

HOW TO DEAL WITH PENILE CARCINOMA INGUINAL METASTASES INVADING FEMORAL VESSELS

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Abstract

Penile cancer accounts for 1-10% of men neoplastic diseases and 30-60% of patients have inguinal metastases at the time of diagnosis. Inguinal metastases of penile cancer with femoral vessel involvement could lead to vascular fistula and hemorrhagic shock. We present 3 consecutive patients with inguinal metastases of penile cancer complicated by infection and hemorrhage from femoral vessels invaded by the tumor. Simultaneous extra-anatomical axillo-femoral bypass graft, wide excision of tumor and groin defect reconstruction was used to achieve "tumor-free" oncologic aim and to save the lower limb. We consider the extra-anatomic axillo-femoral bypass associated with wide inguinal tumor excision and defect covering a feasible surgical solution for improving the life quality and extend life expectancy in patients with lymph node metastasis of penile cancer complicated by necrosis, infection and femoral vessel involvement.

Keywords: extra-anatomical axillo-femoral bypass, penile cancer, rectus abdominis flap

Introduction

Penile cancer represents 1% of all men neoplastic diseases in Europe and United States and 10% in other countries of South America, Asia and Africa [1]. Inguinal lymph nodes metastasis occurred in 30-60% of penile cancer cases and they are correlated with tumor staging, cellular differentiation and lymphatic or vascular involvement of primary tumor [2]. Heyns et al. [3] established the indication of inguinal lymph nodes dissection (ILND) for penile cancer by developing a risk calculation nomogram for the presence of inguinal micrometastasis. If the primary tumor is grade 1 (pTis, verrucous carcinoma, pT1) with nonpalpable inguinal nodes and no lymphovascular involvement and with probability of positive nodes being lower than 10%, the recommendation is surveillance. Modified ILND or sentinel node biopsy is indicated for intermediate risk group with 10-50% probability of positive nodes or with tumor grade 1-2

and no lymphovascular implication. In case of probability of positive nodes over 50% or tumor grade 2-3, T2-4, cN1-2 and lymphovascular involvement, bilateral ILND is mandatory to be performed.

Adjuvant radiotherapy of the inguinal lymph nodes can prevent local recurrence and it is indicated after radical resection of lymph node metastasis [4]. Adjuvant chemotherapy after ILND can have effect in patients with more than two positive inguinal metastatic lymph nodes [5].

Recurrent inguinal metastases of penile cancer after ILND is noted in 40-80% of patients with positive lymph nodes showing an aggressive pattern for penile cancer. This statement is reflected also by five-year overall survival rate (5-25%) for squamous cell carcinoma of the penis after ILND [6].

Inguinal metastasis can become ulcerated, infected and can involve femoral vessels causing hemorrhage with hypovolemic shock and death. Methods of treatment for acute tumor hemorrhage are: ligation of femoral vessels with lower limb amputation, endovascular stent for closing

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vascular fistula and hemipelvectomy [7]. In order to save the lower limb, it is possible to use extra-anatomic transobturator bypass [2] or extra-anatomic lateral bypass combined with embolization of the femoral stump [8].

The groin large defect resulting from excision of complicated inguinal metastases of penile cancer can be covered by local and distant flaps [9].

We present our surgical strategies for 3 consecutive patients with inguinal metastases of penile cancer complicated by infection and hemorrhage from femoral vessels invaded by tumor. Simultaneous extra-anatomical axillo-femoral bypass graft, wide excision of tumor and groin defect reconstruction was used to achieve "tumor-free" oncologic aim and to save the lower limb.

Case reports

Case 1

A 71-year old male with penile carcinoma developed a large necrotic and spontaneous hemorrhagic right groin mass associated with lymph node enlargement in the left groin region. CT scan with i.v. contrast showed that the tumor on the right side involved the femoral vessels. Six months previously, the patient had total penectomy without ILND for T3 penile carcinoma and no adjuvant radiotherapy. Surgery included simultaneous 3 steps:

A. Extra-anatomical axillo-femoral bypass.

B. Wide excision of right groin ulcerated mass including distal external iliac vessels, femoral vessels and adductor muscles. The inguinal defect had 18 cm diameter. On the left side, radical ILND was performed.

