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Case report

Penile metastases from primary bronchus carcinoma – A case report and literature review



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KEYWORDS

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Abstract

Introduction: The penis is an uncommon site of secondary metastases, and in most cases the primary tumour is found in the bladder, prostate, rectum or sigmoid colon. It is an extremely rare secondary metastatic site of lung cancer, with only 28 cases found in a review of the current literature. The majority of these cases were squamous cell carcinoma, with only 3 cases of adenocarcinoma.

Case presentation: Our case is a 55-year-old builder who presented with a painfully enlarged penis and loss of weight. He had a smoking history and was cachectic, with generalised lymphadenopathy and a firm mass on his left olecranon. His penis contained multiple firm nodules. Complete laboratory and imaging workup were done. Findings revealed a bronchial adenocarcinoma with multiple distant metastases, with the penile deposits as presenting symptoms. Management was with single high dose palliative half body irradiation. He survived 2 months after the presentation of penile metastasis.

Conclusions: Cases of metastases to the penis are very rare and often carry a grave prognosis, as it is a late manifestation of malignant disease. The average survival from the diagnosis of penile metastases in our review was just under 4 months. It is however important to be aware and recognise this rare phenomenon, and differentiate it from primary penis cancer. Treatment of penile metastases is mostly palliative, but much can be done to improve the patient's quality of life. Early correct diagnosis may also alter the treatment of the primary tumour.

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Introduction

The penis is an uncommon organ for tumours to metastasise to, irrespective of the primary tumour, with just over 400 cases reported in the literature. The majority of metastases to the penis originate from cancers of the prostate (32%), bladder

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(30%) and rectum and sigmoid colon (15%) [1–3]. Rarer sites include the kidneys, the respiratory tract, bone, testes and pancreas [1,2,4,5].

To our knowledge only 29 cases, including our own, of penile metastasis from lung cancer have been reported (see Table 1). The majority of these cases were squamous cell carcinoma (20/29 = 69%), with only three cases of penile metastasis from bronchial adenocarcinoma. Metastasis to the penis is usually associated with advanced metastatic disease, and a poor prognosis, regardless of tumour origin [3,5–9]. Preferred target organs for bronchial carcinoma are the brain, liver, adrenals, bone and regional lymph nodes, although virtually all organs may be affected [10]. Penile metastases are usually located in the corpus cavernosum, with the corpus spongiosum and glans penis rarely involved [11]. The most common presenting symptoms and signs are priapism, penile mass, pain, ulcer formation and obstructive urinary symptoms.

In this case report we will discuss a patient who presented with penile metastasis as the initial symptom of lung cancer. We also conducted and present a review of the current literature on penile metastasis from lung cancer.

Case presentation

Our case was a previously healthy 55-year-old builder, of mixed descent, who presented with a 3-month history of a painfully enlarged penis and loss of weight. He had a history of smoking (8 pack years) and a chronic cough. At diagnosis he complained of a painful glans penis, lower backache, swelling of the penis, poor stream, hesitancy and loss of weight.

He was pale and cachectic, with fixed lymphadenopathy (Virchow Trossier node, right supraclavicular, and bilateral hard inguinal nodes). He had a firm rubbery mass of 4 cm × 3 cm extending from his left olecranon. He had a swollen circumcised penis, with areas of ulceration on the glans. The rest of penile skin was not affected. The clinically obvious abnormality was the corpus spongiosum, which was hard and nodular along its entire palpable course. Both corpora cavernosa contained multiple nodules (± 1 cm). The testes and scrotum were normal, with a benign feeling prostate of normal size, ± 25 g. He had tenderness over his lumbar vertebrae, but no bony masses were palpable. He was HIV negative with a prostate specific antigen of 0.4 $\mu\text{g/l}$, and a corrected calcium level of 3.49 mmol/l.

Abdominal ultrasound revealed a Bosniak II cyst in the lower pole of the right kidney. His kidneys, liver, gallbladder and spleen appeared normal. His prostate was of normal size and echogenicity. Flexible urethroscopy revealed an inflamed erythematous irregular urethral mucosa.

Chest X-ray showed a large mass in the upper lobe of his left lung, compressing the left main bronchus (Fig. 1). Urethrogram showed multiple areas of external compression (Fig. 2).

CT scan of chest, abdomen and pelvis revealed a primary lung carcinoma with a left-sided perihilar tumour nodal complex measuring 94 mm × 86 mm. The mass encased the left-sided pulmonary artery as well as major branches of the left-sided main bronchus. Pathological lymphadenopathy was noted within the left hilar, right hilar, subcarinal, retrocaval, anterior mediastinal and



Figure 1 Primary lung carcinoma.

