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CASE REPORT

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Role of nuclear medicine imaging in differential diagnosis of accessory spleens in patients after splenectomy

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Summary

Background: More than 10% of healthy population has one or more accessory spleens. The most common location is the hilum of the spleen or area near the tail of the pancreas. The radiological appearance of accessory spleens in oncologic patients who underwent splenectomy can be misinterpreted as a recurrence, especially in the case of compensatory growth of an accessory spleen in successive radiological examinations.

Caser Reports: We present the cases of three patients who underwent splenectomy for gastric carcinoid, gastric adenocarcinoma and cancer of the left adrenal gland, respectively. CT examination and/or PET-CT scan revealed suspicious findings in the left upper abdomen. In one patient, the dimensional increase of this finding in successive examinations was initially considered suggestive for cancer recurrence. Scintigraphy with ^{99m}Tc-nanocolloid was able to confirm the presence of an accessory spleen in all these patients.

Conclusions: Splenic scintigraphy is an economical, accessible and accurate tool in differential diagnosis of accessory spleens in patients after splenectomy.

Key words: accessory spleen • diagnosis • nuclear medicine

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Background

Accessory spleen is present in 10–12% of human population and is usually located in the area of the splenic hilum or near the tail of the pancreas. It is rare in other locations: gastro-splenic ligament, pancreas, gastric wall, intestinal wall, omentum or mesentery [1–3].

Accessory spleen is a variant of norm. However, in some situations, its presence may cause clinical problems, such as persistent function of the organ after removal of the proper spleen, mesenteric torsion, bleeding from the organ, or difficulties with differential oncological diagnosis. This work concerns the last instance [4–7].

On CT, accessory spleen is usually 1 cm in diameter. However, its size may reach 3 cm, and its density is similar to the density of the tissue of the proper spleen or slightly lower - in case of accessory spleens smaller that 1 cm. It is round or oval in shape, usually without a hilum. CT or US is not able to differentiate the tissues accurately, even after contrast administration [1–3].

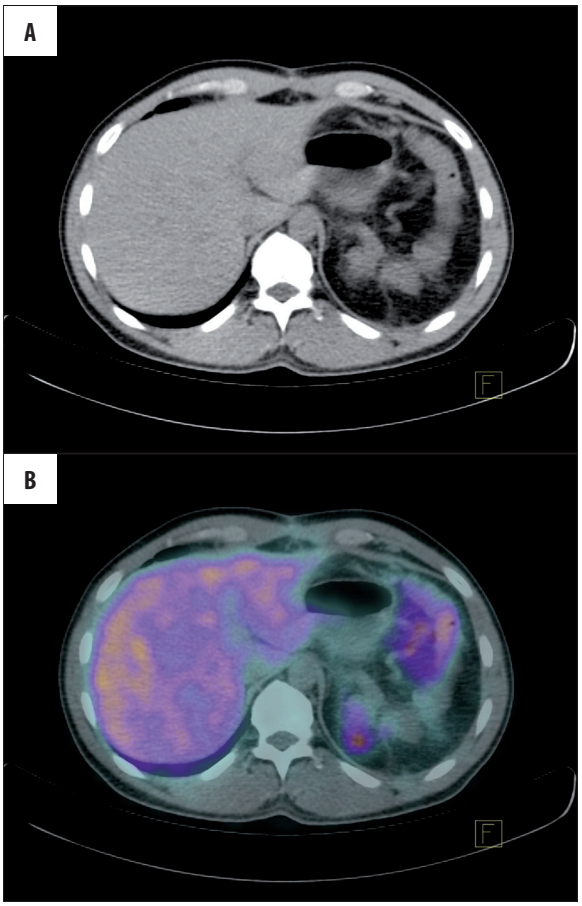

Figure 1A,B. Patient K.A.: CT scan and PET-CT with gallium-68 labeled somatostatin analogues on 8 October 2008: no radiological changes in the left upper abdomen with physiological radiotracer uptake in the liver, intestine and kidney.

