Clinical Case Report

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Squamous cell carcinoma of the renal pelvis presenting as an integumentary neoplasm of the flank

A case report

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Abstract

Rationale: Although chronic pyelonephritis and urolithiasis are established risk factors for squamous cell carcinoma (SCC), only a minority of patients with chronic urolithiasis eventually develop SCC. It is believed that the chronic irritation leads to squamous cell metaplasia that may subsequently develop into SCC. Although studies show that SSC generally spreads locally with associated symptoms of lymphadenopathy, metastasis to the lungs and liver have also been reported. However, cases spreading to the flank have yet to be reported. Therefore, the use of reconstructive techniques for the repair of extensive soft tissue defects in the flank region after extended retroperitoneal resection, is unknown.

Patient concerns: We report a 54-year-old man who presented with a 1-month history of an enlarged skin mass on the right flank.

Diagnoses: The patient was subsequently diagnosed with metastatic SCC involving the patient's integumentary system near the flank region proximal to the right kidney following percutaneous nephrostomy.

Interventions: The skin mass and the surrounding muscle tissue of the right flank were excised with a wide resection margin including radial nephrectomy. The soft tissue defect after resection was reconstructed using a unilateral gluteus maximus myocutaneous V-Y advancement flap.

Outcomes: No recurrence of the SSC was found on follow-up CT performed 12 months postoperatively.

Lessons: In patients with long-standing nephrolithiasis complicated by staghorn stone-related infections, biopsies from suspicious lesions detected during percutaneous nephrolithotomy may facilitate early diagnosis. The modified gluteus maximus V-Y advancement flap may be a useful technique for the reconstruction of extensive soft-tissue defects involving the flank region.

Abbreviations: CT = computed tomography, SCC = squamous cell carcinoma.

Keywords: gluteus maximus myocutaneous flap, kidney, percutaneous nephrolithotomy, squamous cell carcinoma

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1. Introduction

Squamous cell carcinoma (SCC) of the renal collecting system is rare, accounting only for 0.5% to 0.8% of malignant renal tumors.[1] The risk factors for the development of SCC of the renal pelvis include renal calculi, infections, endogenous and exogenous chemicals, radiation therapy and prior percutaneous nephrolithotomy (PCNL).[2–4] Although studies show that SSC generally spreads locally with associated symptoms of regional lymphadenopathy, metastasis to the lungs, liver, and bone have also been reported.[5] To date, no cases have been reported indicating metastatic spread to the integumentary system near the flank region. Therefore, the role of reconstructive technique in the repair of extensive soft tissue defects of flank region after extended retroperitoneal resection is unknown. Here, we report a case of SCC involving the renal pelvis spreading along the remnant percutaneous nephrostomy track to the skin on the flank region proximal to the right kidney in a 54-year-old-man. We suggest that the modified gluteus maximus V-Y advancement flap may be a useful technique for the reconstruction of extensive soft tissue defects involving the flank region.

2. Consent

The patient signed informed consent for publication of this case report and any accompanying image. The ethical approval of this

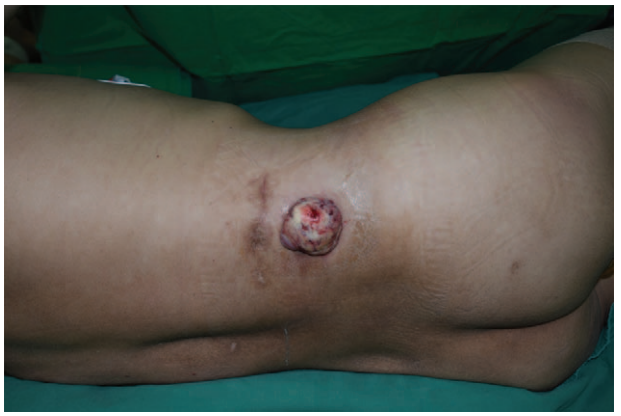

Figure 1. An erythematous nodular ulcerative skin mass measuring approximately 4.0 × 5.0 cm is located at the previous percutaneous nephrostomy site on the right flank. Above this area, a transverse scar from the percutaneous nephrolithotomy is observed.

study was waived by the ethics committee of Chonbuk National University Hospital, because this study was case report and the number of patients was less than 3.

