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The use of dynamic sentinel node biopsy in case of penile cancer. A case report

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Abstract

Penile cancer is a rare disease with prevalence of approximately 1/100000 man in Europe. Well documented risk factors for a penile cancer are HPV Infection, phimosis, and chronic inflammation. Penile cancer is a curable condition when diagnosed and treated promptly. The invasion of lymphatic system is one of the most important matters affecting long term survival. Proper evaluation and treatment of lymph nodes is a main goal when dealing with this condition. In patients with palpable lymph nodes lymphadenectomy is method of choice. When dealing with unpalpable lymph nodes and increased risk of micro-metastatic disease, invasive nodal staging is recommended. For this staging we can choose from Modified inguinal lymphadenectomy and Dynamic Sentinel Node Biopsy. In this paper we would like to present a case report of patient with penile cancer, where due to TNM staging, Dynamic Sentinel Node Biopsy was implemented.

Cancer of the penis, in most cases, is squamous cell carcinoma. It is a rare disease with a prevalence rate of 1/100000 men in Europe and the United States per year. The incidence of penile cancer increases with age, reaching a peak at the age of 60. [1,2].

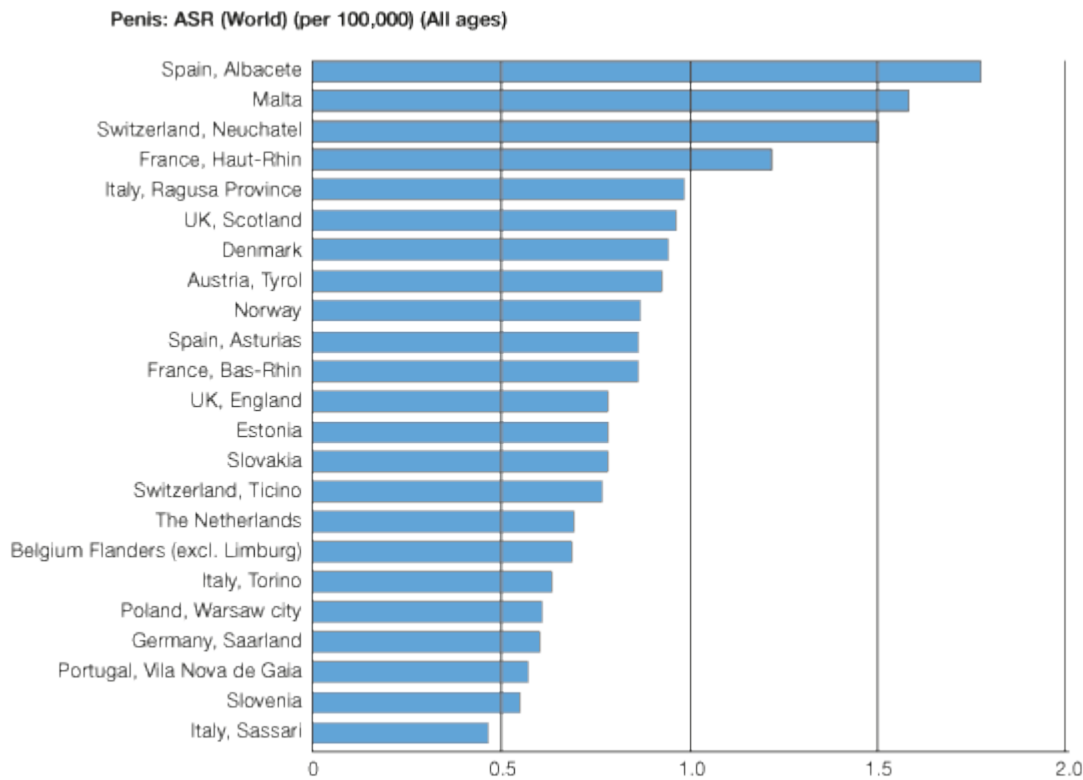


Fig. 1. The incidence of penile cancer. [3].

