Chyluria as a Rare Delayed Complication Following Kidney-Sparing Resection of Accidentally Diagnosed Clear Cell Carcinoma

Agnieszka Bartos*, Karolina Sawicka, Krzysztof Batycki

Faculty of Medical and Health Sciences, Kazimierz Pulaski University of Radom, Poland

***Correspondence:** Agnieszka Bartos, Faculty of Medical and Health Sciences, Kazimierz Pulaski University of Radom, Malczewskiego 29 St., 26-600 Radom, Poland,

agabartos00@gmail.com

Radiology Case. 2026 March; 20(3):1-11 :: DOI: 10.3941/jrcr.5982

AUTHOR'S CONTRIBUTION

Agnieszka Bartos- Study Design, Statistical Analysis, Data Interpretation, Manuscript Preparation, Literature Search
Karolina Sawicka- Study Design, Statistical Analysis, Data Interpretation, Manuscript Preparation
Krzysztof Batycki- Study Design, Data Collection, Data interpretation, Manuscript Preparation, Funds Collection

ACKNOWLEDGEMENTS

The authors would like to thank Dr. Anita Pawelec and Dr. Artur Kaczor for their help in preparing the article.

DISCLOSURE

The authors declare that they have no competing interests or conflicts of interest related to the content of this manuscript. No financial support, personal relationships, or affiliations influenced the work reported herein.

CONSENT

The authors obtained written informed consent from the patient for submission of this manuscript for publication.

HUMAN AND ANIMAL RIGHTS STATEMENT

The case report involved a human participant who underwent standard diagnostic procedures and routine clinical care. No experimental interventions were performed, and all procedures were conducted in accordance with applicable ethical guidelines.

ABSTRACT

We present a rare case of delayed-onset chyluria caused by a lymphatic-urinary fistula following kidney-sparing surgery for renal cell carcinoma. The patient remained asymptomatic, and the diagnosis was made incidentally on CT (computed tomography), which revealed a fat-fluid level within the bladder. This case highlights the importance of considering iatrogenic lymphatic leakage in patients with history of renal surgery and underlines the diagnostic value of imaging in detecting subclinical uro-lymphatic fistulas and guiding appropriate management.

CASE REPORT

BACKGROUND

This case highlights the importance of recognizing lymphatic-urinary fistula, an exceedingly rare complication arising during surgical resection of a renal tumor, in which lymphatic channels abnormally communicate with the pelvicalyceal system, as a potential cause of chyluria. We aim to contribute to the existing literature by emphasizing the role of cross-sectional imaging in identifying intravesical lymphatic fluid and tracing the precise fistulous connection, thereby guiding appropriate management.

CASE REPORT

A 59-year-old man was incidentally found to have a right renal lesion on lumbar spine MRI (magnetic resonance imaging) performed on May 28, 2022 (Figure 1). The study revealed a 29 mm heterogeneous mass in the dorsal aspect of the right kidney, extending beyond the renal contour. Further urologic evaluation led to an open, kidney-sparing resection of a 40 mm clear-cell carcinoma (grade 2, pT1a) on September 1, 2022. His postoperative recovery was unremarkable, and he was discharged on day 5. Preoperative laboratory tests showed preserved renal function (serum creatinine 0.57 mg/dL; eGFR (estimated Glomerular Filtration Rate) > 60 mL/min/1.73 m²), normal electrolytes (Na 140.5 mmol/L; K 4.20 mmol/L), and a normocytic complete blood count (WBC (white blood cells) 5.37 G/L; HGB (hemoglobin) 15.6 g/dL). Multiphase contrast-enhanced CT of the abdomen and pelvis performed on February 24 and again on September 8, 2023, demonstrated only mild stranding of perinephric fat and slight contour irregularity at the surgical bed, consistent with typical postoperative

findings without clinical significance. There was no evidence of focal masses, fluid collections, or lymphadenopathy. The contralateral kidney, ureters, and bladder appeared normal. A bone scintigraphy on November 17, 2023, excluded skeletal metastases by showing no abnormal tracer uptake. Control multiphase CT on April 30, 2024, confirmed the expected postsurgical appearance of the right renal remnant, showing smooth resection margins without enhancing nodules or perirenal collections. Importantly, a distinct low-attenuation fluid layer consistent with lymphatic fluid was visualized in the bladder lumen (Figures 2,3).

