CLINICAL CASE

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FAT NECROSIS MIMICKING RECURRENT KIDNEY CANCER

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Fat necrosis is a benign inflammation of adipose tissue, which is associated with sterile saponification, due to impaired blood supply. At the same time, differential diagnostics with malignant neoplasms and tumor relapses is extremely difficult due to the similar features according to imaging studies (ultrasound, CT, MRI, PET/CT). We present a clinical case of fat necrosis, confirmed by the immunohistochemical study, simulating recurrent kidney cancer. The patient underwent partial nephrectomy for renal cell carcinoma. After 6 months, radiological signs of tumor recurrence were detected in the resection area, due to which patient underwent laparoscopic nephrectomy. Immunohistochemical study indicated fat necrosis.

K e y w o r d s: *fat necrosis, recurrent kidney cancer, partial nephrectomy, imitation of recurrent kidney cancer*

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Fat necrosis (FN) is a benign inflammatory process of adipose tissue, the basis of which is sterile fat saponification, developing as a result of impaired blood supply. Often, FN is detected in the breasts after surgical interventions [1]. The causes of FN development are previous surgical treatment, radiation therapy, trauma, infections [2]. At the same time, differential diagnosis with malignant neoplasms and tumor recurrences is extremely difficult due to the similar changes according to imaging studies, including ultrasound examination (US), computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET/CT) [3]. Similar to tumor recurrence, according to contrast-enhanced CT/MRI, FN is visualized as a soft tissue area with pronounced accumulation of the contrast [4]. As of February 2024, four clinical cases have been described in the literature in which FN mimicked renal cancer recurrence after partial nephrectomy. All patients underwent open radical nephrectomy after the detection of this feature [4, 5].

We present a clinical case of a patient with FN mimicking cancer recurrence after left partial nephrectomy for a renal cell cancer (patient consent for publication was obtained).

A 63-year-old man in November 2023 was admitted to the urological department of the St. Luke Clinical Hospital with complaints of moderate left loin pain.

Medical history. In May 2023, the patient underwent laparoscopic left-side partial nephrectomy for a malignant tumor in the lower pole with a maximum size of 87 mm (cT2aN0M0). According to pathological examination, clear cell renal cell carcinoma, WHO Grade 2, with areas of Grade 3 less than 5% of the total area was diagnosed. He denied other surgical interventions.

Upon admission to the hospital, the patient underwent multispiral contrast-enhanced CT (100 ml of Omnipaque 350 with an injection rate of 4 ml/s + bolus saline 50 ml). According to CT, renal cell cancer recurrence was detected in the area of surgical intervention (Fig. 1).

This finding was regarded as a recurrence of the kidney tumor, and the patient underwent laparoscopic nephrectomy, resection of the psoas muscle, and resection of the colon mesentery. A protocol of surgical procedure: the kidney is surrounded by dense tissues, which are difficult to separate from the psoas major. The wall of the descending colon and paranephric tissue are firmly fixed. With technical difficulties, mainly by sharp dissection, the ureter was isolated from the scars, dissected to the lower third, and the lower pole of the left kidney was gradually mobilized. The tissue is densely adhered to the psoas major. Resection of the muscle was performed over a length of 5 cm along the posterior surface of the scar tissues, in which the kidney is located. With technical difficulties, resection of the colon mesentery is performed. No tumor-like lesions were found in the area of the intestinal wall. The kidney was isolated with paranephric tissues, the renal artery and vein were dissected from scars, clipped, transected, the upper pole and adrenal gland were isolated, separated from adhesions, then the ureter and testicular vein were transected in the middle third, the kidney in the surrounded tissues was placed in a container and extracted through a 9 cm incision in the left iliac region.