To a well-documented risk factors for penile cancer include:

- HPV - the presence of the viral DNA has been identified in about 40% of invasive cancer of the penis.
- Phimosis - circumcision significantly reduces the risk of cancer, observed a much smaller percentage of penile cancer in ethnic groups undergoing early circumcision for religious reasons.
- Chronic inflammation of the penis
- Smoking
- Frequent change of sexual partner.

TNM classification of penile cancer. To evaluate the TNM, unlike other cancers, the Grading of the primary tumor is used.

Clinical Classification	
T - Primary Tumor	
TX	Primary tumour cannot be assessed
T0	No evidence of primary tumour
Tis	Carcinoma in situ
Ta	Non-invasive verrucous carcinoma*
T1	Tumour invades subepithelial connective tissue
T1a	Tumour invades subepithelial connective tissue without lymphovascular invasion and is not poorly differentiated
T1b	Tumour invades subepithelial connective tissue with lymphovascular invasion or is poorly differentiated
T2	Tumour invades corpus spongiosum with or without invasion of the urethra
T3	Tumour invades corpus cavernosum with or without invasion of the urethra
T4	Tumour invades other adjacent structures
N - Regional lymph nodes	
NX	Regional lymph nodes cannot be assessed
N0	No palpable or visibly enlarged inguinal lymph nodes
N1	Palpable mobile unilateral inguinal lymph node
N2	Palpable mobile multiple or bilateral inguinal lymph nodes
N3	Fixed inguinal nodal mass or pelvic lymphadenopathy, unilateral or bilateral
M - Distant Metastasis	
M0	No distant metastasis
M1	Distant metastasis
Pathological Classification	
The pT categories correspond to the clinical T categories.	

The pN categories are based upon biopsy or surgical excision	
pN - Regional lymph nodes	
pNX	Regional lymph nodes cannot be assessed
pN0	No regional lymph node metastasis
pN1	Metastasis in one or two inguinal lymph nodes
pN2	Metastasis in more than two unilateral inguinal nodes or bilateral inguinal lymph nodes
pN3	Metastasis in pelvic lymph node(s), unilateral or bilateral extranodal or extension of regional lymph node metastasis
pM - distant metastases	
pM1	Distant metastasis microscopically confirmed
G - Histopathological rating	
GX	Grade of differentiation cannot be assessed
G1	Well differentiated
G2	Moderately differentiated
G3	Poorly differentiated
G4	Undifferentiated

Fig. 2. TNM classification of penile cancer. To evaluate the TNM, unlike other cancers, the Grading of the primary tumor is used. [4].

* Papillary carcinoma unrelated to the destructive invasion.

Penile cancer is a curable disease, but a late notification period for patients to obtain advice, resulting in the presence of metastases in the lymphatic system significantly reduces the survival prognosis of patients with this disease. Local lesion is usually easy to see, however, it is possible to be under primary phimosis. Each patient suspected of having cancer of the penis should be carefully palpated considering the inguinal lymph nodes (cN), since the guidelines for clinically negative lymph nodes differs from the one for clinically positive nodes. [5].

In case of primary lesion local sparing treatment, appears to be justified. Local excision with a margin of 5 mm gives a good effect in terms of therapeutics and aesthetics. [6]. Local relapses, as opposed to the lymph nodes, have no significant impact on long-term survival. After classifying the patient with TNM scale further treatment may be planned.

T1/T2 Tumors can receive sparing surgery.

T2-4 cancer require radical treatment, taking into account the total Penectomy.

In the case penile cancer lymphatic invasion is one of the most important prognostic factors, which is why accurate diagnosis and treatment are necessary to improve the survival of patients.

Patients with clinically positive nodes – palpable lymph nodes.

In case of the cN1 / cN2 it is recommended to remove enlarged lymph nodes, asses them during frozen section and if positive radical inguinal lymphadenectomy should be implemented. In the presence of two or more positive lymph nodes or extracapsular invasion, after radical lymphadenectomy it is advised to perform pelvic lymphadenectomy on the same side. [7].

Patients with clinically negative lymph nodes - non-palpable lymph nodes.

Depending on the result of the histopathological staging of the patient he is classified into one of three risk groups of micrometastases.

