**INGUINAL LYMPH NODE DISSECTION (ILND) IN LOWER LIMB CANCERS IN A SUB-SAHARAN ONCOLOGICAL SURGERY SETTING**

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**Abstract**

**Background:** The inguinal region is sometimes the site of lymph node metastases or primary sites of certain cancers. The lower limbs may be the site of cancers of cutaneous, bone or other soft tissue origin. The risk of inguinal lymph node involvement depends on the type of cancer, the depth of invasion and the stage of disease.

**Aim**: To describe the indications for and evaluate the results of inguinal lymph node dissection (ILND) in cases of lower limb cancers at the Surgical Oncology Unit of Donka, Conakry Hospital.

**Materials and methods:** Retrospective, descriptive, and analytical study of ILND in cases performed from 2007 to 2016. The anatomic and clinical characteristics, intraoperative findings, type of ILND performed, operative complications, histopathological findings and prognostic factors were evaluated.

**Results**: Twenty-five inguinal lymph node dissections were performed for 24 patients. Patients had a median age of 57 years (with a range of 11 to 78); the male to female sex ratio was 1.3. The operative indications were squamous cell carcinoma (10 cases), sarcoma (6 cases), melanoma (5 cases) and osteosarcoma (2 cases**),** and Kaposi’s sarcoma (1 case) (who underwent bilateral ILND with an interval of two years). The primary lesion was on the limb in 23 cases and in the Scarpa triangle in 2 cases. ILND was systematic in 23 cases and after inguinal relapse in 2 cases. It was superficial in 22 cases and deep in 3. Other surgical procedures included wide local excision of the primary tumor (10 cases), amputation (14 cases) and disarticulation (1 case)**.** The margins of resection were free in 18 cases and invaded in 7 cases. The operative complications were delayed healing (5 cases), seroma (3 cases), and lymphedema (3 cases). After a median follow-up of 14 months, there were 8 cases of relapse and 11 deaths.Overall survival was 54.2%. Survival was 12 (70.6%) in those who had free margins and 1(14.3%) in the absence of free margins (p = 0.023); it was 12 (75.0%) in those without relapse and 1 (12.5%) in those with relapse (p=0.008).

**Conclusion:** Cutaneous malignancies are the commonest lower limb cancers. Systematic inguinal lymph node dissection is a common practice for management of lower limb cancer, in addition to various forms of excision of the primary tumour. Survival was higher in those who had free margins of the excised primary tumour and those who did not suffer a relapse. The less morbid sentinel lymph node technique should be placed in the context of early diagnosis of primary lesions.

**Key words: Inguinal lymph node dissection; cancers; lower limb**

**Introduction**

The inguinal region is sometimes the site of lymph node metastases or primary sites of certain cancers.1 This region includes the scarpa triangle, which is bordered superiorly by the inguinal ligament, laterally by the sartorius muscle and medially by the adductor longus muscle. The superficial and deep inguinal lymph nodes drain the lymphatic vessels of the lower limbs, gluteal region, external genitalia, lower digestive tract (anus, anal canal, and lower rectum) and perineum.1,2 The lower limbs may be the site of cancers of cutaneous, bone or other soft tissue origin. The risk of inguinal lymph node involvement depends on the type of cancer, the depth of invasion and the stage of disease. While some spread via the lymphatic route (squamous cell carcinoma), others spread by both lymphatic and haematogenous routes (melanoma); others are even less likely to spread by the lymphatic route (sarcomas of bone and soft tissue).3,4

Inguinal lymph node dissection (ILND) can improve locoregional control of the disease and provide information on the prognosis for lymph node involvement (LNI). LNI increases the risk of relapse and mortality. Survival in LNI of squamous cell carcinoma and cutaneous melanoma ranges from 30-34% at five years.5

Surgical procedures of ILND have improved over time due to better knowledge of the natural history of cancers. ILND is systematic in the presence of palpable inguinal lymph nodes5,6, whereas the sentinel lymph node excision is indicated in the absence of inguinal lymphadenopathy.7 ILND should be completed by conservative or radical excision of the primary tumor which is the origin of the inguinal lymph node involvement (ILNI).6 Morbidity depends on the level of ILND and surgical excision of primary site.8

It was in the perspective of improving ILND that we carried out this study whose objectives were to describe the indications for and evaluate the results of this practice at the Surgical Oncology Unit of Donka Teaching Hospital.

**Materials and Methods**

***Study design***

In this historical cohort, patients who had inguinal lymph node dissection for lower limb cancers from April 30, 2007 to December 31, 2016 were included. Cancers without histological confirmation were excluded.

