

# Adenocarcinoma of the Lung Presenting with Paraplegia—A Case Report

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## Abstract

Adenocarcinomas constitute 40% of lung cancers and are the commonest type. Clinical symptoms are usually rare in the early stages of the disease and may be found on X-ray or CT scan as a round or oval mass, which is slow-growing. In some conditions, the spinal metastasis can lead to compression of the dural sac and its contents (spinal cord and/or cauda equina) by an extradural tumour mass, resulting in loss of neurological function with paralysis of the extremities as well as loss of autonomic functions like bowel and bladder control. We present a case of a young lady who presented with paraplegia without any prior respiratory symptoms. She was unable to sit due to the loss of stability of the lumbar spine. She had posterior spinal decompression and stabilization with pedicle screws and rods, as well as primary lung tumour excision. Histological analysis confirmed metastatic adenocarcinoma of the lungs. Patient was able to mobilize on a wheelchair postoperatively without back pain but did not gain power or sensation. She has since received adjuvant radiotherapy and has been stable.

## Keywords

Lung Adenocarcinoma, Spinal Metastasis, Paraplegia, Decompression, Fusion

## 1. Introduction

Adenocarcinomas constitute 40% of lung cancers and are the commonest type [1]. Clinical symptoms are usually rare in the early stages of the disease and may be found on X-ray or CT scan as a round or oval mass, which is slow-growing [2]. In

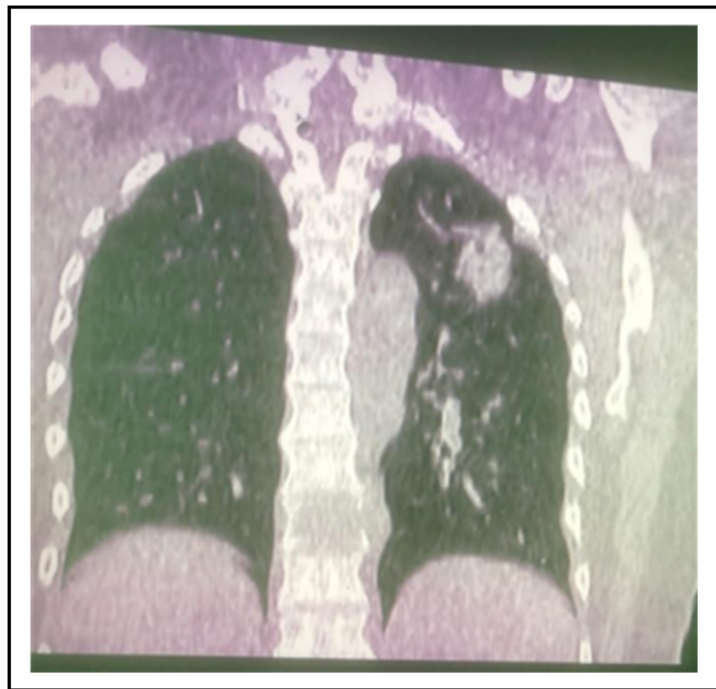
some conditions, the spinal metastasis can lead to compression of the dural sac and its contents (spinal cord and/or cauda equina) by an extradural tumour mass, resulting in loss of neurological function with paralysis of the extremities as well as loss of autonomic functions like bowel and bladder control [3]. It is a predominant type of lung cancer among non-smokers and females and can sometimes present first with paraplegia from spinal metastasis, which is a challenging clinical problem [4] [5]. The tumour is reported to have a wide spectrum of clinical, radiologic, molecular, and morphologic features [6]. The variants of lung adenocarcinoma consist of invasive mucinous adenocarcinoma, colloid adenocarcinoma, foetal adenocarcinoma, and enteric adenocarcinoma [7].

