

Maxillary Sinus Squamous Cell Carcinoma Presenting with Fatal Tumor Lysis Syndrome: A Case Report and Review of the Literature

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Key Words

Squamous cell carcinoma · Tumor lysis syndrome · Liver metastases · Maxillary sinus

Abstract

Acute tumor lysis syndrome (TLS) is a condition resulting from rapid destruction of tumor cells and subsequent massive release of cellular breakdown products. It has been described following the treatment of many hematologic and solid malignancies. However, spontaneous TLS has rarely been described. Here we report a case of spontaneous TLS that occurred in a patient with a treated maxillary squamous cell carcinoma (SCC) presenting with diffuse liver metastases, which is an infrequent site of distant metastases.

Introduction

Acute tumor lysis syndrome (TLS) is a constellation of metabolic disturbances that can develop in rapidly proliferating tumors, mainly hematologic malignancies, or more rarely in solid tumors after initiation of cytotoxic therapy. It is characterized by the release of large amounts of potassium, phosphate, and nucleic acids into the systemic circulation. This can lead to hyperuricemia, hyperphosphatemia, hyperkalemia and hypocalcemia, which can cause lactic acidosis, acute renal failure, cardiac arrhythmias, seizures, muscle cramps, tetany, syncope, and possibly sudden death. TLS has been reported to occur in very few cases of solid tumors without any prior therapy. Here we report an unusual case of a maxillary squamous cell carcinoma (SCC) who presented a few months after treatment of the primary disease with diffuse liver metastases and TLS.

Case Report

The patient is a 53-year-old man who started to complain of progressive left cheek pain, nasal obstruction and epistaxis. CT scan of the head and neck showed a left maxillary sinus mass invading the medial and anterior walls of the sinus, extending into the left nasal cavity and soft tissues of the cheek and eroding the floor of the orbit. MRI of the sinuses confirmed these findings. Biopsy from the tumor revealed infiltrating squamous cell carcinoma arising from an inverted papilloma with focal high-grade dysplasia. Chest CT scan and abdominal ultrasound were negative for metastases. The patient underwent a radical maxillectomy that showed infiltrating squamous cell carcinoma of $2.8 \times 2 \times 2$ cm originating from an inverted papilloma with presence of vascular and perineural invasion and negative margins of resection. After surgery, the patient received adjuvant chemoradiation of 66 Gy to the tumor bed and 50 Gy to the upper neck area. At the end of treatment, the patient started to complain of crampy abdominal pain. Abdominal ultrasound was requested and revealed multiple hypoechoic liver nodules that are suspicious for metastases ([fig. 1](#)).

CT-guided core biopsy of one of these lesions was performed and showed high-grade carcinoma with focal positivity for CK8/18 and no staining for high-molecular-weight cytokeratin, compatible with a metastatic poorly differentiated carcinoma similar to the previous pathology. Four days later, the patient presented to the emergency room with a decrease in the level of consciousness and abdominal pain. Laboratory investigations revealed a BUN of 144 mg/dl; creatinine, 6.4 mg/dl; uric acid, 20.9 mg/dl; potassium, 7.6 mg/dl; phosphorus, 11.8 mg/dl; calcium, 6.2 mg/dl; ALP, 734 IU/L; GGT, 621 IU/L; and lactate dehydrogenase (LDH), 1,000 U/l ([table 1](#)). An ultrasound of the abdomen showed normal kidneys. The clinical picture and the rapidly progressive disease, the acute deterioration in electrolytes, and kidney function are all in favor of an acute TLS. The patient was treated with allopurinol, urinary alkalization, and rehydration. He was also given one dose of rasburicase 8 mg, but he deteriorated rapidly and passed away the following day from TLS.

Discussion

TLS is characterized by hyperphosphatemia, hyperuricemia, hyperkalemia, hypocalcemia, lactic acidosis, and acute renal failure. Hyperuricemia is the result of purine degradation and may lead to precipitation of uric acid crystals in the collecting tubules in the kidney, resulting in obstructive nephropathy. Hyperkalemia is due to potassium release from the cytoplasm and may lead to cardiac arrhythmias and cardiac arrest. Hyperphosphatemia, caused by nucleoprotein degradation, may cause precipitation of calcium phosphate in the renal tubules. Hypocalcemia follows the precipitation of calcium phosphate in the tissues and may cause neurologic and muscular symptoms.

