



Case Report

Pelvi-calyceal Cast Formation and Renal Artery Pseudoaneurysm Complicating Silver Nitrate Instillation for Chyluria: A Clinical Radiologist Perspective

Ashwin Garg^{1*}  and Krantikumar Rathod²

¹Department of Radiology, Hamdard Institute of Medical Sciences and Research, Tughlaqabad, New Delhi, India

²Department of Radiology, Seth G S Medical College and KEM Hospital, Parel, Mumbai, India

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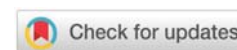
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***Corresponding author:** Dr. Ashwin Garg, Department of Radiology, Hamdard Institute of Medical Sciences and Research, Tughlaqabad, New Delhi, India, E-mail: ashwin_garg@yahoo.co.in

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Abstract

We report an unusual case of radiopaque pelvi-calyceal cast formation and intrarenal artery pseudoaneurysm following ureteroscopic instillation of 1% silver nitrate for chyluria. These dual rare complications with immediate and delayed onset, respectively, were identified on different radiology modalities in the same patient and have not been reported earlier. The pseudoaneurysm was successfully managed through endovascular coil embolisation. While a version of this case was previously published with different clinical emphasis by a different department, our manuscript presents critical findings not included in that report—namely, delayed presentation and cast formation. There are a few other significant radiological findings not reported in the earlier version which may help in understanding the pathogenesis of pseudoaneurysm formation. The discrepancy in the two manuscripts may be attributed to differences in departmental focus; it is also plausible that, in an increasingly competitive academic environment, the urgency to report a rare vascular complication led to the inadvertent omission of very obvious concurrent imaging findings. Our manuscript offers a more complete radiological-clinical correlation. It reinforces the importance of detailed history taking and careful study of the radiology images, thereby providing many valuable teaching points to postgraduate students.

Introduction

Chyluria, a common problem in Asian countries, is commonly treated with silver nitrate instillation. While relatively safe, few complications have been reported. We present a case with unusual radiographic findings of pelvicalyceal cast formation and a renal pseudoaneurysm in the same patient. This case, previously reported by Dhabalia et al, [1], is revisited here to present additional findings.

Case report

A 32-year-old male from a low socioeconomic background, with no history of alcohol use, trauma or hypertension, was referred to the emergency department with complaints of oliguria and hematuria persisting for five days. 10 days earlier,

he had presented in a peripheral hospital with voiding of 'milky urine' and intermittent hematuria. Abdominal ultrasonography and intravenous urography (Figure 1) were normal at that time. Urine was turbid and tested positive for chylomicrons, thus confirming the diagnosis of chyluria. At cystoscopy, milky efflux was seen from the right ureteric orifice, and 7–8 ml of 1% silver nitrate solution was instilled into the right renal pelvis. The procedure was thus unilateral. There was prompt disappearance of chyluria; however, the patient presented 3 days later with vague abdominal pain and distension. Plain abdominal radiograph showed a radiopaque cast outlining the right pelvicalyceal system (PCS) (Figure 2). He was settled with intravenous fluids and antibiotics for a day. But later, he developed acute pain in the right hypochondriac region and oliguria. Blood pressure was unrecordable. Emergency

unenanced computed tomography (CT) scan showed a large perirenal hematoma on the right side, and a high-attenuating cast outlining the renal PCS. There was no contrast excretion seen in the right PCS on contrast-enhanced CT scan. The patient did not have CT films, and there was no mention of pseudoaneurysm in the CT report.

The patient was then referred to a higher centre. On admission in our hospital, the patient's pulse rate was 96 BPM, BP: 130/90 mm of Hg and Hb-8.2 gm/dL. Serum creatinine was 1.1mg/dl. Urine was positive for RBC cells. In view of hematuria and retroperitoneal haemorrhage, the patient was immediately referred to us for renal angiography. Right renal angiography showed a pseudoaneurysm arising from the inferior branch of the renal artery (Figure 3a). In addition, remarkable findings of a beaded appearance in multiple intrarenal branches and pyelo-lymphatic reflux were quite evident (Figure 3b,c). The bleeding artery was embolised using two 35-8-5 steel coils (Cook Inc, Bloomington, USA). Post-embolisation angiographic control images showed complete obliteration of the pseudoaneurysm (Figure 4a,b). There was no nephrogram on the right side; the renal vein was not filling, and no excretion of contrast was seen in PCS even on delayed angiography (Figure 4c). The hematuria was immediately stopped, and the recovery was uneventful. Due to the large size of the perirenal hematoma and persistent low-grade fever, surgical drainage was performed two days later. Although the glomerular filtration rate at that time was 15 mL/min/1.73 m², nephrectomy was deferred, and he was managed conservatively. The patient was discharged after resolution of the infection and advised regular follow-up. Being from a remote area and having limited financial



Figure 3a: High-resolution fluoroscopic control image obtained before renal arteriography shows a well-defined right pelvicalyceal radiopaque cast. A pigtail angiographic catheter is seen in the abdominal aorta. Three distinct radiopaque shadows adjacent to the right renal silhouette correspond to the nasogastric Ryle's tube.

