

Benign Ovarian Serous Cystadenoma Mimicking Papillary Thyroid Carcinoma Metastasis on I-131 SPECT/CT

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CLINICAL PRESENTATION

A 34 year-old female patient was found on ultrasound to have multinodular goiter with a complex 1.3 cm thyroid nodule in the lower pole of the left thyroid lobe. Fine needle aspiration of this thyroid nodule revealed cytology that was highly suspicious for cystic papillary thyroid carcinoma. She underwent total thyroidectomy; surgical pathology showed an eight mm and a second seven mm papillary carcinoma within this nodule with negative margins. She was started on levothyroxine after thyroidectomy. A thyrogen-stimulated diagnostic I-131 scan (Figure 1) showed a single focus of

increased uptake in the mid thyroid bed consistent with residual thyroid tissue or tumor, with a 52-hour uptake of 0.4% without evidence of additional sites of metastatic disease. A rounded focus of activity in the mid pelvis was presumed to represent normal bladder activity. She was treated with 149.7 mCi of I-131. Post-treatment thyroid scan (Figure 2) at seven days showed a small amount of activity in the thyroid bed and a large focus of intense activity in the lower pelvis that was thought to represent a distended bladder, but which was more prominent compared to the diagnostic study. Straight catheterization of the

bladder was performed to decrease the radiation to the bladder. However, this large focus of activity (Figure 3) persisted after emptying the bladder by straight catheterization. SPECT/CT scan of the pelvis (Figure 4) showed increased uptake within a large mass immediately anterior to the uterus, with the bladder decompressed. The patient reported that she had a prior ultrasound performed at an outside institution that showed a large mass arising from her left ovary, which raised the possibility of a large struma ovarii. She underwent left salpingo-oophorectomy and pathology revealed a diagnosis of benign serous cystadenoma of the ovary

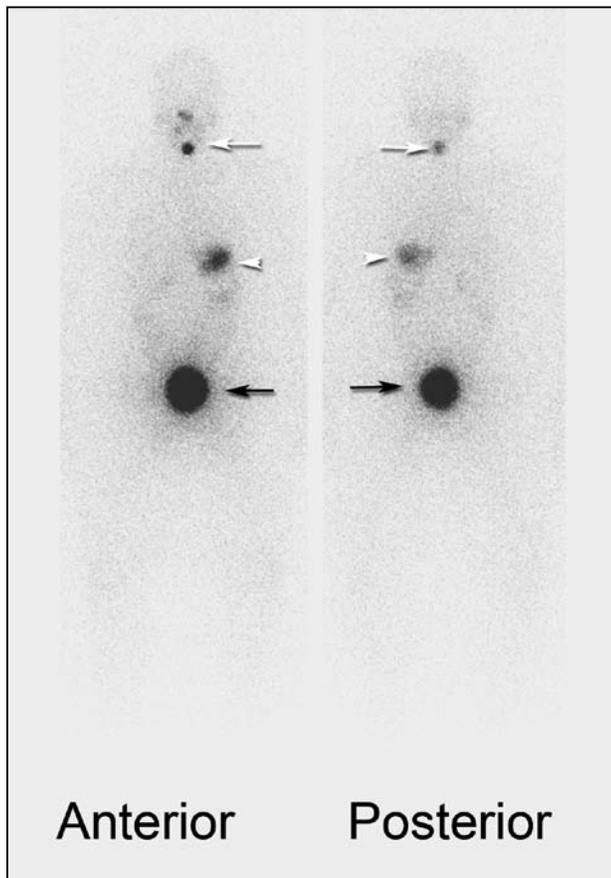


Figure 1. Anterior and posterior whole-body planar images from a thyrogen-stimulated diagnostic I-131 scan at 52 hours show a focus of uptake in the superior aspect of the thyroid bed (white arrow), physiologic activity in the stomach (white arrowhead), and activity in the lower pelvis (black arrow) which was thought to represent normal bladder activity.