The bladder wall remained smooth and of normal thickness, and no stones or intraluminal lesions were present. Both ureters were unobstructed, with no proximal dilatation. Additional imaging revealed a mildly enlarged, homogeneous prostate gland measuring 36 × 50 mm. Prostate MRI on May 19, 2024 (Figures 4-10), corroborated these findings, showing a normal bladder wall and again demonstrating the intravesical fluid layer. Finally, CT of the chest, abdomen, and pelvis on January 17, 2025, confirmed continued prostate enlargement (44 × 38 × 48 mm) with fine calcifications but without evidence of urinary obstruction. The bladder, ureters, and kidneys appeared normal, with no signs of local tumor recurrence, while chyluria in the bladder (Figures 11,12) was noted as a delayed postoperative finding following renal tumor resection. Taken together, detailed imaging and laboratory data obtained more than 18 months after kidney-sparing surgery for renal clear cell carcinoma document a rare delayed presentation of intravesical lymphatic fluid layering (chyluria) without evidence of tumor recurrence or obstructive uropathy. Recognizing this characteristic low-attenuation bladder fluid on CT is essential to differentiate postoperative lymphatic leakage from neoplastic or calculous causes and to guide appropriate management.

DISCUSSION

Introduction

Lymphatic–urinary fistula is a rare pathological occurrence in which the connection between the lymphatic and urinary systems forms. Although not many cases were presented regarding post-surgery lymphatic-urinary fistula, infection-related fistulas are reported in literature more often. The radiological diagnosis of lymphatic-urinary fistula is possible as a result of the introduction of oily contrast agents used in lymphangiography which enables precise preoperative identification of the location of lymphatic fistulas and occlusions; however, the diagnosis of chyluria can be established using CT or MRI imaging demonstrating chyle in the bladder [1].

Etiology & demographics

The described case presents a uro-lymphatic fistula, which most likely developed as a complication of surgical procedures undergone by the patient due to a diagnosis of clear-cell carcinoma (grade 2, pT1a).

The renal capsule and cortex are supplied by rich lymphatic vessels. A fistula connection between the capsule or cortex and the lymphatic system would pragmatically be a more frequent phenomenon, particularly following partial nephrectomy involving disruption of the collective system [2].

The occurrence of uro-lymphatic fistula is uncommon in the literature, especially the ones of surgical genesis. Chyluria, as one of the most common findings associated with fistulas, is more commonly reported than the cause itself.

It is observed that fistulas concern more men (86%) than women, locating itself on the left site of the body [3].

The origin of Chyluria and therefore the origin of uro-lymphatic fistulas vary. According to the literature the chyluria can occur both in parasitic and non-parasitic cases. The first is the result of infection, leading to lymphatic stasis and congestion, caused by endemic species roundworm such as *Wuchereria*, *Brugia* and *Onchocerca*. The former cause might be tuberculosis, pregnancy, secondary to neoplasm or in our case - iatrogenic, such as surgical procedure regarding abdomino-pelvic cavity [2]. Strict anatomical correlation between lymphatic vessels and calyceal-pelvis system in the retroperitoneal space makes them prone to forming connections [4].

Published data does not cover extensively the matter of fistulas, however in endemic areas, where the aforementioned roundworms inhabit, there are several articles discussing in detail varied therapeutic methods regarding chyluria. Both issues are interconnected, thus are closely mentioned in literature.

Nonparasitic etiology of chyluria caused by surgical interventions regarding kidneys occurs sporadically, therefore a few publications can be mentioned [2].

Miller et al. reported 4 cases of chyluria after partial nephrectomy. It is crucial to note that none of the patients was diagnosed by clinical symptoms, only after the CT scan showing the level of fatty fluid in the bladder, suggesting the importance of subclinical chyluria and its similarity to our case [5].