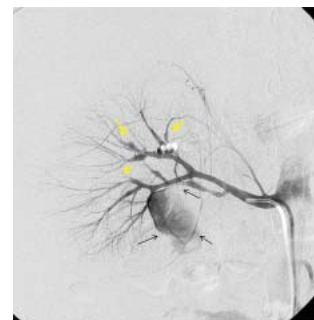


Figure 3b: Selective right renal angiography shows a large pseudoaneurysm (black arrows) arising from the inferior segmental branch. The beaded appearance in multiple intrarenal branches (yellow arrows) is suggestive of inflammation.

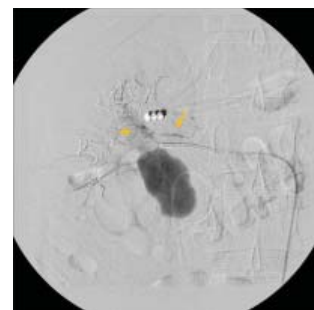


Figure 3c: Selective right renal angiography shows a large pseudoaneurysm (black arrows) arising from the inferior segmental branch. The beaded appearance in multiple intrarenal branches (yellow arrows) is suggestive of inflammation.



Figure 1: Intravenous Urography shows symmetric opacification of the pelvicalyceal systems and ureters during the excretory phase in both kidneys.



Figure 2: Plain abdominal radiograph obtained three days after silver nitrate instillation shows a radiopaque cast outlining the right pelvicalyceal system (arrows).



Figure 4a,b: Post-embolisation check angiogram (subtracted and unsubtracted) reveals coils (arrows) occluding the renal artery branch that fed the pseudoaneurysm; no further extravasation of contrast is noted even on delayed phase.

means, the patient was unable to come for in-person follow-up. However, 9 months of telephonic follow-up confirmed that he was asymptomatic.

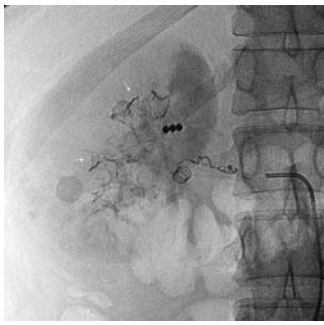


Figure 4c: Further to be noted is the absence of excretion in the pelvi-calyceal system. Pelvicalyceal cast is better appreciated on the delayed image (white arrows).

Discussion

Chyluria is frequently seen in tropical regions such as India and Southeast Asia [2]. *W. bancrofti* infestation is responsible for 95% of parasitic chyluria in endemic regions and is considered to be the causative agent until proved otherwise. For suspected parasitic causes, filarial antigen detection in urine and serum can be performed using immunochromatography or ELISA testing. As the patient belonged to an endemic region, and in the absence of other causes such as trauma or surgery, a presumptive clinical diagnosis of filarial chyluria was made by the primary treating team in a remote area.

Chyluria often responds to conservative management such as dietary modification and anti-parasitic therapy. In the present case, however, the patient had already presented with chyluria for 10 days before being subjected to silver nitrate instillation at a peripheral hospital. As we were not part of the primary treating team, we do not have detailed information on whether conservative measures were attempted before sclerotherapy. Chyluria, which does not respond to conservative treatment, is often managed by endoscopic instillation of sclerosants in the pelvic-caecal system. This causes chemical lymphangitis and oedema of lymphatic channels, and the resultant blockage leads to immediate cessation of chyluria. While silver nitrate has historically been the agent of choice, it is often associated with serious complications [3], including hematuria, renal papillary necrosis, pelvi-calyceal cast formation, acute renal failure, and vascular injuries like pseudoaneurysm.

Author Desai Rajesh, in his review article, has discussed different complications associated with various percentages of silver nitrate and has recommended 1% solution to be the safest concentration [4]. The present patient underwent instillation with the recommended dose of approximately 7ml of 1% silver nitrate in the right renal pelvis, but still presented with the complications of oliguria and intrarenal pseudoaneurysm resulting in retroperitoneal haemorrhage. There is no information available to us regarding the rate of instillation. Recent literature has highlighted safer alternatives to silver nitrate, particularly povidone-iodine. Though Goel et al [5] have found 0.2% povidone-iodine to be equally effective as 1% silver nitrate instillation with no major complications, a recent case report from Sudan described successful sclerotherapy using 5% povidone-iodine [6]. However, long-term results

are awaited before recommending it as an ideal sclerosant for chyluria. More recently, Mitsunari et al. (Trop Med Infect Dis 2019) reported that even high-volume instillation of low-concentration silver nitrate (0.1–0.5%, 15–30 mL) was safe and effective, with no severe complications observed [7]. A relatively new treatment modality, i.e. renal pedicle lymphatic disconnection (via open surgery or retroperitoneoscopy), is also being utilised as the alternative surgical technique for chyluria [8].