Clinical symptoms are usually rare in the early stages of the disease and may be found on X-ray or CT scan as a round or oval mass, which is slow-growing [2]. The adenocarcinomas tend to be more peripherally located than centrally, so when still confined, they tend to be asymptomatic, but occasionally, cough or pleuritic chest pain may present due to diffuse infiltration of lung parenchyma and large bronchial secretions. Other symptoms due to local tumour growth include dyspnoea, localized wheeze, haemoptysis, and Fever, which is due to tumour necrosis [8]. The spine is the most common bony site for metastatic deposits [9] [10]. Spinal metastasis may cause bone pain, pathological fractures, motor or sensory dysfunction, and sometimes symptoms associated with systemic disease such as weight loss or anaemia [11]. In some conditions, the spinal metastasis can lead to compression of the dural sac and its contents (spinal cord and/or cauda equina) by an extradural tumour mass, resulting in loss of neurological function with paralysis of the extremities as well as loss of autonomic functions like bowel and bladder control. Bony compression and spinal instability may also occur, requiring surgical stabilization [3] [12]. Plain radiographs are necessary and could show pedicle erosion (that is, the “winking owl” sign), paraspinal soft-tissue shadows, wedge compression, and pathological fractures. The Intervertebral disc margins may be spared in metastatic tumour invasion; this differentiates it from the disc erosion commonly seen in infectious spondylodiscitis [13]. CT scan gives a better three-dimensional definition of the tumour and its relation to the surrounding bone. CT with contrast has a higher sensitivity, while CT myelography is comparable to MRI in the information acquired about the tumour and is used in patients with contraindication to MRI [14]. Magnetic resonance facilitates the earlier diagnosis of spinal metastases than other modalities. It is superior in depicting epidural and bone marrow tumour infiltration, and it delineates the extraosseous soft-tissue component of a neoplasm from the normal paraspinal soft tissue and neural structures and the use of Gadolinium-enhanced MRI further increases the sensitivity, especially for multiple spinal metastasis [15]. Metastasis to the spine can occur in adenocarcinomas of the lungs, with 70% occurring in the Thoracic region and the lumbar and cervical regions, with 20% and 10% respectively [16]. Spinal metastasis can be intradural (which can be intramedullary or extramedullary) or extramedullary, which accounts for up to 95% of spinal metastasis

[17] [18]. Surgical resection of the tumour is the conventional treatment for spinal cord metastasis from lung adenocarcinomas. It is effective, but recurrence is common. Biopsy of the lung tissue is needed to confirm diagnosis, staging, and treatment planning of the primary tumour [19]. Chemotherapy penetrates the CNS poorly and has low efficacy. High-dose radiotherapy is now used as an adjunct [20].

## 2. Case Report

The patient was a 49-year-old lady who presented in our clinic with a history of inability to bear weight on both lower limbs of about 3 months duration. She was unable to sit upright due to severe back pain. She had both urine and faecal incontinence but no upper respiratory symptoms. Examination revealed that the power was 0 in both lower limbs with loss of sensation below T10. She was bedridden. Radiographs showed that the vertebral heights were maintained with sparing of the intervertebral disc. While the CT scan shows lytic changes with cortical bone destruction of T10 vertebral body. It also shows the tumour with sparing of the intervertebral discs and the upper lobe of the left lung. This is shown in **Figure 1**.



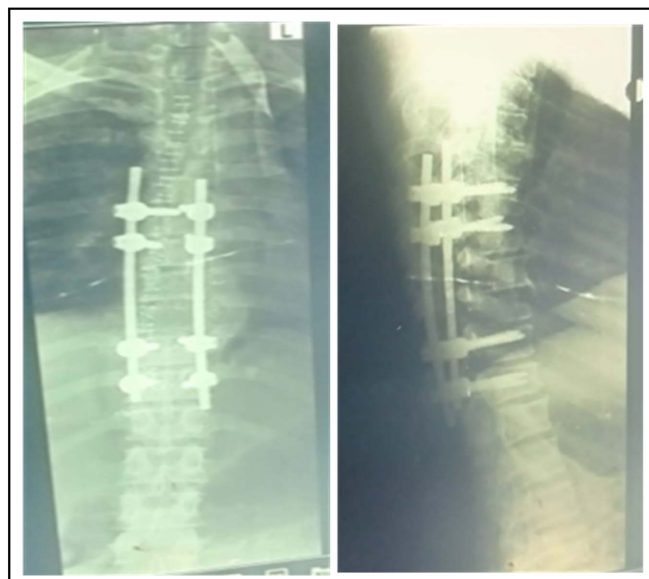
**Figure 1.** CT scan of the chest showing lytic changes in T10 and tumour in upper lobe of left lung.