Trasher and Snyder published a case demonstrating chyluria after percutaneous nephrolithotomy, which was resolved completely after parenteral nutrition and no surgical intervention [6].

Clinical & imaging findings

Among clinical manifestations of uro-lymphatic fistula the most typical is chyluria-turbid, milky urine. It can be associated with lumbar pain, fever, dysuria and discomfort [3].

In later stages or more advanced cases the weight loss and malnutrition can be observed as a result of excessive fat loss via the urinary system [1].

It is also observed that chyluria and uro-lymphatic fistula can be subclinical, therefore the diagnosis can be obtained solely by imaging [2].

Radiological findings

The radiological image can be evident, showing a low-attenuation fluid layer consistent with lymphatic fluid within the bladder, as presented in our case. The typical MRI appearances of fat will be seen as a layer floating on top of the normal fluid signal urine.

Sonography allows for the assessment of renal structures and can help detect blood clots with lymphatic fluid. Intravenous urography is not commonly used because visualizing dilated lymphatic vessels around the renal calyces requires increased pressure within the kidney or ureter [7].

In other instances chyle-filled lymphatic vessels can be visible as a meshwork of fluid occupied structures of tubular shape that are located in retroperitoneum using MR (magnetic resonance) urography. It provides a precise anatomical representation of fistulas in the lower ureter or bladder, therefore is useful in diagnosis of those structures [3,7].

In CT dilation of lymphatic channels can be misinterpreted as a mass of confluent low-density lymph nodes. It is possible to identify fat within the urinary bladder [3,7].

Lymphoangiography is the most accurate imagining method before surgery and one of the most precise diagnostic techniques, however it is not routinely performed due to its complexity, invasiveness and technical demandingness. It can demonstrate the number, site and size of fistulas. It is also used in diagnosis of abnormalities in lymphatic vessels.

Typical findings include: fistulas connecting the lymphatic system with the urinary tract - on various levels, including kidney, ureter or bladder; dilated lymphatic channels near the renal hilium, which may communicate with paravertebral channels, and finally contrast-enhanced peristalsis within both major and minor calyces [3].

Additionally, it may indicate changes such as a twisted and irregular thoracic duct, enlarged and granular lymph nodes in the paraaortic passage, interrupted lymphatic continuity, a dilated chyli cistern, or other lymphatic ductal abnormalities in the ureters.

Unilateral pedal lymphangiography allows for the detection of lymphatic-renal fistulas. The pelvic floor might be blocked by the absorption of the contrast medium to the contra lateral side (the “cross-over” phenomenon). Compared to bilateral examination, this method is superior due to its lesser invasiveness [7].

Treatment & prognosis

In mild cases uro-lymphatic fistulas and chyluria can be treated with dietary changes such as a low-fat diet [1,3,7].

A supportive method of treatment is compensating for protein loss in the form of lymph, a high-protein diet is recommended. In hematochyluria, supplements that support blood production (hematinics), vitamin supplements, and green leafy vegetables are also beneficial. In cases of concomitant lymphadenitis, rest, anti-inflammatory, analgesic, and antypyretic medications are helpful [3,7].

It should be emphasized that diethylcarbamazine therapy is an established treatment for parasite-related chyluria; however, our case concerns postoperative chyluria, where the therapeutic option is not indicated [3,7].

The most minimally invasive methods of treating chyluria rely on sclerotherapy, recommended for patients in whom conservative or pharmacotherapy have proven ineffective. Various sclerosing agents are used for this purpose, the most common being 1% silver nitrate. Once introduced into the renal pelvis, it permeates through fistulas into the lymphatic vessels, causing inflammation, swelling, and occlusion of the vessels, leading to fibrosis and resolution of symptoms [3,7].

