

Gallbladder Visualization on I-131 Post-Ablative Whole Body Imaging Mimicking Hepatic Metastases

Frank J. Welte, M.D., Robert H. Dann, M.D., James P. Polga, M.D., and Laurie E. Gianturco, M.D.

A 52-year-old woman with follicular thyroid carcinoma presented for ablative radioiodide and whole body I-131 imaging following subtotal thyroidectomy. An abnormal focus of increased activity was present in the region of the gallbladder fossa, persistent on delayed imaging. Subsequent CT revealed no hepatic metastases. Contemporaneously, the patient described right upper quadrant abdominal pain. Abdominal ultrasound demonstrated cholelithiasis. Cholecystectomy revealed extensive cholelithiasis and evidence of chronic cholecystitis; no hepatic metastases were identified. This case demonstrates the potential pitfall of gallbladder activity on I-131 whole body imaging secondary to cholecystitis mimicking hepatic metastases.

Introduction

Cholecystitis is a relatively common condition and can rarely mimic hepatic metastases in patients undergoing post-ablative I-131 imaging for thyroid cancer.

Additional clinical workup is necessary in these cases to distinguish between these possibilities.

Case Report

A 52-year-old woman with follicular thyroid carcinoma presented for ablative radioiodide therapy (97.7 mCi Iodine-131; I-131) and whole body imaging 8 weeks following subtotal thyroidectomy. Residual thyroid activity was noted, which is not atypical. An abnormal focus of increased activity was present in the region of the gallbladder fossa on 48 and 72 hour post-ablative imaging (Fig. 1). Initially, this activity was felt to likely represent activity within the bowel near the hepatic flexure, however delayed imaging at 11 days post ablation demonstrated persistent activity in this area (Fig. 2).

Citation: Welte FJ, Dann RH, Polga JP, Gianturco LE. Gallbladder visualization on I-131 post-ablative whole body imaging mimicking hepatic metastases. *Radiology Case Reports*. [Online] 2008;3:180.

Copyright: © 2008 Frank J. Welte, M.D. This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs 2.5 License, which permits reproduction and distribution, provided the original work is properly cited. Commercial use and derivative works are not permitted.

Abbreviations: CT, computed tomography

Frank J. Welte, M.D. (Email: fjwelte@gmail.com), Robert H. Dann, M.D., James P. Polga, M.D., and Laurie E. Gianturco, M.D., are in the Department of Radiology, Baystate Medical Center, Tufts University School of Medicine, 759 Chestnut Street, Springfield, MA, USA.

Published: May 25, 2008

DOI: 10.2484/rcr.v3i2.180

Gallbladder Visualization on I-131 Post-Ablative Whole Body Imaging Mimicking Hepatic Metastases

Iodine avid hepatic metastases, although somewhat unlikely given the normal appearing liver on recent ultrasound, could also give a similar appearance, although a solitary hepatic metastasis of the size suggested by the nuclear imaging would be unusual. Due to the somewhat limited sensitivity of ultrasound for evaluation of small lesions in the liver and the potential to significantly change management, an abdominal CT was performed to exclude hepatic metastases. Consideration was given to the possibility that the patient may require additional radioiodine therapy and that a contrast enhanced CT may diminish the efficacy of such

treatment. As the question to be addressed by the CT was of substantial clinical importance and would impact management and additional radioiodide therapy could potentially be administered in an only mildly delayed time frame, the clinical team and patient elected to proceed.

Contrast-enhanced abdominal CT performed 5 weeks after ablative therapy revealed no hepatic metastasis or other abnormalities in the liver. No inflammatory changes were present in the hepatic flexure and the remainder of the bowel was also normal in appearance. Numerous calculi were noted in the gallbladder (Fig. 3).