T2 weighted MRI showed hyperintensity of the body of T10 with maintenance of the vertebral body height and sparing of the intervertebral disc. There was infiltration of surrounding structures with effacement of CSF at the same level. **Figure 2** shows sagittal view of the MRI of the thoracic spine.



**Figure 2.** Sagittal T2 weighted MRI Scan.

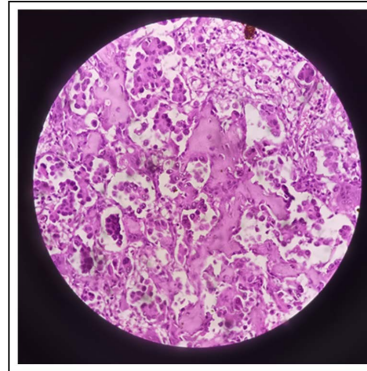
Following a multidisciplinary discussion with the cardiothoracic surgeons a decision was taken to first perform spinal decompression, complete biopsy of the spinal tumour which was epidural and well circumscribed without dural infiltration at the level of T10 and posterior spinal stabilization with pedicle screws at 2 levels above and below the level of the laminectomy with autologous bone grafting (**Figure 3**).



**Figure 3.** Pre-operative radiographs showing posterior spinal fusion after excision biopsy of tumour and spinal decompression.

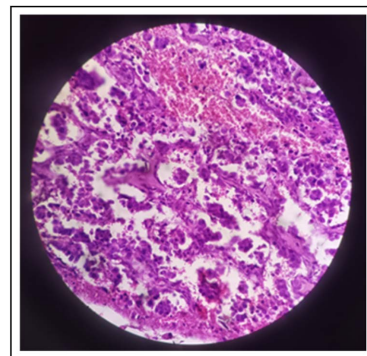
Based on TNM staging of the American joint committee on cancer, the tumour was staged as stage IV, T4N2M1 as there is metastasis to the spine.

Histologic results showed malignant epithelial proliferation composed of cells with large, pleomorphic and hyperchromatic nuclei. Lesional cells are arranged in glandular structures. In most of the fields, the micropapillary pattern of growth is observed. Lepidic growth pattern is seen where neoplastic cells are infiltrating the bone. The features are consistent with metastatic adenocarcinoma of the lungs. This is shown in **Figure 4**.



**Figure 4.** Histology of spine tumour showing malignant epithelial proliferation composed of cells with large, pleomorphic and hyperchromatic nuclei.

The patient was able to sit after the surgery and mobilize in wheelchair. 2 weeks later, the cardiothoracic surgeons performed a tissue biopsy (with complete excision of the lung tumour) was taken for histology, which showed lung tissue in which there is malignant epithelial proliferation composed of cells with large, pleomorphic and hyperchromatic nuclei. Neoplastic cells are arranged in glandular structures. Lepidic pattern of growth is the dominant growth pattern observed. The micropapillary growth pattern is the secondary growth pattern. The above lesion is micromorphologically similar to the lesion described in the spinal biopsy. This is as in **Figure 5**.



**Figure 5.** Histology of primary lung tumour showing malignant epithelial proliferation composed of cells with large, pleomorphic and hyperchromatic nuclei. Neoplastic cells are arranged in glandular structures. Lepidic pattern of growth is the dominant growth pattern observed.

Multidisciplinary decision was taken with the cardiothoracic surgeon, oncologist and pathologist to use surgery alone as the initial treatment for the patient in view of the well-defined primary lung tumour and the complete excision of the spinal tumour and the lack of evidence of any other secondaries in the patient and also the patient was in good health condition without any other systemic anomalies. The patient later underwent radiotherapy and is now in stable condition.

