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Case Report

Trans-urethral resection of bladder tumor (TURBT) and radiofrequency ablation of renal tumor: Rare etiologies of chyluria

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ABSTRACT

Chyluria is a rare entity which is caused by abnormal communication between the lymphatic system and the urinary tract, which allows the passage of chyle into the urine. Whenever symptomatic, chyluria presents with lower urinary tract symptoms such as dysuria and hematuria. Multiple imaging modalities can aid in diagnosis such as lymphoscintigraphy, retrograde pyelography, CT scan of the abdomen and pelvis, and magnetic resonance imaging. Numerous etiologies are associated with chyluria among which are surgical interventions. Partial and radical nephrectomy have been reported in a number of symptomatic and asymptomatic cases, while radiofrequency ablation of renal tumors has been very rarely reported.

Herein, we report 2 cases of chyluria; one caused by trans-urethral resection of a bladder tumor and another by radiofrequency ablation of a renal oncocytoma. Fat-fluid level in the urinary bladder was seen on both precontrast and postcontrast images of CT scan of the abdomen and pelvis. Cystoscopy demonstrated no evidence of any abnormality of the urinary bladder.

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Introduction

The presence of fat in the bladder, better known as chyluria, is known to occur in a variety of clinical situations. It is a potential manifestation of filariasis, a parasitic infection endemic in tropical and subtropical regions [1].

Other causes include tumor, abscess, tuberculosis, pregnancy, and congenital conditions [2]. Although relatively rare, fat retention in the urinary bladder may also occur after surgical interventions [3]. The proposed mechanism for chyluria in the surgical setting is through surgical injury to the lymphatic system, which results in fistulous connection to the urinary system [4]. Here, we present 2 cases of chyluria detected by CT imaging after urological procedures; one after trans-urethral resection of a bladder tumor (TURBT) presenting with lower urinary tract symp-

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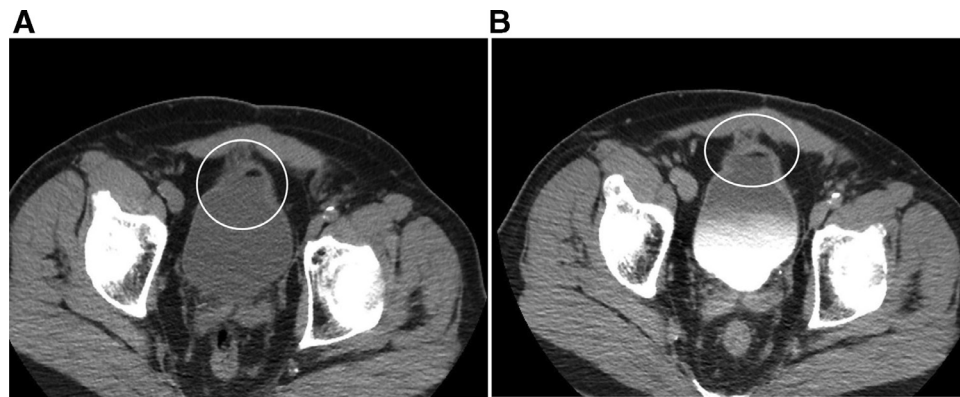


Fig. 1 – A. Noncontrast axial CT image demonstrates a fat-fluid level in the urinary bladder (White circle). B. Contrast enhanced axial CT image showing a fat-fluid level (White circle) and excreted contrast material in the urinary bladder.

toms, and the other after radiofrequency ablation of a renal oncocytoma presenting with abdominal pain.

Case presentation

Case 1

A 65-year-old man with a past medical history of TURBT presented to the emergency department 1 month after the procedure for 2-week history of hesitancy, poor urinary stream, straining, and prolonged micturition. He also reported intermittent hematuria. The patient denied any fever, chills, or recent weight loss. He had no other relevant medical history. Physical examination was completely normal with slightly enlarged smooth prostate. Urinalysis was negative for any pyuria, hematuria, or proteinuria.

CT scan of the abdomen and pelvis revealed a fat-fluid level in the urinary bladder on both precontrast and postcontrast images (Fig. 1A and B). To date, the patient has not received any treatment directed at treating the chyluria or for alleviating symptoms related to chyluria. He underwent a cystoscopy which demonstrated no evidence or residual or recurrent neoplasm or other abnormality of the urinary bladder.

Case 2

An 82-year-old man with a past medical history of hypertension, hyperlipidemia, and left renal oncocytoma (Fig. 2A) treated with radiofrequency ablation (Fig. 2B–D) presented 1 month after the procedure for a 2-week history of vague generalized abdominal pain. The pain started gradually with an increasing intensity. The patient denied any fever, chills, or urinary symptoms. Physical examination was completely normal except for pain in the 4 quadrants on deep palpation.

CT scan of the abdomen and pelvis showed a fat-fluid level in the urinary bladder (Fig. 2E–H). The patient did not receive any treatment aimed at alleviating symptoms related to chyluria.

