

Case report of renal pelvis squamous cell carcinoma with tumor embolus in autosomal dominant polycystic kidney disease

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Abstract

Introduction: Autosomal dominant polycystic kidney disease (ADPKD) is a multisystem hereditary disease characterized by formation of cysts in the ductal organs. Renal pelvis malignancy in ADPKD is very rare and sporadically reported in the previous literature. Here, we report the first case of renal pelvis squamous cell carcinoma with tumor embolus in a 35-year-old ADPKD patient. The patient presented with 3 months of persistent backache and intermittent fever, and was initially diagnosed as intracystic hemorrhage with inferior vena cava thrombosis formation. As a result, he received anticoagulation therapy in a local hospital. However, his backache got worsened during the therapy, and he lost 10 kg of his body weight from the onset of illness. In our hospital, computed tomography demonstrated a heterogeneous right renal mass as well as emboli in the inferior vena cava and bilateral renal veins. Positron emission tomography computed tomography and biopsy were also performed, but the results were equivocal. Considering the patient's willingness and the potential malignancy, we performed thoracoabdominal nephrectomy and embolectomy, and histological examination made the diagnosis of renal pelvis squamous cell carcinoma. After adjuvant chemotherapy including paclitaxel and carboplatin, the patient obtained improved physical status and was disease free at the 6-month follow-up. Although rare, renal pelvis squamous cell carcinoma should be considered in the differential diagnosis of renal mass in ADPKD patients.

Conclusion: Our case suggested surgery combined with adjuvant chemotherapy might be effective treatments in such a condition.

Abbreviations: ADPKD = autosomal dominant polycystic kidney disease, CT = computed tomography, IVC = inferior vena cava, PET-CT = whole-body positron emission tomography computed tomography.

Keywords: ADPKD, chemotherapy, embolectomy, squamous cell carcinoma, tumor embolus

1. Introduction

Autosomal dominant polycystic kidney disease (ADPKD) is a multisystem genetic disorder characterized by formation of cysts in the ductal organs, primarily the kidneys and liver. It is caused by mutations of PKD1 or PKD2, and affects approximately 1 in 400 to 1000 individuals.^[1] The manifestations of ADPKD mainly include abdominal discomfort, flank pain, hematuria, and hypertension. The expanding bilateral renal cysts lead to the progressively decreased renal function, and almost half of ADPKD patients develop end-stage renal disease by the age of 60.^[2]

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Renal malignancy is infrequent in ADPKD and difficult to detect due to its nonspecific symptoms and the distorted renal anatomy. Here, we present an extremely rare case of renal pelvis squamous cell carcinoma in ADPKD, with the formation of tumor emboli in the inferior vena cava (IVC) and bilateral renal veins. This case is unique in that both squamous cell carcinoma of renal pelvis and tumor embolus have not been previously reported in ADPKD.

2. Case report

In March 2015, a 35-year-old man with a history of ADPKD presented with 1 week of persistent backache and intermittent fever. The pain was dull and persistent, with radiation to the right flank. At a local hospital, an abdominal computed tomography (CT) revealed multiple right renal cysts with intracystic hemorrhage. After 3 months of conservative treatment at the local hospital, the patient's symptoms did not relieve. As a result, an enhanced CT was performed, showing a heterogeneous right renal mass with the thrombosis formation in the IVC. The patient then received anticoagulation therapy and was closely followed up in the following 2 months. However, his backache was worsening and he lost 10 kg of his body weight from the onset of illness. Ultimately, the patient turned to our hospital for help.

On examination, he was emaciated, with palpable firm mass and mild tenderness in the right abdomen. Laboratory tests revealed moderate anemia (hemoglobin 86 g/L), elevated creatinine (125 μmol/L) and erythrocyte sedimentation rate (94 mm/h). Prothrombin time and activated partial thromboplastin time were also prolonged. Urine cytology was negative for malignant