The specimen was sent for histopathological examination. Result: The morphological features more correspond to FN

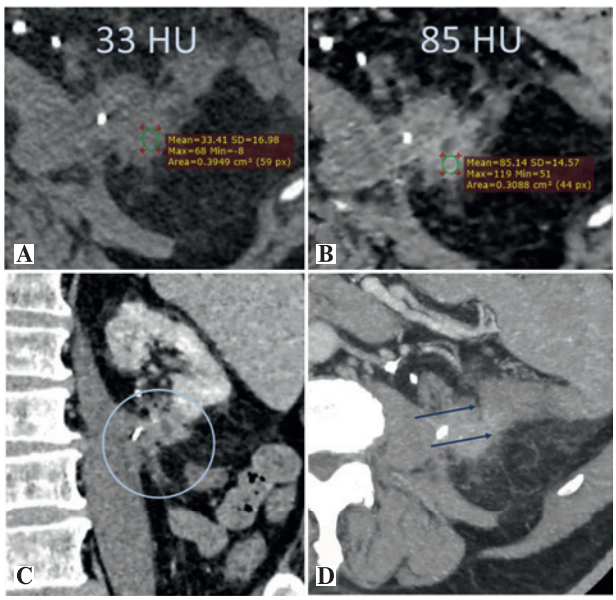


Fig. 1. CT data: Irregularly shaped soft tissue area (A), 35×35×33 mm in size, after intravenous injection of contrast there is intensive enhancement up to 85 HU in the arterial phase (B); the lesion is adjacent with a wide base to the psoas major (C, figure), intimately adjacent to the descending colon (D, arrows)

HU – Hounsfield unit; Mean – average value; SD – standard deviation; Max – maximum value; Min – minimum value.

of the perinephric adipose tissue with a pronounced active inflammatory reaction, which clinically could have been perceived as elements of residual tumor. No tumor was found within the specimen. No tumor was found at the resection margins (Fig. 2).

After obtaining the result of the histopathological examination, due to the non-standard diagnosis, it was decided to perform an immunohistochemical study, during which a negative reaction with MCK, PAX8, S100 antibodies was found, and a positive reaction with CD68 antibodies, which allowed reliably excluding a malignant epithelial and lipomatous tumor and confirming FN (Fig. 3).

The postoperative period was uneventful, and the patient's condition upon discharge was satisfactory. After six months, a follow-up contrast-enhanced CT scan of the chest, abdomen, and pelvis was performed. The study data indicate the absence of pathological features in the kidney bed or secondary involvement of lymph nodes and organs. The patient had no complaints.

In 20-30% of patients after radical treatment of renal cell carcinoma, disease progression is noted [6]. The risk of local recurrence is highest with ablative techniques, somewhat lower after partial nephrectomy [7]. The most important criterion determining the need for surgical treatment of a renal tumor is the accumulation of contrast agent. The threshold value of contrast enhancement by a renal cell cancer is considered to be 20 HU [8]. At the same time, FN, due to an active inflammatory process, also demonstrates high metabolic activity on PET/CT, similar to that in malignant lesions [9]. Due to the extreme rarity of FN after partial nephrectomy and the widespread occurrence of postoperative recurrences, all cases described in the literature were clinically perceived as tumor recurrence, and all patients underwent open radical nephrectomy. In the presented case, laparoscopic resection of the lesion with resection of the colon mesentery and psoas major was performed for the first time.

In conclusion, we would like to emphasize the following aspects:

1. The most important criterion of instrumental research methods determining the need for surgical treatment of a renal tumor is the accumulation of contrast agent.