Discussion

Chyle is lymphatic fluid rich in chylomicrons that normally flows from the small lymphatic capillaries to the larger lymphatic vessels, which then drains into the left subclavian vein via the thoracic duct [1]. In certain situations, an abnormal connection develops between the lymphatic vessels and the urinary tract, resulting in chyluria [5].

Naturally, chyluria has a relapse-remitting course [6]. Whenever symptomatic, it presents as passage of milky-white urine along with clots and symptoms of renal colic [6]. Moreover, the symptoms can mimic those of a urinary tract infection or benign prostatic hyperplasia [6]. One of our patients had a combination of lower urinary tract symptoms while the other had only abdominal pain which made the diagnosis challenging. However, it is not known for certain whether our 2 patients' symptoms were attributable to chyluria.

Various imaging modalities are used to diagnose and evaluate chyluria. Among these are lymphangiography, lymphoscintigraphy, retrograde pyelography, magnetic resonance imaging (MRI), and CT. Lymphangiography is the appropriate procedure for identifying fistulous communication as well as vascular dysplasias of the lymphatic vessels [7]. Because such a procedure is invasive and has a lot of mechanical complications, it is not currently use as a diagnostic tool [8]. On the contrary, lymphoscintigraphy using ^{99m}Tc -nanocolloid has an equal accuracy to lymphangiography and is noninvasive [9]. This safe technique allows localization, lateralization, and knowledge of the functional extent of reflux and detection of recurrence [10]. Moreover, retrograde pyelography, single photon emission computed tomography (SPECT), diethyl carbamazepine (DEC) combined with CT scan can be useful to identify lymphatic renal pathologies [11]. Retrograde pyelography has been successfully used prior to treatment of chyluria with sclerotherapy and surgery [12]. While unable to directly demonstrate the site of fistulous communication, MRI may show multiple tubular, tortuous, fluid-filled structures in the retroperitoneum corresponding to retroperitoneal and perirenal lymphangiectasia [13]. Interestingly, the association between retrograde pyelography and MRI seems to be effective in the evaluation of chyluria due to a detailed intra-abdominal

