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## Case Report

# Muscle involvement by widely metastatic squamous cell carcinoma of the lung <sup>☆</sup>

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### ABSTRACT

Muscle metastases remain rare as a secondary localization for cancers in general and lung cancer in particular. They are discovered incidentally in most cases and in the advanced stages of cancer. We report the case of a 60-year-old man, followed for squamous cell carcinoma, who was found to have muscle metastases during the follow-up of associated muscle pain. This case highlights the existence of these metastases in lung squamous cell carcinoma, rare as it is, and requires particular attention from practitioners in the follow-up of patients to detect these cases as early as possible and improve patient survival. Computed Tomography (CT) remains an excellent exam for the detection of skeletal metastasis.

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## Introduction

Lung cancer remains the most deadly cancer in men and is on increase in women due to ever-increasing smoking. Squamous cell carcinoma is the second most common histological type of non-small cell lung cancer. Epidemiologically, it represents about 30%, after adenocarcinomas, which are estimated to 60%.

The most frequent metastases are liver, bone, and brain. Muscle metastases are rare and can occur in two main ways:

by contiguity with loco-regional invasion or rarely by the hematogenous way. Di Giorgio et al, in a study of 3,000 patients treated for lung cancer, found only 3 cases of muscle metastases, i.e. 0.1% of cases [1]. These metastases have a poor prognosis

## Case report

60-year-old patient followed in oncology for stage IV of lung squamous cell carcinoma, with liver and adrenal gland metas-

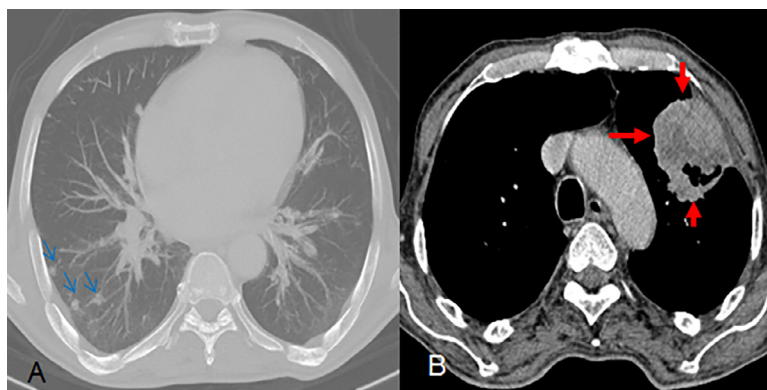
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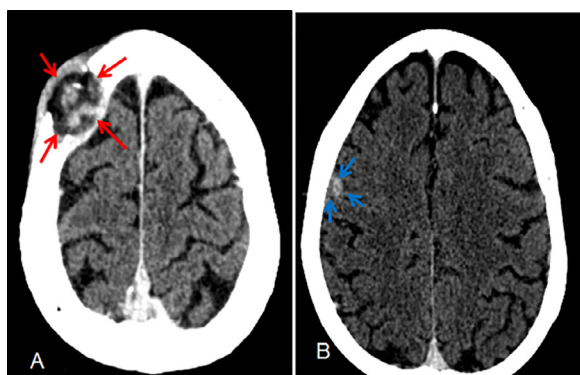
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**Fig. 1 – Contrast-enhanced chest CT scan in axial showing in the parenchymal window A: metastatic nodules in the lateral lung (blue arrows); in the mediastinal window B: irregularly enhanced left upper lobar mass after injection: squamous cell carcinoma (red arrows).**



**Fig. 2 – Contrast enhanced brain CT scan in axial in the parenchymal window showing A: a lytic bone lesion centered on the right frontal bone (red arrow) B: a nodular right frontal parenchymal lesion with peripheral enhancement and a hypodense center (blue arrow): brain metastases.**

tases under palliative chemotherapy, who presented with sporadic muscular pains buttocks areas with the presence of a mass in the skull that was progressively increasing in size. At the time of his periodic assessment, he had a brain scan and a thoracic-abdominal-pelvic scan.