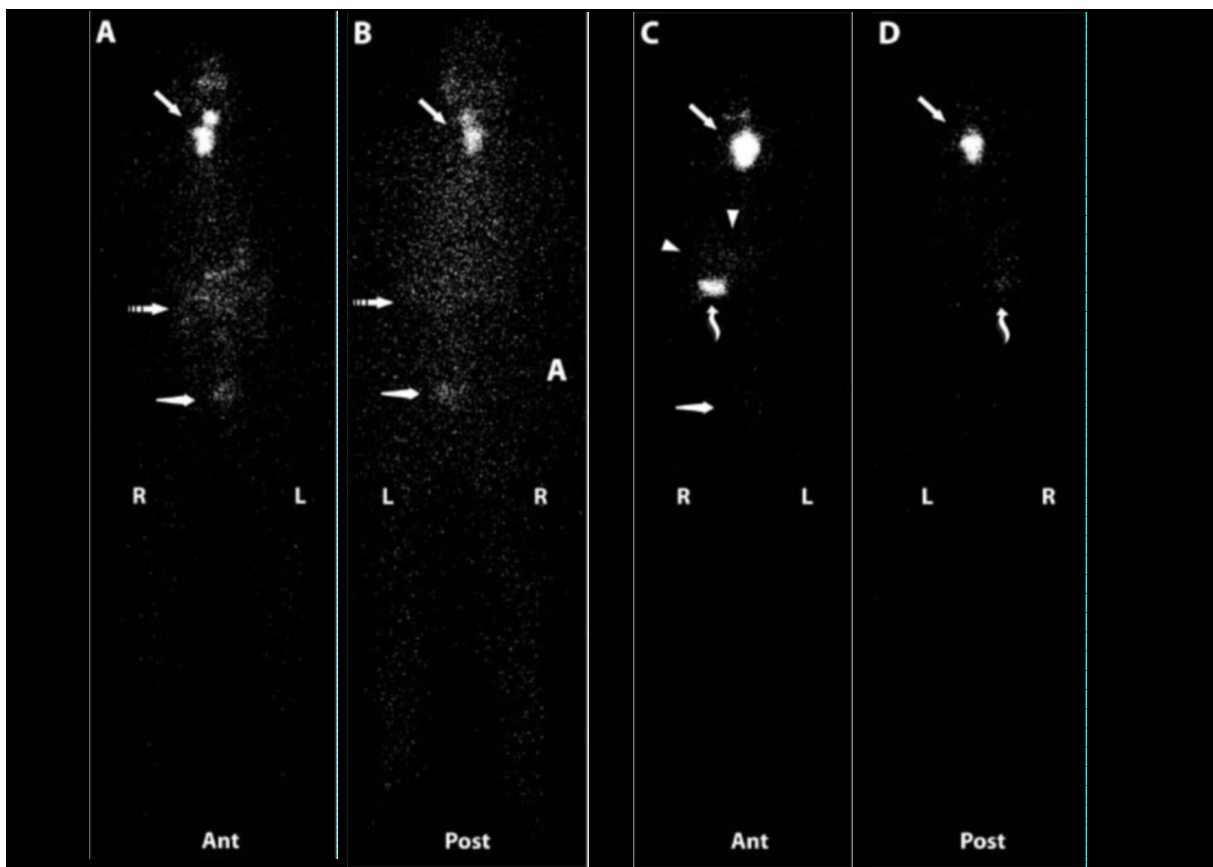


Figure 1. 52-year-old woman with follicular thyroid carcinoma treated by subtotal thyroidectomy. Pre- (A, B) and Post-ablative (C, D) whole body and spot I-131 imaging performed at 8 and 9 weeks status post subtotal thyroidectomy respectively demonstrated residual activity in the thyroid bed (straight arrows in A-D). Post-ablative imaging (C, D) additionally demonstrated an intense focus of abnormal activity in the region of the gallbladder fossa (curved arrows in C, D), which was persistent on delayed imaging (see Fig. 2). Liver (arrowheads in C, D), bowel (dashed arrows in A-B), and bladder (tapered arrows in A-C) activity is also noted.

