

Authors: Geliashvili T.M., Li A.A., Parnas A.V., Baranova O.D., Ilyakov V.S.

E-mail address: Geliashvili_tata@mail.ru

Phone number: +7 (910) 515-83-35

Institution: Federal State Budgetary Institution «N.N. Blokhin National Medical Research Center of Oncology» of the Ministry of Health of the Russian Federation (N.N. Blokhin NMRCO), 24 Kashirskoe highway, Moscow, Russian Federation 115478

Introduction

Thyroid cancer is a malignant neoplasm arising from the epithelial cells of the thyroid gland. Differentiated thyroid cancer (DTC) accounts for 90-95% of all thyroid malignancies. Predominantly, DTC is represented by the papillary form (80-85% of all histological types of DTC), which responds to radioiodine therapy in 85-95%, but in the presence of distant metastases, the prognosis is determined by the sensitivity of the tumor cell to ^{131}I .

However, in 2017 World Health Organization classified it as a distinct tumor type owing to significant histopathological and molecular differences with follicular thyroid cancer. This cancer variant arises from Hurthle cells (Ashkenazi cells, B cells, oncocytes), which are eosinophilic oxyphilic cells with rounded/oval nuclei. Hurthle cells are present normally, appear during life, and peak in number by the age of 50 years.

Hurthle cell cancer is characterized by the presence of Hurthle cells comprising more than 75% of the tumor, capsular and vascular invasion, infiltrative growth, and frequent distant metastasis.

Dynamic follow-up

During dynamic follow-up of patients with DTC after combined treatment (thyroidectomy with radioiodine therapy) are determination of the level of oncomarkers (serum thyroglobulin and antibodies to thyroglobulin) and ultrasound diagnostic of the neck, scanning with radioactive iodine (if clinically indicated). In 10,4% of cases, patients have TENIS-syndrome (Thyroglobulin Elevated Negative Iodine Scintigraphy, hereinafter TENIS-syndrome), characterized by high serum thyroglobulin level in blood and absence of radioactive iodine accumulation on post therapeutic scintigraphy.

When TENIS-syndrome is diagnosed, PET/CT with ^{18}F -FDG is necessary in determining further treatment tactics, as this method has high sensitivity and specificity (89% and 72%, respectively) to radioiodine-refractory foci and, according to the literature data, in 20-40% of cases cardinaly changes the patient's treatment tactics.

Clinical case

In February 2019 ultrasound detected a mass in thyroid gland. According to cytologic examination, papillary thyroid cancer was suspected. In September 2019 in N.N. Blokhin NMRCO thyroidectomy with fascial-futlar excision of the neck fiber on the left side was performed. According to the histologic study – **Hurthle cell cancer** with signs of vascular and capsular invasion without spreading beyond the gland capsule; node in the left lobe 6,5x4x3 cm. The diagnosis was made: C73 Hurthle cell thyroid cancer pT3aN0M0, stage I.

The next stage of combined treatment was recommended radioiodine therapy, which was not performed due to the pandemic and the patient's family circumstances.

Radioiodine therapy (6 GBq) was performed in January 2022 due to suspected disease progression given high thyroglobulin levels (stimulated serum thyroglobulin – 1097,65 ng/ml). Given the absence of pathologic accumulation of ^{131}I according to post-therapy radioiodine scanning (Fig. 1), PET/CT with ^{18}F -FDG (Fig.2) was performed, which revealed a solitary metastasis in the left iliac bone (41x35x42 mm with SUVmax 17.25).

