

Isolated Skull Metastasis as first presentation of possible primary from Lung

Kavita Jain¹ , Akshay Surana² , Ashish Dubey³, Shirish Nandedkar⁴

Skull or scalp metastasis is commonly seen in carcinoma of breast, prostate, kidneys and lungs. Here we report a case of 80-year-old male who presented with scalp swelling for treatment. High resonance ultrasonography (HRUS) and contrast-enhanced computed tomography (CECT) of brain showed large soft tissue lesion on right occipito-parietal region with erosion of underlying bone, suggestive of neoplastic etiology. Subsequently, on further workup, his CT thorax showed lesion in right hilar and lower lobe of right lung with mediastinal lymph nodes. Patient underwent excision of the right occipito-parietal lesion which on histopathology was reported as epithelial malignancy, favoring metastatic moderately differentiated squamous cell carcinoma. This case is reported here to emphasize the importance of good clinical workup to rule out metastatic lesions which might be the initial presentation of an unknown primary at other site.

Access this article online

Website:

www.cijmr.com

Keywords:

Lung, Metastatic, Skull.

10.58999/cijmr.2022.121

Introduction

Most patients of carcinoma of prostate, breast, lungs and kidney present with bone metastasis.^{1,2} Skull metastasis is sometimes an incidental finding as most patients are asymptomatic but at times, it can be the presenting complaint in the form of pain associated with scalp swelling.³ In literature, there are only a few cases of skull tumor as initial complaint which on further work up revealed primary in lungs.^{2,4} We herein report a case of primarily scalp swelling with skull involvement, which on histopathology was diagnosed as metastatic squamous cell carcinoma, probably from lung.

Case report

80-year-old male patient with history of giddiness for the last 2 months and scalp swelling (figure 1) was referred for treatment to the neurosurgery department. His high resonance ultrasonography (HRUS) of scalp swelling showed 67 x 47 mm right occipito parietal vascularised complex mass lesion with osseous and intracranial

component, reported as metastatic or primary bone neoplasm. On CECT brain, 7.7 x 5.4 x 6.7 cm large soft tissue scalp lesion with erosion of underlying bone and intracranial extension was seen, suggestive of neoplastic etiology. On subsequent CT thorax, he showed a 5.8 x 4.9 x 5.5 cm soft tissue, dense lesion with internal necrotic components in right hilar and adjacent lower lobe of right lung with enlarged nodes at right hilar and carinal region (figure 2). Patients primary complaints were related to his scalp swelling and there was no history related to lung tumor or its treatment. He was a known tobacco smoker for past 40 years.

The mass in right lung was reviewed by pulmonologist. No biopsy from the right lung lesion was however possible at the time of presentation. In view of his present complaints, he underwent craniotomy for excision of the skull tumor. In histopathology, we received specimens in two containers with diagnosis of metastatic tumor.

Container 1 had multiple firm to soft tissue pieces labeled as excised dural-based mass, aggregate measuring 12 x 10 x 1.5 cm. Container 2 had three hard bony pieces labeled as bone adjacent to mass. Sections submitted from the firm tissue bits showed features of epithelial malignancy. Neoplastic cells were medium sized and

¹Department of Pathology, R.D Gardi Medical College, Ujjain, Madhya Pradesh, India.

²Department of Pathology, R.D Gardi Medical College, Ujjain, Madhya Pradesh, India.

³Department of Neurosurgery, R.D Gardi Medical College, Ujjain, Madhya Pradesh, India.

⁴Department of Pathology, R.D Gardi Medical College, Ujjain, Madhya Pradesh, India.

Correspondence to: Kavita Jain, Department of Pathology, R.D Gardi Medical College, Ujjain, Madhya Pradesh, India. **E-mail:** kjain1974@rediffmail.com

Submitted: 20/04/2022

Revision: 27/05/2022

Accepted: 27/07/2022

Published: 19/09/2022

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

How to cite this article: Jain, K., Surana, A., Dubey, A., Nandedkar, S. Isolated Skull Metastasis as first presentation of possible primary from Lung. Central India Journal of Medical Research. 2022;1(2):6-8.