The procedure is usually performed under local anaesthesia through a catheter inserted into the renal pelvis, administering 7-10 ml of the drug until pain occurs. The best results are achieved with infusions repeated every 8 hours for 3 days, rather than a single weekly administration for 6 weeks. To reduce the risk of kidney damage, sclerotherapy is performed on one side only, and in bilateral lesions, the other side is treated after a minimum of 2 months.

Surgical treatment is considered in patients with severe symptoms who are refractory to medications and minimally invasive treatments, especially if two or more attempts at sclerotherapy have failed. Surgical success rates are up to 95%. Surgical techniques include disconnection of the lymphatic vessels from the urinary tract, creation of lymphatic-venous anastomosis such as retroperitoneal lymphatic-venous anastomosis, vas-seminal fistula through the groin or anastomosis of the inguinal lymph node with the great saphenous vein.

In patients treated conservatively alone, chyluria can recur in up to 80% of patients after a period of improvements. Sclerotherapy significantly reduces the risk of recurrence to approximately 13-41%, although in 10-20% of patients, the procedure is initially unsatisfactory. Recurrence after intervention most often results from incomplete removal of the affected vessels, lymphatic reflux from the contralateral side, or lymphatic backflow from the bladder. To minimise this risk, a greater omentum can be used or methods that enlarge

the surgical field, such as magnifying glasses or a surgical microscope, can be employed. It is worth noting that not every recurrence immediately requires invasive surgery [7].

Differential diagnosis

Due to the fact, that fat excreted in the urine appears as a colloidal suspension, it may be mistaken for lipiduria, which is characteristic of conditions such as eclampsia, diabetes, kidney diseases, or complications following fractures [1].

Lumbar pain and dysuria can be differentiated from urinary tract infections or other sexually transmitted infections [1].

TEACHING POINT

Lymphatic-urinary fistulas, though rare, should be considered in patients with chyluria- especially post renal surgery. Accurate imagining, including lymphangiography, plays a key role in preoperative diagnosis, and management ranges from dietary therapy to surgical intervention.

QUESTIONS

1) Which of the following is the most common clinical manifestation of the uro-lymphatic fistula?

a) Hematuria
b) Chyluria (applies)
c) Pyuria
d) Proteinuria

Explanation: Chyluria- milky, turbid urine- it the hallmark sign of uro-lymphatic fistula.

2) What imagining modality is considered the most accurate for preoperative identification of uro-lymphatic fistulas?

a) Intravenous urography
b) Abdominal ultrasonography
c) Lymphangiography (applies)
d) Computed tomography of the urinary tract

Explanation: Lympangiography with oily contrast is the most precise method for detecting the site, size and number of fistulas.

3) Which of the following is <u>not</u> a known cause of chyluria?

a) Filariasis
b) Partial nephrectomy
c) Diabetes mellitus (applies)
d) Tuberculosis

Explanation: Chyluria may be caused by parasitic infections, surgery or tuberculosis. Diabetes can cause lipiduria, which may mimic chyluria.

4) Which of the following treatment options is recommended for patients with chyluria unresponsive to conservative and pharmacologic measures?

a) High-carbohydrate diet
b) Albendazole only
c) Repeated paracentesis
d) Sclerotherapy with silver nitrate (applies)

Explanation: Sclerotherapy using agents like 1% silver nitrate is a common minimally invasive treatment when conservative management fails.

5) What is a characteristic radiological finding of chyluria in a patient with the uro-lymphatic fistula?

a) Air-fluid levels in the renal pelvis
b) Calcification in the ureter
c) Fat-fluid level within the urinary bladder (applies)
d) Contrast extravasation into perinephric fat

Explanation: A fat-fluid level in the bladder, seen on computed tomography or other imaging, is characteristic of chyluria due to the presence of lymphatic (fat-rich) fluid.

REFERENCES

[1] Craig O, Woodroffe FJ. Chyluria and lymphatic renal fistula. *Clin Radiol.* 1969; 20(4): 465-472. PMID: 5349353.

[2] Kim RJ, Joudi FN. Chyluria after partial nephrectomy: case report and review of the literature. *ScientificWorldJournal*. 2009; 9: 1-4. PMID: 19151891.