3. Case report

In February 2018, a 54-year-old man presented with a 1-month history of progressively enlarged integumentary mass located on his right flank. The patient reported that he was treated for staghorn calculi involving both kidneys via percutaneous nephrolithotomy (PCNL) 13 years ago. Three months prior to the clinical presentation, the patient was treated for pyelonephritis and subjected to PCNL of the right kidney in the urology department. Physical examination revealed an erythematous nodular ulcerative skin mass measuring approximately 4.0 × 5.0 cm in size and located near the previous PCNL site on the right flank (Fig. 1). The laboratory results indicated an abnormally high erythrocyte sedimentation rate of 41 mm/h and a high sensitivity C-reactive protein level of 18.2 mg/L. The other laboratory results were within the normal range. The patient's urinalysis revealed microscopic hematuria and pyuria.

Radiographs of the kidney, ureter and bladder (KUB) obtained 3 months previously indicated nephrolithiasis with staghorn renal calculi within the right kidney (Fig. 2). Compared with previous radiographs contrast computed tomography (CT) of the abdomino-pelvic region revealed increasingly fragmented staghorn calculus. Multiple cysts measuring less than 2 cm were also identified in the right kidney (Fig. 3). Abdominal magnetic resonance imaging (MRI) with enhancement revealed a 4.0 × 5.0 cm well-defined mass of the integumentary system on the right flank. In addition, increased signaling was detected around the dermis and the muscles connected to the right kidney. A lesion with a parenchymal invasion measuring approximately 3.0 cm in diameter at the lower pole of the right kidney was observed (Fig. 4). However, no significant lymphadenopathy was identified. Chest CT and bone scan did not reveal any metastasis. A histopathological examination of the skin mass based on incisional biopsy confirmed the diagnosis of a well-differentiated SCC.

The skin mass and the surrounding muscle tissue of the right flank were excised with a wide resection margin and radial nephrectomy was performed (Fig. 5a). The extensive soft tissue defect after resection was reconstructed using a V-Y unilateral

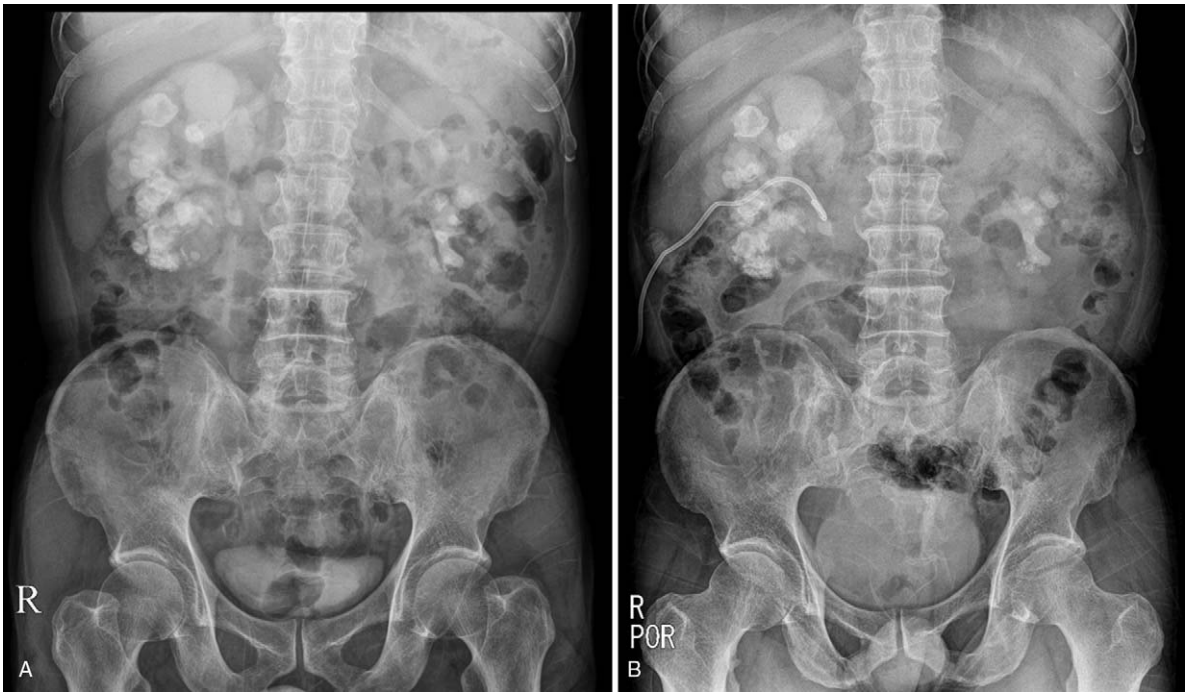

Figure 2. Radiographs of the kidney, ureter and bladder taken 3 months prior to presentation to the clinic. (A) Initial KUB of a 54-year-old male patient with right flank pain shows renal calculi associated with fragmented staghorn calculi in the right kidney. (B) Percutaneous nephrostomy of the right kidney was performed in the urology department.