arranged in nests and clusters, separated by fibrous stroma with mixed inflammatory infiltrate giving them a lobulated appearance on scanner view. Focal pseudo glandular pattern of arrangement was also seen. Cells had moderate pale eosinophilic to clear cytoplasm with irregular enlarged nuclei, prominent inclusion like eosinophilic nucleoli (figure 3). Mitosis was very brisk (3-4 mitotic figures per high power field). Few scattered cells had Periodic Acid Schiff (PAS) positive cytoplasmic inclusions. No keratin pearls or psammomatous calcification were seen. Foci of lymphovascular tumor emboli were present. Rest of the bits showed areas of coagulative necrosis. Sections from bone pieces showed involvement by tumor as invading nests of tumor cells (figure 4).

In view of the morphology, histopathology diagnosis was of epithelial malignancy, favoring moderately differentiated squamous cell carcinoma with invasion of skull bone. Immuno-histochemistry with Cytokeratin, TTF-1 (Thyroid transcription factor 1) and EMA (epithelial membrane antigen) was suggested for confirmation. Patient was advised for further treatment of the primary lung tumor with biopsy confirmation but was lost to follow up.

Discussion

Scalp swelling can be due to a number of pathological entities like infections, granulomatous lesions like tuberculosis, sarcoidosis, melanocytic tumor of the scalp, epithelial or adnexal neoplasm and a few other tumors like lymphoproliferative malignancies.⁵ 15-25% of metastasis are from primary malignancies in breast, prostate and lungs and few are from other rare sites like liver and thyroid.^{6,7} On imaging by Computed tomography (CT) or magnetic resonance imaging (MRI), an underlying bone destructive lesion can suggest metastatic skull lesion. In most cases, the patient is already on treatment for known primary from breast, lungs, prostate, kidneys etc. Diagnostic challenge is encountered when patient presents with scalp swelling or skull metastasis as the primary complaint as was in our case.

In females, carcinoma from breast and lungs and in males prostate primaries are the common cause of metastasis to skull. A retrospective cohort study of 175 patients reported that 55% of skull metastasis are from breast, 14% from lung, 6% from prostate and 25% from other sites.⁸ Lung carcinoma usually metastasizes to bone and 3% of these involve skull.² These cases present in advanced primary disease stage but rarely a retrograde diagnosis is made on basis of investigation of primary complaint of skull swelling as metastasis.

Typical appearance on CT is of lytic lesion in metastatic deposits from breast, kidneys and thyroid gland.³ The mode of metastasis is hematogenous but mechanism of invasion of bone tissue from adjacent metastatic lesion is not very well known as bone is generally resistant to destruction. Injuries to periosteum have been implied in some cases.⁹ However, most studies on bone metastasis are from breast and prostate carcinoma or multiple myeloma wherein they metastasize directly to bone rather than invading it.¹⁰

Lung carcinoma with distant metastasis is a poor predictor of survival, but there are few case reports of patients with isolated metastasis who have responded well to excision of the metastatic lesion along with aggressive chemotherapy and radiotherapy.^{1,4} Associated intradural metastasis can also be treated by chemotherapy but parenchymal or intracerebral metastatic deposits are difficult to treat due to blood-brain barrier. Thus, at imaging this distinction should be made to plan therapy accordingly.⁵

In this case, the tumor cells had clear cytoplasm so metastasis from clear cell carcinoma of kidney, clear cell meningioma or secretory meningioma or sebaceous carcinoma can be the differentials but the pleomorphism and appearance were not in their favour. Cells were polygonal in shape favoring squamous cells. Presence of spindle cells would have raised the possibility of meningioma or solitary fibrous tumor. No melanin



Figure 1: Photograph showing scalp swelling



Figure 2: CT Thorax showing lesion in right hilar region and medial aspect of right lower lobe of lung

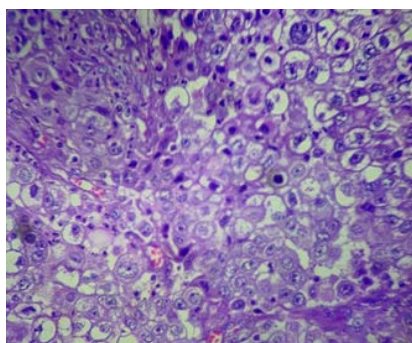


Figure 3: Photomicrograph showing neoplastic cells in sheets with pleomorphic nuclei and clear to pale eosinophilic cytoplasm (H and E stain, x100)

