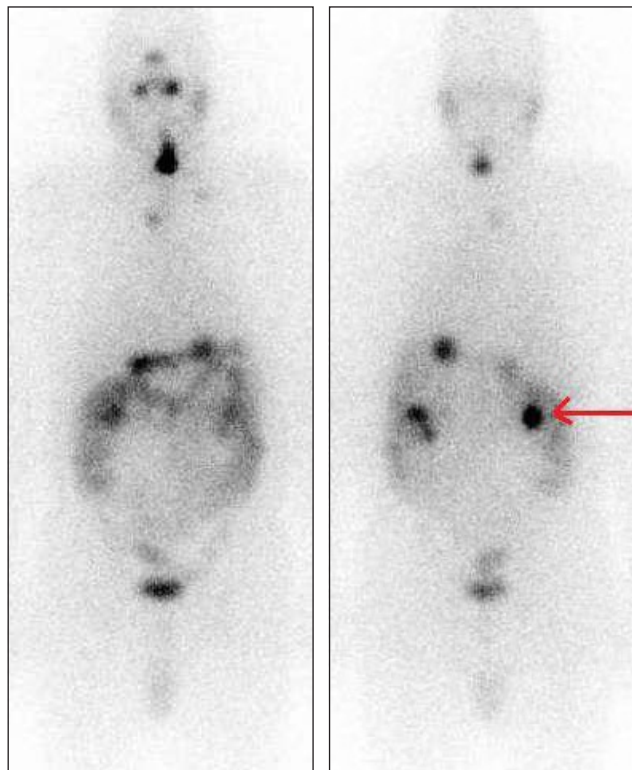


# Bilateral renal metastases from papillary thyroid carcinoma on post $^{131}\text{I}$ treatment scan: Flip-flop sign, radioiodine SPET, $^{18}\text{F}$ -FDG PET, CECT and histopathological correlation

**To the Editor:** Papillary thyroid carcinoma is known to metastasize preferably to lymph nodes; however 10% of cases may show distant metastases, mainly to lungs and bones [1]. Rare cases of metastases to kidneys have been reported in the literature, which occurred mostly after a considerable period of latency post thyroidectomy and radio-iodine treatment [2, 3].

Herein, we report a case of a 56 years old male patient who was diagnosed with papillary carcinoma of the thyroid with lymph node metastases. Following total thyroidectomy he received 1.85GBq of iodine-131 ( $^{131}\text{I}$ ) for thyroid remnant ablation.

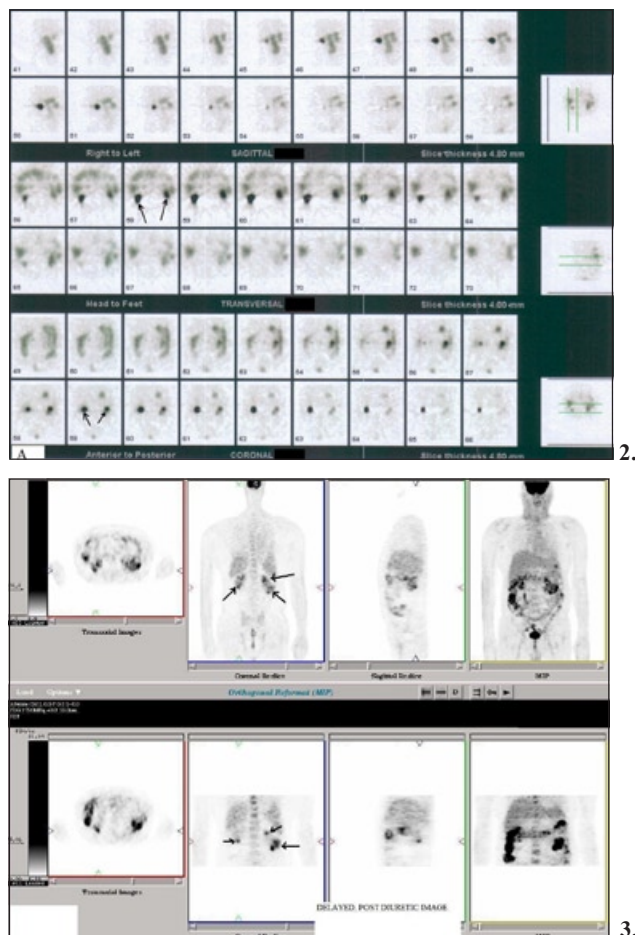
The intensity of  $^{18}\text{F}$ -FDG uptake in these foci demonstrated a flip-flop pattern with respect to the uptake of  $^{131}\text{I}$  (clarified further on post-furosemide delayed, limited scan) among the renal metastases. An additional small focus of  $^{18}\text{F}$ -FDG uptake was seen in the upper pole of the left kidney (this was not noted on the post  $^{131}\text{I}$  treatment planar or SPET images). No other abnormal  $^{18}\text{F}$ -FDG uptake was noted on the whole body PET scan (Fig. 1-5).