[3] Sharma S, Hemal AK. "Chyluria—An Overview," Nephro-Urology Monthly. 2009; 1: 14-26.

[4] Alushika J, Ravi Shankar P, Sanmeet G, et al. A Rare Case Report - Leaky Pipes - The Uro-Lymphatic Fistula Fiasco. *Ann Clin Case Rep*. 2024; 9: 2647.

[5] Tuck J, Pearce I, Pantelides M. Chyluria after radical nephrectomy treated with N-butyl-2-cyanoacrylate. *J Urol.* 2000; 164(3 Pt 1): 778-779. PMID: 10953149.

[6] Thrasher JB, Snyder JA. Post-nephrolithotomy chyluria. *J Urol.* 1990; 143(3): 578-579. PMID: 2304174.

[7] Stainer V, Jones P, Juliebø SØ, Beck R, Hawary A. Chyluria: what does the clinician need to know? *Ther Adv Urol.* 2020; 12: 1756287220940899. PMID: 32728391.

FIGURES

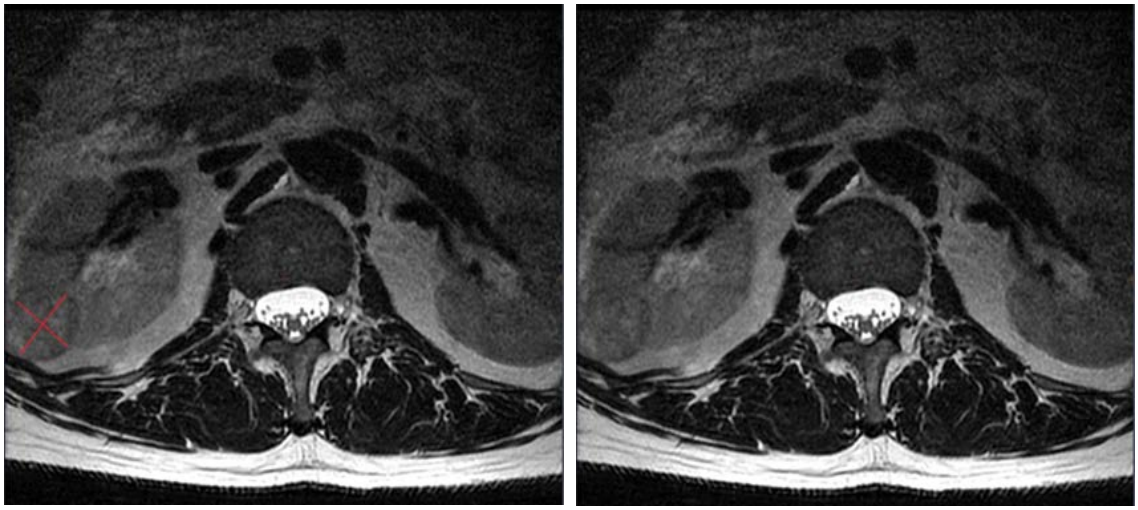

Figure 1:.A 59-year-old male patient undergoing lumbar spine MRI.

FINDINGS: Axial T2-weighted FSE (fast spin echo) sequence (28/05/2022) demonstrates an abnormal appearance of the right kidney, partially visualized at the dorsal margin of the field of view. A heterogeneous lesion measuring approximately 29 mm in diameter is noted, protruding beyond the renal contour. Notably, this was the only scan in the entire study in which the lesion was apparent, underscoring the importance of meticulous evaluation of all acquired images for incidental but clinically significant findings such as renal malignancy, which could otherwise be easily missed.

TECHNIQUE: MRI of the lumbar spine was performed using a GE Signa HDxt 1.5 T scanner. Sequences included sagittal STIR (short tau inversion recovery), sagittal and axial FSE T1- and T2-weighted images, obtained without intravenous contrast.

Figure 2: A 59-year-old male patient undergoing abdominal and pelvic CT (30/04/2024).

FINDINGS: Pre-contrast axial CT demonstrates a fat-fluid level within the urinary bladder lumen (attenuation approximately - 100 HU), consistent with chyluria.