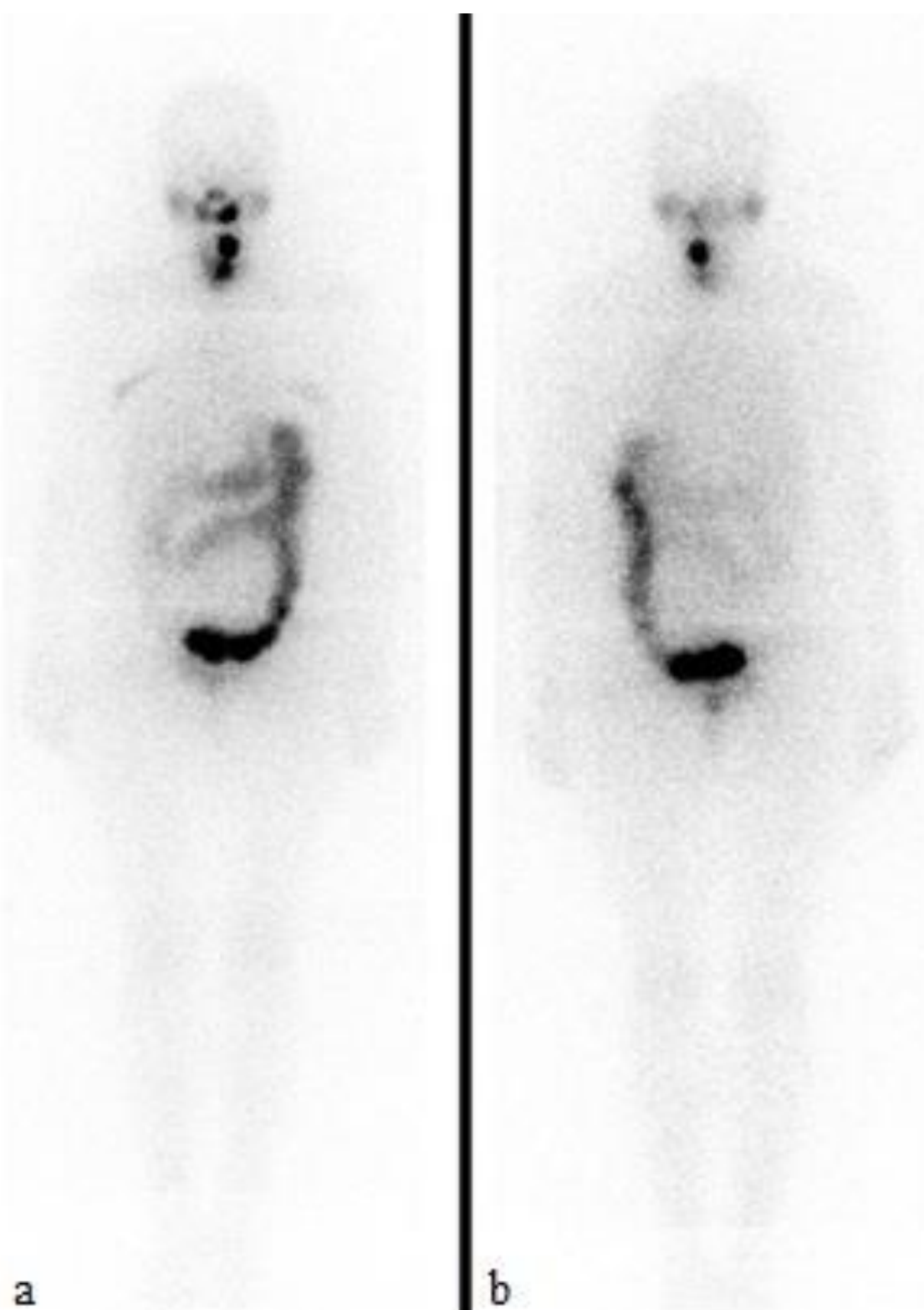


Fig. 1. Whole body post therapeutic scintigraphy. Accumulation ^{131}I in the projection of the thyroid gland bed: a - anterior projection, b- posterior projection