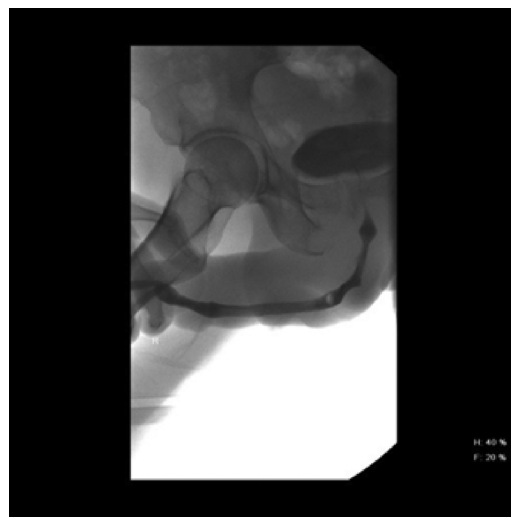


Figure 2 Urethrogram showing external compression.

supraclavicular region. Bilateral pulmonary and renal metastases were demonstrated (Fig. 3).

There were bony metastases to the right acetabulum, bilaterally in the pubic body and inferior pubic rami (Fig. 4). Metastatic lesions to the corpora spongiosa were also noted. The liver, spleen and adrenal glands appeared normal, with no metastatic lesions. His CT scan was therefore compatible with a primary bronchus carcinoma stage T4 N3 M1.

Fine needle aspiration of the Virchow Trossier node showed cytology compatible with metastatic adenocarcinoma. The immunohistochemistry profile of CK7 positivity and CK 20 negative marker was strongly suggestive of metastatic adenocarcinoma of lung origin.

Table 1 Summary of all cases found in the literature of penile metastasis from lung cancer.

Investigators	Age	Histology	Symptoms	Location	Other distant metastases	Treatment	Survival from penile metastasis (months)
Staffieri et al. [15]	33	EC	Urinary retention, priapism	CC, CS	+	Unknown	<1
Richter [16]	67	SCC	Swelling of penis	CC	+	None	<1
Truc et al. [17]	50	SCC	Priapism	CC	Unknown	Anticoagulant	Unknown
Hayes and Young [3]	78	SCC	Mass	CC	+	None	<1
Silber [6]	52	SCC	Urgency, weak stream	CC, CS	+	None	1
Akita et al. [18]	43	SCC	Mass, priapism	CC	+	Amputation	3
Van Wyk [19]	54	LCC	Mass	CC	+	Radiation	7
Usui et al. [20]	72	AC	Urinary retention, priapism	CC	Unknown	Cystostomy	1
Honda et al. [21]	69	SCC	Penile pain, priapism	CC	Unknown	Amputation	3
Schwesinger [22]	45	SCC	Urinary retention	CC, CS, GP	+	Cystostomy	Unknown
Takenwa et al. [23]	70	SCC	Urethralgia, priapism	CC, CS	+	None	2
Palfi et al. [24]	64	SCLC	Mass	GP	Unknown	Resection	>12
Cansado et al. [25]	51	SCC	Mass, priapism	CC	–	Chemotherapy	Unknown
Yokoi et al. [14]	68	SCC	Urinary retention, priapism	CC, CS, GP, PU	+	Cystostomy	<1
Danno et al. [26]	65	SCC	Mass	Unknown	+	Chemotherapy	3
Belville et al. [13]	65	SCC	Priapism	Unknown	+	Radiotherapy	3
Bonaminio et al. [8]	67	SCC	Mass	CC	+	None	<1
Fujimoto et al. [9]	75	SCC	Mass	CC	+	Radiotherapy	3
Dong Wei et al. [27]	75	SCC	Mass	CC	–	Chemotherapy	Unknown
Li R et al. [28]	49	SCC	Mass	Unknown	+	Chemotherapy	>15
Sofikerim et al. [29]	50	SCC	Weak stream, pain	CC	–	Chemotherapy, radiotherapy	4
Zheng et al. [11]	51	AC	Swelling of penis	CC, CS, GP	+	Chemotherapy	<2
Siam and Hooper [7]	67	SCC	Mass	Unknown	+	None	2
Ozkaya et al. [30]	55	SCC	Mass, ulcer, pain	GP	–	None	6
Chaux et al. [31]	67	SCC	Mass	Foreskin	–	Chemotherapy	6
Chaux et al. [31]	77	SCLC	Mass	GP	+	Chemotherapy	9
Karanikas et al. [32]	59	AC	Mass	CC	+	Chemotherapy, radiotherapy	Unknown
Haliloglu et al. [33]	57	NSCLC	Erectile dysfunction, mass	CC	Unknown	Resection	Unknown
Present case	55	AC	Swelling of penis, glans penis pain	CC, CS, GP	+	Radiotherapy	2
Summary of cases	63	SCC = 20/29 (69%) AC = 4/29 (14%)	Mass in 16/29 (55%) Priapism in 9/29 (31%)	CC in 85%	Present in 85%		With treatment = 5.5 months Without treatment = 1.9 months