Patients with well differentiated pT1 G1 lesion, belong to the low risk group, patients with pT1 G2 lesion to intermediate-risk group, and pT1 G3 to high risk of micrometastases. [8]. Depending on the risk group we can offer three management strategies.

Surveillance-suitable for the lowest risk group

Invasive diagnosis of lymph node-pT1 suitable for patients in the intermediate and high risk group and T2-T4. The diagnosis includes the mINLD - modified inguinal lymphadenectomy and DSNB-Dynamic sentinel-node biopsy.

DSNB-Dynamic Sentinel Node Biopsy.

The first mention of selective diagnosis of sentinel lymph node appeared in 1960. In 1976, Cabanas first described the presence of the sentinel lymph node around the lymphatic drainage of the penis. The first attempt to determine the penile lymphatic runoff took place in 1965 using lymphoscintigraphy. It showed the presence of the sentinel lymph node in the front region of the superficial epigastric vein. Cabanas excised a lymph node as expected anatomically. In 31 patients with a negative sentinel lymph node metastasis was not detected in the following lymph nodes. Despite this success, the technique has not been introduced into daily practice because of concerns about the precise position of the sentinel lymph node.

A turning point in the determination of sentinel lymph nodes was an innovative approach by Morton and Cochran in the late 80's. To determine the localization of sentinel lymph node, they combined lymphoscintigraphy with the patent blue dye and the intraoperative use of a gamma camera. The new technique has been tested, showing high sensitivity and specificity in diagnosing and locating the sentinel node.

The first sentinel lymph node biopsy for cancer of the penis took place in 1993, a few months after the first ever documented sentinel lymph node biopsy. [10].

Diagnosis of lymph nodes plays a key role in the treatment of penile cancer. Survival is approximately 90% for the negative lymph nodes, compared to 50% survival in the presence of metastases in nodes.

In the past, in case of lesions of the intermediate and high risk group, routinely modified lymphadenectomy was performed. This treatment is burdened with a high rate of complications described in various works at the level of 30-70%, even in the hands of an experienced surgeon. In the case of the risk groups mentioned above in approximately 80% of excised nodes will be negative.

To reduce the number of complications, without compromising the detection of metastases, dynamic sentinel node biopsy was implemented. The sensitivity of this method is determined at the level of 95% at about 5% of the risk of complications. Lymph node biopsy is preceded by lymphoscintigraphy day before surgery, with application of the dye 15 min before operation. Intraoperatively to identify sentinel lymph nodes gamma camera is used. [11].

Case:

70 years old patient reported to the Department of Urology referred from a dermatologist because of a suspicious lesion on the skin of the penis glans after fail of conservative treatment. During the physical examination of the patient, there was no palpable inguinal lymph nodes (cN0). The patient was qualified for surgery. Local excision with a margin of healthy tissue with circumcision was performed.

The histological evaluation of lesion was made showing pT1 G2. The patient was qualified to intermediate risk of metastases in the lymph nodes, requiring invasive lymph node staging. It was decided to execute the Dynamic Sentinel Lymph Node Biopsy.

Patient was admitted to the Department of Urology, Kliniczny Szpital Wojwódzki Nr.1 in Rzeszów. The next day lymphoscintigraphy was performed using a labeled technetium.



Fig. 3. The fields marked in lymphoscintigraphy.

Patient was prepared for surgery. Using a Gamma camera we verified the probable location of the sentinel lymph node.

According to the literature, to get to the sentinel lymph node, 5 cm incision at a distance of two fingers laterally and then downwardly from the pubic tubercle should be made. Lymph node should be located in the region close to junction of the saphenous vein with the femoral vein. [12].