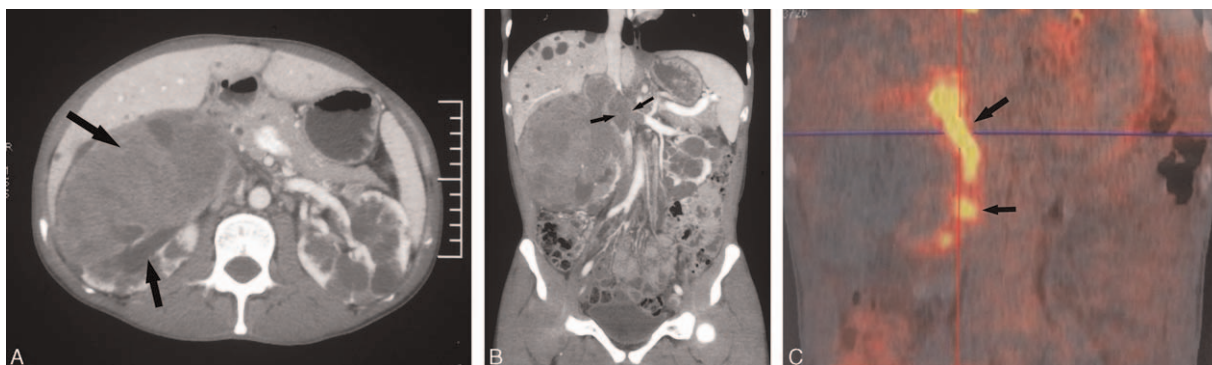


Figure 1. Renal pelvic squamous cell carcinoma with the tumor emboli in the IVC and bilateral renal veins in an ADPKD patient. (A) Axial CT demonstrated a 139 × 87 mm² heterogeneous mass in the right kidney with slight enhancement (arrows). (B) Coronal CT showed IVC and bilateral renal veins were full of emboli (arrows). (C) PET-CT showed no radioactivity uptake in the right renal mass and sporadically increased uptake in the emboli in the IVC.

urothelial cells. Ultrasonography and enhanced CT demonstrated a 139 × 87 mm² right renal mass and emboli in the IVC and bilateral renal veins, as well as cysts in the left kidney (A). The mass was heterogeneous and slightly enhanced, and the embolus had already reached to the level of porta hepatis (B). The glomerular filtration rate of right kidney was 41.5 mL/min/1.73 m², and the glomerular filtration rate of left kidney was 35.2 mL/min/1.73 m². Positron emission tomography computed tomography (PET-CT) showed no radioactivity uptake in the mass and sporadically increased uptake in the embolus in the IVC (maximum standardized uptake value, 3.8, C). No evidence of distant metastasis was revealed.

Based on all examinations, the patient was diagnosed as renal cell carcinoma with the tumor embolization in the IVC and bilateral renal veins. Targeted therapy was considered to degrade the staging and afford operation possibility, and a biopsy of the right renal mass was performed to confirm the diagnosis. However, pathologic examination revealed fractured squamous epithelium and lamellar keratotic substance, thus a tentative diagnosis of epidermoid cyst or mature teratoma was made. In view of the patient’s strong willingness to undergo a surgery, the potential malignancy, and the progressing course of disease, we carefully designed and performed right thoracoabdominal nephrectomy and embolectomy. The resection was successful and no lymph node enlargement was observed intraoperatively. Grossly, the vast majority of the right renal cysts were occupied by firm and grayish white neoplasms (Fig. 2A). Pathologic examination established the final diagnosis of well-differentiated renal pelvis squamous cell carcinoma with negative margins (Fig. 2B). The patient underwent an uneventful recovery and received 4 cycles of adjuvant chemotherapy. The adjuvant chemotherapy, including paclitaxel (240 mg, day 1) and carboplatin (250 mg, day 2), was performed every 21 days. At 6 months of follow-up, he gained 5 kg weight with complete resolution of symptoms, and showed no evidence of recurrence or metastasis.

3. Discussion

It was estimated that 35% to 40% of ADPKD patients will develop some form of cancer during their lifetime, and 25% of individuals will die of their cancer.^[3] The most common malignancy observed in ADPKD patients is renal cell carcinoma, while collecting duct carcinomas, non-Hodgkin lymphoma and renal pelvis urothelial cell carcinoma is also sporadically reported.^[4-6] In a previous study, 10 (4.2%) papillary renal cell

carcinoma, 5 (2.1%) clear cell renal cell carcinoma, and 1(0.4%) papillary noninvasive urothelial cancer were found in 240 ADPKD patients undergoing renal surgery.^[7]

