CASE REPORT

Tumor lysis syndrome following radiation therapy in metastatic pancreatic cancer: A case report

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ABSTRACT

A 65-year-old female presented to radiation oncology for potential treatment options due to metastatic pancreatic cancer and significant abdominal pain. Imaging demonstrated a large pancreatic mass with lymphadenopathy, vascular encasement, and liver metastases. She initiated palliative radiation treatment and developed persistent nausea and vomiting, as well as significant laboratory derangements. She was subsequently admitted and diagnosed with tumor lysis syndrome, though this diagnosis is usually an oncologic emergency seen with hematologic malignancies following chemotherapy.

Key Words: Tumor lysis syndrome, Radiation oncology, Pancreatic adenocarcinoma

1. INTRODUCTION

Tumor lysis syndrome (TLS) is an oncologic emergency generally seen with hematologic malignancies following chemotherapy administration. TLS related to solid tumors is uncommon, and RT-induced TLS has rarely been reported. Here, we report radiation therapy-induced TLS in a metastatic pancreatic cancer patient.

2. CASE PRESENTATION

A 65-year-old female with metastatic pancreatic cancer and abdominal pain presented to radiation oncology clinic for consideration of palliative treatment. CT demonstrated a large mass in the pancreatic head with vascular encasement, bulky retroperitoneal lymphadenopathy and liver metastases (see Figure 1).

Given significant abdominal pain attributed to her primary tumor and lymphadenopathy, she initiated a palliative treatment course of 33 Gy over eleven fractions (see Figure 2). After 18 Gy, she developed persistent nausea and vomiting, poorly controlled on prochlorperazine and was transitioned to ondansetron. Shortly thereafter, she noted decreased visual acuity, prompting ondansetron replacement with dexamethasone. She continued with radiation therapy, later experiencing progressive symptoms including worsening visual acuity, malaise, lightheadedness, lethargy, and persistent nausea. At 30 Gy, she continued to experience persistent nausea. Obtained labs were significantly deranged, consistent with acute renal failure (K 6.5, Ca 8.1, P 10.1, BUN 108, Cr 8.1, and uric acid 16). She was admitted to the MICU with suspicion for tumor lysis syndrome. She received sodium polystyrene and insulin for hyperkalemia, sevelamer for hyperphosphatemia, and rasburicase for hyperuricemia. She underwent 3 dialysis sessions with resolution of laboratory imbalances. She was ultimately discharged with the decision to discontinue radiotherapy one treatment short of the initial

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prescription. Three days following discharge, the patient presented to the emergency department with poor urine output and AKI which was determined to be secondary to poor oral intake. While discussing future treatment options, the patient and her medical oncology team recognized that she would not reach the performance status she needed to receive any additional therapy, and that any additional therapy would likely not improve her quality of life or overall survival. It was decided that given her symptom burden, hospice care would be most appropriate and the patient agreed to this transition.

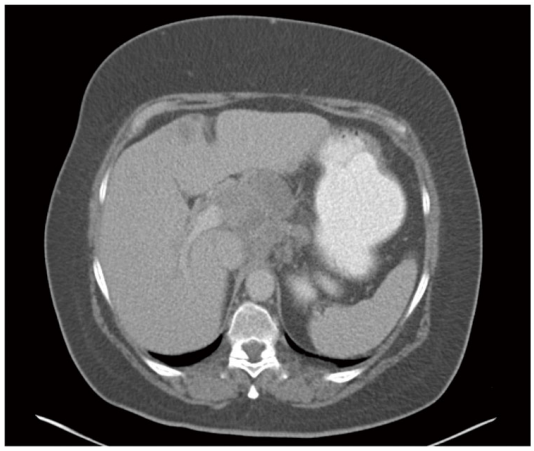

Figure 1. Bulk of adenopathy seen in radiation planning CT

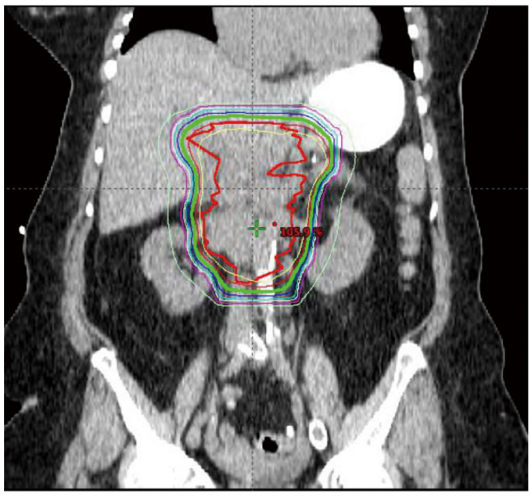

Figure 2. Extent of adenopathy seen on radiation planning CT. Adenopathy outlined in red. Other colored lines represent radiation isodose curves (relative doses of radiation).

3. Discussion

Clinically, TLS is characterized by imbalance of two or more electrolytes (hypocalcemia, hyperuricemia, hyperphosphatemia, hyperkalemia), along with at least one clinical finding (i.e. increased Cr, arrhythmia, sudden death, and seizure). The most widely accepted classification system in oncology is the Cairo-Bishop classification.[1] Our patient met these criteria, although the diagnosis is unusual in this scenario. TLS results from massive lysis of tumor cells resulting from therapy or even spontaneously. This results in release of intracellular electrolytes into the circulation – most importantly potassium from cytosol breakdown, phosphate from protein breakdown, and uric acid from nucleic acid breakdown.[2] This leads to signs and symptoms ranging from nonspecific malaise and nausea to acute renal failure and sudden cardiac death.

To our knowledge, there have been no published reports of TLS in pancreatic adenocarcinoma patients following radiation therapy. One report described TLS following gemcitabine delivery in a patient with metastatic pancreatic cancer, and another described TLS following reduced-dose gemcitabine administration.[3] In addition, two separate cases of spontaneous TLS without any treatment in patients with metastatic pancreatic adenocarcinoma have been reported.[4,5] A 2003 systemic review found only 45 reported cases of TLS in solid tumors.[6] No cases were associated with pancreatic cancer, and only 5 involved radiotherapy (3 cases neuroblastoma, 1 medulloblastoma, and 1 breast carcinoma; in two of the neuroblastoma cases, vincristine and teniposide were also delivered). A more recent review of TLS in solid tumor patients described 8 cases of TLS in non-small cell lung cancer patients (1 following radiotherapy), 13 in small cell lung cancer, 12 in breast adenocarcinomas (1 following radiotherapy), 10 in gynecologic malignancies, 13 in genitourinary/urologic malignancies, 15 in hepatic malignancies, 7 in colorectal malignancies (1 following combined chemoradiation), 7 in other miscellaneous gastrointestinal malignancies, and 4 in neurologic malignancies (2 following combined chemoradiation and 1 following radiotherapy only).[3]

Although rare, TLS is a potentially fatal oncologic treatment complication[7] and our case further supports the potential for TLS occurrence in not only solid tumors but also following radiation therapy, including pancreatic cancer. Our case also supports an increasing incidence of TLS in tumors that were, historically, rarely associated with such.[8] Therefore, TLS should remain an important consideration in the differential diagnosis for all treated oncologic patients manifesting appropriate symptoms and lab abnormalities, even in unlikely clinical scenarios. Recent treatment developments and efficacy in solid tumors with chemotherapy and radiation may contribute to an increasing incidence of TLS with contemporary clinical approaches.[9] As mortality rates related to TLS have been reported to be higher with solid tumors as compared to hematologic malignancies, awareness and recognition is important in these settings.[9]

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