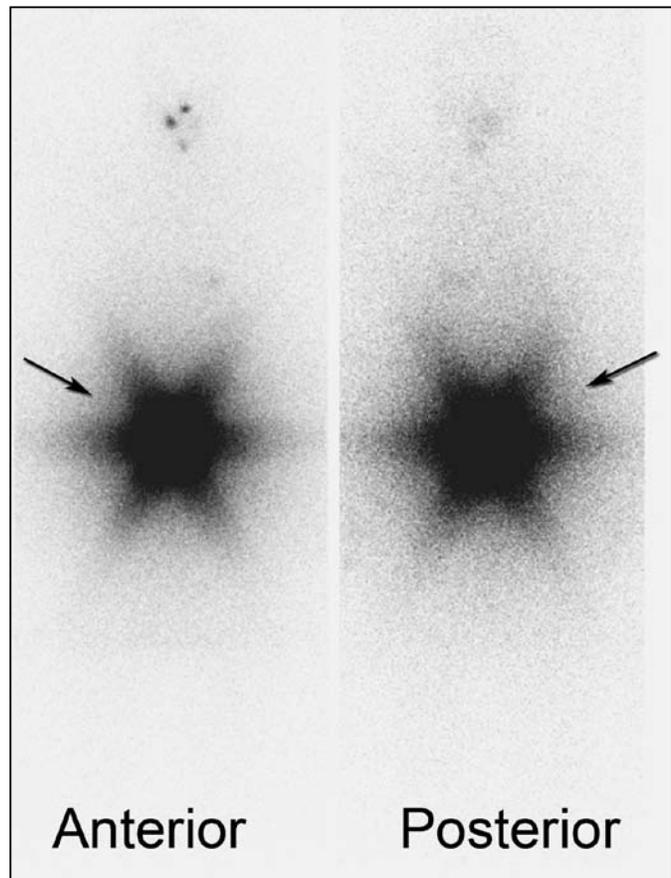


Figure 2. Anterior and posterior whole-body planar imaging 7 days after treatment with radioactive I-131 ablation shows a large focus of increased uptake in the lower pelvis (black arrow, with star artifact indicating the presence of a large amount of I-131 with extensive septal penetration) that was initially thought to represent a markedly distended bladder.

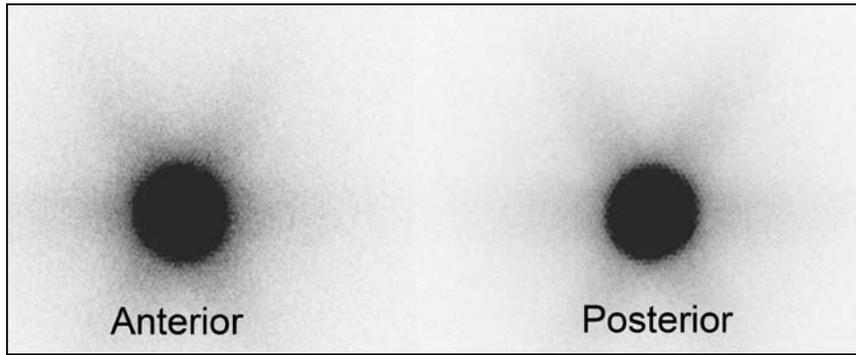


Figure 3. Anterior and posterior spot images of the pelvis after straight catheterization of the bladder again shows a large focus of activity in the lower pelvis.

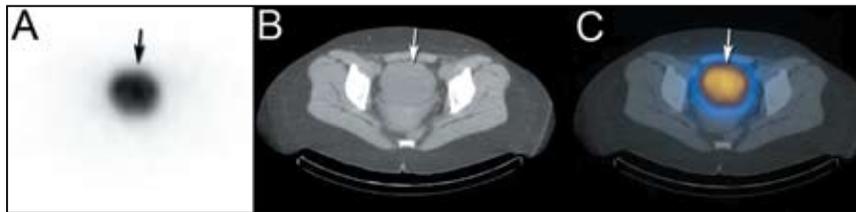


Figure 4. Axial SPECT (A), CT (B), and fused SPECT/CT (C) images show intense uptake in a round mass anterior to the pelvis (black arrow and white arrows, respectively).