Gallbladder Visualization on I-131 Post-Ablative Whole Body Imaging Mimicking Hepatic Metastases

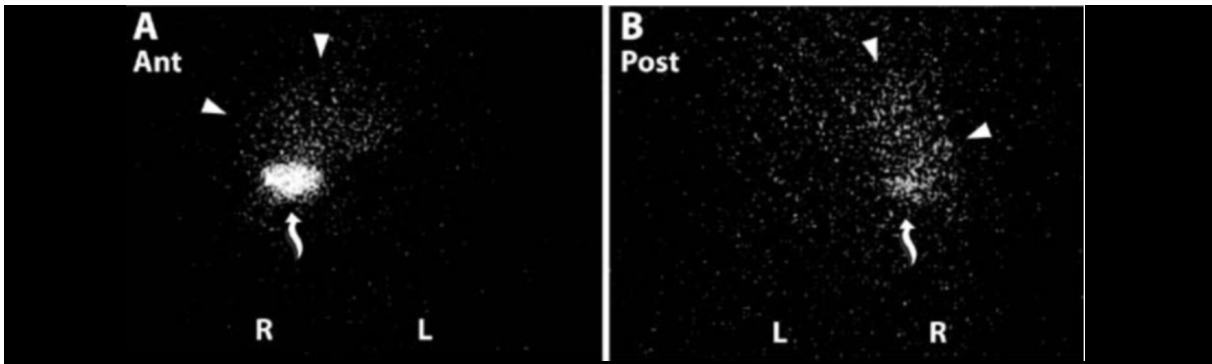


Figure 2. Delayed spot I-131 imaging performed at 11 days post ablative therapy. Intense focal activity (curved arrows) remains visible in the region of the gallbladder fossa. The liver (arrowheads) shows lower level diffuse activity. Anterior (A) and posterior (B) views are shown.

