Foreign body in the ureter: A particle of glue after transarterial embolization of a renal pseudoaneurysm during percutaneous nephrostomy

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Abstract

Reports on foreign bodies within the ureter are extremely rare in the literature. Herein, we present a case of a foreign body in a ureter, specifically a particle of glue resulting from transarterial embolization of a renal pseudoaneurysm secondary to percutaneous nephrostomy. Emergent transarterial embolization was required due to life-threatening active bleeding of the pseudoaneurysm. However, the glue material subsequently fell into the ureter where it became a foreign body, resulting in obstructive uropathy. Several surgical interventions, including endoscopic and laparoscopic methods, were performed to retrieve the foreign body, but these attempts were unsuccessful. Finally, the glue material was spontaneously passed out by chance. To the best of our knowledge, this type of complication (a glue particle left over from an embolization procedure migrating into the urinary collecting system) has never been reported. We recommend close follow-up examinations after transarterial embolization for renal pseudoaneurysm in order to avoid possible obstructive uropathy caused by glue materials or coils.

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1. Introduction

Percutaneous renal procedures are commonly used to manage various renal pathologic lesions. The most serious complications are hemorrhage and vascular lesions such as arteriovenous fistula and pseudoaneurysm. Meanwhile, foreign bodies within the ureter are extremely rare. Iatrogenic foreign bodies in the ureter that have been reported in the literature are mostly fragmented ureteral stents and medical instruments.1 Here, we report a patient who received transarterial embolization (TAE) therapy for active bleeding of a right renal pseudoaneurysm, a complication of previous percutaneous nephrostomy (PCN) procedure. However, part of the glue material detached and later turned out to be a ureteral foreign body, causing obstructive uropathy which was difficult to retrieve even by percutaneous nephroscopy, ureteroscopy, and open ureterotomy. Fortunately, the glue particle was spontaneously expelled.

2. Case report

A 61-year-old female patient was hospitalized at a local hospital and received PCN due to severe right-side hydrenephrosis secondary to ureteral stricture. Gross hematuria occurred 2 weeks later, and pseudoaneurysm of the right kidney was diagnosed by angiography. The patient presented to our emergency department due to massive hematuria, low blood pressure (67/39 mmHg), and a decreased hemoglobin (8.4 g/dL). After resuscitation, including fluid challenge and blood transfusion, an abdominal computed tomography (CT) scan was arranged, revealing a pseudoaneurysm in the right renal artery near the renal pelvis with blood clots that were retained in the urinary collecting system and a large aneurysm in the right internal iliac artery (Fig. 1A and 1B). The obstruction level of the right ureter was just anterior to the
right internal iliac artery aneurysm. Angiography was immediately performed after removal of the PCN drainage tube. Active bleeding from the pseudoaneurysm at a branch of the right renal artery with contrast extravasation into the renal pelvis was shown (Fig. 2A and 2B). Embolization with n-butyl cyanoacrylate (NBCA) (Ingenor, Minvasys, France) glue, which is an embolic agent with a radiopaque character on X-ray films, was mixed with Lipiodol in a 1:1 ratio. The bleeding was successfully stopped. However, right-side hydronephrosis still persisted 1 week after the TAE. Antegrade pyelography showed that part of the glue material had dislodged at the right ureteropelvic junction with obstructive uropathy (Fig. 3A, 3B, and 3C). At first, we intended to retrieve the foreign body via percutaneous nephroscopy, but this was impossible because the glue particle could not be found within the renal pelvis. We thought the particle had migrated into the ureter where it was unreachable due to the sharp angle of the insertion route of the nephroscope. Ureteroscopy was then attempted in order to remove the glue, but this failed due to the severe angulation of the middle-third ureter at the level of the right internal iliac artery aneurysm, which made advancing the ureteroscope impossible. Therefore, the PCN drainage tube was replaced. Five months later, follow-up antegrade pyelography showed that the glue particle was still retained in the right upper-third ureter with proximal hydronephrosis (Fig. 4A and 4B). Unfortunately, recurrent massive bleeding from the pseudoaneurysm took place 6 months after the first TAE. Another TAE was performed using coils instead, and hemostasis was successfully achieved. In the subsequent months, repeated urinary tract infections with hematuria related to the ureteral glue particle obstruction presented, and the patient had to undergo frequent PCN drainage and ureteral stent catheterization. Thus, we performed an open ureterotomy to remove the foreign body, but we failed to locate the glue material due to severe adhesion of the ureter and the right internal iliac artery aneurysm. Unexpectedly, the glue particle was spontaneously
expelled, according to the patient’s statement, and this was verified by imaging at an 18-month follow-up examination (Fig. 5). The patient is now doing well.

3. Discussion

Pseudoaneurysm of the renal artery is a well-documented complication following various invasive procedures such as PCN, percutaneous renal biopsy, percutaneous nephrolithotomy (PCNL), and partial nephrectomy. The reported incidence of pseudoaneurysm is 0.36–1.0% after PCNL and 2.0–3.4% after percutaneous needle biopsy of a renal allograft. In a study on 2108 patients who received various percutaneous invasive procedures, the incidence of pseudoaneurysm was 0.9%. Among those with pseudoaneurysm, most were either asymptomatic or presented with minor symptoms that were self-limiting. Flank pain, gross hematuria, arterial bruits, hypertension, and deterioration of renal function may be the symptoms and signs if a pseudoaneurysm presents. When continuous bleeding occurs, either surgery or TAE should be considered as the therapeutic procedure. Cases treated with successful TAE using glue or coil have been widely reported and could be considered the treatment of choice in terms of preservation of the affected kidney. The reported success rate of TAE is up to 100%, and, therefore, it is considered the gold standard for treatment of pseudoaneurysm with active bleeding.

Life-threatening massive gross hematuria requiring blood transfusion and emergent TAE makes our case uncommon. A combination of NBCA and Lipiodol was used as the embolization agent to treat our patient, but part of the glue material eroded into the renal pelvis, causing subsequent obstructive uropathy 1 week after the procedure. This condition might seriously impair renal function in those with chronic renal failure, a solitary kidney, or a transplanted kidney. A small case series using the same mixture of NBCA and Lipiodol was reported, demonstrating excellent results in five patients after 1 year of follow-up. To our knowledge, the dislodgment of the glue material after TAE has never been reported in the literature, whereas spontaneous passage of embolization coil...
through the urinary collecting system has been described in two case reports.\textsuperscript{9,10} This reminds us that it is necessary to closely follow all patients after TAE with either glue or coils, although they are reported as safe in previous studies.

In our case, the dislodged glue material as the iatrogenic foreign body of the upper urinary tract was difficult to manage because of the right internal iliac artery aneurysm, resulting in both the ureteroscopy and open ureterotomy to fail. Foreign bodies in the ureter are extremely rare and usually result from external violence, typically due to a gunshot or grenade wound.\textsuperscript{1} Occasionally, the ureteral foreign bodies are iatrogenic in nature and associated with fragmented ureteral stents or medical instrumentation. Our case was an iatrogenic foreign body following TAE, a rarely reported cause of a foreign body within the ureter.

In conclusion, we should keep in mind the complications of renal pseudoaneurysm or arteriovenous fistula when gross hematuria occurs after various percutaneous procedures. Early diagnosis and management by TAE is essential and should be the treatment of choice. In addition, close follow-up examinations after the procedure should be performed in case of possible obstructive uropathy by the embolization material.

References


Fig. 5. KUB at 18 months showing no glue particles after they were spontaneously expelled.