Percutaneous Renal Ablation in Patient with Persistent Urine Leaks

CHIEN-CHUNG TSAI¹,4 LARRY SY² CHING-CHYUA SU³ SHU-JEN HAN⁴

Departments of Radiology¹, Urology², Surgery³, Tian-Sheng Memorial Hospital
Department of Radiology⁴, Tainan Municipal Hospital

Nephrectomy is not always possible and is technically demanding in cases of severe fibrosis due to previous radiation, multiple operations, or repeated renal infections. We report a case of persistent urine leaks after partial nephrectomy treated by percutaneous transcatheter renal artery embolization for renal ablation.

A 58-year old male patient was admitted. He had a history of urinary tract stone with obstructive uropathy and a previous surgery for stone removal. Due to recurrent renal calculi and infection, the attending physician was prompted to perform nephrectomy. However, severe adhesion and fibrosis were found during the operation and partial nephrectomy was performed instead of complete nephrectomy.

Persistent urine leakage for 5 months was noted from a rubber drain placed in peri-renal space during operation. The patient was therefore referred to our department for renal artery embolization.

A combination of coil-spring emboli and polyvinyl alcohol (PVA) was used as an embolic agent for complete and permanent occlusion of the renal artery. Urine leaks resolved within 24-hours after embolization with no evidence of procedure-related complication.

This paper describes the efficacy of percutaneous transcatheter renal ablation as an alternative to nephrectomy in cases of persistent urine leaks.

Key words: Renal arteries, therapeutic embolization; Urine, extravasation

CASE REPORT

A 58-year old male patient was admitted due to urine leaks for five months after partial nephrectomy. He underwent surgical intervention 12 years ago for the removal of renal calculi. Recurrent renal stones with concomitant obstructive uropathy and infection occurred, thus nephrectomy was done five months ago. However, severe adhesion and fibrosis were noted causing difficulty during surgical dissection. Partial nephrectomy was performed instead of complete nephrectomy. There was a residual functioning renal parenchyma and excretion of urine was expected. A rubber drain was placed at the peri-renal space. Persistent urine leaks from the rubber drain was noted after the operation that affected his quality of life. Therefore, he was referred to our department for renal artery embolization.

On admission, he was afebrile with stable vital signs. There was nothing particular in the physical examination. A rubber drain at the right flank region was in place. CT scan showed residual parenchyma of upper pole of right kidney. Broad – spectrum antibiotics were administered intravenously three days before and after the embolization. Selective right renal angiography showed residual upper pole of right kidney with patent main renal artery and dorsal arterial branch (Fig. 1). Superselective placement of the catheter into the right renal artery and 0.1 g of polyvinyl alcohol (Ultra Drivalon, Nycomed Amersham, France, size 150-250 um) particles mixed with 15 ml contrast medium was slowly infused under fluoroscopic monitoring. Injection of contrast medium confirmed stasis of the renal flow and two pieces of coil-spring emboli, with a diameter of 0.38-5-5 mm (Cook, USA) were deployed thereafter. Post-embolization angiogram showed complete occlusion of the renal artery (Fig. 2). Mild flank discomfort lasting for 48-hour was noted after embolization. Urine leaks stop within 24-hours after embolization with no evidence of recurrence after 20 months of follow-up.
DISCUSSION

Renal artery embolization is an accepted method of treating advanced or unresectable renal cell carcinoma. Preoperative complete renal embolization has also been done to decrease blood loss during nephrectomy, especially in large hypervascular tumor [1]. This technique has also been used as treatment of various benign diseases such as end stage renal disease with massive proteinuria or uncontrollable hypertension [2-3].

Hirao et al reported 6 patients with nonfunctioning hydronephrosis who were treated with complete renal embolization and percutaneous sclerotherapy of renal pelvis with absolute alcohol [4]. We had reported our clinical experience with renal artery embolization in the treatment of pseudoaneurysm caused by percutaneous drainage catheter and also for the renal angiomyolipoma [5-6].

Renal artery embolization is a safe and effective treatment of various conditions. But one must be aware of its serious potential complications such as inadvertent embolization of untargetted organ, lower extremity gangrene, bowel infarction and spinal cord infarction all have been reported [7-9].

Hypertension is a potential complication when there is incomplete infarction of the kidney. It may be due to increased renin production of the ischemic renal parenchyma [10]. Therefore, it is very important that complete ablation of arterial inflow must be done.

Our patient has persistent urine leaks for five months which has affected the quality of his life due to the external drainage tube. Surgical nephrectomy in this case is hazardous and technically demanding. Therefore, percutaneous transcatheter renal artery embolization is an alternative choice of treatment.

Different embolic materials have been used clinically and absolute ethanol seems to provide the most efficient devascularization of the kidney [11-12]. Ethanol has an advantage over the other vascular embolization agents since vascular recanalization and collateral vessels are avoided. However, severe complications may occur because of the radiolucency of ethanol that cannot be opacified under fluoroscopy. Some authors preferred to use ethanol emulsified with iodized oil, allowing visualization during injection.

In this case, we applied both liquid and mechanical permanent embolic agents to occlude the renal artery completely. Polyvinyl alcohol (PVA) prevented the opening of collateral vessels while the coil-spring emboli plugged the targeted artery for immediate and permanent interruption of arterial flow. This combination technique can avoid revascularization of the proximal renal artery via short collaterals such as ureteral or diaphragmatic arteries, which were not initially embolized with PVA.

We conclude that percutaneous transcatheter renal artery embolization using a combination of PVA and coil spring emboli is a safe and effective method for renal ablation. It is an alternative to surgical nephrectomy, as presented in this case.
REFERENCES

7. Woodside J, Schwarz H, Bergreen P. Peripheral embolization complicating bilateral renal infarction with gelfoam. AJR Am J Roentgenol 1976; 126: 1033
經皮腎臟栓塞術使用於持續性尿液遠漏病人

蔡建中14 施文苑2 蘇清泉3 韓淑珍4

屏東東港安泰醫院 放射科1 泌尿科2 外科3
台南市立醫院 放射科4

腎切除對於因先前放射線治療，多次開刀或因反覆性感染的病人，並非總是可行亦可能有其技術上困難。

本文報告一例，因不成功的腎切除導致持續性尿液遠漏，利用經皮導管腎動脈栓塞術做腎
剝離治療。

一位58歲男性病患曾有泌尿道結石造成泌尿道阻塞的病史，也曾接受手術移除結石。因反
覆的泌尿道結石及感染，而被建議做腎切除，可是在手術中發現嚴重的癥痕及纖維化，因此只
做了部分腎切除。術後因為有持續性尿液遠漏，於是轉介做經皮導管腎動脈栓塞術。

栓塞物是選擇線圈－彈簧栓子及PVA的混合物以達成完全及永久性腎動脈栓塞，栓塞後
24小時內尿液遠漏消失，而且沒有因栓塞步驟引起的後遺症。本文旨在描述針對尿液遠漏以經
皮導管腎剝離術做為腎切除的另一選擇。

關鍵詞：尿液遠漏；腎動脈栓塞