C. Contralateral left rectus abdominis musculocutaneous flap based on inferior epigastric vessels was harvested for covering the large defect of the right groin region.

No wound complication was noted postoperatively. The patient left hospital after 14 days with functional axillo-femoral bypass. Two months later, tumor recurrence on the right groin region was noted and the patient was sent to radiotherapy after oncologic assessment. He refused the adjuvant treatment and died 4 months later, due to respiratory insufficiency and pulmonary metastasis (Figure 1).

Case 2

A 41-year old male was admitted with a left large ulcerated, infected and hemorrhagic groin mass associated with right inguinal adenopathies. He had a history of T3 penile cancer treated by total penectomy and bilateral ILND performed 10 months before. Patient had no radiotherapy or chemotherapy. CT scan with i.v. contrast revealed femoral vessel involvement with thrombosis of common femoral vein on the left side.

Surgical plan included:

A. Left extra-anatomical axillo-femoral bypass.

B. Wide resection of left groin mass with tumor involvement. Some branches of the femoral nerve were invaded by the tumor and were removed. The branches to

vastus lateralis muscle and some for vastus intermedius muscle were spared. The soft tissue defect was 22 cm in diameter. Radical ILND was performed on the right side (Figure 2).

C. The exposed vessels were covered by Sartorius muscle flap which was transposed. Skin graft was used to cover the defect.

The patient left the hospital after 28 days with wounds healed and with functional axillo-femoral bypass. He had adjuvant radiotherapy on bilateral inguinal regions.

Patient had no local recurrence at 1 year (Figure 3).

Case 3

A 73-year old male was admitted to the hospital with ulcerated and infected left groin metastasis of penile carcinoma with femoral vessel involvement. Eight months previously, he had T1 tumor excision with penis salvage without ILND. He had no radiotherapy or chemotherapy.

Surgery included:

A. Extra-anatomical axillo-femoral bypass.

B. Wide resection of the tumor with distal and proximal femoral vessels ligation. The soft tissue defect was 16 cm.

C. Contralateral rectus abdominis flap based on inferior epigastric vessels was used to cover the groin defect.

On the 6th postoperative day, a superior dehiscence of groin wound appeared and it was treated with vacuum therapy. In the 14th postoperative day the patient developed colitis with clostridium difficile. Despite of specific treatment for colitis, he had sepsis with shock. A few days later he died with multiple organ failure. During this time, the axillo-femoral bypass was patent (Figure 4).

In all cases, the patients had distal lower limb pulses and they had no signs of arteriopathy. For patency of lower limb arteries, we used for extra-anatomic axillo-femoral bypass a long 8 mm precoagulated silver coated Dacron prosthetic graft (the length ranged from 60 cm to 80 cm). Proximal anastomosis was end-to-side prosthetic graft-axillary artery with running suture using Polipropilene 5-0. Distal anastomosis was end-to-side prosthetic graft-superficial femoral artery in the middle portion of the thigh. We used running suture with Polipropilene 5-0. The prosthetic graft passed from axillary region, under the great pectoralis muscle, to anterior axillary line to the lateral portion of thigh to the middle part of the superficial femoral artery. The femoral vein was not reconstructed. Postoperatively, we used enoxaparine 40 mg twice a day as anticoagulant therapy.

In all cases, we took bacterial culture from ulcerated tumor and the antibiotic therapy was initiated in agreement with the antibiogram. There was no sign of bacteremia or systemic infection before surgery in all cases.

In all cases, before starting wide resection of the inguinal tumor, samples of skin and subcutaneous tissue biopsies were harvested at 5 cm from the ulcerated tumor. We sent them to frozen section and we began resection if the biopsy specimens were free of tumor tissue.