### 3. Discussion

There is an increasing incidence of lung adenocarcinoma among non-smoking females [21] [22]. The reason could be due to exposure to fumes, passive smoking from living or working with smokers and some studies have also mentioned mutations of certain genes like epidermal growth factor receptor and echinoderm microtubule-associated protein-like 4 [23]. Early stages of lung adenocarcinoma can be without respiratory symptoms and presentations with paraplegia secondary to compressions on the spinal cord, as we had in our patient, are not common and need to be treated early [24]. Radiological investigations are an important part of the evaluation. X-rays may show compression fractures and pedicle erosion and usually there is sparing of the discs, as in our patient. CT scan is more sensitive and shows the extent of bony involvement. On MRI, Lesions are hypo-intense on T1-weighted and hyper-intense on T2-weighted MRI images [25]. Laminectomy supplemented with stabilization with neutralizing fixation devices, such as pedicle screws, does offer pain relief and a degree of functional recovery in a substantial number of patients. It does offer relief from pain and some degree of functional recovery in some patients [26]. In our patient who was unable to sit, she was able to start wheelchair mobilization after the surgery. Surgery also enables tissue biopsy. Radiation therapy is an adjunct but requires careful consideration in certain situations, which include severe spinal cord compression and significant neurological deficits such as paralysis or bowel/bladder dysfunction [27].

### 4. Conclusion

Adenocarcinoma of the lungs can present in non-smoking female patients with paraplegia secondary to spinal metastasis. Spinal decompression and stabilization of the spine, as well as primary tumour excision, are important management modalities to enhance patients' quality of life.

### Ethical Approval and Consent to Participate

This work follows the guidelines for human studies and was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. Written informed consent was obtained from the patient for reporting and publication of this case report and any accompanying images, and the relevant approval was obtained from the ethical committee of our hospital.

## Authors' Contributions

All the authors participated in the literature review, Physical examination and neurological assessment of the patient, writing of discussion and references. Dr. Nnakenyi also did the Histological review workup personally. He contributed to manuscript writing in his area of expertise. All authors edited the English language of the manuscript and have approved the final draft of the manuscript before sending it for publication.

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## Conflicts of Interest

The authors have no competing interest to declare.

## References

- [1] Zappa, C. and Mousa, S.A. (2016) Non-Small Cell Lung Cancer: Current Treatment and Future Advances. *Translational Lung Cancer Research*, **5**, 288-300. <https://doi.org/10.21037/tlcr.2016.06.07>
- [2] Consonni, D., Pierobon, M., Gail, M.H., Rubagotti, M., Rotunno, M., Goldstein, A., *et al.* (2015) Lung Cancer Prognosis before and after Recurrence in a Population-Based Setting. *JNCI: Journal of the National Cancer Institute*, **107**, djv059. <https://doi.org/10.1093/jnci/djv059>
- [3] Kilbride, L., Cox, M., Kennedy, C.M., Lee, S.H. and Grant, R. (2010) Metastatic Spinal Cord Compression: A Review of Practice and Care. *Journal of Clinical Nursing*, **19**, 1767-1783. <https://doi.org/10.1111/j.1365-2702.2010.03236.x>
- [4] Nakamura, H. and Saji, H. (2014) A Worldwide Trend of Increasing Primary Adenocarcinoma of the Lung. *Surgery Today*, **44**, 1004-1012. <https://doi.org/10.1007/s00595-013-0636-z>
- [5] Hata, Y., Takai, Y., Takahashi, H., Takagi, K., Isobe, K., Hasegawa, C., Shibuya, K., Goto, H., Tamaki, K., Sato, F., and Otsuka, H. (2013) Complete Response of 7 Years' Duration after Chemoradiotherapy Followed by Gefitinib in a Patient with Intramedullary Spinal Cord Metastasis from Lung Adenocarcinoma. *Journal of Thoracic Disease*, **5**, E65-E67.
- [6] Travis, W.D., Brambilla, E., Muller-Hemelinck, H.K., and Harris, C.C. (2004) World Health Organization Classification of Tumours. Pathology and Genetics of Tumours of the Lung, Pleura, Thymus and Heart. IARC Press.
- [7] Rekhman, N., Brandt, S.M., Sigel, C.S., Friedlander, M.A., Riely, G.J., Travis, W.D., *et al.* (2011) Suitability of Thoracic Cytology for New Therapeutic Paradigms in Non-Small Cell Lung Carcinoma: High Accuracy of Tumor Subtyping and Feasibility of *EGFR* and *KRAS* Molecular Testing. *Journal of Thoracic Oncology: Official Publication of the International Association for the Study of Lung Cancer*, **6**, 451-458. <https://doi.org/10.1097/jto.0b013e31820517a3>
- [8] Cohen, M.H. (1982) Natural History of Lung Cancer. *Clinics in Chest Medicine*, **3**, 229-241.
- [9] Harrington, K.D. (1993) Metastatic Tumors of the Spine: Diagnosis and Treatment. *Journal of the American Academy of Orthopaedic Surgeons*, **1**, 76-86. <https://doi.org/10.5435/00124635-199311000-00002>