Imaging revealed a spiculated lung mass (Fig. 1), liver and adrenal metastases (Fig. 2) and a right frontal lytic lesion centered on the right frontal bone with an associated parenchymal metastasis (Fig. 3).

Imaging revealed multiple homogeneous, iso-dense muscle lesions that were enhanced more peripherally after injection of a radiocontrast agent, associated with local bone lyses: left iliac muscle with lysis of the left iliac wing, muscle lesions of the left middle and right greater gluteal muscles; right abdominal muscle lateralized to the left with extension to the left oblique and external muscle; the right abdominal muscle lateralized to the right with lysis of the right ischial pubic branch. (Fig. 4 and Fig. 5).

In summary this patient who was followed for squamous cell carcinoma have brain, liver, adrenal metastases, mediastinal and retroperitoneal adenopathies, so it was concluded to muscular metastases. The patient was classified as T4N3M1c (8th Edition TNM classification)

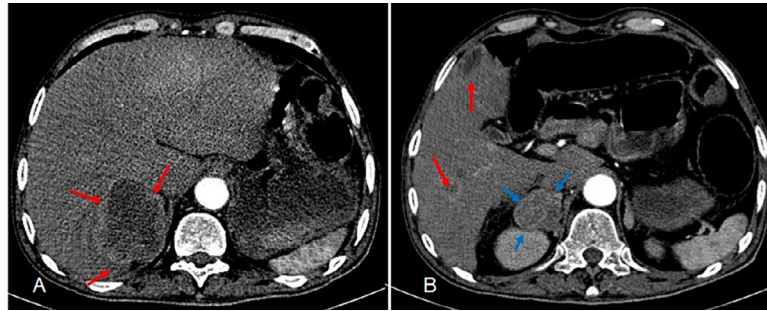
## Discussion

Lung cancer remains one of the leading causes of cancer deaths worldwide due to late diagnosis. The most common known metastases are adrenal, liver, bone, and brain. Skeletal Muscle metastases are extremely rare in lung squamous cell carcinoma.

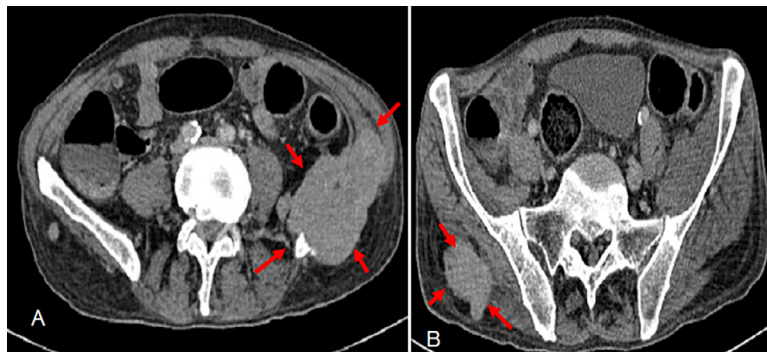
Muscle metastases are rare in all types of primary cancer. Muscle metastases remain a rare location by hematogenous dissemination of squamous cell carcinoma. Approximately 40-50% of primary lesions are lung cancers, with an incidence of 0.16% out of a total of 2,557 patients with lung cancer. The most common histological types are adenocarcinoma of the lung and digestive tract (35%) [2]. The most affected muscles are usually the iliopsoas and paraspinal muscles [3]. This has been confirmed by a retrospective study carried out by A. Surov et al. on 5,170 patients (only 0.8% of lung cancers) with cancer metastases, of whom 61 (1.1%) had muscle metastases, with 27.5% in the iliopsoas muscles and 25% in the paraspinal muscles [4]. In our case, we found muscle locations involving the gluteal muscles, iliac muscles, and the rectus abdominis muscle.

In another study by Javid Muzamil et al, over 8 years out of 26,660 cases of cancer, 3068 (11.5%) were lung cancers; 1277 (40%) were squamous cell carcinomas. Only 18 patients (1.5%) had muscle metastases and 10 had metastases at several sites. Pelvic skeletal muscles were involved in 66% of cases, thigh muscles in 22%, and paraspinal muscles in 11% [5].