Patients at highest risk for acute TLS are those who have a large tumor burden or rapidly proliferating tumors, mainly hematologic malignancies, such as leukemia and lymphoma [1]. Acute TLS is a metabolic complication of chemotherapy: cytotoxic therapy can induce cytolysis of neoplastic cells and release of intracellular substances, which can precipitate this syndrome. It is more rarely seen in solid tumors, and it has been reported to occur after therapy. A review of the literature by Kalemkerian et al. [2] found 25 cases of patients with solid tumors who developed acute TLS after treatment. TLS has been described in association with a variety of solid tumors. These tumors are usually bulky with multiple metastatic sites, and acute TLS was described to develop after recent treatment.

Only a few cases of spontaneous TLS in solid tumors have been described without any prior therapy ([table 2](#)) [4–11]. In this case, acute TLS may be due to cell turnover rather than to a treatment effect.

Crittenden and Ackerman [3] were the first to report a case of disseminated adenocarcinoma of the gastrointestinal tract with renal failure and high levels of uric acid.

We reported the first case of TLS secondary to liver metastases from a primary maxillary SCC.

On the other hand, the liver is a very rare location of metastases from maxillary sinus tumors. The incidence of lymphadenopathy at diagnosis is very low because the maxillary sinuses have a limited lymphatic supply [12]. Regional and distant metastasis are also uncommon in this disease entity [13]. Dulguerov et al. reviewed 220 patients who were treated for nasal and paranasal sinus carcinoma between 1975 and 1994 with a minimum follow-up of 4 years and found that only 9 patients (4.3%) developed distant metastasis [14].

In a recent study published by Tanvetyanon et al. [15], the medical records of patients with inverted papilloma (IP) and SCC treated during 1999–2007 were retrospectively reviewed. Four biopsy specimens were described as SCC arising in IP, one case was read as carcinoma in situ arising in IP and one as IP with areas of severe dysplasia. Liver metastases were described in one case and were discovered at the time of local recurrence along with lung metastases 33 months after diagnosis.

In conclusion, our case is unique in so far as the patient developed liver metastases, which is a rare location for distant metastases from maxillary tumors, even without developing local or locoregional recurrence, and in the development of spontaneous TLS, which is an unusual finding in solid tumors and was never reported in sinus SCC. Spontaneous TLS should be anticipated in solid tumors with a large volume of metastatic disease.

Table 1. Development of the laboratory blood results of the patient until his death

	2 weeks prior to presentation	Day 1	Day 2	Day 3
BUN, mg/dl		144	98	129
Creatinine, mg/dl	0.5	6.4	4	5.1
Potassium, mmol/l		7.6	4.7	5.6
Calcium, mg/dl		10.7	6.2	8.9
Phosphate, mg/dl		11.8	7.8	13.2
Carbon dioxide, mmol/l		15	11	13
Uric acid, mg/dl				20.9
ALP, IU/l	375	734		
GGT, IU/l	594	621		
Bilirubin (total/direct), mg/dl	0.7/0.5			1/0.8
LDH, IU/l	271	1,000		

Table 2. Reported cases of spontaneous TLS in solid tumors

	Metastases	Metastatic sites	Outcome
Gastrointestinal adenocarcinoma [3]	Yes	Liver/bone	Death
Colon cancer [4]	Yes	Liver/bone	Improvement
Pheochromocytoma [4]	No		Improvement
Hepatocellular carcinoma [4]	No		Death
Germinoma [5]	Yes	Liver/lungs/ paraaortic lymph nodes	Improvement
Germinoma [5]	Yes	paraaortic lymph nodes	Improvement
Breast cancer [6]	Yes	Liver/lungs/bone lymphangitic spread	Death after recurrence of TLS
Prostate cancer [7]	Yes	Liver/bone	Death
Gastric cancer [8]	Yes	Liver/lymph nodes	Improvement then death from pneumonia
Non-small cell lung cancer [9]	Yes	Liver	Death
Non-small cell lung cancer [10]	No		Improvement
Non-hodgkin lymphoma [11]	No		Death
Retroperitoneal non-hodgkin lymphoma [11]	No		Improvement
Currently reported case	Yes	Liver	Death

Fig. 1. Abdominal CT scan showing diffuse liver metastases.

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