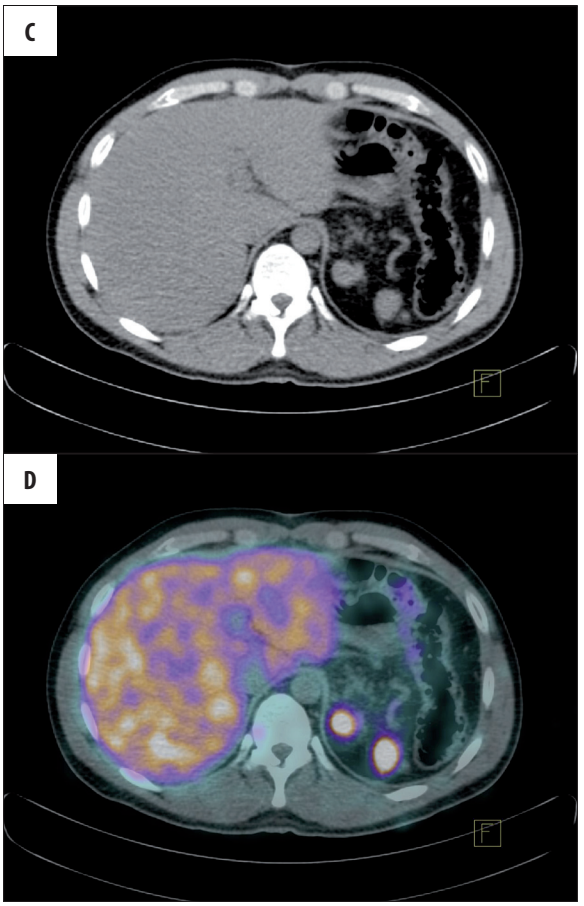

Figure 1C,D. Patient K.A.: CT scan and PET-CT with gallium-68 labeled somatostatin analogues on 25 May 2009: two oval masses in the left upper abdomen, not vizualised before, initially interpreted as cancer localizations.

Scintigraphy with nanocolloid radiolabeled with ^{99m}Tc is a diagnostic method of the spleen, known for 30 years. After intravenous administration, the ^{99m}Tc-nanocolloid accumulates in the tissues of the spleen mainly, which allows for their identification as early as after 15–30 minutes afterwards [8]. The examination may be performed with the use of SPECT tomography, allowing for evaluation of radiotracer distribution in 3 dimensions. Recently, there has also appeared a possibility of examination with CT image fusion with the use of hybrid units – i.e. a combined gamma camera/CT imaging system, for a more precise localisation of radiotracer accumulation with regard to anatomical structures. These examinations are especially useful in patients with ambiguous results of PET-CT, because neither CT nor PET is able to differentiate an accessory spleen from a lymph node metastasis or tumour recurrence in the left upper abdomen [9].

We presented descriptions of three cases in whom colloid scintigraphy of the spleen solved the diagnostic problem which could not be explained with the use of radiological examinations (US, CT) or PET.

Case Reports

Planar scintigraphy and SPECT of the spleen were performed after approximately 20 minutes following intravenous administration of 5 mCi of ^{99m}Tc-nanocolloid. In one case (M.O.), the examination used a hybrid SPECT-CT camera Simens Symbia T6; in other cases, a gamma camera Siemens E-Cam Duet was used.

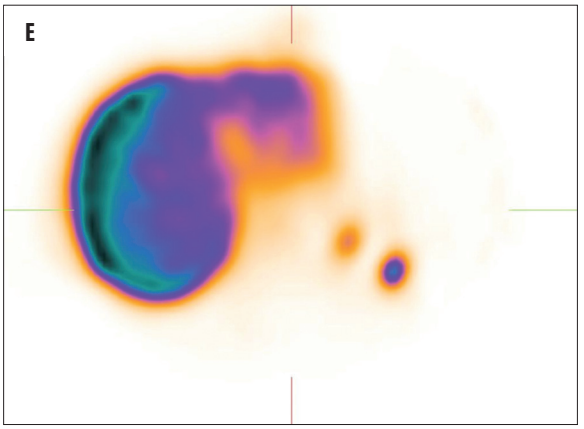

Figure 1E. Scintigrafic SPECT scan of the same patient performed in November 24,2009 with nanocolloid radiolabelled with ^{99m}Tc, with focal uptake of the masses in left upper abdomen, typical for accessory spleens.