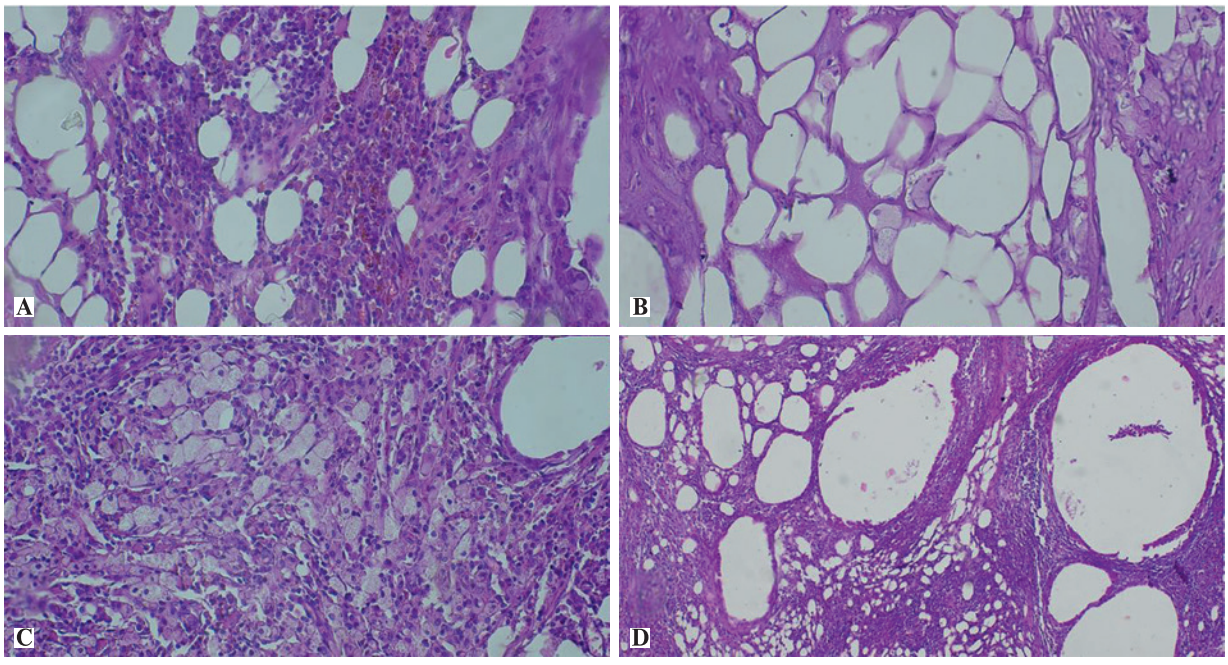


Fig. 2. Histological examination of the removed lesion (stained with hematoxylin and eosin, 100x):

A, abundant infiltration with lymphocytes, plasma cells and histiocytes; B, necrotic adipose tissue; C, numerous foam cells; D, numerous cystic cells. No tumor cells were detected during histological study.