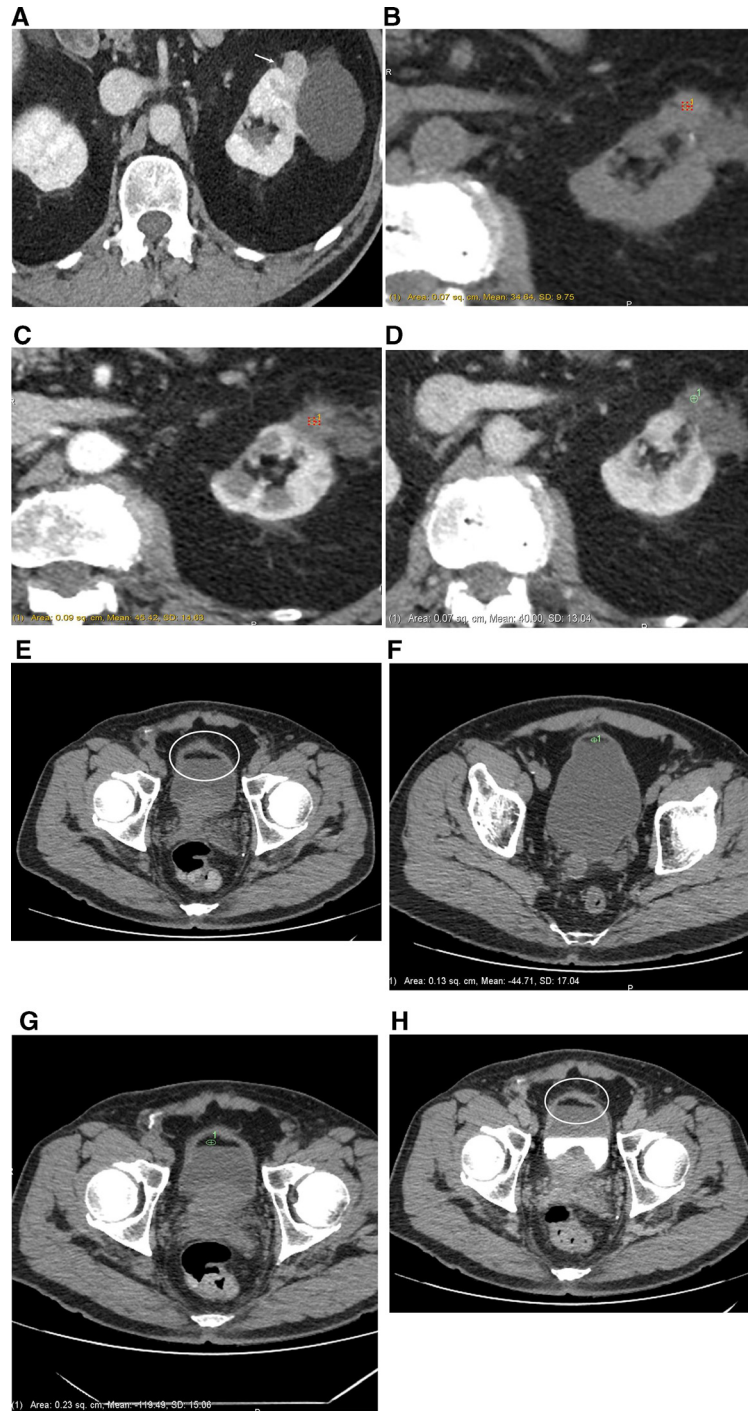


Fig. 2 – A. Axial view of a contrast enhanced abdominal and pelvic CT scan showing a left upper pole renal mass (White arrow) that turned out to be an oncocytoma on pathology. **B.** Contrast enhanced study of the abdomen performed 1-month post radiofrequency ablation, showing a shrunken oncocytoma post ablation. The Hounsfield unit (HU), performed to detect enhancement of oncocytoma, noted did not change significantly between pre and post contrast. **C.** Contrast enhanced study of the abdomen performed 1-month post radiofrequency ablation showing a shrunken oncocytoma post ablation that is non enhancing on the arterial. The HU noted did not change significantly after contrast than before contrast. **D.** Contrast enhanced study of the abdomen performed 1-month post radiofrequency ablation showing a shrunken oncocytoma post ablation that is non enhancing on the arterial and portal phase. The HU noted did not change significantly between pre and post contrast states. **E.** Noncontrast enhance axial CT scan of the pelvis showing a fat-fluid level (White circle). **F.** Contrast enhanced axial CT scan of the pelvis showing fat-fluid level (White circle). **G.** Noncontrast axial CT image demonstrating a fat-fluid level in the urinary bladder showing mean HU of -44 close to fat level. **H.** Noncontrast enhanced axial CT scan of the pelvis showing a fat-fluid level with a mean HU of -119 close to fat level.

Table 1 – Data from the literature on chyluria after radiofrequency ablation of renal tumors.

Studies	Clinical findings	Diagnostic modality
Schneider and colleagues [16] (2010), Case report	8 months after percutaneous radiofrequency ablation of clear cell renal cell carcinoma. No urinary symptoms.	CT scan of abdomen and pelvis
Schneider and colleagues [16] (2010), Case report	11 months after radiofrequency ablation of clear cell renal cell carcinoma. No urinary symptoms.	CT scan of abdomen and pelvis
Kaur and colleagues [21] (2011), Retrospective review	Chyluria was detected at a mean time of 44.5 weeks in 17 (41%) of 41 patients with renal tumors treated by radiofrequency ablation. Review of patient medical charts with chyluria did not reveal any specific signs, symptoms, or laboratory abnormalities attributable to chyluria.	CT scan of abdomen and pelvis
Tze Min Wah [22] (2011), Case report	Two years after radiofrequency ablation for renal cell carcinoma. Patient was asymptomatic.	CT scan of abdomen and pelvis

evaluation [14]. CT performed after diagnostic lymphangiography has been used as a complementary tool for diagnostic lymphangiography [15]. A CT scan identifies the presence of a fat-fluid level in the urinary bladder. The attenuation value of fat on CT is generally between -20 and -180 HU. Of note, a fat-fluid in the urinary bladder can be mistaken for an air-fluid level, which is a much more frequent finding on CT. Therefore, careful window and leveling techniques and CT attenuation measurement may be necessary to correctly identify the fat-fluid level associated with chyluria [16]. In both of our cases, a CT scan was sufficient for radiologic diagnosis.

Besides its more common association with the parasitic infection filariasis, chyluria can also result from certain surgical interventions. Partial and complete nephrectomy are among the procedures known to cause chyluria. Tuck and colleagues [4] reported the first case of chyluria after radical nephrectomy. Similarly, Miller and colleagues [17] described 4 cases of subclinical chyluria after partial nephrectomy that were diagnosed by abdominal CT scan that revealed the presence of a fat-fluid level in the bladder. Kim and Joudi [18] reported another case of chyluria in a patient who underwent partial nephrectomy, and presented thereafter for turbid urine. Panchal and colleagues [2] reported 4 cases of chyluria, 3 post partial nephrectomy and 1 post radical nephrectomy. Also, Komeya and colleagues [19] reported a chyluria case after partial nephrectomy for renal cell carcinoma. Kazaoaka and colleagues [3] retrospectively reviewed postoperative CT images from 123 patients who underwent surgery for renal tumors (92 patients after partial nephrectomy and 31 after total nephrectomy). They found fat retention in the bladder of 5 patients (5.4%) after partial nephrectomy but did not observe any fat-fluid level in the total nephrectomy patients. Interestingly, all patients who had chyluria were asymptomatic.

Radiofrequency ablation has become an accepted, minimally invasive treatment of renal masses in patients who are unable to undergo surgery [20]. Table 1 highlights literature data describing chyluria post renal radiofrequency ablation. To our best knowledge, there is no prior report of chyluria following TURBT.

Since half of chyluria cases resolve spontaneously, treatment may only be required for persistent cases and

symptomatic patients [1]. Treatment options include nutritional support, renal sclerotherapy, and surgical ligation of the lymphatic system [1].

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