- [10] Böhm, P. and Huber, J. (2002) The Surgical Treatment of Bony Metastases of the Spine and Limbs. *The Journal of Bone and Joint Surgery. British volume*, **84**, 521-529. <https://doi.org/10.1302/0301-620x.84b4.0840521>
- [11] Sciubba, D.M., Petteys, R.J., Dekutoski, M.B., Fisher, C.G., Fehlings, M.G., Ondra, S.L., *et al.* (2010) Diagnosis and Management of Metastatic Spine Disease. A Review. *Journal of Neurosurgery: Spine*, **13**, 94-108. <https://doi.org/10.3171/2010.3.spine09202>
- [12] Loblaw, D.A., Perry, J., Chambers, A. and Laperriere, N.J. (2005) Systematic Review of the Diagnosis and Management of Malignant Extradural Spinal Cord Compression: The Cancer Care Ontario Practice Guidelines Initiative's Neuro-Oncology Disease Site Group. *Journal of Clinical Oncology: Official Journal of the American Society of Clinical Oncology*, **23**, 2028-2037. <https://doi.org/10.1200/jco.2005.00.067>
- [13] Portenoy, R.K., Galer, B.S., Salamon, O., Freilich, M., Finkel, J.E., Milstein, D., *et al.* (1989) Identification of Epidural Neoplasm. Radiography and Bone Scintigraphy in the Symptomatic and Asymptomatic Spine. *Cancer*, **64**, 2207-2213. [https://doi.org/10.1002/1097-0142\(19891201\)64:11<2207::aid-cncr2820641104>3.0.co;2-9](https://doi.org/10.1002/1097-0142(19891201)64:11<2207::aid-cncr2820641104>3.0.co;2-9)
- [14] Helweg-Larsen, S., Wagner, A., Kjaer, L., Johnsen, A., Boesen, J., Palner, T., *et al.* (1992) Comparison of Myelography Combined with Postmyelographic Spinal CT and MRI in Suspected Metastatic Disease of the Spinal Canal. *Journal of Neuro-Oncology*, **13**, 231-237. <https://doi.org/10.1007/bf00172475>
- [15] Keogh, C., Bergin, D., Brennan, D. and Eustace, S. (2000) MR Imaging of Bone Tumors of the Cervical Spine. *Magnetic Resonance Imaging Clinics of North America*, **8**, 513-527. [https://doi.org/10.1016/s1064-9689\(21\)00622-x](https://doi.org/10.1016/s1064-9689(21)00622-x)
- [16] Gilbert, R.W., Kim, J. and Posner, J.B. (1978) Epidural Spinal Cord Compression from Metastatic Tumor: Diagnosis and Treatment. *Annals of Neurology*, **3**, 40-51. <https://doi.org/10.1002/ana.410030107>
- [17] Perrin, R.G. and Laxton, A.W. (2004) Metastatic Spine Disease: Epidemiology, Pathophysiology, and Evaluation of Patients. *Neurosurgery Clinics of North America*, **15**, 365-373. <https://doi.org/10.1016/j.nec.2004.04.018>
- [18] Jacobs, W.B. and Perrin, R.G. (2001) Evaluation and Treatment of Spinal Metastases: An Overview. *Neurosurgical Focus*, **11**, 1-11. <https://doi.org/10.3171/foc.2001.11.6.11>
- [19] Tuzi, A., Bolzacchini, E., Suter, M.B., Giaquinto, A., Passaro, A., Gobba, S., *et al.* (2017) Biopsy and Re-Biopsy in Lung Cancer: The Oncologist Requests and the Role of Endobronchial Ultrasounds Transbronchial Needle Aspiration. *Journal of Thoracic Disease*, **9**, S405-S409. <https://doi.org/10.21037/jtd.2017.04.09>
- [20] Lee, D.S., Kwak, Y.K., Jeong, S.M., Song, J.H., Kang, Y.N., Lee, S.N., *et al.* (2013) High-Dose Radiotherapy Using Helical Tomotherapy for Vertebral Metastasis: Early Clinical Outcomes and Cord Dose Specification. *Japanese Journal of Clinical Oncology*, **43**, 646-653. <https://doi.org/10.1093/jjco/hyt050>
- [21] Subramanian, J., Morgensztern, D., Goodgame, B., Bagstrom, M.Q., Gao, F., Piccirillo, J., *et al.* (2010) Distinctive Characteristics of Non-Small Cell Lung Cancer (NSCLC) in the Young: A Surveillance, Epidemiology, and End Results (SEER) Analysis. *Journal of Thoracic Oncology: Official Publication of the International Association for the Study of Lung Cancer*, **5**, 23-28. <https://doi.org/10.1097/jto.0b013e3181c41e8d>
- [22] Liu, N.S., Spitz, M.R., Kemp, B.L., Cooksley, C., Fossella, F.V., Lee, J.S., *et al.* (2000)