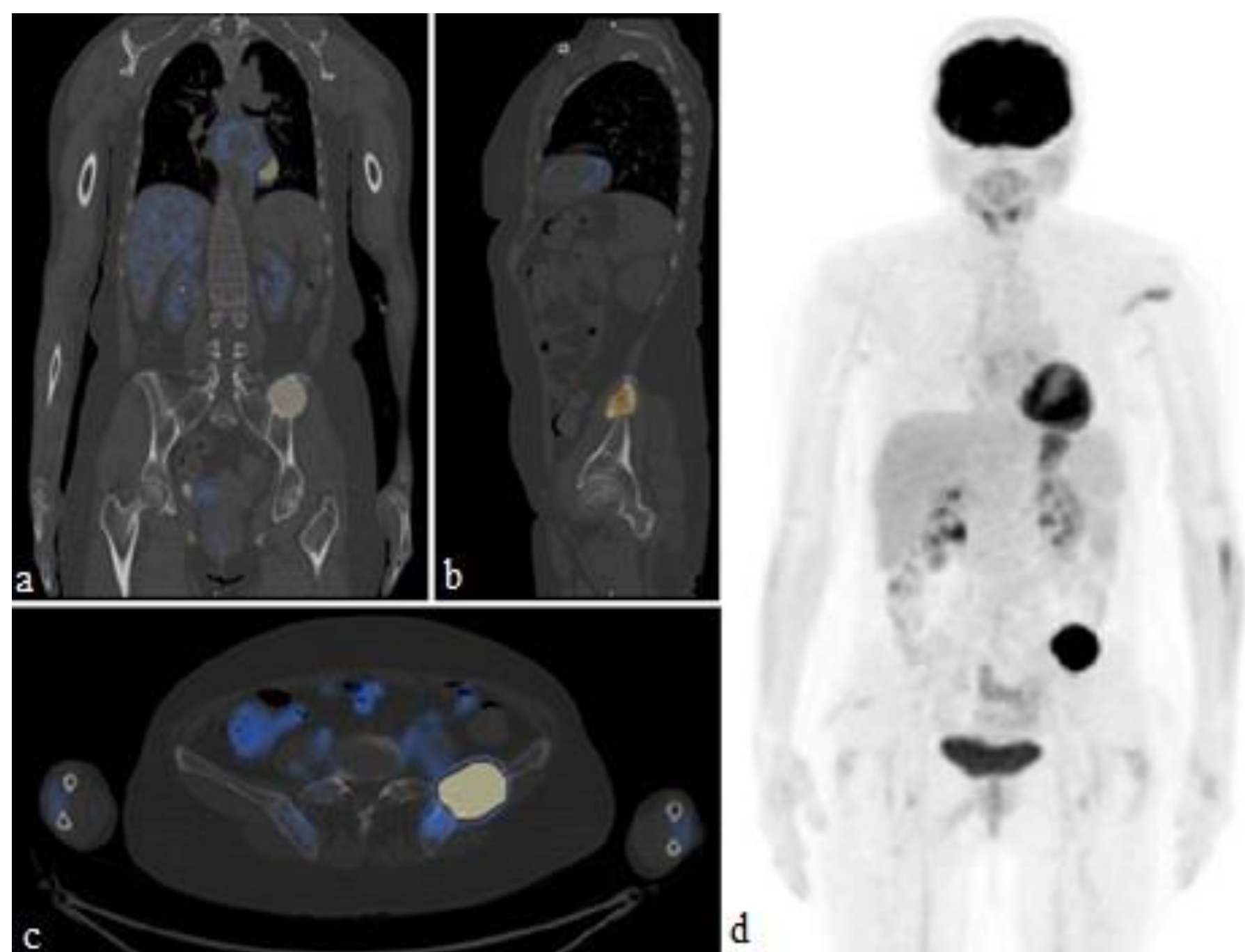


Fig. 2. ^{18}F -FDG (07.2022) accumulation in the lytic destruction foci in the left iliac wing and residual thyroid tissue: a - coronal projection, b- sagittal projection, c - axial projection, d - MIP

In November 2022, radical treatment of the solitary bone metastasis was performed in the scope of resection of the left iliac bone with reconstructive-plastic component. According to the histological study: a tumor with microfollicular type of growth, represented by epithelioid cells with expressed intensely eosinophilic cytoplasm and enlarged round-oval nucleus, no tumor growth was found along the resection margin of tumor elements.

The postoperative period was complicated by diastasis in the area of the postoperative wound and the presence of serous discharge, as a result of which VAC therapy was performed, followed by necrectomy and secondary suturing of the postoperative wound area

According to the data of control examinations in June 2023, the patient has a complete biochemical and radiologic remission of the disease:

- **Serum thyroglobulin** – 0,15 ng/ml,
- **Thyroglobulin antibodies** – 0,9 IU/ml,
- **Thyroid stimulating hormone** – 0,01 mIU/l
- **PET/CT with ^{18}F -FDG** (21.06.2023, Fig. 3) - There are no signs of tumor process recurrence