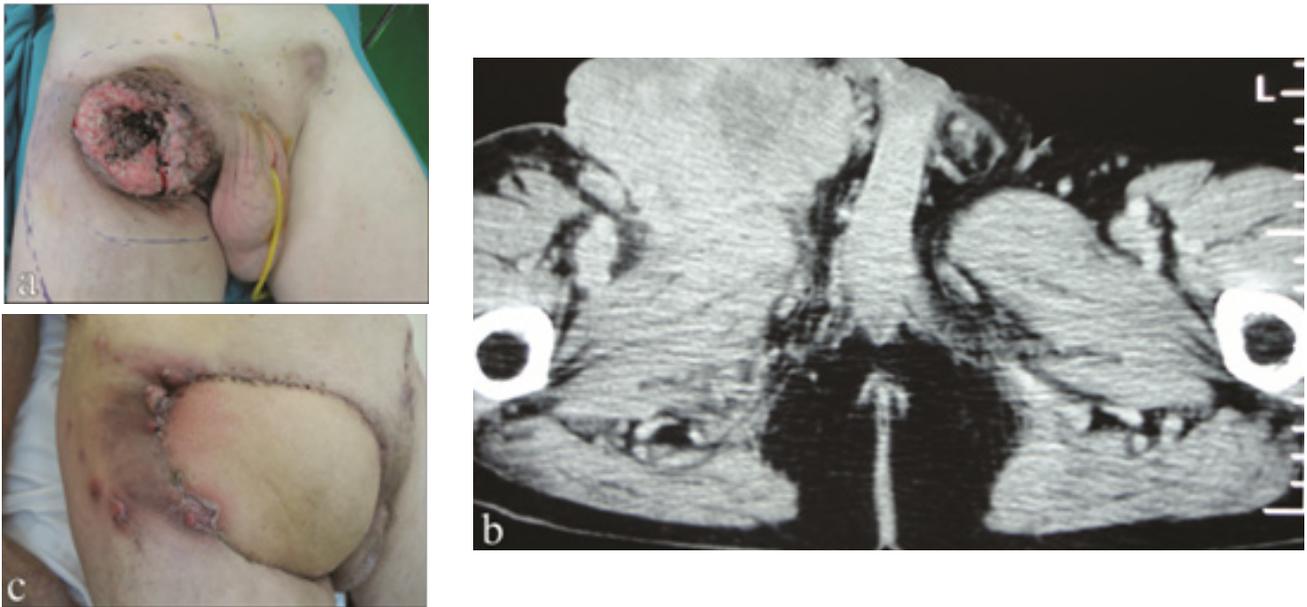


Figure 1. a. Preoperative aspect case 1; b. Preoperative CT scan - right femoral vessel invaded by tumor; c. Local tumor recurrence at 2 months.

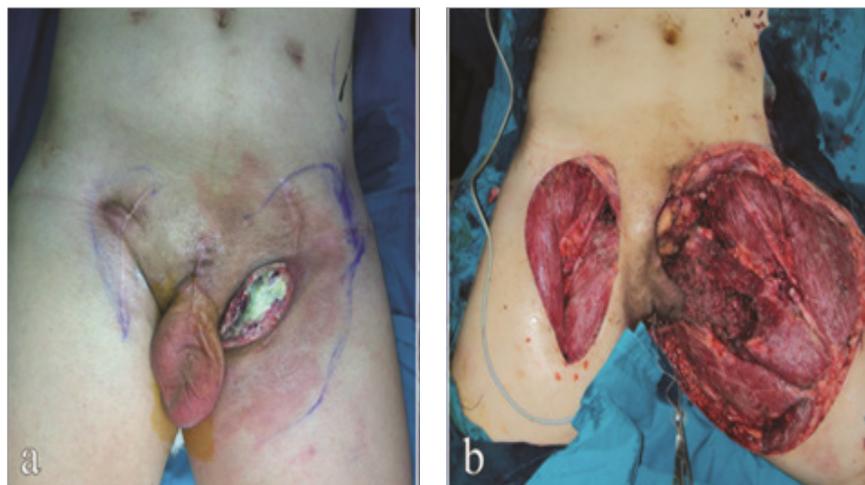


Figure 2. a. Preoperative aspect case 2; b. EAAF bypass: distal anastomosis.