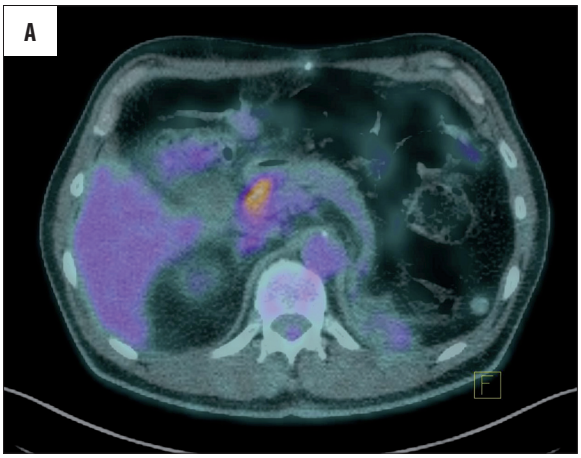

Figure 2A. Patient M.O., PET-CT scan with 18F-FDG from 25 January 2011: circular lesion in the left upper abdomen after splenectomy.

Case 1

Patient K.A., man, 38 years old. Patient with neuroendocrine cancer with metastases to lymph nodes, after removal of the pancreatic tail and spleen in July 2008, with intraoperative biopsy of the pancreatic tail. An abdominal contrast-enhanced multi-phase spiral CT performed on 11 September 2008 showed abnormal structures near the left adrenal gland and in its bed, suggestive of secondary foci of neoplasia.

PET-CT with 68Ga-labeled somatostatin analogues, performed on 8 October 2008 did not show any foci of radiotracer accumulation at the site of the resected spleen (Figure 1A,B).

On 5 November 2008, an abdominal MRI was carried out in the transverse and frontal plane, in T1- and T2-weighted images, fat sat, in-phase, opposed-phase and diffusion. After intravenous contrast agent administration, a dynamic examination was performed, showing stable size of the lesions in the post-resection area, as compared to CT.

One more PET-CT with 68Ga-labeled somatostatin analogues, performed on 26 May 2009, showed that the size of the lesions at the site of the resected spleen increased. Moreover, PET examination showed two foci of radiotracer uptake within those lesions, not present in the previous examination (Figure 1C,D). The observed lesions were therefore initially interpreted as the site of the primary disease.

Only after planar scintigraphy and SPECT of the spleen, on 24 November 2009, two foci of uptake were shown in the left upper abdomen, corresponding to accessory spleens (Figure 1E).

Case 2

Patient M.O., man, 66 years old. Tumour of the rectum and left kidney. Status post nephrectomy, splenectomy and rectal amputation during one procedure (10 June 2010).

On 4 January 2011, a contrast-enhanced spiral multiphase CT of the abdomen was performed at a different hospital,