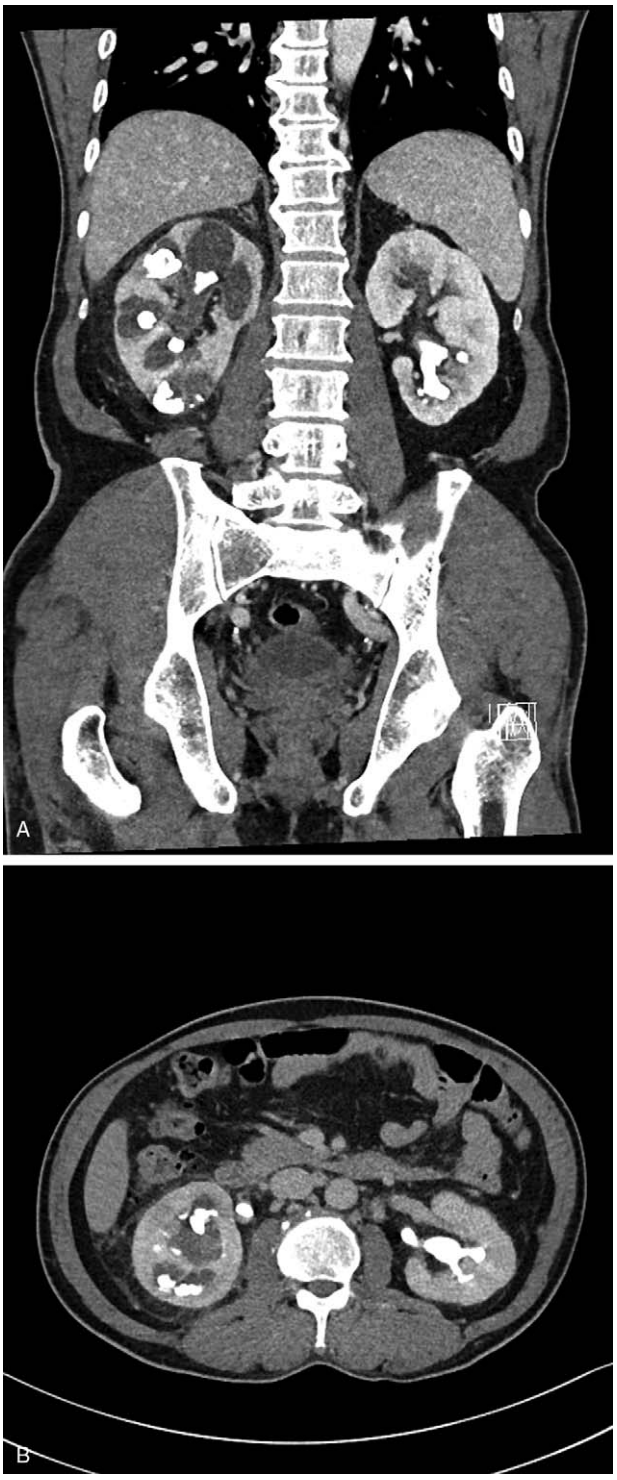

Figure 3. Contrast computed tomography (CT) of abdomen and pelvis taken 3 months prior to presentation to the clinic. (A) and (B) The contrast CT of the abdomen and pelvis reveals increasingly fragmented staghorn calculi compared with those detected in the kidney, ureter and bladder radiographs. Multiple cysts measuring less than 2 cm are also seen in the right kidney.

