



Signet ring gastric carcinoma with scalp metastasis: A case report

Reetu Kundu, Niti Singhal, Uma Handa, Rajpal Singh Punia, Harsh Mohan

ABSTRACT

Cutaneous metastases of visceral cancers are uncommon, as metastases generally have a predilection to occur on skin surfaces near the site of a primary tumor. Metastasis to the skin from gastric carcinoma appears to most commonly occur in the umbilical region. Metastasis to the scalp is rare, as in the present case, often leading to differential diagnoses of primary cutaneous tumors. Promptly diagnosing metastases of internal malignancies is crucial for enabling early treatment.

Key words: Gastric adenocarcinoma, metastasis, signet ring

Introduction

Cutaneous metastases from internal visceral malignancies are uncommon, and their incidence is reported to be approximately 0.7-10.4% of visceral cancer cases [1]. Common primary sites include cancers of the breast, lung, colon, ovary, head, and neck, kidney, and the gastrointestinal tract. In contrast, cutaneous metastases are relatively rare in carcinomas of the thyroid, pancreato-biliary system, urinary bladder, endometrium, prostate, testes, and neuroendocrine tumors [2]. Herein, we report a rare case of gastric signet ring carcinoma metastasizing to the scalp.

Case Report

A 30-year-old male presented to the fine needle aspiration (FNA) clinic with cutaneous swelling in the scalp for 15 days. The swelling measured 3 cm × 2 cm, and was firm and mobile over the underlying bone. The patient had no other clinical complaints at that

time. FNA was performed from the scalp swelling. The smears were cellular and showed clusters and scattered tumor cells (Figure 1). The cells showed anaplastic nuclei and a moderate amount of cytoplasmic vacuolation. Many cells showed signet ring morphology with cytoplasmic mucin pushing the nuclei to the periphery, which was highlighted by mucicarmine staining. The final diagnosis by FNA was metastatic adenocarcinoma.

Four months prior to this diagnosis, the patient had a history of severe bouts of vomiting due to gastric outlet obstruction. A contrast enhanced computed tomography (CECT) scan revealed an almost symmetrically thick-walled pylorus with complete luminal obstruction. The spleen, liver, gallbladder, pancreas, and kidneys were normal. No significant retroperitoneal lymphadenopathy was seen. The impression was of a malignant growth with the possibilities of lymphoma and carcinoma pyloric region stomach. An upper gas-

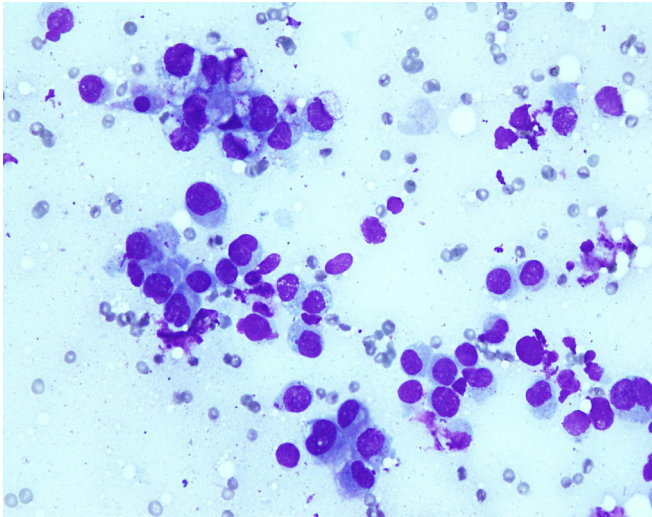


Figure 1. Fine needle aspiration from the scalp swelling shows loosely cohesive clusters and moderately scattered pleomorphic tumor cells (May-Grunwald-Giemsa stain, ×400).

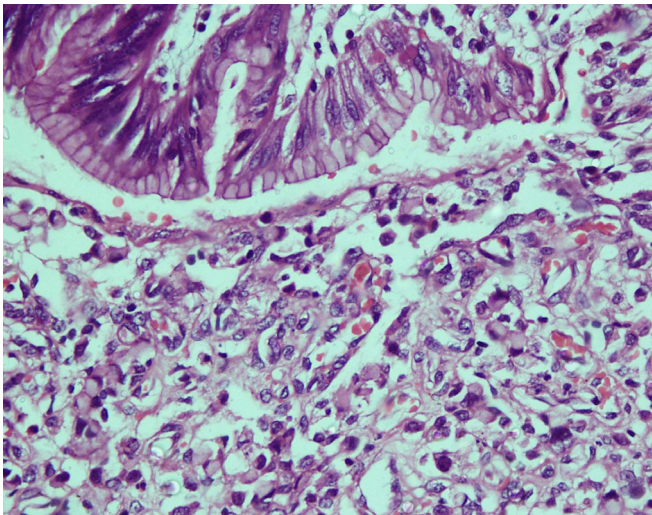


Figure 2. Histopathology of gastrectomy specimen shows signet ring tumor cells beneath the mucosal layer in the lamina propria (hematoxylin and eosin stain, ×400).

