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# $^{18}$F-FDG PET/CT and $^{68}$Ga-DOTATATE PET/CT Findings of Polycystic Kidney-derived Paraganglioma

## *Polikistik Böbrek Kaynaklı Paragangliomanın $^{18}$F-FDG PET/BT ve $^{68}$Ga-DOTATATE PET/BT Bulguları*

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**Abstract**

Paragangliomas (PGLs) are neuroendocrine tumors originating from the neural crest. They usually arise from the adrenal medulla and sympathetic or parasympathetic ganglions. Approximately 10% of PGLs are located in the extra-adrenal gland. Renal PGL is a rare condition. In this case report, we present the $^{18}$F-fluorodeoxyglucose positron emission tomography/computed tomography (PET/CT) and $^{68}$Ga-DOTATATE PET/CT findings of polycystic kidney-derived PGL.

**Keywords:** Renal paraganglioma, $^{18}$F-FDG PET/CT, $^{68}$Ga-DOTATATE PET/CT

**Öz**

Paragangliomalar (PGL'ler), nöral krestten köken alan nöroendokrin tümörlerdir. Genellikle adrenal medulla ve sempatik veya parasempatik ganglionlardan köken alırlar. PGL'lerin yaklaşık %10'u ekstraadrenal yerleşimlidir. Renal PGL nadir görülen bir durumdur. Bu olguda polikistik böbrek kaynaklı PGL'nin $^{18}$F-florodeoksiglukoz pozitron emisyon tomografisi/bilgisayarlı tomografi (PET/BT) ve $^{68}$Ga-DOTATATE PET/BT bulgularını sunuyoruz.

**Anahtar kelimeler:** Renal paraganglioma, $^{18}$F-FDG PET/BT, $^{68}$Ga-DOTATATE PET/BT

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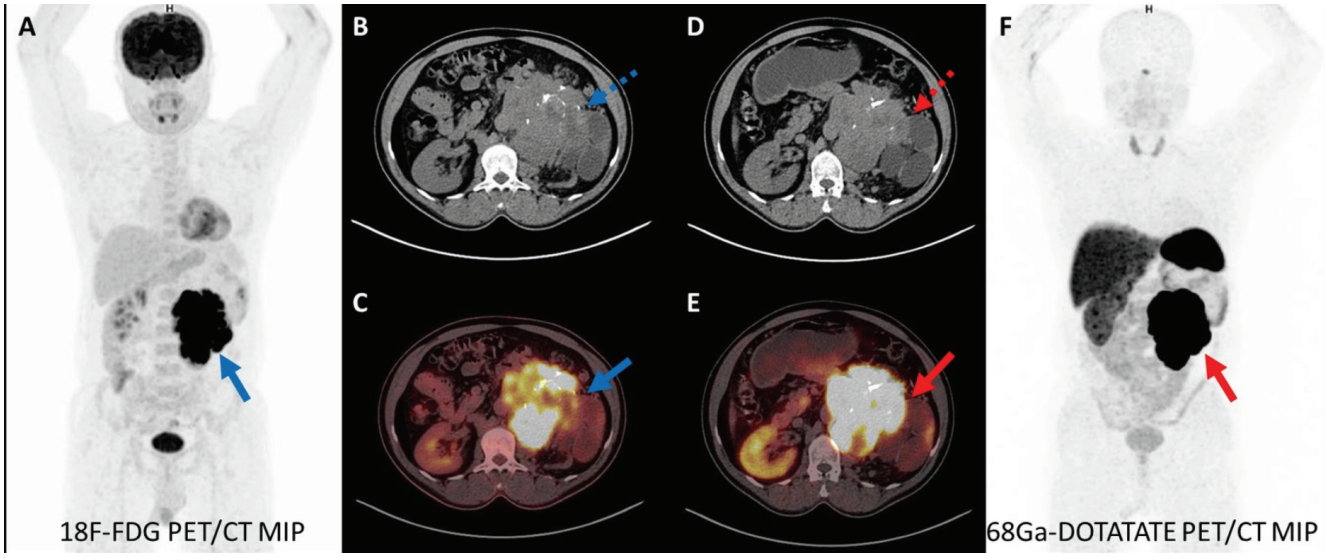


**Figure 1.** A 46-year-old man with no known medical conditions presented to the urology outpatient clinic with a complaint of left side pain and abdominal swelling that had been ongoing for 3 weeks. Blood and urine tests were normal. Abdominal magnetic resonance imaging and ultrasound revealed a mass in the lower pole of the left kidney measuring approximately 10x15 cm. $^{18}$F-fluorodeoxyglucose positron emission tomography/computed tomography ($^{18}$F-FDG PET/CT) scan was performed with a preliminary diagnosis of renal cell cancer (RCC) (A). Transaxial CT sections showed a mass lesion with irregular borders measuring 8.5x15 cm that extended anteriorly from the inferior part of the left kidney and contained calcifications (B). Intense $^{18}$F-FDG uptake was detected on the fusion images [maximum standardized uptake value ($SUV_{max}$): 32.7] (C). There were no regional or distant metastases. Tru-cut biopsy of the mass was diagnosed as paraganglioma (PGL) (Figure 2). $^{68}$Ga-DOTATATE PET/CT imaging was performed for staging (F). Transaxial CT sections showed the left kidney to have a polycystic appearance, and a mass lesion measuring approximately 10x15 cm was present in the medial part of the left kidney (D). Intense DOTATATE receptor activation was observed on the fusion images ($SUV_{max}$: 75.8) (E). No regional or distant metastases were observed.