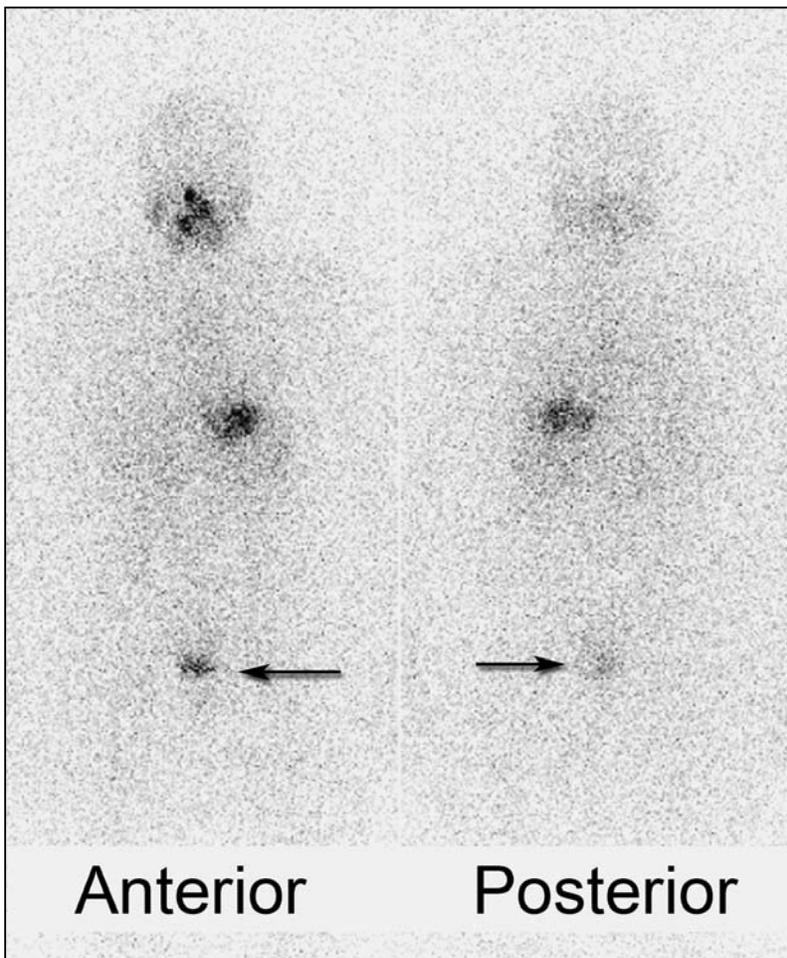


Figure 5. Anterior and posterior whole-body planar images 2 months after resection of the benign serous cystadenoma of the ovary show minimal normal activity in the bladder (black arrow) and normal physiologic distribution of activity in the rest of the study, including in the stomach and salivary glands.

without the presence of any thyroid tissue. Two months later, a repeat diagnostic thyrogen-stimulated I-131 scan (Figure 5) showed minimal normal activity in the bladder and no evidence of iodine-avid disease. The thyroglobulin level at this time was undetectable.

Thyroid carcinoma represents approximately 1.5% of cancers, with an incidence of 10.2 per 100,000 people per year, and papillary thyroid carcinoma constitutes 75-85% of cases of thyroid cancer.^{1,2} Survival for disease localized to the thyroid and with metastasis to regional lymph nodes is very good (five-year survival of 99.8% and 97.1%, respectively) but drops to 58.1% with the presence of distant metastatic disease.¹

Nuclear imaging using radioactive iodine takes advantage of the fact that well-differentiated thyroid tumors retain a degree of physiologic function inherent to the native thyroid gland, namely the ability to trap iodine to synthesize thyroid hormone. Planar scintigraphy using I-123 or I-131 is routinely used post-thyroidectomy to detect residual functioning thyroid tissue or tumor in the surgical bed, functioning metastases in the regional lymph nodes, and distant metastases, and assists in determining the dose of I-131 needed to most efficaciously ablate residual thyroid tissue or tumor.