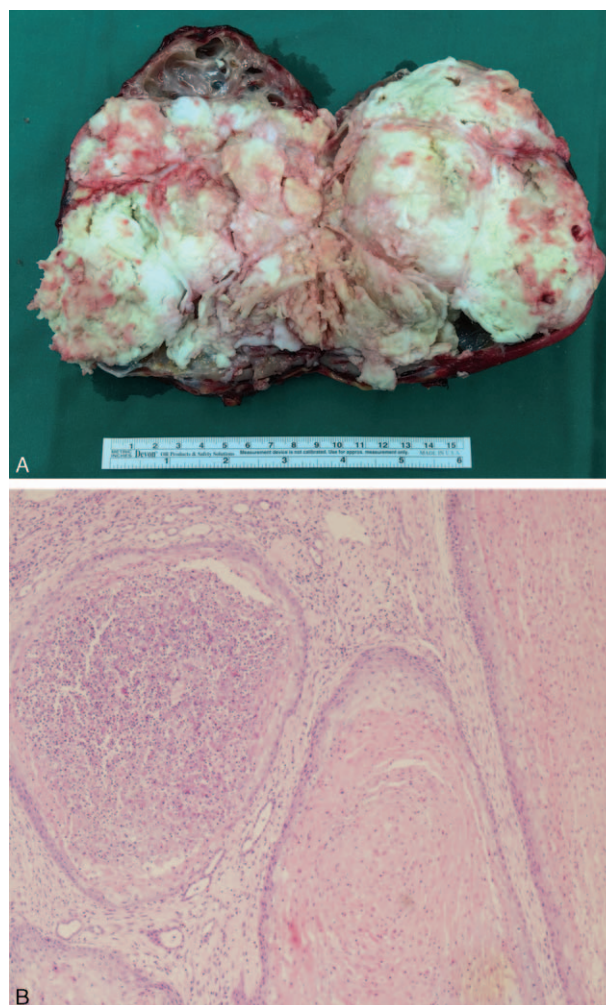


Figure 2. Pathologic examination of the ADPKD patient. (A) Grossly, the excised right kidney (bisected) was with intact renal capsule and showed a grayish white cut surface, and firm neoplasms occupied almost all cysts in the right kidney. (B) Histologically, the squamous carcinoma cells in the cysts were well differentiated, as evidenced by pink keratin pearls.

The pathogenesis of renal malignancy in ADPKD patients still remains obscure. Some investigators have proposed that tubular epithelial hyperplasia may contribute to the formation of carcinomas in ADPKD.^[8] However, ADPKD is generally recognized as a disorder of the renal tubular epithelium rather than the urothelial epithelium. Thus, the etiologies for urothelial neoplasms in ADPKD might be associated with the common factors, such as prolonged exposure to urinary carcinogens caused by obstruction and chronic inflammation related to infection or nephrolithiasis.^[9]

In the present case, we think the challenge of diagnosis and treatment includes 2 aspects—the renal mass and the embolus. Due to the distorted renal architecture, the nature of renal mass in ADPKD is difficult to be determined merely by ultrasonography and computed tomography. Thus, additional diagnostic modalities such as PET-CT and biopsy were performed on our patient. However, the results were also equivocal, which caused hardship in the choice of treatment protocols. On the other hand, the tumor embolus in this patient was initially misdiagnosed as thrombosis, because the relation between intracystic hemorrhage and IVC thrombosis in ADPKD had been well documented.^[10] In addition, IVC appeared to be pressed by an enlarged renal cyst located at the upper pole of the right kidney in our patient, so IVC thrombosis was assumed, because the extrinsic mechanical compression of renal cysts was reported to induce IVC thrombosis even in healthy individuals.^[11] Fortunately, the PET-CT provided useful information to distinguish tumor embolus from thrombosis, as the latter is generally with no radioactivity uptake. The ambiguous renal mass, progressive embolus after anticoagulation therapy, and rapid weight loss also supported the diagnosis of tumor embolus. Thus, considering the potential malignancy and patient's willingness, we performed the operation and achieved satisfactory outcome.

To the best of our knowledge, this is the first case of concurrent renal pelvis squamous cell carcinoma and tumor embolus ever reported in an ADPKD patient. In this case, we also noticed that PET-CT showed increased radioactivity uptake in the tumor emboli, but not in the primary tumor. That might be due to the relatively more invasive intrinsic biology of the cells in tumor emboli. Although rare, it should be considered in the differential diagnosis of renal mass and vein embolus in ADPKD. After

surgery and adjuvant chemotherapy, our patient obtained complete resolution of symptoms and obviously improved physical status, suggesting these treatment modalities may be helpful in such a condition.

4. Consent

Written informed consent was obtained from the patient before and after all procedures, and for the publication of this report.

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