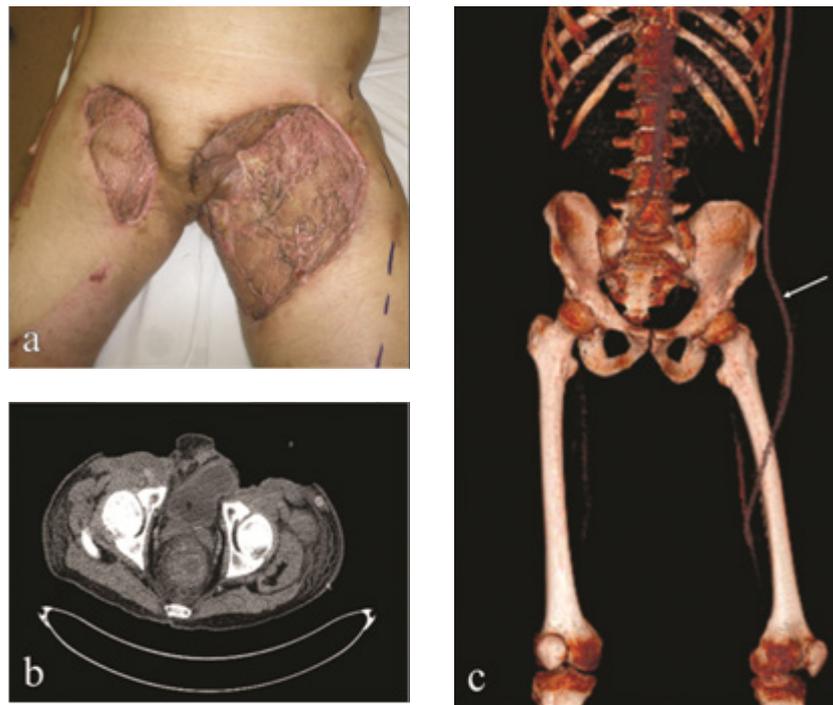


Figure 3. a. One year postoperative aspect; b. CT scan: no recurrence –one year; c. AngioCT scan: EAAF bypass- one year.