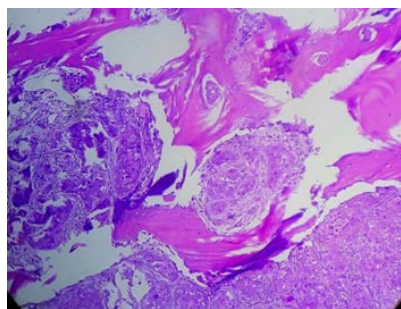


Figure 4: Photomicrograph showing invasive nests of tumour cells in bone adjacent to dura based mass (H and E stain, x100)

pigmentation or granulomas were seen which ruled out the differentials of melanoma or granulomatous lesion. The possibility of metastasis was considered here before excision of the skull mass as the patient's CT chest showed lung lesion. Our experience, in this case, has taught us that metastasis should be kept high in the clinical diagnosis in such cases.

Legends for figure

Learning points

Numerous pathological entities enter the differential diagnosis for skull metastasis presenting as scalp swelling. Thus, good clinical history, examination findings and appropriate investigations will help plan treatment best suited for the patient.

Conflict of interest

None

Source of Funding

None

Ethical Approval

All procedures were in accordance with the ethical standards at the authors' institution and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

References:

1. H. Sugiura, K. Yamada, T. Sugiura, T. Hida, and T. Mitsudomi, "Predictors of survival in patients with bone metastasis of lung cancer," *Clinical Orthopaedics and Related Research*, vol. 466, no. 3, pp. 729–736, 2008.
2. R. C. Turner, B. P. Lucke-Wold, R. Hwang, and B. D. Underwood, "Lung cancer metastasis presenting as a solitary skull mass," *Journal of Surgical Case Reports*, vol. 2016, no. 6, 2016.
3. E. G. Clair and I. E. McCutcheon, "Skull tumors," in *Youmans Neurological Surgery*, H. R. Winn and R. Julian, Eds., Saunders, Philadelphia, Pa, USA, 2011.
4. Altalhy A, MaghrabiY, Almansouri Z, Baeesa SS. "Solitary Skull Metastasis as the First Presentation of a Metachronous Primary Lung Cancer in a Survivor from Pancreatic Cancer", *Case Reports in Oncological Medicine*, vol. 2017, Article ID 5674749. Epub 2017 Jul 24. doi:10.1155/2017/5674749. Epub 2017 Jul 24. PMID:28811947; PMCID: PMC5546056.
5. Daniel Lyndon D, Lansley JA, Evanson J, Krishnan AS. Dural masses: meningiomas and their mimics. *Insights Imaging*. 2019 Feb 6;10(1):11. doi: 10.1186/s13244-019-0697-7. PMID: 30725238; PMCID: PMC6365311.
6. C.-T. Hsieh, J.-M. Sun, W.-C. Tsai, T.-H. Tsai, Y.-H. Chiang, and M.-Y. Liu, "Skull metastasis from hepatocellular carcinoma," *Acta Neurochirurgica*, vol. 149, no. 2, pp. 185–190, 2007.
7. J. Shen, S. Wang, X. Zhao, X. Shao, X. Jiang, and Y. Dai, "Skull metastasis from follicular thyroid carcinoma: report of three cases and review of literature," *International Journal of Clinical and Experimental Pathology*, vol. 8, no. 11, pp. 15285–15293, 2015.
8. K. Mitsuya, Y. Nakasu, S. Horiguchi et al., "Metastatic skull tumors: MRI features and a new conventional classification," *Journal of Neuro-Oncology*, vol. 104, no. 1, pp. 239–245, 2011.
9. Kader, Imran & Strong, Michael & George, Mathew. (2013). Skull destruction from intra-cranial metastasis arising from pulmonary squamous cell carcinoma: A case report. *Journal of medical case reports*. 7. 28. 10.1186/1752-1947-7-28.
10. Sohara Y, Shimada H, DeClerck Y: Mechanisms of bone invasion and metastasis in human neuroblastoma. *Cancer Lett* 2005, 228:203–209.