Penile Metastasis from Rectal Carcinoma: Case Report and Review of the Literature

Justas Kuliavas^a Audrius Dulskas^{a, b, c} Julius Drachneris^d Edita Miseikyte-Kaubriene^{c, e}
Narimantas E. Samalavicius^{c, f}

^aDepartment of Abdominal and General Surgery and Oncology, National Cancer Institute, Vilnius, Lithuania;

^bFaculty of Health Care, University of Applied Sciences, Vilnius, Lithuania;

^cClinic of Internal Diseases, Family Medicine and Oncology, Faculty of Medicine, Vilnius University, National Cancer Institute, Vilnius, Lithuania;

^dState Pathology Center, Vilnius, Lithuania;

^eDepartment of Radiology, National Cancer Institute, Vilnius, Lithuania;

^fDepartment of Surgery, Klaipeda University Hospital, Klaipeda, Lithuania

Keywords

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Summary

Background: Metastasis of rectal cancer to the penis is a very rare condition with less than 40 cases found in the literature. **Case Report:** We here report a case of a 41-year-old man who was diagnosed with rectal cancer which later metastasized to the penis. The patient was treated with neoadjuvant radiotherapy, underwent rectal resection, had adjuvant chemotherapy, and, despite that, had penile metastasis 2 years later. Palliative penectomy as well as bilateral orchiectomy with suprapubic cystostomy were performed. The patient died 2 months after the diagnosis. All the previous cases mentioned in the literature are reviewed as well. **Conclusion:** The prognosis of penile metastasis from rectal cancer is poor and life expectancy is short. The mechanism of rectal cancer metastasis spread to the penis is unknown. The most acceptable theory is retrograde venous spread. There are several treatment options; however, no single treatment option is associated with superior results.

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Introduction

Rectal cancer is a common disease. It mainly metastasises to regional lymph nodes, the liver, the lungs, and the bone. Metastatic involvement of the penis in rectal carcinoma is a very rare condition. The first case was reported by Eberth [1] in 1870. Other more frequent sites of origin are the bladder (33%), prostate (30%), colon (17%), and kidneys (7%) [2]. We performed a literature search and found only 38 cases of rectal cancer spreading to the penis.

Case Report

Here, we report a case of a 41-year-old man who underwent neoadjuvant radiotherapy and rectal resection, who was treated with adjuvant chemoradiotherapy, and who later developed metastases to the penis. Moreover, we reviewed all previous cases of penile metastases from rectal cancer (table 1).

Informed consent was taken from the patient regarding all the material. Approval from the Institutional Review Board was granted.

On endoscopy, the patient was diagnosed with rectal cancer 7 cm from the anal verge without distant metastases (cT3N1) and underwent preoperative short-course radiotherapy in October 2007 (with a total dose of 25 Gy in 5 fractions). After 5 days the patient underwent rectal resection. The final histopathology report resulted in a ypT2N1M0 stage III moderately-differentiated (G2) adenocarcinoma. The surgical margins were negative (R0 resection was performed), and 2 of 14 lymph nodes were positive. The recovery of the patient was uneventful. He was then given adjuvant chemotherapy with 5-fluorouracil 425 mg/m² i/v 1–5 day and calcium folinate 20 mg/m² i/v 1–5 day, repeated for 6 courses every 4 weeks. No clinical or radiological evidence of recurrence was observed for 17 months after rectal resection until he started complaining of dysuria. Pelvic computed tomography (CT) was performed. There was suspicion of direct cancer spread to the neck of the bladder. Transurethral resection of the bladder tumour (2-cm flat, polypoid irregular mass) was performed. Histopathology revealed intestinal spread of the adenocarcinoma. 2 months later,

Audrius Dulskas and Justas Kuliavas contributed equally to this work.

Table 1. All previous rectal cancer cases with metastasis to the penis (review of the literature)

Year, authors, ref.	Age, years	Treatment of primary rectal tumor	MTS occurrence after primary tumor resection, months	Clinical presentation	Treatment of metastatic disease to the penis	Survival, months
1870, Eberth [1]	40	–	–	–	–	–
1951, Cattell and Mace [11]	30	APR	29	priapism	resection	–
1966, Oehlschlaegel [12]	–	–	–	–	–	–
1967, Tagart [13]	75	APR	108	curved, infiltrated penis	amputation	–
1975, Rees [3]	–	–	–	–	–	–
1980, Kumar and Newland [14]	70	APR	4	nodes, difficult urination	no treatment	5 days
1984, Okumara et al. [15]	45	Hartmann's resection	22	priapism	–	–
1986, Khupchandani [16]	71	APR	48	nodules	radiochemotherapy	9
1987, Mukamel et al. [17]	58	–	2	priapism	no treatment	5
1989, Doré et al. [18]	58	–	–	–	–	–
1992, Ben-Yosef and Kapp [4]	–	–	–	–	radiotherapy	–
1995, Cuvillier et al. [19]	–	APR	29	nodules	chemotherapy	15
2000, Al-Mashatt et al. [20]	65	APR	19	nodule, dysuria	no treatment	5
2001, Sukumar and Qureshi [21]	75	APR, chemotherapy	2	ulcers	no treatment	2
2002, Tan et al. [22]	53	APR	at same time	nodules	radiochemotherapy	–
2004, Yilmaz et al. [23]	71	LAR	24	priapism	–	–
2004, Lo and Crew [24]	56	APR	24	nodules	radiotherapy	–
2006, Cathomas et al. [25]	–	–	–	–	–	–
2006, Appu et al. [26]	65	APR	24	nodules	radiochemotherapy	12
2006, Cherian et al. [9]	75	APR	60	ulceration	no treatment	4
2007, Ketata et al. [2]	59	APR	312	nodules	chemotherapy	16, alive
2007, Murhekar et al. [27]	78	APR	24	nodules	refused	4
2008, Chung et al. [28]	69	–	at same time	nodules	radiochemotherapy	6, alive
2009, Kürönya et al. [29]	65	LAR	54	nodule	radiochemotherapy	–
2009, Park et al. [30]	43	APR	24	nodules	radiotherapy	–
2009, Yildirim et al. [31]	79	APR	24	nodules	chemotherapy	3
2010, Madrigal-Medina et al. [32]	45	APR	6	ulcers	refused	1
2011, Goris Gbenou et al. [33]	79	LAR	24	nodules	refused	6
2011, Lee et al. [34]	54	APR	18	nodules	radiotherapy	–
2012, Kimura et al. [6]	57	APR	16	PET CT	penectomy	24, alive
2012, Dorsett et al. [35]	60	chemo-radiotherapy	–	mass	penectomy	4
2013, McGuinness et al. [36]	61	LAR	60	lesion	circumcision, glansectomy	–
2014, Papaefthymiou et al. [37]	78	chemoradiotherapy, APR	24	nodule	chemotherapy	3
2014, Persec et al. [38]	43	APR	24	lesion	local excision	6
2015, Nunes et al. [39]	63	APR	14	lesion	radiotherapy	12
2015, Cholin et al. [40]	88	–	at same time	lesion	no treatment	5 weeks
2015, Alzayed [7]	70	LAR	26	no symptoms	PET CT	–
Our case	41	radiotherapy, LAR, chemotherapy	17	dysuria	penectomy	2