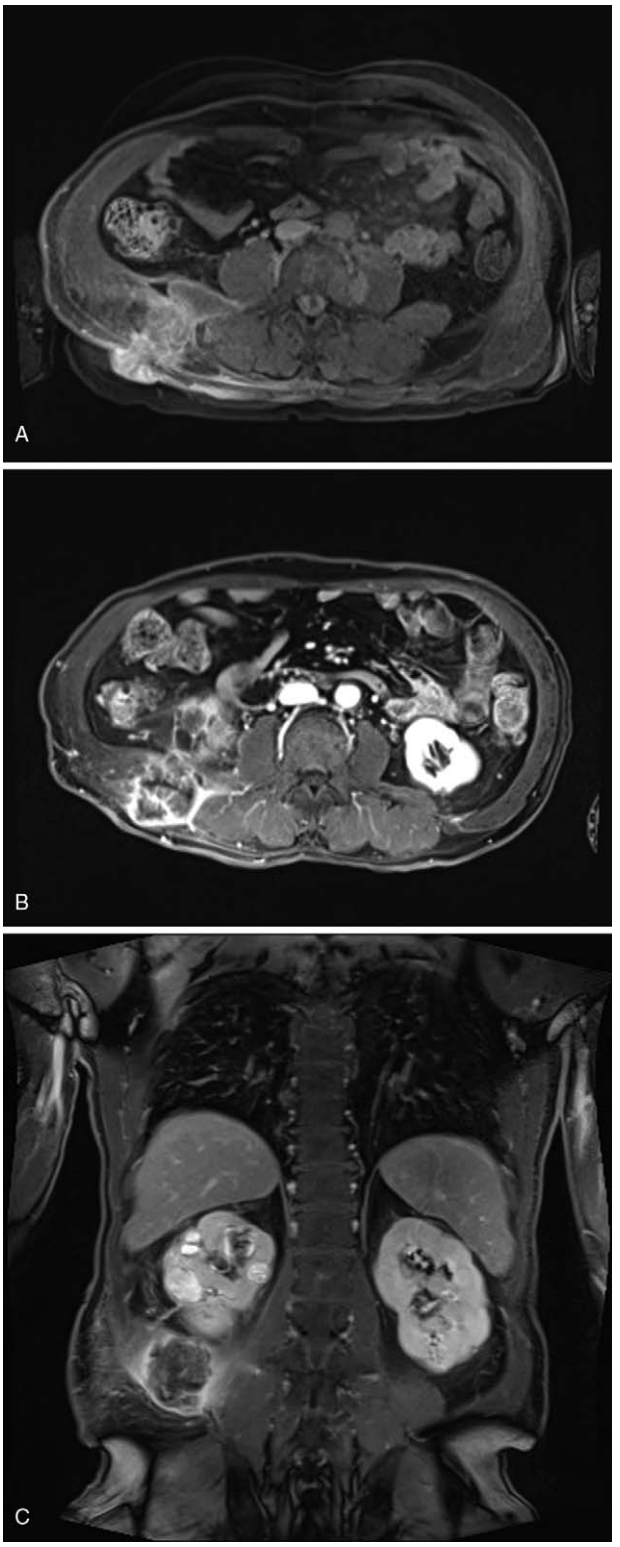

Figure 4. Magnetic resonance imaging (MRI) of the abdomen showing enhancement of the lesion. (A) T1 fat suppression coronal images show a 4.0 × 5.0 cm well-defined mass of the integumentary system near the right flank. (B) and (C) T1 fat suppression coronal and transverse images reveal multiple signals around the dermis and muscles connected to the right kidney. A lesion with parenchymal invasion measuring approximately 3.0 cm in diameter near the lower pole of the right kidney is shown.