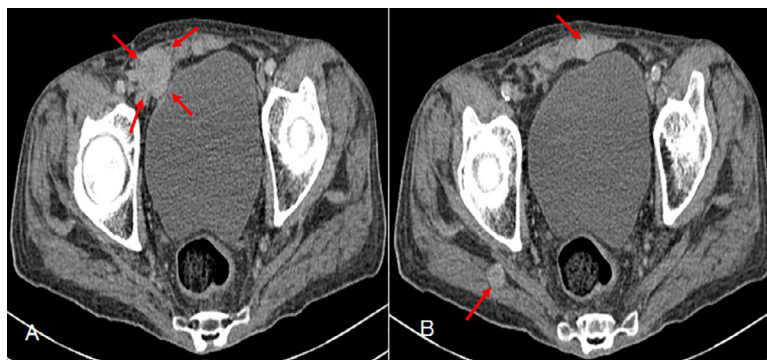
The type of enhancement found on CT scan is generally homogeneous and more intense in the periphery in most muscle metastases. Studies in groups of lung cancer metastases have also found homogeneous enhancement more marked in the periphery with a sometimes hypodense center [4].



**Fig. 3 – Contrast-enhanced abdominal pelvic CT showing A and B: peripherally enhanced liver lesions with a hypodense center (red arrows) and a right adrenal lesion with the same characteristics as the liver lesions (blue arrows) : liver and adrenal metastases.**



**Fig. 4 – Contrast-enhanced abdominal pelvic CT showing enhanced muscle masses (red arrows), A: involving the left iliac and left middle gluteal muscles with extension to the left internal and external oblique muscles with lysis of the right iliac bone, B: involving the right gluteus maximus muscle: muscle metastases.**



**Fig. 5 – Contrast-enhanced abdominal pelvic CT showing enhanced muscle masses (red arrows) A: involving the right-lateralized rectus abdominis muscle, B: the right middle gluteal muscle and the left-lateralized rectus abdominis muscle in favor of muscle metastases.**

Most of the time these lesions are discovered fortuitously after diagnosis with the CT scan, which remains an excellent examination for detecting these metastases. The biopsy will confirm the diagnosis if necessary. However, there are cases of metastases being found before the diagnosis of lung squamous cell carcinoma [6].

Several factors are involved in the frequent occurrence of muscle metastases including muscle contractile actions, vari-

ations in blood flow, local environment i.e. pH, accumulation of lactic acid, and other metabolites [7]. Other factors that have been suggested include the immunological cause i.e. cellular and humoral immunity, and the strong hypersensitivity reaction within the muscles [8].

The occurrence of these metastases is indicative of the aggressive nature of the primary tumor. In Javid Muzamil et al. study of patients with muscle metastases, the median

survival age was 15 months with extremes ranging from 12 to 26 months. In cases of discovery of other synchronous metastases, patient survival did not exceed 5 years, with better survival in patients with single muscle metastasis [5]. Pop et al. found identical survival at 5 years with a median of 6 months in patients with early detection of muscle metastases [9].

The treatment of muscle metastases is not yet well codified due to the rarity of the cases. In cases of solitary metastasis, excision may be performed, combined with adjuvant chemotherapy. In other cases, the association of excision and/or local radiotherapy with adjuvant chemotherapy has given good results in patient survival [10].

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## Conclusion

Muscle metastases are rare in non-small cell lung cancers, especially squamous cell carcinomas. Their discovery is fortuitous in most cases during the follow-up of patients by CT scan. They can rarely be indicative of a diagnosis of primary lung cancer. The most common sites are the iliopsoas and paraspinal muscles, although other locations are not excluded. Their occurrence remains a poor prognostic factor and evidence of the aggressiveness of the primary lung tumor. It is most often associated with other metastases, which reduces the survival of patients. Treatment is not yet well codified for the management of these cases of muscle metastases from lung cancer.

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## Patient consent

Written informed consent for publication was obtained from patient

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