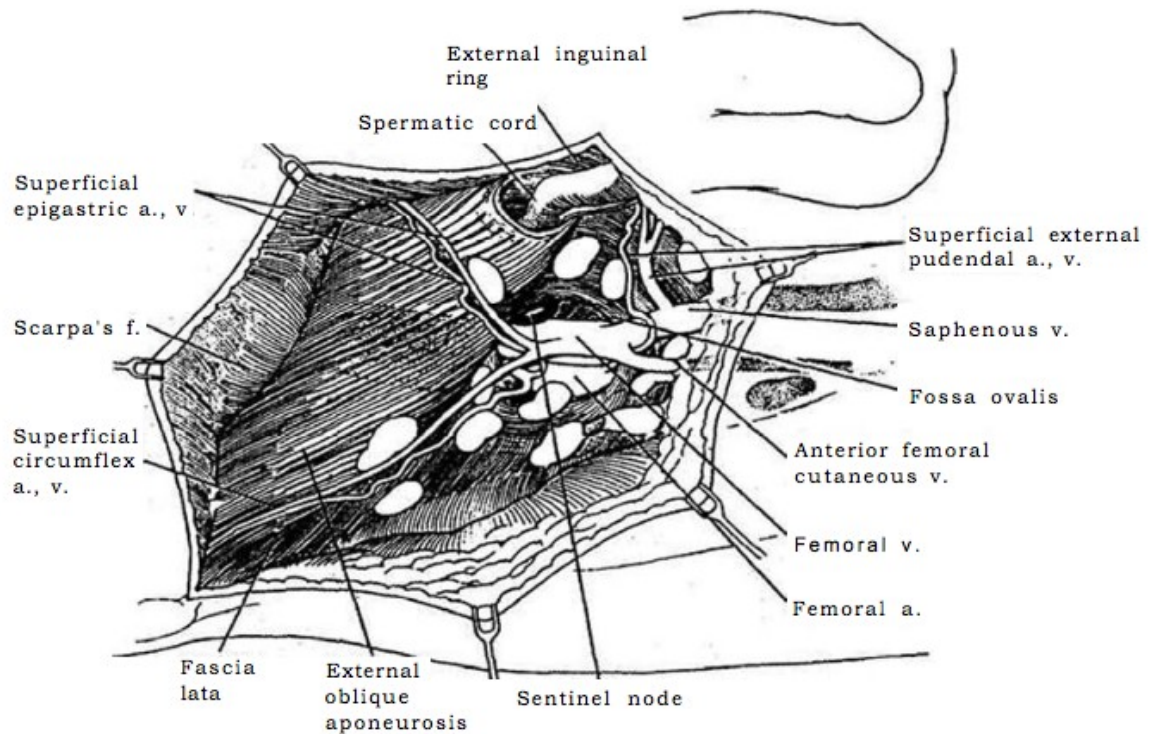


Fig. 4. Lymph node should be located in the region close to junction of the saphenous vein with the femoral vein. [12].

15 minutes before the skin incision Patent Blue Dye was injected.

An incision was made on the left side as previously described and a Sentinel node was identified.

Lymph node was taken. Next, an incision was made on the right side. Right node was removed.

No metastases were shown in the obtained result of the histopathological examination of

sentinel nodes. The patient remains under the watchful observation on a possible local recurrence and disease progression.



Fig. 5. Blue Dye Injection.



Fig. 6. Location of left sentinel lymph node.



Fig. 7. Sentinel Lymph node on the right side.

Discussion

Cancer of the penis is a rare disease, but most urologists will face this disease during practice. The most important thing in the treatment of this disease is the right approach to the lymph nodes. In patients with clinically negative lymph nodes and a lesion T1 G2 upward, Invasive nodal staging should be implemented, due to the risk of micrometastases. Omission of these metastases results in a significant decrease in patient survival during follow-up. [13] Until now a routine matter in the above mentioned staging has been modified inguinal lymphadenectomy, but this procedure carries a high risk of complications (30-70%, according to various studies), detecting metastases in the nodes only in 20% of cases. Recently, more and more centers tends to perform Dynamic Sentinel Node Biopsy which is characterized by high sensitivity with a considerable decrease in the number of complications. According to the latest studies it is a safe procedure (4.5% of complications) and maintaining adequate standardization shows a sensitivity of 95%. Both methods of invasive node staging carry out risk of missing the micrometastases. For DBWW risk is at a level of 12% and for the risk for mILND has not been precisely determined [14].

Dynamic sentinel lymph node biopsy seems to be the method which is suitable for patients in terms of safety. It limits the number of complications compared to the standard lymphadenectomy, without increasing the risk of omission of micrometastases.

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