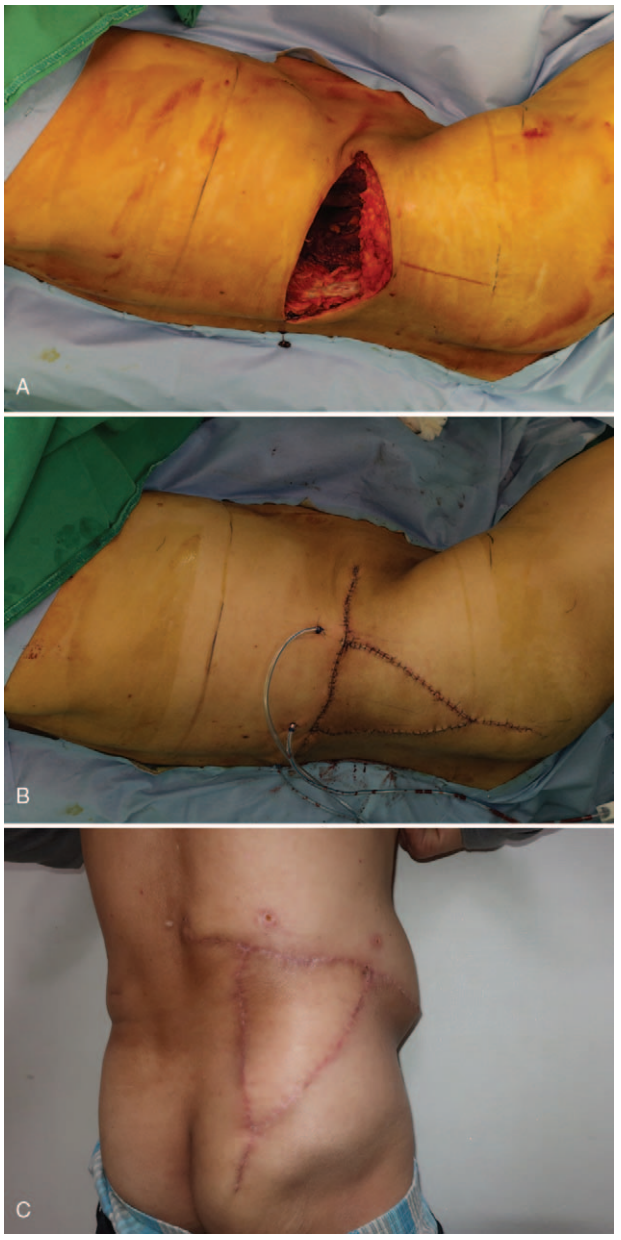

Figure 5. Gluteus maximus myocutaneous flap was used for reconstruction after wide resection of the flank via nephrectomy. (A) Clinical image was obtained after wide resection of the flank using nephrectomy in the lateral decubitus position. (B) Extensive soft tissue defects were closed using a unilateral gluteus maximus myocutaneous V-Y flap. (C) Clinical image was obtained 1 month after surgery.

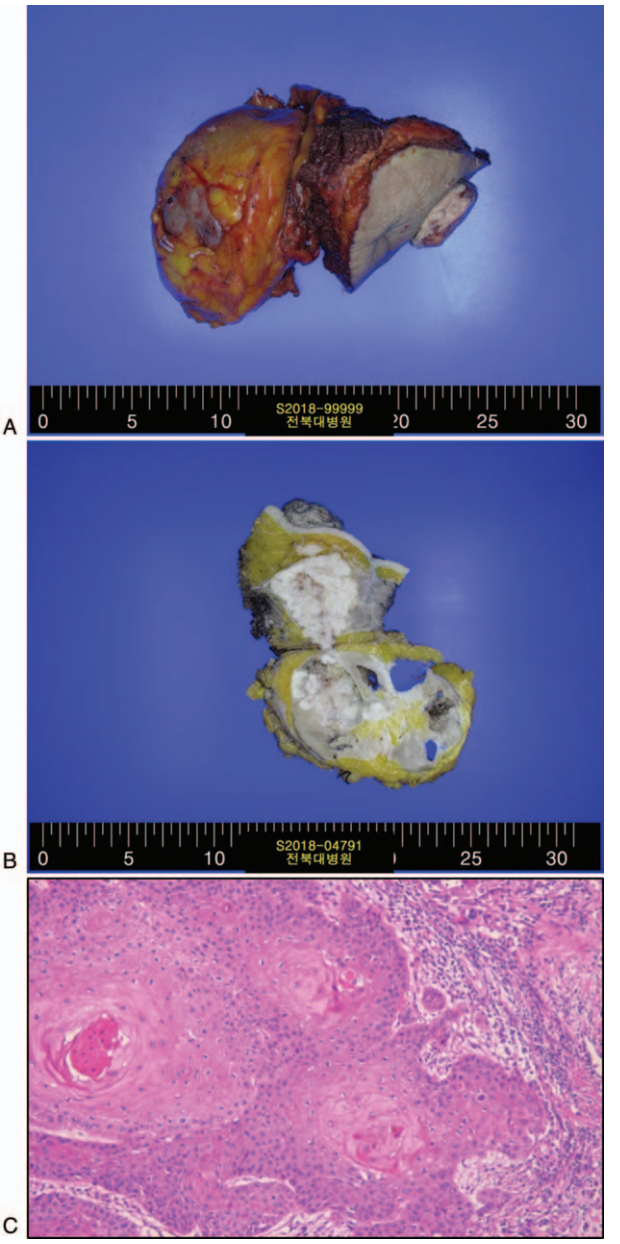

Figure 6. Surgical and histological findings. (A) The dimensions of the resected mass were 20 cm × 12 cm × 11 cm. (B) The mass is white with an unclear boundary including the surrounding tissue on the cut surface. The mass penetrated the subcutaneous fat layer and the surrounding muscle tissue, and the right renal parenchyma, renal pelvis and Gerota's fascia. (C) Hematoxylin and eosin-stained section shows invasive well-differentiated squamous cell carcinoma with keratin pearls (×200).