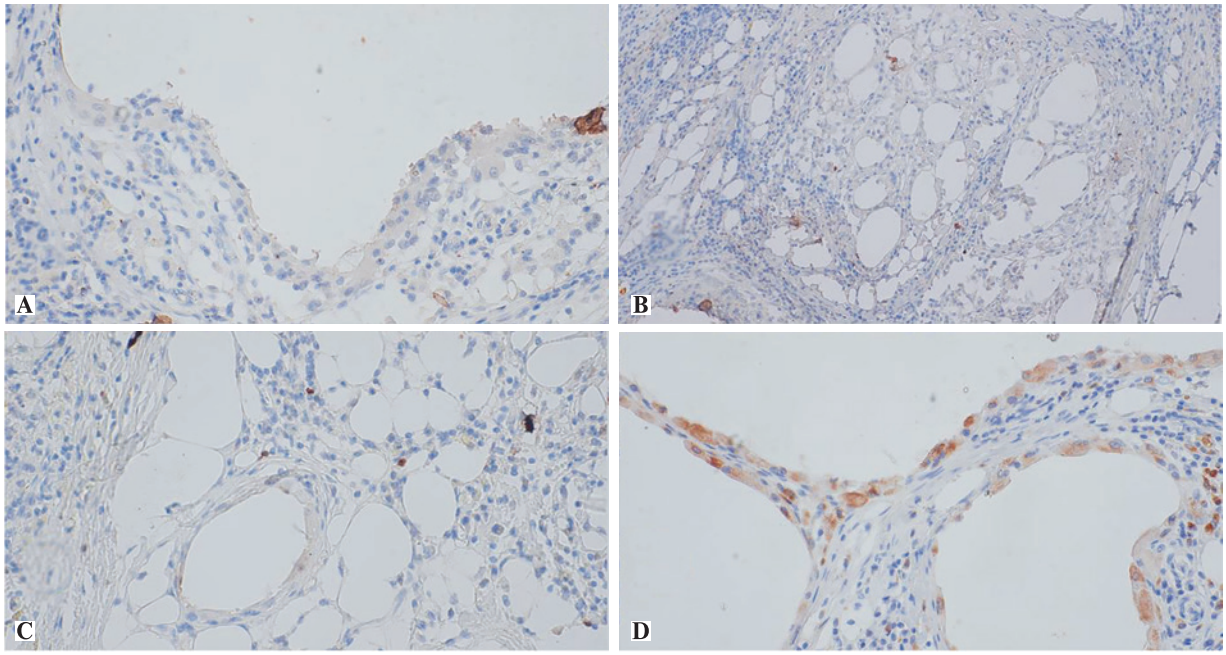


Fig. 3. Results of immunohistochemical study: A, negative reaction for MCK in cells lining cystic structures; B, negative reaction for MCK antibodies in areas of cystic structures; C, negative reaction with S100 antibodies in areas of cystic structures; D, positive reaction with CD68 antibodies in cells lining cystic structures.

2. None of the imaging studies allows reliably differentiating FN from recurrence of renal cell cancer.
3. Despite the fact that FN can mimic recurrence of renal cell cancer, due to its rarity, it should be considered as a diagnosis of exclusion and should be established only in the case of proven absence of an oncological process.
4. We consider further study of this problem necessary, which will reduce the frequency of excessive surgical interventions.

REFERENCES

1. *Vasei N., Shishegar A., Ghalkhani F., Darvishi M.* Fat necrosis in the Breast: A systematic review of clinical. Lipids Health Dis. 2019;18(1):139. doi: 10.1186/s12944-019-1078-4. Erratum in: Lipids Health Dis. 2019;18(1):158.
2. *Geldmaker L.E., Ericson C.A., Baird B.A., Haehn D.A., Zhai Q.J., Nassar A., Thiel D.D.* Fat Necrosis Mimicking Renal Cell Carcinoma Recurrence Following Cryotherapy, Partial Nephrectomy, and Nephrectomy. Urology. 2021;156:181–184. doi: 10.1016/j.urology.2021.05.051. Epub 2021 Jun 16.
3. *Kerridge W.D., Kryvenko O.N., Thompson A., Shah B.A.* Fat Necrosis of the Breast: A Pictorial Review of the Mammographic, Ultrasound, CT, and MRI Findings with Histopathologic Correlation. Radiol Res Pract. 2015;2015:613139. doi: 10.1155/2015/613139. Epub 2015 Mar 16.
4. *Durack J.C., Richioud B., Lyon J., Solomon S.B.* Late emergence of contrast-enhancing fat necrosis mimicking tumor seeding after renal cryoablation. J Vasc Interv Radiol. 2014;25(1):133–37. doi: 10.1016/j.jvir.2013.07.006.
5. *Geldmaker L.E., Ericson C.A., Baird B.A., Haehn D.A., Zhai Q.J., Nassar A., Thiel D.D.* Fat Necrosis Mimicking Renal Cell Carcinoma Recurrence Following Cryotherapy, Partial Nephrectomy, and Nephrectomy. Urology. 2021;156:181–184. doi: 10.1016/j.urology.2021.05.051. Epub 2021 Jun 16.
6. *Beisland C., Guðbrandsdottir G., Reisæter L.A., Bostad L., Hjelle K.M.* A prospective risk-stratified follow-up programme for radically treated renal cell carcinoma patients: evaluation after eight years of clinical use. World J Urol. 2016;34(8):1087–99. doi: 10.1007/s00345-016-1796-4. Epub 2016 Feb 27.
7. *Eggener S.E., Yossepowitch O., Pettus J.A., Snyder M.E., Motzer R.J., Russo P.* Renal cell carcinoma recurrence after nephrectomy for localized disease: predicting survival from time of recurrence. J Clin Oncol. 2006;24(19):3101–06. doi: 10.1200/JCO.2005.04.8280.
8. *Israel G.M., Bosniak M.A.* How I do it: evaluating renal masses. Radiology. 2005;236(2):441–50. doi: 10.1148/radiol.2362040218.
9. *Tanaka T., Yoshida T., Maegawa Y., Nakagawa M., Kishikawa H.* Fat Necrosis Mimicking Local Recurrence With Fluorodeoxyglucose Positron Emission Tomography (FDG-PET) Positivity After Partial Nephrectomy for Renal Cell Carcinoma. Cureus. 2023;15(6):e40327. doi: 10.7759/cureus.40327.

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