TECHNIQUE: Multiphase spiral CT of the abdomen and pelvis was performed on a GE Revolution EVO scanner, before and after intravenous and oral administration of iodinated contrast (Omnipaque 350, 80 ml).

Figure 3: Delayed-phase CT of the abdomen and pelvis (30/04/2024), obtained 10 minutes after intravenous contrast administration.

TECHNIQUE: Multiphase spiral CT of the abdomen and pelvis, GE Revolution EVO, pre- and post-contrast (Omnipaque 350, 80 ml IV (intravenous) and oral).

Figure 4: Axial T2-weighted multiparametric MRI of the prostate (19/05/2024). A fat–fluid level within the urinary bladder is also visible, consistent with chyluria.

TECHNIQUE: Multiparametric MRI of the prostate performed on a 1.5 T scanner, including T2-weighted, DWI (diffusion-weighted imaging), pre- and post-contrast T1-weighted sequences, evaluated according to PIRADS v2.1 (prostate imaging-reporting and data system version 2.1).

Figure 5: Sagittal T2-weighted mpMRI (multiparametric magnetic resonance imaging) of the prostate (19/05/2024). A fat–fluid level within the urinary bladder is visible, consistent with chyluria.

Figure 6: Axial T1-weighted mpMRI of the prostate (19/05/2024). A fat–fluid level within the urinary bladder is visible, consistent with chyluria.

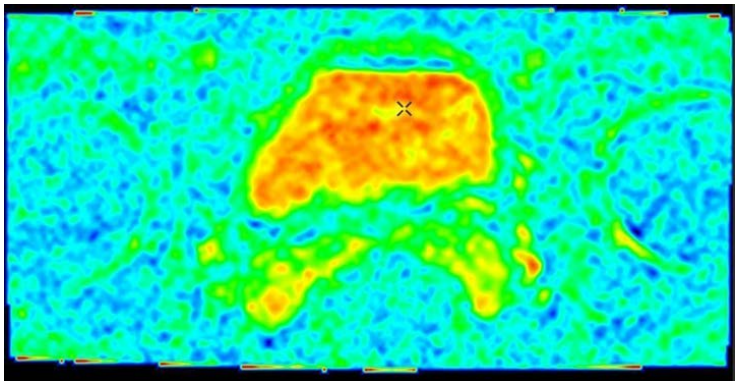

Figure 7: Apparent Diffusion Coefficient (ADC) map from multiparametric prostate MRI (19/05/2024). A fat–fluid level within the urinary bladder is visible, consistent with chyluria.

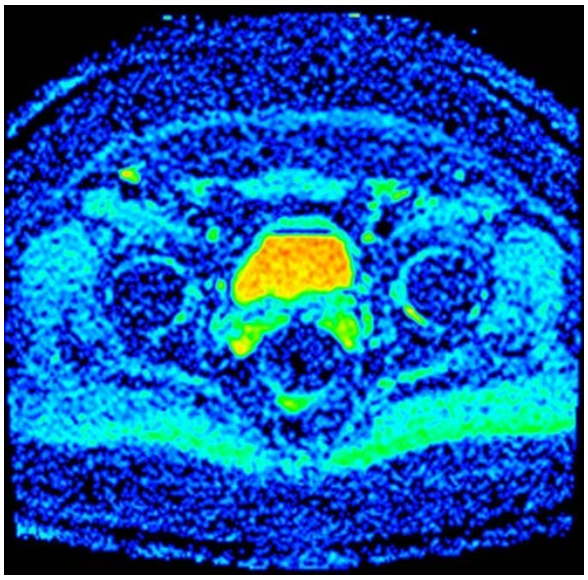

Figure 8: Apparent Diffusion Coefficient (ADC) map from multiparametric prostate MRI (19/05/2024). A fat–fluid level within the urinary bladder is visible, consistent with chyluria.