Extra-adrenal PGLs most commonly occur in the carotid body, vagal body, mediastinum, and retroperitoneum (1). Renal PGL is rare (1,2). In the genitourinary tract, the renal pelvis (4.9%) is the third primary site of PGLs, followed by the bladder (79.2%) and urethra (12.7%) (3). The clinical symptoms depend on the location of the mass in the kidney (2,4). Functional imaging methods play an important role in confirming diagnosis, staging, and restaging (5). PGLs contain high levels of somatostatin receptors (6,7). In a study evaluating 22 PGL patients with $^{68}$Ga-DOTATATE PET/CT, the detection rate of lesions was 100% (8). In another study evaluating 23 patients with PGLs using $^{18}$F-FDG PET/CT and $^{68}$Ga-DOTATATE PET/CT, many regions were $^{68}$Ga-DOTATATE and $^{18}$F-FDG positive, but $^{18}$F-FDG uptake was lower than $^{68}$Ga-DOTATATE uptake (median $SUV_{max}$ values were 12.5-21, respectively) (9). $^{68}$Ga-DOTATATE PET/CT has higher diagnostic accuracy than $^{18}$F-FDG PET/CT (10). Renal PGL should be considered when evaluating kidney masses because it can mimic RCC, and caution should be exercised.

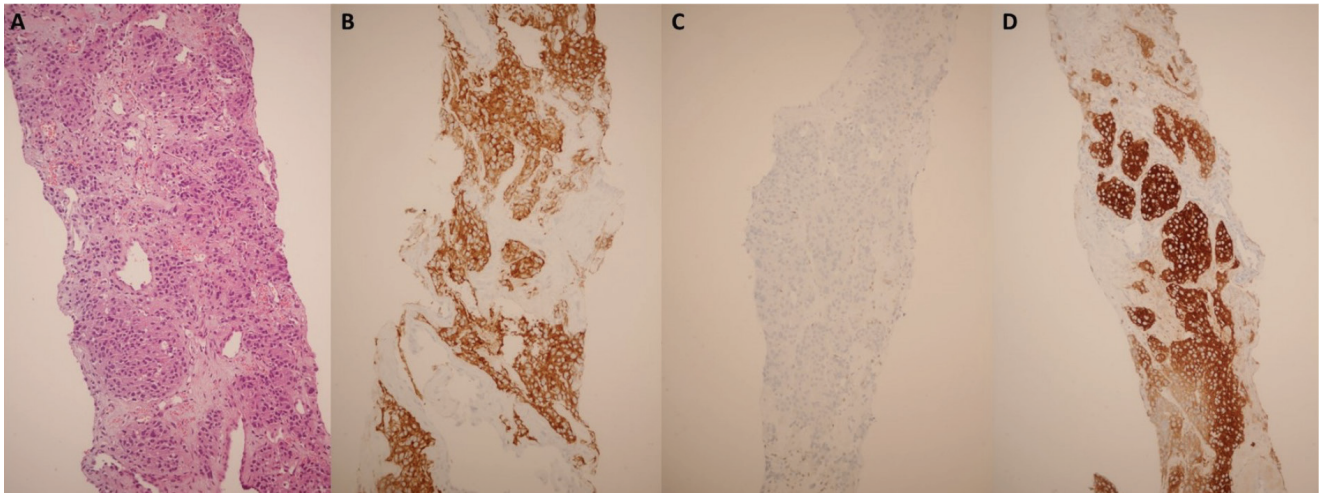


**Figure 2.** Tumor cells are arranged in a Zellballen pattern within a fibrovascular stroma (A, H&E x200). The tumor is strongly positive for chromogranin-A (B, x200). S-100 immunostain highlighting the focally preserved sustentacular cells (C, x200). Strong cytoplasmic positivity for tyrosine hydroxylase confirms the diagnosis of PGL (D, x200).

## Ethics

**Informed Consent:** The patient consent was obtained.

**Peer-review:** Externally peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: Z.T., S.B.K., N.E., T.F.Ç., E.A., Concept: Z.T., S.B.K., T.F.Ç., E.A., N.E., Design: Z.T., N.E., S.B.K., T.F.Ç., E.A., Data Collection or Processing: Z.T., S.B.K., N.E., T.F.Ç., E.A., Analysis or Interpretation: Z.T., S.B.K., N.E., T.F.Ç., E.A., Literature Search: Z.T., S.B.K., N.E., T.F.Ç., E.A., Writing: Z.T., T.F.Ç., E.A., S.B.K., N.E.

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