MTS = Metastasis; LAR = low anterior resection; APR = abdominoperineal resection; PET CT = positron emission computer tomography.

the patient complained of pain and swelling of the penis and scrotum. On examination, a hard 0.5-cm nodule on the penis and an induration involving the right corpora cavernosa were noted. A biopsy of the nodule revealed metastases of the adenocarcinoma. The patient underwent a palliative penectomy and bilateral orchiectomy with suprapubic cystostomy. Histopathology results revealed intestinal adenocarcinoma metastases in the penis (fig. 1). The patient refused chemotherapy and died after 2 months.

Discussion

Despite its rich vascular supply and its proximity to the rectum, bladder, and prostate, which are common sites of malignancy, metastatic involvement of the penis is rare [3]. In our review, we found that penile metastases from rectal cancer usually present on aver-

Fig. 1. a, b Glandular and cribriform structures with 'dirty necrosis', typical of intestinal-type adenocarcinoma, infiltrating corpus cavernosum.

age 37 months after the treatment of the primary tumour. Two-thirds of the patients had disseminated metastases at presentation [4, 5]. The most common symptoms noted were palpable nodule, lesion/ulceration, priapism, and difficulties with urinating. 2 patients had no symptoms [6, 7]. In our case, the patient complained of difficulty urinating, pain, and swelling in the scrotum and penis. Our patient underwent multimodal rectal cancer treatment 2 years ago, i.e. preoperative short-course radiotherapy, radical R0 surgical resection, and adjuvant chemotherapy.

The mechanism of metastatic spread to the penis is not well established. Despite sufficient blood supply and close proximity to pelvic malignancies, penile metastasis is very rare, and the route by which it is spread is still a matter of controversy. Already in 1956, Paquin and Roland [8] proposed the following modes of dispersal: direct extension, retrograde venous transportation, retrograde lymphatic transportation, secondary embolism from lung metastases, tertiary embolism from liver metastases, direct extension into arterial pathways, and instrumentation (tumour cell spillage). Most investigators suggest that retrograde venous transportation is the main mechanism involved in the development of secondary penile tumours [9]. In our case, direct dispersal is likely to occur from the rectal tumour along the perineal planes, and then reach the bladder; during the transurethral resection of the bladder, it was disseminated to the penis.

Diagnosis is usually made by a biopsy, which helps to differentiate between metastasis and primary tumours. The favoured non-invasive imaging modality to delineate the extent of involvement of the penis is magnetic resonance imaging [6]. On T1-weighted images, lesions have low signal intensity and are isointense with the surrounding corpus cavernosum. On T2-weighted imaging, they appear inhomogeneous with low to intermediate signal intensity and can be clearly seen against the high background intensity of the cavernosal bodies. Other radiological diagnostic modalities

such as CT and positron emission tomography are useful non-invasive methods for the evaluation of lesions [6, 7]. Invasive methods such as cavernosography may be used. It is useful to delineate the extent of involvement of the corporal bodies [10]. Metastatic lesions are usually seen as filling defects or structural deformities of the corporal bodies or glans. In the presence of malignant priapism, obstruction of penile venous flow can also be demonstrated. However, this approach is disliked because of the invasiveness of the procedure.

Regardless of the treatment option chosen, prognosis of penile metastases remains poor, with an average survival of only 7 months according to our review. This might reflect the fact that penile metastasis usually indicates a widely disseminated disease. In our case, the patient survived only 2 months after the onset of the urinary problems and the surgical treatment. Treatment options include surgical excision, radiotherapy, chemotherapy, and symptomatic management. Although only small treatment groups are available for comparison, no single treatment option yielding superior results has been noted. Total penectomy remains the only treatment option to have shown a longer-term survival in patients with localized disease [6]. Surgery might also play a role in palliation when there is intractable penile pain.

In conclusion, secondary malignancy of the penis is an uncommon clinical entity with less than 40 cases reported. The common mode of spreading to the penis is probably by the retrograde venous route. In the case presented, however, direct spreading may have occurred. The overall outcome is poor in most patients, and these require only palliative or supportive care.

Disclosure Statement

The authors declare that they have no conflict of interest.

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