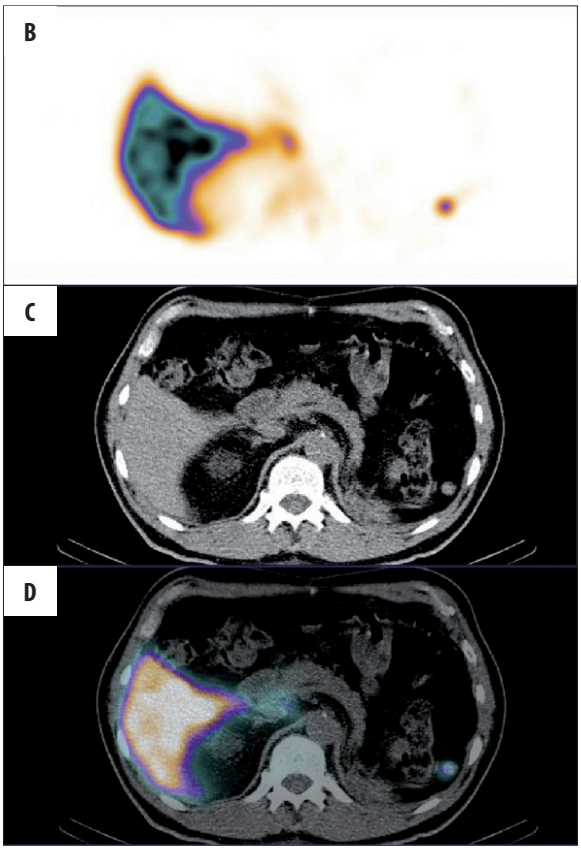

Figure 2B–D. SPECT scan (**B**), CT scan (**C**) and SPECT-CT fusion (**D**) of patient M.O. after injection of nanocolloid radiolabeled with ^{99m}Tc: the uptake of nanocolloid demonstrates the presence of accessory spleen.

revealing a round lesion, 13 mm in diameter, at the site of the resected spleen, enhancing to 80–90 HU and suggestive of renal tumour recurrence.

Our institute performed PET examination with 18F-FDG on 25 January 2011, which showed a trace uptake within the round lesion subdiaphragmatically, on the left side (SUV max 1.05) (Figure 2A). The lesion was interpreted as corresponding most probably to an accessory spleen, and the patient was referred for spleen scintigraphy.

SPECT/CT scintigraphy of the spleen performed on 24 February 2011 showed a focus of increased radiotracer accumulation in the left subdiaphragmatic area within a roundish tissue structure with approximate transverse dimensions of 12×13 mm, confirming the presence of an accessory spleen (Figure 2B–D).

Case 3

Patient D.K., man, 24 years old. Patient with MEN 2B, after a complete removal of the thyroid gland and bilateral lymph nodes of the neck, bilateral adrenalectomy and splenectomy in March 2010.

Abdominal PET-CT from 29 November 2010 showed an oval, well-demarcated structure, 3.6×2.7 cm in size (AP×RL) within the site of the resected spleen, which could

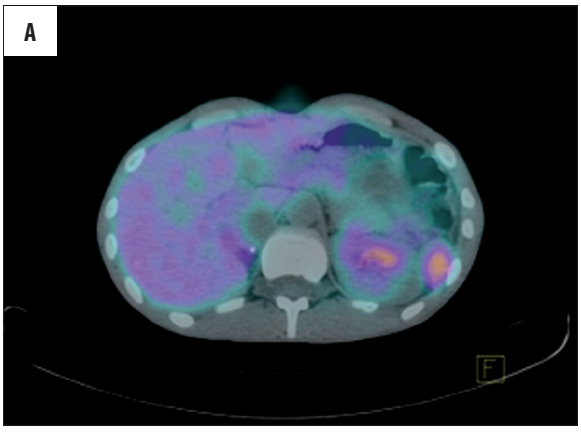

Figure 3A. PET-CT scan with 18F-FDG of patient D.K. from 29 November 2010 with suspected accessory spleen near the left kidney.

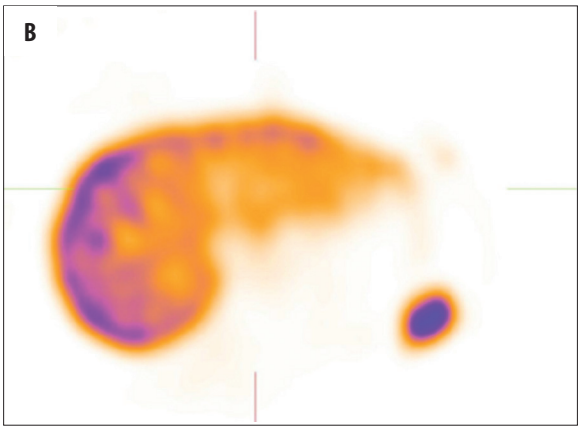

Figure 3B. Scintigraphic SPECT projection of patient D.K. after injection of nanocolloid labeled with ^{99m}Tc form 14 January 2011, confirming the presence of the accessory spleen.

correspond to an accessory spleen, to be differentiated with neoplasm (Figure 3A).

Planar scintigraphy and SPECT of the spleen, from 14 January 2011, showed a focus of radiotracer accumulation corresponding to an accessory spleen (Figure 3B).