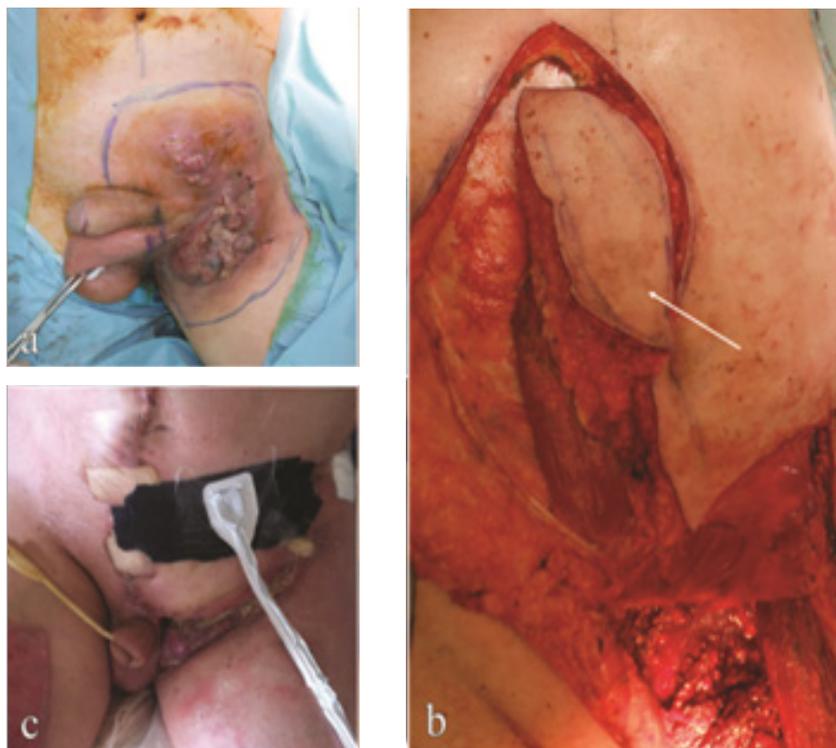


Figure 4. a. Preoperative aspect; b. Contralateral rectus abdominis flap; c. Vacuum therapy.

Discussion

Penile cancer has an aggressive lymphatic cell tumor spreading because at the time of diagnosis 30-60% of patients had groin and pelvic lymph node metastasis. Considering the specifics of the anatomic area, the large majority of the patients are at least in a locally advanced form of the disease when they present for examination. The survival prognosis is reduced in the presence of lymph node metastases which continue to grow in volume leading to tumor necrosis and local complications [2,10]. Even more, the inflammatory involvement of the lymph nodes, especially remission of a inguinal tumor mass after antibiotic treatment is a major bias factor that can postpone the application of a curative treatment in the early stages. In this situation FDG-PET/CT scanning has been reported to have a high sensitivity of 88-100% with specificity of 98-100% for confirming metastatic nodes in patients with palpable inguinal lymph nodes [11,12].

Infection and femoral vessels invaded by tumor are other complications of inguinal lymph node metastases of penile cancer. Some patients can develop vascular fistula with hemorrhagic shock. [2,8,13]. All patients reported here were admitted to the hospital with vascular fistula caused by femoral vessels involvement and required emergency surgical solution in order to avoid massive hemorrhage.

One step surgery in our cases involved:

1) Salvage the lower limb using extra-anatomic artery bypass.

2) Radical resection of lymph node metastasis together with invaded tissues (femoral vessels, muscles, skin, nerves).

3) Reconstruction of inguinal region.

Salvage of lower limb can be performed using an extra – anatomical bypass artery graft. It is prohibited “in situ” vascular reconstruction for the infected area (risk of graft infection) [14,15] and in case of adjuvant radiotherapy (risk of graft thrombosis) [16]. Extra-anatomical transobturator bypass graft [2] and extra-anatomic lateral bypass [8] could be options for revascularization of the lower limb in case of groin tumor with femoral vessels involvement. We did not use them because the possible trajectory for prosthetic graft (for both mentioned bypasses) was invaded by large groin tumors. We did an extra-anatomic axillo-femoral bypass with a silver coated prosthetic graft placed far away from inguinal ulcerated tumor. The femoral veins were not reconstructed.

In the presence of vascular fistula from femoral vessels invaded by inguinal metastasis of penile cancer, it is mandatory to stop bleeding by vessel ligation or embolization, the tumor radical resection being sometimes delayed [7,8]. We stopped the bleeding and did the inguinal tumor resection in same time for the presented patients. In one case, we had a local tumor recurrence because of unidentified lateral lymphatic vessels with tumor cells.

Rectus abdominis flap based on inferior epigastric

vessels can be used with success to cover large groin defect [9,17,18]. The vessel stump from groin defect can also be covered by transposition of sartorius muscle [19,20]. We covered the groin defect resulted after wide excision by contralateral rectus abdominis flap based on inferior epigastric vessels in 2 cases in order to have good vascularized tissue in area with significant infection. We used contralateral flap because the ipsilateral inferior epigastric vessels were involved in wide tumor resection. In one case, we used Sartorius muscle transposition for covering the vessels stump.

Conclusion

We consider the extra-anatomic axillo-femoral bypass associated with wide inguinal tumor excision and defect covering to be a good surgical solution for improving the life quality and prolonged life expectancy in patients with lymph node metastasis of penile cancer complicated by necrosis, infection and femoral vessel involvement.

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