The present report is authored by interventional radiologists directly involved in the interpretation of images, procedural diagnosis and endovascular treatment. Importantly, although our efforts to publish the article in a clinically oriented journal were unsuccessful, meanwhile a version of this case was published by Dhabalia et al., with emphasis on vascular complication and retroperitoneal hematoma management, without emphasising the easily visible, hallmark radiological feature: pelvi-calyceal cast formation. The finding of cast formation was described for the first time by Gulati et al [91]. Srivastava Et al had described the finding of pseudoaneurysm in 1998 [10]. Our version of the manuscript is unique as it reports simultaneous dual radiological findings in the same patient, which have not been described before. Moreover, several other critical findings were not included in the earlier publication, including:

- Various radiological imaging findings at different intervals.
- Delayed onset of oliguria and hematoma (vs immediate onset).
- Catheter placement for sclerotherapy into the renal pelvis (vs. lower ureter).

These additions provide a more complete clinical picture. The discrepancies in the two versions of the same case may be attributed to differences in departmental focus. It is also plausible that, in an increasingly competitive academic environment, the urgency to report a rare vascular complication may have contributed to the omission of initial imaging findings. It has been observed that when radiologists—particularly interventional radiologists—conduct direct medical history interviews with patients, it not only improves diagnostic accuracy but also enhances patient satisfaction [11]. This interaction allows radiologists to elicit clinically relevant details that may be overlooked in standard referral notes, and correlate imaging findings more precisely. In our case, this direct interaction helped to know additional details—such as the delayed onset of abdominal distension, flank pain and oliguria, and confirmation of the site of catheter placement from the primary doctor's operative notes—that were not mentioned or differed from those reported by Dhabalia et al. This may also explain the differences in case history between our version and the earlier publication by Dhabalia et al., despite both describing the same patient. This shows the importance of integrating radiological and clinical perspectives to ensure accurate diagnosis and comprehensive documentation.

Post silver nitrate instillation follow-up plain radiography generally does not show any findings. However, a plain abdominal radiograph showed an unusual feature of pelvi-calyceal cast formation following this treatment, which is due to silver deposition [3]. Washing with normal saline after silver nitrate instillation induces precipitation of silver chloride, which is an opaque precipitate and causes obstruction; therefore, washing with saline is not recommended.

The mechanism for the development of pseudoaneurysm following silver nitrate instillation is not known. There is pyelolymphatic reflux (Figure 3c), which induces an inflammatory reaction in the lymphatics. In the present case, as the patient presented with hematuria 5 days after sclerotherapy, superadded infection to already sensitive and weakened vessels adjacent to the pelvicalyceal system is a very likely possibility for pseudoaneurysm formation. Chemical injury due to reflux into renal parenchyma or vessels, or pressure-related (rapid instillation) trauma, even in normal recommended concentration and volume, are possible contributors. In our case, in addition to an obvious pseudoaneurysm, multiple intrarenal branches show a beaded appearance suggestive of more likely chemical inflammation (Figure 3b).

Notably, despite the left kidney being normal, the patient developed oliguria 5 days post sclerotherapy. The reasons for oliguria could be similar to those described for reflex anuria—a condition in which renal shutdown occurs due to chemical irritation, ureteric manipulation or trauma to one kidney or ureter, leading to suppression of renal function [12]. Though seen only in the right kidney in our case, this hypothesis may explain the absence of contrast extravasation on contrast-enhanced CT scan (performed at primary hospital), lack of nephrogram or contrast excretion on angiography, and the patient's eventual recovery with conservative management. These findings suggest a transient functional shutdown rather than irreversible structural damage.

In conclusion, this case highlights the complex and multifaceted complications that can arise following silver nitrate instillation for chyluria even at the recommended dose. Although a version of this case was previously published, our report offers a more complete clinical narrative, correlating history and radiological findings. It also illustrates how direct radiologist–patient interaction can enrich clinical history and improve diagnostic accuracy. For postgraduate learners, this case serves as a reminder that rare complications demand detailed history, careful imaging review, and open communication across specialities.

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Patient consent and ethics committee approval

This manuscript does not contain any identifiable patient information. All clinical details and images have been fully anonymised. Due to the retrospective nature of the report and complete de-identification of data, patient consent and ethics committee approval are not required.

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