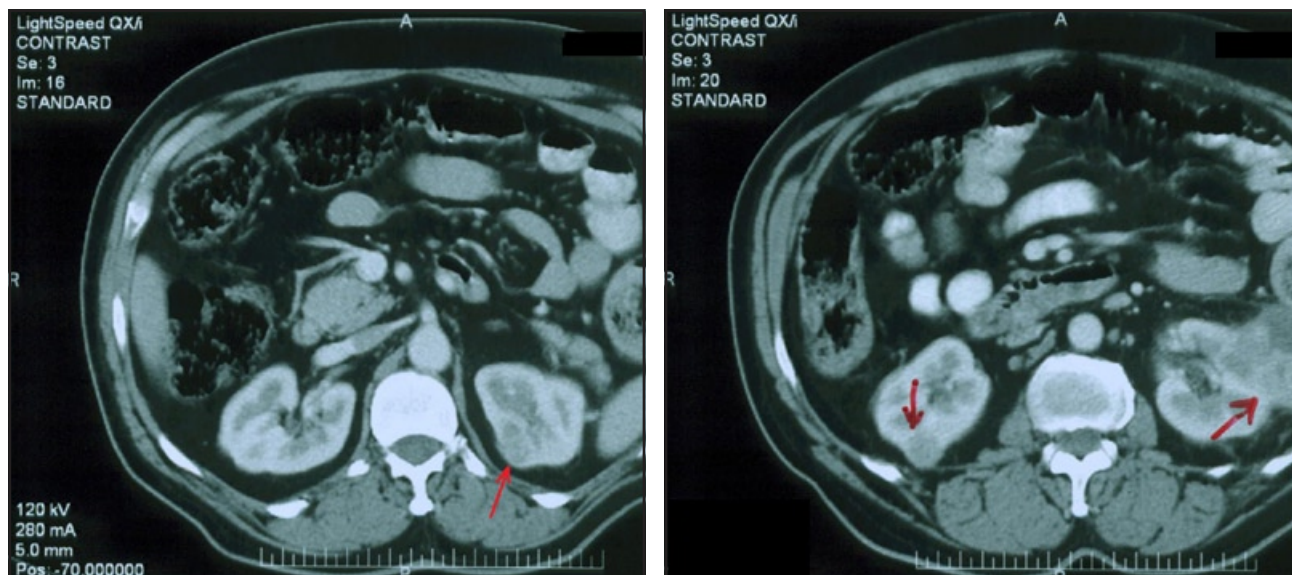
**Figure 1.** Post radio-iodine-131 treatment scan, undertaken while discharging the patient from the ward at exposure rate of  $<3\text{mR/h}$  at 1m distance revealed intense uptake in the thyroid bed, faint uptake in upper mediastinum along with, intense, focal uptake in right renal region that was prominent on posterior view of  $^{131}\text{I}$ -whole body scan.