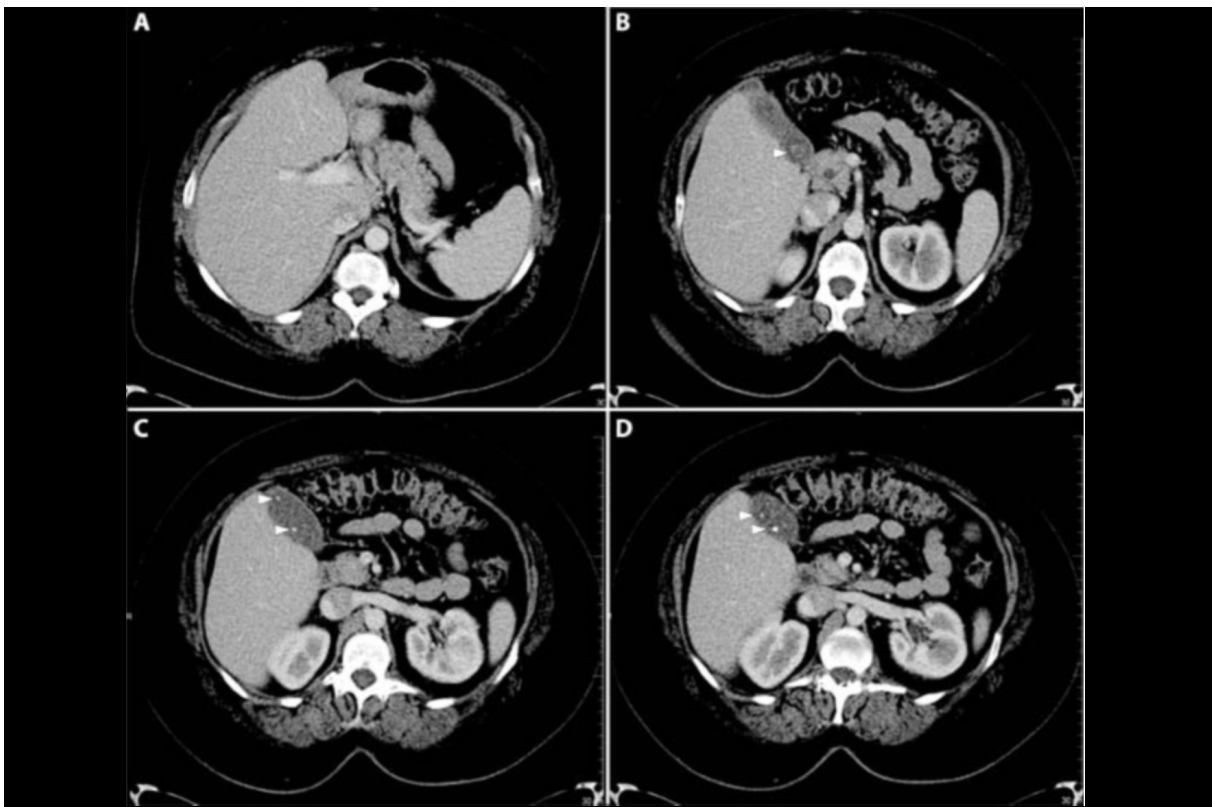


Figure 3. Intravenous contrast-enhanced abdominal CT performed 3 weeks following ablative therapy and whole body imaging demonstrated cholelithiasis (white arrowheads), but no evidence of hepatic metastases.

Gallbladder Visualization on I-131 Post-Ablative Whole Body Imaging Mimicking Hepatic Metastases

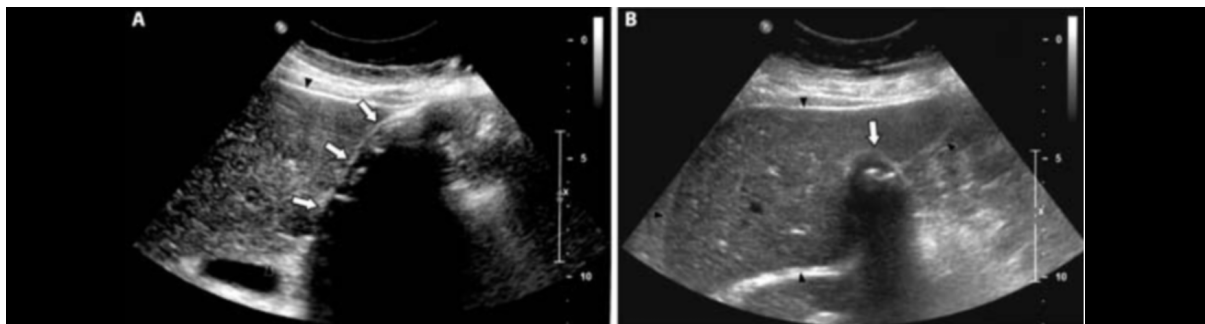


Figure 3. Intravenous contrast-enhanced abdominal CT performed 3 weeks following ablative therapy and whole body imaging demonstrated cholelithiasis (white arrowheads), but no evidence of hepatic metastases.

Review of the patient's chart revealed that she had described right upper quadrant abdominal pain 7 weeks after thyroidectomy (5 days prior to ablative therapy). Abdominal ultrasound shortly thereafter also demonstrated extensive cholelithiasis (Fig. 4). Laparoscopic converted to open cholecystectomy was subsequently performed 7 weeks after ablative therapy, where cholelithiasis and evidence of chronic cholecystitis were confirmed; no gross hepatic abnormalities were noted intra-operatively. At this point, the previously demonstrated abnormal I-131 activity was attributed to gallbladder pathology. Chronic cholecystitis was confirmed on post-operative pathology.