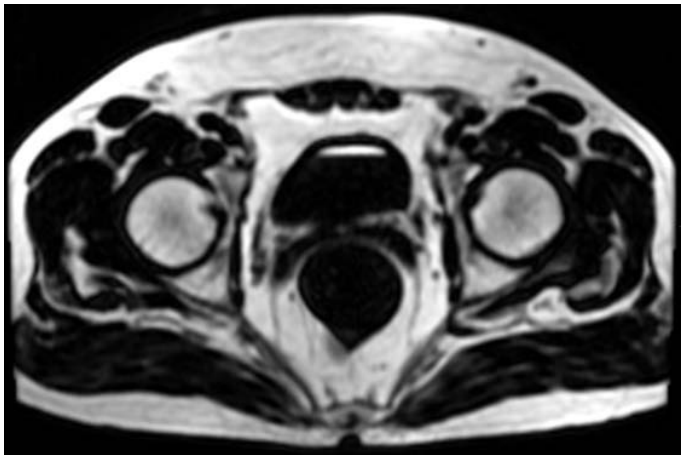

Figure 9: Axial T1-weighted Liver Acquisition with Volume Acceleration (LAVA) sequence with contrast and fat suppression (19/05/2024). The urinary bladder contains a fat–fluid level compatible with chyluria.

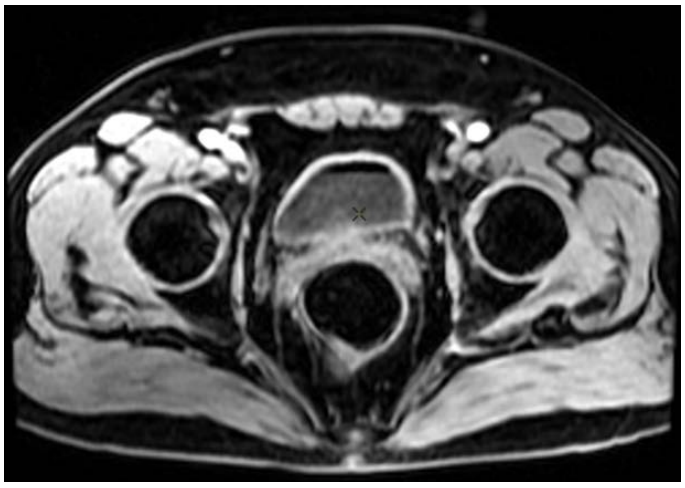

Figure 10: Axial T1-weighted Liver Acquisition with Volume Acceleration (LAVA) sequence with contrast and water excitation (19/05/2024). The urinary bladder contains a fat–fluid level compatible with chyluria.

Figure 11: Pre-contrast axial CT of the abdomen and pelvis (17/01/2025) demonstrates a fat–fluid level within the urinary bladder (attenuation approximately –100 HU (hounsfield units), consistent with chyluria in a patient after right renal tumor resection. No pathological wall thickening, calcified deposits, or filling defects are observed.

TECHNIQUE: Multiphase spiral CT of the abdomen and pelvis performed on a GE Revolution EVO scanner, before and after intravenous and oral administration of iodinated contrast (Omnipaque 350, 80 ml).

Figure 12: Delayed-phase CT of the abdomen and pelvis (17/01/2025), acquired 12 minutes after intravenous contrast administration.