Age at diagnosis, sex, level of education, occupations of the patients, and comorbidities (HIV infection, diabetes, and hypertension) were noted. The segment of the affected limb, type of cancer, clinical appearance, invasion of adjacent muscles and/or bones, inguinal lymphadenopathy and metastases were assessed.

***Inguinal lymph node dissection (ILND)***

Anaesthesia was spinal or general. In case of failure, spinal anaesthesia was converted into general anaesthesia. The surgical approach was open longitudinal incisional from the base to the top of the scarpa triangle. Vertical open incisions were used. In most cases, ILND was performed at the same time as the excision of the primary lesion. ILND was delayed in patients who experienced inguinal relapse after resection of the primary tumour without initially palpable lymphadenopathy.

Superficial inguinal dissection consisted of removal of the superficial lymph nodes while deep dissection involved removal of the lymph nodes along the femoral vessels and Cloquet's lymph node. Deep ILND was the preferred option for patients with fixed inguinal lymph nodes. The wound was closed using intradermal reversal sutures over suction Redon drain.

After ILND, primary lesion removal was performed according to the segment of the affected limb, infiltration of adjacent structures, and patient desire. Conservative wide excision, amputation or disarticulation of segment or limb was performed, as necessary. In a few cases, adjuvant chemotherapy was given. No patient had access to radiation therapy.

The average time of follow-up was defined as the interval in months between the date of the first consultation and the date of the last contact with the patient. Post-operative complications were classified as early (within one month following surgery) and late (beyond one month after surgery). Excision margins of at least 2 cm were considered healthy. Lymph node status was also determined. Cases of relapse and death were recorded.

***Data analysis***

The data was analyzed with the Statistical Package for the Social Sciences (version 21.0 for Windows, SPSS, Inc., Chicago, IL). Categorical data were presented as proportions (%), and quantitative data as median with range. Overall survival was calculated and compared according to surgical resection margins, use of adjuvant chemotherapy, and the occurrence of relapse. Differences in survival were determined using the chi-square test. Differences were considered significant if p<0.05.

**Results**

From 2007 to 2016, 25 operations of ILND were performed in 24 patients. The median age at diagnosis was 57 (range 11 to 78). There were 13 males (54.2%) and 11 females (45.8%). Patients were aged 15 to 60 years in 15 cases (62.5%). They were housewives (7 cases), farmers (5 cases), and students (5 cases). Twelve (50.0%) patients had had no formal education. Table 1 shows the sociodemographic characteristics of the patients.

There were two diabetic patients, two hypertensives and two infected with the human immunodeficiency virus (HIV).

***Clinical Characteristics of Tumours***

There were 16 (66.7%) cases of cutaneous, 6 (25%) cases of soft tissue and 2 (8.3%) cases of bone malignancies. Table 2 presents the distribution of patients according to the characteristics of operated cancers.

The cutaneous malignancies were squamous cell carcinoma (SCC) (10 cases), plantar melanoma (5 cases) and inguinal Kaposi sarcoma (1 case).

The SCCs were located on the foot (4 cases), the leg (4 cases), the thigh (1 case) and the knee (1 case). Clinically, there was ulceration in 9 cases (90.0%) and invasion of adjacent structures in 8 cases (80.0%). Figure 1shows an example of squamous cell carcinoma of the cauliflower type. Inguinal lymph node involvement was present in all patients with squamous cell carcinoma and all were in stage 3.

Among the five cases of plantar melanomas, 4 were ulcerated and associated with inguinal lymphadenopathy. In one case of melanoma, the inguinal lymph nodes were fixed. Histology showed adjacent structures involved in 4 cases (80.0%). These melanomas were stage III cases.

All 6 cases of soft-tissue tumors were sarcomas located in the Scarpa Triangle (3 cases), foot (2 cases) and leg (1 case). Adjacent structures were involved in 2 cases. One of the six cases did not have inguinal lymph node involvement. One case of sarcoma was stage 2 and five were stage 3 cancers.

Both bone tumours were osteosarcomas and were located on the tibia. Inguinal lymph nodes were palpable in one case and not palpable in the other, and the respective stages of these osteosarcomas were 3 and 2.

***Inguinal Lymph node dissection (ILND)***

The anaesthesia used was spinal in 15 cases (60.0%) and general in 9 cases (36.0%); one case (4.0%) which started with spinal was converted to general anaesthesia.

ILND was performed at the same time as the removal of the primary tumour in 22 patients and in cases of relapse in 2 cases (12.0%). In one case, ILND was performed on a contralateral inguinal relapse two years after the first operation in the patient with Kaposi's sarcoma. ILND was superficial in 23 cases (92.0%) and deep in 2 cases (8.0%). The cases who underwent deep ILND had melanoma (1 case) and Kaposi's sarcoma (during the first surgery).