gluteus maximus myocutaneous advancement flap (Fig. 5b). The final pathology report showed invasive, well-differentiated SCC of the right kidney. The tumor extended to the integumentary system near the right flank along the previous percutaneous nephrostomy track (Fig. 6). All surgical margins of the tumor were negative without any indication of regional lymphatic or adrenal invasion of the tumor (stage T3N0M0). The patient had an uneventful postoperative course and was discharged on postoperative day 17 with a well-healed flap wound (Fig. 5c). No recurrence of the SSC was noted on a follow-up CT scan performed 12 months postoperatively.

4. Discussion

Although chronic pyelonephritis and nephrolithiasis are established risk factors for SCC, only a minority of patients suffering from these conditions develop SCC. Other etiologic factors such as tuberculosis, immunosuppression with azathioprine, radiation therapy, chronic rejection of a transplanted kidney and prior percutaneous nephrolithotomy have been associated with SCC.[4–6] Chronic irritation leads to squamous metaplasia, which may subsequently develop into SCC.[7] Early diagnosis of SCC in patients with nephrolithiasis is difficult and often impossible due to the existing stones and the inflammatory

response of the kidney. Li et al[1] reported that the average duration of symptomatic nephrolithiasis in their patients with SCC was 8 years. The major symptoms of carcinoma of the renal pelvis include hematuria, lumbar pain, renal mass, and loin sinus formation,[8,9] although the first 3 symptoms may be confused with the recurrence of nephrolithiasis. Although cases of renal SCC are associated with renal stones, no specific imaging features are available to establish a definitive diagnosis. Renal SCC presents as a diffuse enlargement of the nonfunctional kidney with renal calculi, hydronephrosis, perirenal infiltration, and low density or echogenicity of the renal parenchyma.[7] SCC may also present as an infiltrative soft tissue in the renal pelvis without evidence of a distinct mass.[8] More specific findings detected via imaging include an enhanced extra-luminal or exophytic mass.[10] These varying imaging characteristics often contribute to diagnostic delays until histopathologic examination of the surgical specimen is performed.

The prognosis of patients with SCC of the renal pelvis is often poor due to delayed diagnosis and the biological behavior of the cancer. Since early diagnosis may be the only option for increased survival, Katz et al[4] suggested that biopsies from suspicious lesions during the PCNL may facilitate early diagnosis. In the present case, multiple cysts in the right kidney reflected inflammatory response to chronic calculi and a biopsy was not performed with the initial PCNL. Subsequently, 3 month later, SCC of the renal pelvis presented as an integumentary neoplasm near the flank along the previous percutaneous nephrostomy track. Thus, in the absence of clinical or radiological evidence of SCC, the possibility of SCC should always be considered while operating on a patient with a chronic history of nephrolithiasis or pyelonephritis. A biopsy is indicated for suspected lesions during the PCNL to prevent potential spread to surrounding tissues via the percutaneous nephrostomy track.

The skin mass and the surrounding muscle tissue of the right flank were excised with a wide resection margin and radial nephrectomy was performed. The extensive soft tissue defects of the flank region were reconstructed using the modified gluteus maximus V-Y advancement flap. The gluteus maximus V-Y advancement flap was originally used to treat decubitus ulcers in the sacral and ischial regions, or in the region of the greater trochanter. This myocutaneous flap has a copious blood supply, is safe, and facilitates the reconstruction of extensive skin defects after excision of a decubitus ulcer.[11,12] We reconstructed the flank region using the modified gluteus maximus V-Y advancement flap.[13] The original V-Y advancement is horizontal, lateral-to-medial, whereas the modified V-Y advancement employs a craniocaudal sliding technique. An additional 90 minutes of operation time was required for the flap; however, no severe postoperative pain was reported by the patients. The patient was able to perform normal daily activities without any complications. Thus, the modified gluteus maximus V-Y advancement flap is indicated for patients with metastatic renal cancer of the flank region requiring extensive tumor resection, and is associated with limited complications and a relatively rapid postoperative recovery.

Author contributions

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