EC, epithelial carcinoma; SCC, squamous cell carcinoma; LCC, large cell carcinoma; AC, adenocarcinoma; SCLC, small cell lung cancer; NSCLC, non small cell lung cancer; CC, corpus cavernosa; CS, corpus spongiosum; GP, glans penis; PU, penile urethra.

Management was palliative, consisting of a single dose of half body irradiation (10 grey). He survived 2 months after the diagnosis of penile metastases was made.

Discussion

The penis has a rich and complex vascular and lymphatic supply, and it is surprising that metastases to the penis are such rare phenomena. The mechanisms by which the metastases reach the penis include direct extension of the tumour from nearby structures, retrograde lymphatic and retrograde venous spread and possibly arterial dissemination. Venous and lymphatic spread may occur by direct invasion of these structures, but more commonly if reversed flow is caused by neoplastic disease blocking the pudendal plexuses [3].

Direct extension is a well-described mechanism of spread, usually from a regionally advanced primary tumour. It will follow logically

that this mechanism of spread will firstly involve the penile root and base of the penile shaft. In our review (see Table 1) the corpora cavernosa were involved in 85% of cases, and mostly in the middle or distal part of the shaft. This may suggest that local extension is not a common mechanism of metastasis. In lung cancer, arterial dissemination may be the result of erosion of the tumour through the pulmonary veins. The tumour will then spread via the systemic arterial circulation [3]. This mechanism of spread can be implied in our case report with a reasonable amount of confidence, given the size and position of the tumour, as well as the extent and location of the metastases.

The majority of penile metastases (Table 1) are of squamous cell origin, which is remarkable for a number of reasons. Firstly, the incidence of primary squamous and adenocarcinoma of the lungs are very similar, whereas the incidence of penile metastases from the corresponding primary tumour vary widely. In the lung squamous

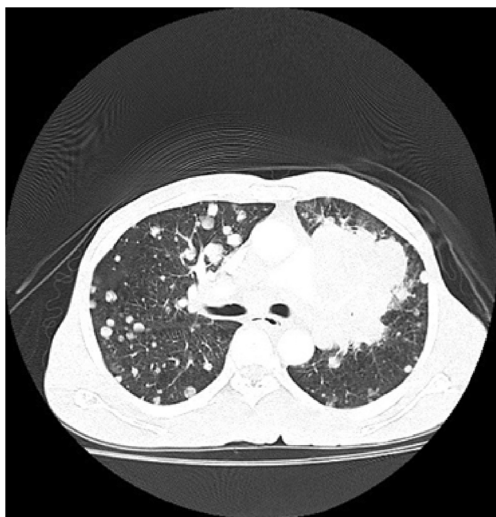


Figure 3 Primary lung carcinoma.

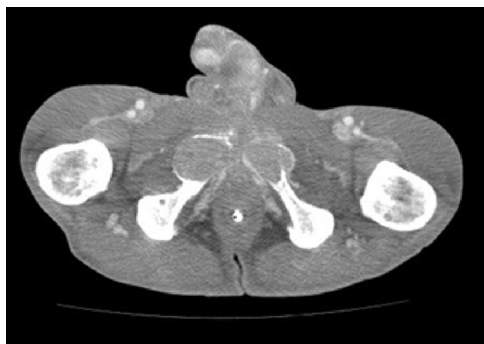


Figure 4 Bony pelvic metastases.

cell carcinoma makes up roughly 25–30% of bronchogenic carcinoma, with adenocarcinoma making up 30–35% [10]. Secondly, it is a known fact that adenocarcinoma tends to metastasise earlier and wider compared to squamous cell carcinoma. One explanation for the dominance of squamous cell carcinoma in penile metastases may be the fact that adenocarcinoma is more common in women [10,11].