Limb amputations were required for the treatment of the primary tumour in 14 cases (56.0%), wide conservative excision in 10 cases (40.0%) and disarticulation in 1 case (4.0%). Excision margins were free in 18 cases (72%) and invaded in 7 cases (28%). Inguinal nodes were invaded in all cases.

Neoadjuvant chemotherapy was used in the case of Kaposi's sarcoma. Adjuvant chemotherapy was used in 4 (20.0%) patients. Patients who received adjuvant chemotherapy had melanoma (2), sarcoma (1), and osteosarcoma (1). Protocols used included 4-6 cycles of dacarbazine and doxorubicin in melanoma, doxorubicin and cisplatin in osteosarcoma, and doxorubicin monotherapy in soft tissue sarcoma and Kaposi's sarcoma. No patient received radiotherapy.

***Follow up***

The median time of follow-up was 14 months (IQR 1.0 to 34.0). Early complications were delayed healing (5 cases), suppuration (4 cases), seroma (3 cases), hematoma (2 cases), haemorrhage (1 case) and cutaneous necrosis (1 case). The only late complication was lymphedema (3 cases).

Relapse occurred in 8 (32%) patients. These relapses were local (1 case), locoregional (2 cases), metastatic (2 cases), and locoregional and metastatic (3 cases).

Eleven patients (45.8%) died. Overall survival was 54.2%. This survival depended on the invasion of surgical margins, 1(14.3%) versus 12 (70.6%) [p=0.023] and on the occurrence of relapse, 1 (12.5%) versus 12 (75.0%) [p=0.008]. Survival was 4(80.0%) for patients who received chemotherapy versus 9 (47.3%) for those who did not [p=0.327].

**Discussion**

Involvement of the inguinal lymph node is part of the natural history and is an important prognostic factor of lower limb cancers. In the management of lymph node-positive or potentially lymphophilic cancers, it seems important to include lymph node dissection in surgical treatment. In this study, we evaluated the indications of ILND which were to treat lymph node spread, to provide information on lymph node status, and to improve the prognosis of lower limb cancers in our oncological surgical environment.

In this study, the detection of ILN was only by clinical examination. The use of ultrasound or computed tomography (CT) scans will improve the assessment of lymph node spread for lower limb cancers in our practice. These procedures are useful in showing deep lymph nodes.5,9 Ultrasound or CT scans were not performed because this equipment was not available in our public hospital and patients could not afford them in private hospitals.

Most patients had palpable ILN. In the case of delayed ILND due to non-palpable ILN, the sentinel node could be performed at the same time of the primary tumour removal**.**7,10

Skin cancers were the leading cancer in this study. Lower extremity SCCs were the most common, accounting for 41.7% of all patients. This was reported in a previous study in the same setting.4 The lesions were larger, ulcerating, and locally advanced. Vinicius et *al* showed that the risk of lymph node metastasis in trunk and extremity SCCs depends on the appearance of the primary lesion and pre-existing precancerous lesions.11 SCC cases previously reported in our unit were associated with LNI in 54% of cases.4

Plantar melanoma was the second most common skin cancer in this study with 5 cases. They were also advanced and ulcerated lesions, corresponding to Clark level 5, initially associated with palpable ILN in 4 out of 5 patients. About 50% of cutaneous melanomas spread usually by regional LNI.12

Sarcomas were localized in the Scarpa triangle and other segments of the lower limb. The risk of LNI in cases of sarcoma is low. The frequency is 3.7% according to Riad et *al* at the Musculoskeletal Oncology Unit in Toronto.13 Without specifying the proportion of positivity, the presence of lymph node was reported in 32.5% of the soft tissue sarcomas diagnosed in our unit.14 The frequency of LNI in cases of lower extremity sarcoma, depending on the histological type, grade and anatomical location can reach 24%.15

Two cases of tibial osteosarcoma have been reported in this study. It is exceedingly difficult to determine the frequency of osteosarcomas lymph node metastases because of their rarity. The frequency of regional lymph node metastases with histological confirmation was 0.7% according to Thampi et *al*.16

Rare cases of lymph node localization of Kaposi's sarcoma have been reported in immunocompromised and immunocompetent patients.17,18 In a case of Kaposi’s sarcoma, ILND should only be done on a residual lesion after neoadjuvant chemotherapy.