- Adenocarcinoma of the Lung in Young Patients: The M. D. Anderson Experience. *Cancer*, **88**, 1837-1841. [https://doi.org/10.1002/\(sici\)1097-0142\(20000415\)88:8<1837::aid-cnrcr12>3.0.co;2-e](https://doi.org/10.1002/(sici)1097-0142(20000415)88:8<1837::aid-cnrcr12>3.0.co;2-e)
- [23] Ko, Y.C., Lee, C.H., Chen, M.J., Huang, C.C., Chang, W.Y., Lin, H.J., *et al.* (1997) Risk Factors for Primary Lung Cancer among Non-Smoking Women in Taiwan Region. *International Journal of Epidemiology*, **26**, 24-31. <https://doi.org/10.1093/ije/26.1.24>
- [24] Kurishima, K., Kagohashi, K., Mammoto, T. and Satoh, H. (2014) Recovery from Paraplegia with Administration of Erlotinib in a Patient with Lung Adenocarcinoma. *Współczesna Onkologia*, **18**, 140-142. <https://doi.org/10.5114/wo.2014.41393>
- [25] Aydin, A.L., Emel, E., Sasani, M., Gomleksiz, C., Oktenoglu, T. and Ozer, A.F. (2016) Lung Cancer Metastasis to the Spine. *Turkish Neurosurgery*, **26**, 635-642.
- [26] Dunning, E.C. (2012) Complications in the Management of Metastatic Spinal Disease. *World Journal of Orthopedics*, **3**, 114-121. <https://doi.org/10.5312/wjo.v3.i8.114>
- [27] Palacio Giraldo, A., Dammerer, V., Neugebauer, J., Leone, G., Schindler, M. and Dammerer, D. (2025) Current Concepts in the Management and Treatment of Spinal Metastases—A Systematic Literature Review. *Cancers*, **17**, Article 1296. <https://doi.org/10.3390/cancers17081296>