Discussion

This case demonstrates the potential pitfall of gallbladder activity on I-131 whole body imaging secondary to chronic cholecystitis mimicking hepatic metastases. Only two cases of gallbladder I-131 uptake after ablative therapy have been previously described in patients with chronic cholecystitis [1, 2]. Activity in the gallbladder and biliary tree on whole body I-131 scans has also infrequently been described in the context of biliary ductal dilatation [3], acute cholecystitis [4], and in the absence of any inflammatory or infectious processes involving the gallbladder [5, 6]. Numerous other causes of false positive results on whole body I-131 scans have also been described [7-11].

Acute and chronic cholecystitis are relatively common conditions that can in rare instances be a source of false positive results in patients undergoing post-ablative whole body I-131 therapy. Additional clinical workup is necessary to distinguish between metastatic disease and various causes of false positives in these situations. Delayed I-131 imaging should be included to exclude bowel activity. Correlation with the patient's history can also help determine if ultrasound or enhanced abdominal CT is warranted to determine the source of activity in the region of the gallbladder fossa. Even when cholecystitis is suspected to be responsible for this type of abnormal increased activity, contrast enhanced CT is often unavoidable to search for hepatic metastases as these entities may obviously coexist and the presence of metastatic disease would have significant clinical implications.

References

1. McEwan LM, Fong W. Unusual extrathyroidal iodine accumulation in a post-ablative I-131 scan. *Australas Radiol.* 2001 Nov;45(4):512-3. [PubMed].
2. Achong DM, Oates E, Lee SL, Doherty FJ. Gallbladder visualization during post-therapy iodine-131 imaging of thyroid carcinoma. *J Nucl Med.* 1991 Dec;32(12):2275-7. [PubMed].

Gallbladder Visualization on I-131 Post-Ablative Whole Body Imaging Mimicking Hepatic Metastases

3. You DL, Tzen KY, Chen JF, Kao PF, Tsai MF. False-positive whole-body iodine-131 scan due to intrahepatic duct dilatation. *J Nucl Med.* 1997 Dec;38(12):1977-9. [PubMed].

4. Brucker-Davis F, Reynolds JC, Skarulis MC, Fraker DL, Alexander HR, Weintraub BD, Robbins J. False-positive iodine-131 whole-body scans due to cholecystitis and sebaceous cyst. *J Nucl Med.* 1996 Oct;37(10):1690-3. [PubMed].

5. Seok JW, Kim SJ, Kim IJ, Kim YS, Kim YK. Normal gallbladder visualization during post-ablative iodine-131 scan of thyroid cancer. *J Korean Med Sci.* 2005 Jun;20(3):521-3. [PubMed].

6. Carlisle M, Cortes A, McDougall IR. Uptake of I-131 in the biliary tract: a potential cause of a false-positive result of scintiscan. *Clin Nucl Med.* 1998 Aug;23(8):524-7. [PubMed].

7. Ozguven M, Ilgan S, Karacalioglu AO, Arslan N, Ozturk E. Unusual patterns of I-131 accumulation. *Clin Nucl Med.* 2004 Nov;29(11):738-40. [PubMed].

8. Carlisle MR, Lu C, McDougall IR. The interpretation of 131I scans in the evaluation of thyroid cancer, with an emphasis on false positive findings. *Nucl Med Commun.* 2003 Jun;24(6):715-35. [PubMed].

9. Leitha T, Staudenherz A. Frequency of diagnostic dilemmas in 131I whole body scanning. *Nuklearmedizin.* 2003;42(2):55-62. [PubMed].

10. Mitchell G, Pratt BE, Vini L, McCready VR, Harmer CL. False positive 131I whole body scans in thyroid cancer. *Br J Radiol.* 2000 Jun;73(870):627-35. [PubMed].

11. Shapiro B, Rufini V, Jarwan A, Geatti O, Kearfott KJ, Fig LM, Kirkwood ID, Gross MD. Artifacts, anatomical and physiological variants, and unrelated diseases that might cause false-positive whole-body 131-I scans in patients with thyroid cancer. *Semin Nucl Med.* 2000 Apr;30(2):115-32. [PubMed].