstrated that FDG-PET scan was the only method that could identify the source of elevated alpha-fetoprotein in 73% of their patients after treatment of HCC^[9]. The recent literature^[10,11] although not yet robust may support the role of FDG-PET scan in HCC metastases and local tumor recurrence after treatment as a new tool. The diagnosis and staging assessment in HCC are rapidly developing and need a precise imaging test for sequential evaluation and follow up, intended in ameliorating the horizon of outcome in liver oncology.

CONCLUSION

HCC is an aggressive liver cancer with an overall low survival. Despite improvements in diagnosis and treatment, the underlying liver disease poses a great challenge for both imaging tests and early detection^[12]. Sometimes the recurrence of hepatocellular carcinoma can't be diagnosed by conventional imaging technologies. The recent advances in this area allow new approaches like the FDG-PET scan for difficult cases and disseminated disease diagnosis after adequate treatment of HCC.

REFERENCES

1. Weinmann A, et al. Trends in epidemiology, treatment and survival of hepatocellular carcinoma patients between 1998 and 2009: An analysis of 1066 cases of a German HCC Registry. *J Clin Gastroenterol.* 2014;48:279–289.
2. Talbot JN, et al. Detection of hepatocellular carcinoma with PET/CT: A prospective comparison of 18F-fluorocholine and 18F-FDG in patients with cirrhosis or chronic liver disease. *J Nucl Med.* 2010;51:1699–1706.
3. Ho CL, et al. 11C-Acetate PET imaging in hepatocellular carcinoma and other liver masses. *J Nucl Med.* 2003;44:213–221.
4. Iwata Y, et al. Clinical usefulness of positron emission tomography with fluorine-18-fluorodeoxyglucose in the diagnosis of liver tumors. *Ann Nucl Med.* 2000;14:121–126.
5. Khan M, et al. Positron emission tomography scanning in the evaluation of hepatocellular carcinoma. *J Hepatol.* 2000;32:792-797.
6. Kwee AS, et al. Chronic liver disease and the detection of hepatocellular carcinoma by [18F] fluorocholine PET/CT". *Diagnostics Basel.* 2015;5:189-199.
7. Ho CL, et al. Dual-tracer PET/CT imaging in evaluation of metastatic hepatocellular carcinoma. *The Journal of Nuclear Medicine.* 2007;48:6.
8. Natsuizaka M, et al. Clinical features of hepatocellular carcinoma with extrahepatic metastases. *J Gastroenterol Hepatol.* 2005;20:1781–1787.
9. Chen YK, et al. Utility of FDG-PET for investigating unexplained serum AFP elevation in patients with suspected hepatocellular carcinoma recurrence. *Anticancer Res.* 2005;25:4719–4725.
10. Wang, et al. Value of 18F-FDG-PET/CT in the detection of recurrent hepatocellular carcinoma after hepatectomy or radiofrequency ablation: A comparative study with contrast-enhanced ultrasound. *J Dig Dis.* 2013;14:433-438.
11. Lin CY, et al. 18F-FDG PET or PET/CT for detecting extrahepatic metastases or recurrent hepatocellular carcinoma: a systematic review and meta-analysis. *Eur J Radiol.* 2012;81:2417-2422.
12. Balogh J, et al. Hepatocellular carcinoma: A review. *J Hepatocell Carcinoma.* 2016:3.