The diagnosis of penile metastases is usually clinically suspected. Imaging modalities may be invaluable in the confirmation of clinical suspicion. Magnetic resonance imaging (MRI) has been shown to have superior diagnostic value when compared to computed tomography (CT), due to higher soft tissue contrast and multiplanar capabilities of MRI [12]. The gold standard of confirmation remains the obtaining of a histological specimen. In our case the clinical picture of the patient left little doubt that he suffered from widespread metastatic disease. Hence, histological confirmation was obtained from the most readily accessible site: the Virchow Trossier node. The final diagnosis of metastatic bronchial adenocarcinoma was made by a combination of clinical, histological and radiological information. A differential diagnosis will include primary penis malignancies, benign penis tumours, syphilitic chancre, venereal or other infectious ulcerations, priapism of any aetiology, Peyronie's disease, tuberculosis, candidiasis, cavernositis and other inflammatory conditions [3,4,11].

Priapism is a common sign of penile metastases (40%), but is almost never seen in primary penis cancer [2]. This makes it an important

tool in differentiating penile metastasis from primary penis cancer, and is something to exclude as a cause when dealing with priapism [8]. Malignant priapism (term first used in 1938 by AH Peacock) as described by Robey and Schellhammer [4] is most often seen in the presence of multiple diffuse infiltrating metastases [8]. The mechanism of priapism is most likely direct invasion of the veins of the penis, or the result of metastases in the corpora cavernosa, causing thrombosis in the cavernous sinuses or congestion of the circulation [3,4]. Priapism may cause severe pain and discomfort and will usually require immediate management, such as continuous aspiration of blood from the corpus cavernosum and injection of alpha adrenergic receptor agonists. Our patient had pain of the glans penis, which was initially successfully treated by simple analgesia and local lignocaine-containing jelly. Severe pain may be relieved by doing a dorsal penis nerve block [13].

Patients with penile metastases usually have widespread metastatic disease. It therefore follows logically that the prognosis will be poor, as shown in many literature reviews including this one. It can therefore be said that penile metastasis is a poor prognostic sign, irrespective of the primary tumour [3,9,12]. The significance of this fact becomes pertinent when one considers the difference in prognosis between primary penis carcinoma and metastatic penile cancer [8].

Treatment of patients with penile metastasis is usually palliative, aiming towards improving the patient's quality of life. The most useful treatment modalities are limited surgical excision and radiation therapy [13]. Other treatment modalities include suprapubic urinary diversion, penectomy and chemotherapy. Second-line chemotherapies like vinorelbine, gemcitabine, paclitaxel, irinotecan, gefitinib and docetaxel have been used in treating bronchial carcinoma with metastases to the penis, but with mixed results [11].

As previously shown in the literature, radiotherapy may benefit patients greatly to alleviate pain and decrease the size of metastatic lesions [9]. In our case, a single high dose palliative radiotherapy treatment of 10 grey to the abdomen and pelvis was used. This improved the patient's pain, but did not have any effect on the size of the metastatic lesions. In our review of cases, patients that received no treatment had an average survival of 1.9 months, whereas those who did receive treatment (medical, surgical, radio or chemotherapy) had an average survival of 5.5 months.

This suggests a small but definite survival benefit to treating patients, although bias may exist as the healthier patients were more likely to be offered treatment regimens, compared to those whose demise was imminent.

Conclusion

Cases of metastases to the penis have a grave prognosis and are a late manifestation of malignant disease. It is, however, important to be aware and recognise this rare phenomenon, as earlier correct diagnosis may also alter the treatment of the primary tumour. Treatment of penile metastases is mostly palliative, but much can be done to improve the patient's quality of life.

Consent

Approval from the Research and Ethics Committee of the University of Stellenbosch was obtained. Clinical data was collected from

Tygerberg Academic Hospital patient records. Written informed consent was taken from the patient for the publishing of this case, including photos, in the scientific literature. A literature review was performed utilising both electronic (Pubmed) and printed media.

Competing interests

We declare no competing interests.

Authors' contributions

DE du Plessis was the main author of this article, and attended to the patient, performed the literature review and wrote most of the manuscript. This was performed as part of a final year assignment for medical studies. A van der Merwe was the attending consultant and initiator of the case report. He was the supervisor and actively involved in guiding the process leading to publication, as well as intellectual input. CF Heyns was the head of department and was involved in the management of the patient, obtaining of the photos and videos of this patient and was actively involved in the literature review included in this article.

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