The case illustrates the value of post  $^{131}\text{I}$  treatment SPET imaging by the fact that at times it can offer higher accuracy in discerning the nature of tracer uptake with respect to conventional planar whole body imaging [4]. Especially helpful was to the  $^{18}\text{F}$ -FDG-radioiodine “flip-flop” in the presented case amongst the metastatic lesions in the two kidneys and the extent of  $^{131}\text{I}$  concentrating/non-concentrating disease. In conclusion, our findings help in delineating and understanding tumor biology and provide critical information in thyroid cancer management.

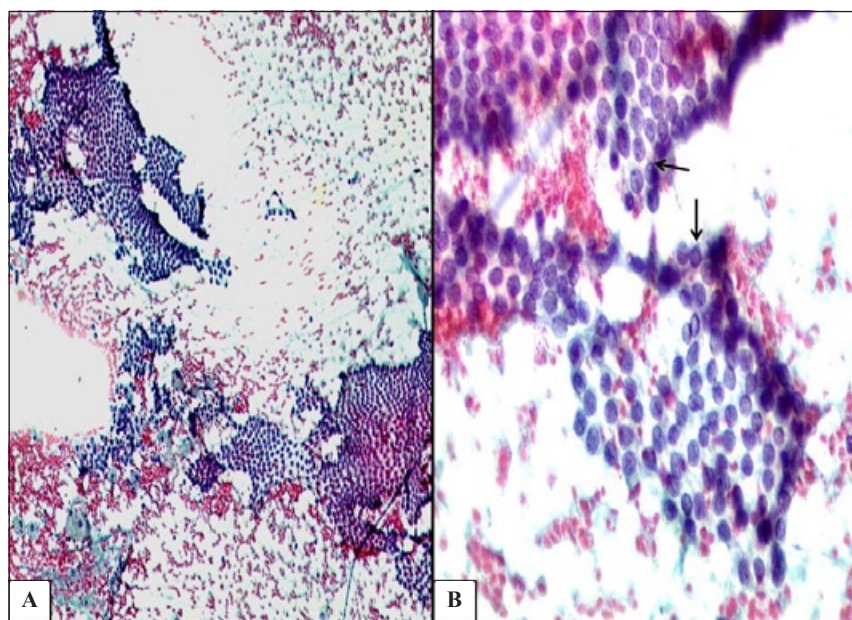
*The authors have no conflicts of interest.*



**Figures 2 and 3.**  $^{131}\text{I}$ -SPET study (Fig. 2) further clarified these foci in both kidneys.  $^{18}\text{F}$ -FDG-PET scan (Fig. 3) done on a separate day revealed abnormal foci of  $^{18}\text{F}$ -FDG uptake in the lower poles of both kidneys, corresponding to the foci seen on post treatment  $^{131}\text{I}$ -SPET. In the  $^{18}\text{F}$ -FDG-PET image, the foci can be well visualized and appreciated in the coronal slice (arrows) while in the MIP image the relatively intense overlapping gut uptake obscures the pattern of uptake in the foci.



**Figure 4.** A limited-region contrast enhanced CT scan (CECT) of abdomen after a few days demonstrated 5.5X5cm sized exophytic, heterogeneously enhancing soft tissue mass in the lower pole of left kidney (red arrow in the lower panel). Similar 1.4X1.3cm and 1.5X1.3cm sized mass lesions were seen in the lower pole of right kidney (red arrow in the lower panel, on the left side of the image) and in the upper pole of left kidney (red arrow in the upper panel), respectively, corroborating the PET lesions.



**Figure 5a and b.** A CT guided FNAC from the lesions was consistent with the diagnosis of metastases from papillary thyroid carcinoma **5a:** Aspirate revealing few sheets and clusters with vascular cores. **5b:** Higher power view demonstrates pale nuclear chromatin and intranuclear inclusions (arrows).

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*Hell J Nucl Med* 2011;14(1): 72-73

*Published on line: 5 March 2011*