The advantages of SPECT over planar scintigraphy include increased spatial resolution by focusing on a narrower section of tissue with less overlap of overlying and underlying structures, and absolute three-dimensional localization of radiotracer. SPECT/CT couples imaging of functional radiotracer accumulation with the spatial and tissue contrast of CT.

In the vast majority of patients (92%) with differentiated thyroid cancer and iodine-avid lesions outside of the neck that are equivocal by planar scintigraphy, SPECT/CT can definitively characterize such lesions as benign or malignant.³ Moreover, with regard to characterization of ovarian masses, struma ovarii and ovarian metastasis in the setting of papillary carcinoma can both present as having focally increased I-131 activity on SPECT/CT.^{4,5} In addition, there are several reports of benign iodine-avid ovarian masses, including mucinous and serous cystadenoma and cystadenofibroma.^{6,7,8} The fact that both benign and malignant ovarian lesions of varying histology can present with fo-

cally increased pelvic I-131 activity, as in the current case, underscores the utility of SPECT/CT for precise localization, the importance of retaining a broad differential diagnosis and the need to pursue histologic correlation for definitive diagnosis.

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Stroke Salvage Using a Suction Thrombectomy Device and Tissue Plasminogen Activator

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A 68-YEAR-OLD FEMALE WHO PRESENTED TO the emergency department 45 minutes after the witnessed onset of slurred speech and right-sided weakness. On physical exam, she was unable to repeat her name, read, or follow commands. She had a left gaze preference and flaccid right upper

and lower extremities. Her NIH Stroke Scale Score was 20. A non-contrast CT scan of the head showed a “dense” left middle cerebral artery sign indicative of acute thrombus.¹ She was immediately brought to the Interventional Radiology department for cerebral angiography and

possible acute stroke intervention. Arterial access was achieved at 1.5 hours after onset of symptoms. After endovascular stroke intervention, the patient was discharged three days later with 4/5 right upper extremity strength, 3/5 right lower extremity strength and a mild residual

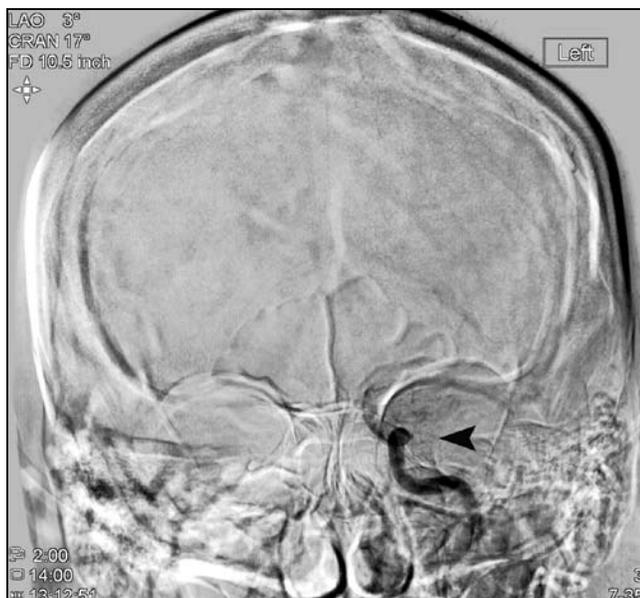


Figure 1. Left internal carotid artery (ICA) angiogram shows stasis of contrast and an extensive filling defect (arrowhead) within the left ICA consistent with acute clot.



Figure 2. Left internal carotid artery angiogram after suction thrombectomy of the ICA and left middle cerebral artery (MCA) with the Penumbra catheter (arrow). Flow is re-established within the left ICA and proximal middle cerebral artery with residual clot in the distal M1 segment of the MCA causing a cutoff appearance of the vessel.