Summary table

Category	Key information
Etiology	Post-surgical complications (e.g., partial nephrectomy, nephrolithotomy) Infectious (parasitic: Wuchereria, Brigid, Onchocerca; non-parasitic: tuberculosis, neoplasm, pregnancy) Iatrogenic trauma to renal/ retroperitoneal lymphatics
Incidence	Rare; very few published cases, especially of surgical origin. Chyluria more commonly reported than fistula itself
Gender ratio	Male predominance (~86% of reported cases)
Age predilection	Middle-aged adults most commonly affected; can occur at any age depending on etiology
Risk factors	Renal surgery (partial nephrectomy, nephrolithotomy) Endemic parasitic infections Retroperitoneal neoplasms Pregnancy Tuberculosis
Clinical features	Most typical: Chyluria, lumbar pain, fever, dysuria, discomfort Advanced cases: weight loss, malnutrition Sometimes subclinical- detected only on imaging
Findings on imaging	USG: Anechoic/ tubular channels, chyle in bladder (echogenic urine) CT: Dilated lymphatic channels mimicking confluent nodes; fat-fluid levels in bladder MRI T1: Hypointense fistulous tracts MRI T2: Hyperintense serpiginous tubular fluid signals; fat-fluid layers in bladder
Treatment	Conservative: low-fat, high-protein diet; supportive medicine Pharmacological: diethylcarbamazine for parasitic cases Minimally invasive: sclerotherapy Surgical: lymphatic disconnection, lymphatic-venous anastomosis; reserved for refractory/severe cases
Prognosis	Recurrence common with conservative treatment (~80%) Sclerotherapy lowers recurrence to 13-41% Surgical success rates up to 95% Prognosis favorable with appropriate therapy

Differential table

Entity	X-Ray	US	CT	MRI-T1	MRI-T2	MRI-DWI	Contrast Enhancement	Scintigraphy	PET
Urolymphatic fistula	Usually normal; may see indirect signs of urinarytract obstruction	Anechoic/tubular channels; fluid in lymphatic spaces; possible communication with urinary tract	Dilated lymphatic channels adjacent to urinary tract; fat debits lymphatic lakes mixed with contrast- opacified urine	Hypointense fluid tracks; may see linear structures	Hyperintense tubular/serpiginous fluid signal	Facilitated diffusion (no restriction)	Minimal to none; rarely subtle enhancement at fistulous track	Lymphoscintigraphy: tracer leakage into urinary tract	Usually negative (no metabolic activity)
Lymphocele	Not visible	Well-circumscribed Anechoic cystic lesion, no flow	Fluid-attenuation lesion, no contrast enhancement	Hypointense	Hyperintense	No restricted diffusion	None	No uptake	No uptake
Urinoma	May see soft tissue mass effect	Anechoic fluid collection near urinary tract	Peri-renal/peri-ureteric low-density fluid collection, may contain contrast if leak	Hypointense	Hyperintense	Usually no restriction (unless infected)	No enhancement (unless infected rim enhancement)	No uptake	Low to absent uptake unless infected
Lymphangioma/ lymphatic malformation	Not visible	Multiloculated cystic structure with thin septa	Multiloculated cystic mass; fluid attenuation	Hypointense	Hyperintense with septations	No restriction	Minimal septal enhancement	Possible uptake on lymphoscintigraphy	No uptake
Abscess	Soft tissue opacity	Hypoechoic/ complex collection with internal echoes	Fluid collection with rim enhancement; gas possible	Hypointense	Hyperintense with fluid content	Restricted diffusion	Rim enhancement (avid)	No uptake	High uptake due to inflammation

KEYWORDS

Uro-lymphatic fistula, Chyluria, renal surgery, post-surgical complications

ABBREVIATIONS

CT = Computed Tomography
MRI = Magnetic Resonance Imaging
EGFR = Estimated Glomerular Filtration Rate
WBC = White Blood Cells
HGB = Hemo Glo Bin
MR = Magnetic Resonance
FSE = Fast Spin Echo
STIR = Short Tau Inversion Recovery
IV = Intra Venous
DWI = Diffusion-Weighted Imaging
PIRADS v2.1 = Prostate Imaging-Reporting And Data System Version 2.1
MPMRI = Multi Parametric Magnetic Resonance Imaging
ADC = Apparent Diffusion Coefficient
LAVA = Liver Acquisition With Volume Acceleration
HU = Hounsfield Units

Online access

This publication is online available at:
www.radiologycases.com/index.php/radiologycases/article/view/5982

Peer discussion

Discuss this manuscript in our protected discussion forum at:
www.radiolopolis.com/forums/JRCR

Interactivity

This publication is available as an interactive article with scroll, window/level, magnify and more features.
Available online at www.RadiologyCases.com

Published by EduRad

www.EduRad.org