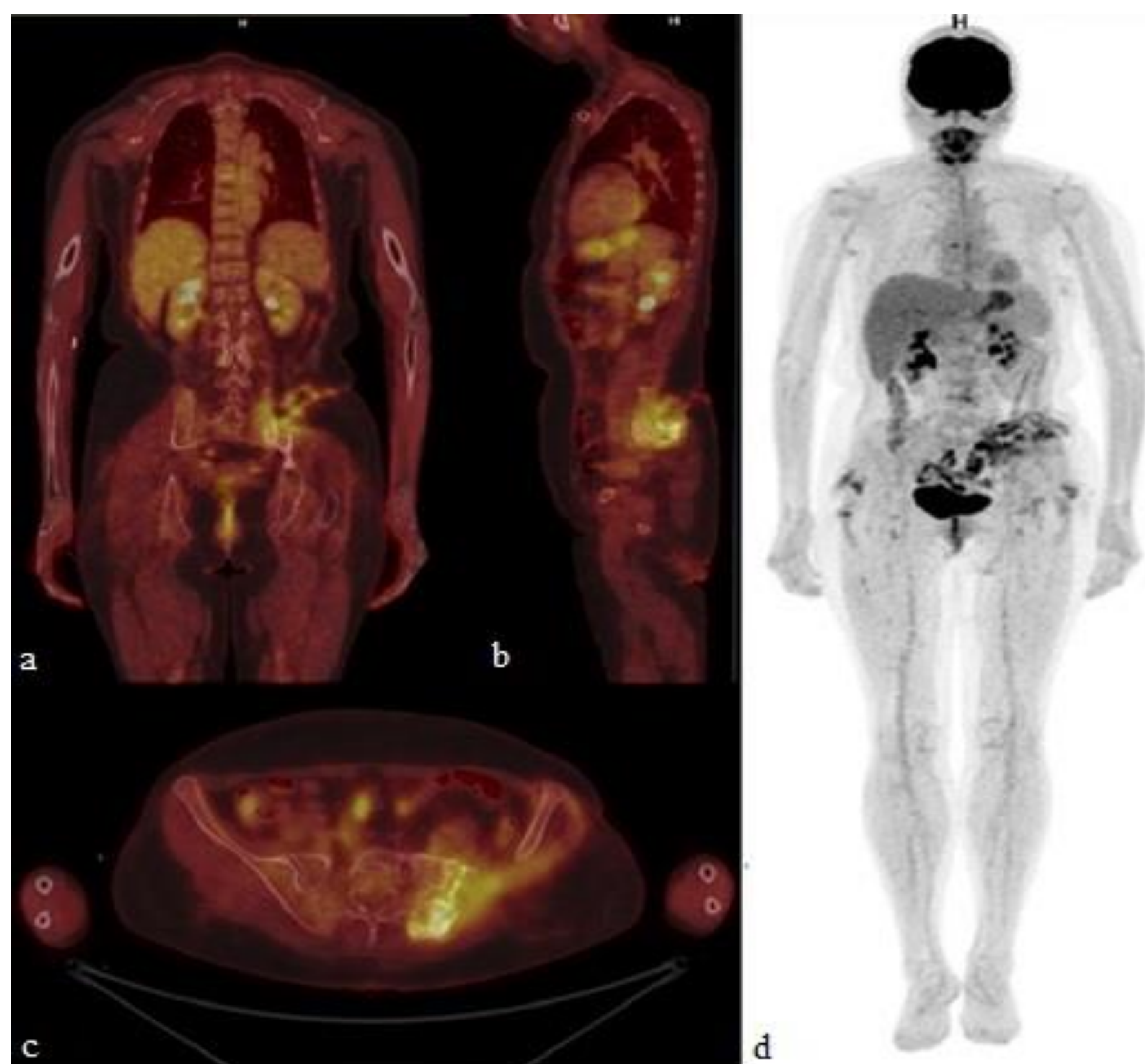


Fig. 3. PET/CT with ^{18}F -FDG, Control study (06.2023). Bone destruction in the wing of the left iliac bone with SUVmax 10.72 (inflammatory character) with the size of 19x15 mm with alternating areas of sclerosis: a - coronal projection, b - sagittal projection, c - axial projection, d – MIP

Conclusion

This clinical case confirms the literature data:

- **About the aggressiveness of Hurthle cell thyroid cancer and the low response of bone metastases to radioiodine therapy;**
- **The significant role of PET/CT with ^{18}F -FDG in the search for non-iodine-avid metastatic foci and the adoption of optimal treatment tactics.**