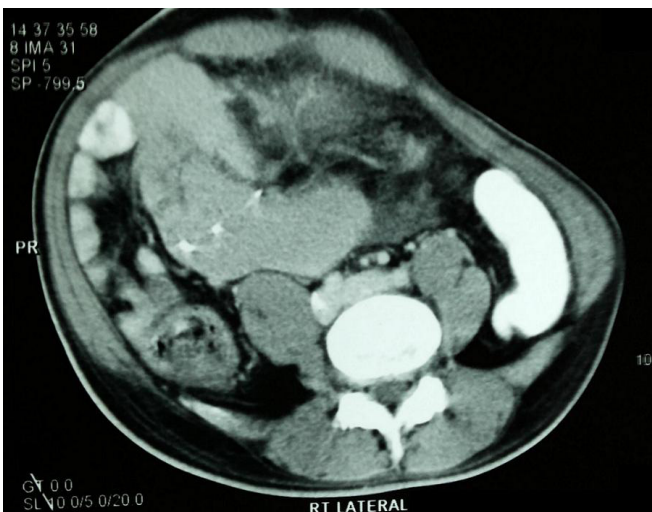


Figure 3. Contrast enhanced computed tomography axial scan of the abdomen following gastrectomy shows circumferential soft tissue thickening involving the anastomotic site, and nodularity of the surrounding perigastric fat.

trointestinal endoscopy (UGIE) was performed three times and biopsies were taken. The endoscopy showed that the folds in the gastric mucosa were thickened; the biopsies were inconclusive and failed to show the tumor. The patient underwent a gastrectomy with clinical possibilities of a gastrointestinal stromal tumor, lymphoma, or adenocarcinoma. Histopathology of the gastrectomy specimen showed a single ring cell adenocarcinoma reaching up to the serosa (Figure 2). Proximal and distal resection limits were free of tumor. Six isolated lymph nodes showed metastatic tumor deposits with extranodal spread.

Subsequent to FNA diagnosis of metastatic adenocarcinoma to the scalp, the patient had a radiological work-up for metastasis to other sites. Computed tomography of the head did not reveal metastasis to the brain, and the chest X-ray was normal. The skeletal survey did not show bony lesions; however, the CECT scan of the whole abdomen showed a grossly distended residual stomach with residue along the dependent part. Circumferential soft tissue thickening of about 2.3 cm × 1.2 cm involving the anastomotic site was also noted. Soft tissue stranding with nodularity of the surrounding perigastric fat was seen (Figure 3). These features suggested tumor recurrence, and UGIE with biopsy correlation was advised.

Based on the cytology report, the patient began four cycles of chemotherapy comprising cisplatin and 5-fluorouracil. However, 4.5 months after detection of scalp metastasis, the patient succumbed to his illness.

Discussion

Cutaneous metastasis usually presents clinically as multiple, firm, non-ulcerated nodules. Diagnosis can be difficult in the case of a solitary lesion, and clinical differential diagnoses include skin adnexal tumors, vascular lesions such as hemangiomas, or soft tissue tumors like neurofibromas [3]. FNA can be used to distinguish these entities. In the current case, the cytomorphological features were characteristic of an adenocarcinoma with signet ring cell morphology.

Differential diagnoses of metastatic gastric signet ring carcinoma include primary carcinomas of the skin, such as adenoid squamous cell carcinoma, adenoid cystic variant of basal cell carcinoma, sweat gland carcinoma, and primary signet ring carcinoma of the skin.

An important feature that helps to exclude between adenoid squamous cell carcinoma and adenoid basal cell carcinoma, is the mucin in these tumors predominantly containing hyaluronic acid or sulfate, respectively [4]. Gastric mucin, however, is a nonsulfated, hyaluronidase-resistant, sialic acid-type mucosubstance. Histochemically, the mucin is hyaluronidase-resistant, periodic acid Schiff-positive, diastase-resistant, and alcian blue-positive at pH 2.5 and negative at pH 0.4 and 1.0 [5]. In the present case, the patient was diagnosed with gastric adenocarcinoma; thus, interpreting the lesions as metastatic was not difficult. In cases where the primary tumor is unknown or occult, morphologic pointers towards a metastatic lesion include pools of extracellular mucin, signet cells, and three-dimensional papillae [6].

The mechanisms that pre-dispose some visceral cancers to develop cutaneous metastases are poorly understood. The skin may provide a favorable environment for the colonization and survival of only certain types of cancer cells. Specific factors, chemokines, and their receptors may play a crucial role in the skin homing mechanism of metastatic cells [7]. Metastases to the skin of an internal malignancy heralds a widespread disease with poor prognosis [8], which may be seen in cases of an occult primary tumor or may present a long time after the primary tumor has been treated. Approximately 9% of all gastric carcinomas are signet ring adenocarcinomas. They usually metastasize to the liver, peritoneal cavity, and regional lymph nodes [9]. Cutaneous metastases from gastric adenocarcinomas are rare, developing in fewer than 5% of patients [10,11]. They have been reported in the axilla, chest, fingers, and commonly in the skin around the umbilicus [9,12]. Tumor deposits to the scalp are rare, as in our case. Sometimes, scalp metastasis is associated with alopecia neoplastica, which was not seen in our case.