Discussion

In the first case, due to increasing size of the lesion in subsequent imaging examinations, the lesion at the site of the resected spleen was incorrectly interpreted as metastasis. It should be remembered that after resection of the proper spleen, accessory spleens may increase significantly, which enhances the risk of their being interpreted as metastases in radiological examinations or PET examinations. Therefore, every oval lesion in the left upper abdomen in patients after spleen resection, showing a tendency to grow in subsequent imaging examinations, should be suspected of being the additional spleen [10–13].

In the second and third case, accessory spleen was suspected right from the beginning, and scintigraphy only confirmed this diagnosis. The specificity of scintigraphy with nanocolloid radiolabeled with Tc 99m in finding accessory spleens in patients after spleen resection is very high due to the absence of other parenchymal organs in the left upper abdomen, which would show radiotracer accumulation. The sensitivity of that examination on the other hand is limited due to lesion size because accessory spleens of less than 8–10 mm in diameter may cause false-negative results due to no radiotracer accumulation [14,15].

Conclusions

Low costs of spleen scintigraphy and the possibility of its performance at all institutes of nuclear medicine should contribute to its wider application in case of ambiguous radiological lesions found in the left upper abdomen in oncological patients.

References:

1. Freeman JL, Jafri SZ, Roberts JL et al: CT of congenital and acquired abnormalities of the spleen. RadioGraphics, 1993; 13: 579–610
2. Dodds WJ, Taylor AJ, Erickson SJ et al: Radiologic imaging of splenic anomalies. AJR, 1990; 155: 805–10
3. Gayer G, Zissin R, Apter S et al: CT findings in congenital anomalies of the spleen. Br J Radiol, 2001;74: 767–72
4. Seo T, Ito T, Watanabe Y et al: Torsion of an accessory spleen presenting as an acute abdomen with an inflammatory mass: US, CT, and MRI findings. Pediatr Radiol, 1994; 24: 532–34
5. Valls C, Mones L, Guma A et al: Torsion of a wandering accessory spleen: CT findings. Abdom Imaging, 1998; 23: 194–95
6. Coote JM, Eyers PS, Walker A et al: Intra-abdominal bleeding caused by spontaneous rupture of an accessory spleen: the CT findings. Clin Radiol, 1999; 54: 689–91
7. Perez Fontan FJ, Soler R, Santos M et al: Accessory spleen torsion: US, CT and MRI findings. Eur Radiol, 2001; 11: 509–12
8. Franceschetto A, Casolo A, Cucca M, Bagni B. Splenosis: ^{99m}Tc-labelled colloids provide the diagnosis in splenectomised patients. Eur J Nucl Med Mol Imaging, 2006; 33(9): 1102
9. Brandon D, Alazraki A, Halkar RK et al: The role of single-photon emission computed tomography and SPECT/computed tomography in oncologic imaging. Semin Oncol, 2011; 38(1): 87–108
10. Stiris MG: Accessory spleen versus left adrenal tumor: computed tomographic and abdominal angiographic evaluation. J Comput Assist Tomogr, 1980;4: 543–44
11. Tsuchiya N, Sato K, Shimoda N et al: An accessory spleen mimicking a nonfunctional adrenal tumor: potential pitfall in the diagnosis of a left adrenal tumor. Urol Int, 2000; 65: 226–28
12. Facon T, Caulier MT, Fenaux P et al: Accessory spleen in recurrent chronic immune thrombocytopenic purpura. Am J Hematol, 1992; 41: 184–89
13. Antevil J, Thoman D, Taller J et al: Laparoscopic accessory splenectomy with intraoperative gamma probe localization for recurrent idiopathic thrombocytopenic purpura. Surg Laparosc Endosc Percutan Tech, 2002;12: 371–74
14. Spencer RP, Gupta SM: The spleen: diagnosis of splenic diseases using radiolabeled tracers. Crit Rev Clin Lab Sci, 1989;27(4): 299–318
15. McQuaid SJ, Southekal S, Kijewski MF et al: Joint optimization of collimator and reconstruction parameters in SPECT imaging for lesion quantification. Phys Med Biol, 2011; 56(21): 6983–7000