Apart from a single case of conversion, spinal anaesthesia was preferred over general anaesthesia in our context. Gottschalk et al comparing the impact of spinal anaesthesia with general anaesthesia on survival in patients undergoing surgery for primary malignant melanoma in the lower extremity, including inguinal lymph node dissection, found a trend towards a better cumulative survival rate for patients who had spinal anaesthesia.19

First described by Basset in 1912, inguinal dissection consisted of removing the deep and superficial lymph nodes from the inguinal region.20 In addition, an ilioinguinal or radical dissection of the groin can be performed, where the inguinal, iliac and obturator nodes are removed.20,21 We performed superficial inguinal dissection in 92% compared to 8% deep inguinal dissection. We did not perform retro-iliac dissection because it should be indicated in cases of Cloquet's lymph node involvement.

Among our patients, inguinal dissection was followed by amputation or disarticulation of the limb in most cases or conservative excision in some cases. The margins of resection of the primary lesion were involved in patients who had excision of the primary lesion. These were patients who had advanced lesions and who had refused amputation or disarticulation necessary to achieve free margins. To be optimal, inguinal dissection should be followed by excision, with adequate free margins, of the primary lesion.22

Postoperative complications included delayed healing, wound infection, seroma, lymphedema, hematoma, haemorrhage, and cutaneous necrosis. Some of these complications were reported by Nelson et al in patients with penile cancer who underwent inguinal lymphadenectomy with or without pelvic lymphadenectomy.23 Glarner et al, in a study of ILND for melanoma found a wound complication rate of 14%.24 Preservation of the saphenous vein in ILND is reported to reduce wound complications, including lymphedema. 25 We did not practice saphenous vein preservation in our series. Robot-assisted video endoscopic inguinal lymphadenectomy (RAVEIL) has been described as an alternative to minimize postoperative complications.25,26

The relapse rate of 32% after a median follow-up of 14 months is very high. Relapses were mostly locoregional and/or metastatic. Mozillo et *al* found 84 (63.2%) cases of relapse out of 133 patients who underwent LND for malignant melanoma, though the median follow-up period in their study was 5.6 years and the median time to relapse was 22.0 months.27 In the same study, the site of relapse was local lymph nodes in 13 cases.

In our study, overall survival was 54.2%, depending on the margin status and the occurrence of relapse. Mozillo et *al* showed that survival of stage 3 melanoma was 55.6% in cases of superficial lymph node invasion compared to 33.3% in cases of both superficial and deep lymph node invasion. The low number of cases of deep lymph node dissection in this study does not allow for comparison using the depth of dissection. 27

**Conclusion**

Cutaneous malignancies are the commonest lower limb cancers. Systematic inguinal lymph node dissection is a common practice for management of lower limb cancer, in addition to various forms of excision of the primary tumour. Survival was higher in those who had free margins of the excised primary tumour and those who did not suffer a relapse. The less morbid sentinel lymph node technique should be considered within the context of early diagnosis of primary lesions.

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**Table 1:** Sociodemographic characteristics of the patients

|  |  |
| --- | --- |
| **Characteristics**  | **Number (%)** |
| **Sex*** Male
* Female
 | 13 (54.2)11 (45.8) |
| **Age distribution, years*** < 15
* 15-60
* > 60
 | 1 (0.4)15 (62.3)8 (33.3) |
| **Occupation*** Housewife
* Farmer
* Pupils/students
* Office workers
* Others\*
 | 7 (29.2)5 (20.8)5 (20.8)3 (12.5)4 (16.7) |
| Formal Education* Yes
* No
 | 12 (50.0)12 (50.0) |

*\*mechanic, shopkeeper, dressmaker*

**Table 2:** Characteristics of cancers operated on

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Characteristics** | **SCC** | **M** | **S** | **OS** | **KS** |
| **Number of Cases** | 10 | 5 | 6 | 2 | 1 |
| **Tumor size** Median (Range) cms | 15(5-42) | 6(3-20) | 16(9-30) | 25.5 (13-38) | 6(6-6) |
| **Primary site*** Scarpa Triangle
* Thigh
* Knee
* Leg
* Foot
 | - 114 4 | ----5 | 3--12 | ---2- | 1---- |
| **Ulceration** |  9 | 4 | 4 | - | - |
| **Clinical Inguinal Lymph Node Involvement** |  10 | 4 | 4 | 1 | - |
| **TNM Stage*** Stage 2
* Stage 3
 | - 10 | -5 | 15 | 11 | 1- |

***SCC :*** *squamous cell carcinoma ;* ***M****: melanoma ;* ***S:*** *sarcoma ;* ***OS:*** *osteosarcoma;* ***KS:****Kaposi’s sarcoma;* ***TNM****: Tumor (T), Node (N), Metastasis (M)*

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**Figure 1:** Squamous cell carcinoma of cauliflower type over the medial malleolus of the

 right foot in a 21-year-old patient.