Ancillary techniques, such as immunohistochemistry for CK7, CK20, MUC5AC, p63, and podoplanin can also be employed in the case of a diagnostic difficulty [13-17]. Gastric adenocarcinoma is CK7 and MUC5AC-positive in 75% and 57% of cases respectively, whereas CK20 expression is seen in 20% of cases [12-14]. Podoplanin and p63 are useful in distinguishing metastatic adenocarcinoma from a primary adnexal

tumor because of their expression in the latter [16,17].

Conclusion

Cutaneous metastases of internal malignancies are rare, and even more rare are isolated metastases to the scalp. Accurately diagnosing metastatic lesions in the scalp, as in the present case of signet ring gastric carcinoma, remains a challenge. In isolation, it needs to be differentiated from primary skin tumors. The timely detection of cutaneous metastases in visceral cancers is important as it has clinical implications and prognostic connotations.

Conflict of interest statement

The authors have no conflicts of interest to declare.

References

1. Lookingbill DP, Spangler N, Helm KF. Cutaneous metastases in patients with metastatic carcinoma: A retrospective study of 4020 patients. *J Am Acad Dermatol* 1993;29:228-36.
2. Johnson WC. Metastatic carcinoma of the skin. In: Elder DE, Elenitsas R, Johnson BL, Murphy GF, Xu X, editors. *Lever's Histopathology of the Skin*. 10th ed. New Delhi: Wolters Kluwer Pvt. Ltd.; 2010. p. 1151-9.
3. Hori M, Yoshida H. Statistical study of metastatic skin cancer – interrelation of the origin of primary tumor, metastatic skin lesions, prognosis and histopathology. *Gan To Kagaku Ryoho* 1988;15:1576-80.
4. Bansal R, Patel T, Sarin J, Parikh B, Ohri A, Trivedi P. Cutaneous and subcutaneous metastases from internal malignancies: An analysis of cases diagnosed by fine needle aspiration. *Diagn Cytopathol* 2011;39:882-7.
5. Esaki Y, Hirayama R, Hirokawa K. A comparison of patterns of metastasis in gastric cancer by histologic type and age. *Cancer* 1990;65:2086-90.
6. Sharma S, Kotru M, Yadav A, Chugh M, Chawla A, Makhija M. Role of fine-needle aspiration cytology in evaluation of cutaneous metastases. *Diagn Cytopathol* 2009;37:876-80.
7. Schwartz RA. Histopathologic aspects of cutaneous metastatic disease. *J Am Acad Dermatol* 1995;33:649-57.
8. Alcaraz I, Cerroni L, Rütten A, Kutzner H, Requena L. Cutaneous metastases from internal malignan-

- cies: A clinicopathologic and immunohistochemical review. *Am J Dermatopathol* 2012;34:347-93.
9. Reingold IM. Cutaneous metastases from internal carcinoma. *Cancer* 1966;19:162-8.
 10. Kilickap S, Aksoy S, Dinçer M, Sağlam EA, Yalçın S. Cutaneous metastases of signet cell carcinoma of the rectum without accompanying visceral involvement. *South Med J* 2006;99:1137-9.
 11. Abrams HL, Spiro R, Goldstein N. Metastases in carcinoma; analysis of 1000 autopsied cases. *Cancer* 1950;3:74-85.
 12. Kim DY, Park YK, Joo JK, Ryu SY, Kim YJ, Kim SK, et al. Clinicopathological characteristics of signet ring cell carcinoma of the stomach. *ANZ J Surg* 2004;74:1060-4.
 13. Tot T. The role of cytokeratins 20 and 7 and estrogen receptor analysis in separation of metastatic lobular carcinoma of the breast and metastatic signet ring cell carcinoma of the gastrointestinal tract. *APMIS* 2000;108:467-72.
 14. Chu P, Wu E, Weiss LM. Cytokeratin 7 and cytokeratin 20 expression in epithelial neoplasms: A survey of 435 cases. *Mod Pathol* 2000;13:962-72.
 15. Leroy X, Copin MC, Boman F, Gosselin B. Cytokeratins 7 and 20: Aid in tumor typing. *Ann Pathol* 1998;18:103-9.
 16. Ivan D, Nash JW, Prieto VG, Calonje E, Lyle S, Diwan AH, et al. Use of p63 expression in distinguishing primary and metastatic cutaneous adnexal neoplasms from metastatic adenocarcinoma to skin. *J Cutan Pathol* 2007;34:474-80.
 17. Liang H, Wu H, Giorgadze TA, Sariya D, Bellucci KS, Veerappan R, et al. Podoplanin is a highly sensitive and specific marker to distinguish primary skin adnexal carcinomas from adenocarcinomas metastatic to skin. *Am J Surg Pathol* 2007;31:304-10.