Tumor lysis syndrome in metastatic colon cancer after single FOLFOX cycle

Akanksha Agrawal, Deepanshu Jain, Mark Morginstin

ABSTRACT

Introduction: Tumor lysis syndrome (TLS) is a life-threatening oncological complication, often described in patients with a large tumor burden, more commonly among hematological malignancies.

Case Report: We present a case report of 55-year-old male who presented to the emergency department with worsening abdominal pain, oliguria, nausea, vomiting and diarrhea of one-day duration. One-month prior, the patient was diagnosed with metastatic colon cancer. He was started on FOLFOX regimen the day prior. Patient was found to be in acute kidney injury with hyperkalemia, hyperuricemia and hyperphosphatemia. Patient was admitted with a diagnosis of TLS (Cairo-Bishop grade II) and managed with aggressive intravenous hydration, furosemide and single dose of rasburicase. In two days, symptoms resolved with improvement in laboratory parameters and patient was discharged after four days.

Conclusion: There have been so far six published cases, reporting TLS in metastatic colon adenocarcinoma. Our case is the only one demonstrating that TLS can occur in metastatic colon cancer patient after a single cycle of FOLFOX therapy even in the absence of any pretreatment. Our patient had all known risk factors for developing TLS like large tumor burden, liver metastases, elevated pretreatment lactate dehydrogenase (LDH), use of combination chemotherapy drugs and dehydration. Unlike previously reported six cases where TLS resulted in death, our patient survived. Therefore, a clinician should maintain high index of suspicion for TLS among metastatic colon cancer patients and should do prompt intervention to prevent potentially life-threatening complications like cardiac arrhythmias, acute renal failure, seizures, or death.

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CASE REPORT

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risk factors for developing TLS like large tumor burden, liver metastases, elevated pretreatment lactate dehydrogenase (LDH), use of combination chemotherapy drugs and dehydration. Unlike previously reported six cases where TLS resulted in death, our patient survived. Therefore, a clinician should maintain high index of suspicion for TLS among metastatic colon cancer patients and should do prompt intervention to prevent potentially life-threatening complications like cardiac arrhythmias, acute renal failure, seizures, or death.

Keywords: Abdominal pain, FOLFOX, Metastatic colon cancer, Tumor lysis syndrome

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INTRODUCTION

Tumor lysis syndrome is a life-threatening oncologic emergency characterized by hyperuricemia, hyperkalemia, hyperphosphatemia and secondary hypocalcemia leading to complications like cardiac arrhythmias, acute renal failure, seizures, or death. It is

the end result of high cell turnover, commonly seen among hematological malignancies with high proliferative rate or those with high sensitivity to treatment [1]. It is rarely observed in patients with solid tumors as a result of therapy or even spontaneously [2].

There have been so far six published cases reporting TLS in metastatic colon adenocarcinoma, four after FOLFIRI (5-fluorouracil, leucovorin, and irinotecan) or irinotecan chemotherapy, one after cetuximab therapy and one after FOLFOX (5-fluorouracil, leucovorin and oxaliplatin) therapy in a patient who had received pretreatment with FOLFIRI [3–8].

We report a case of TLS after first dose of FOLFOX chemotherapy in a patient with metastatic colon carcinoma, managed successfully with intravenous hydration and rasburicase.

CASE REPORT

A 55-year-old African-American male with past medical history of hypertension, emphysema, pneumothorax, prostate cancer status post prostatectomy presented to the emergency department with epigastric and right upper quadrant stabbing pain, anorexia and weight loss for two weeks.

On arrival, patient had a blood pressure of 138/82 mmHg, pulse rate of 85 beats per minute, afebrile at 36.4°C and respiratory rate of 20/min. Physical examination was significant for right upper quadrant tenderness and hepatomegaly. Blood work was significant for acute kidney injury, hyperkalemia, leukocytosis and abnormal liver function tests and negative for HIV, hepatitis B and hepatitis C.

Ultrasound abdomen was significant for multiple hypo-densities in liver. Further imaging with CT scan showed multiple hypo-enhancing liver masses, 1.3 cm nodule in right adrenal gland, multiple cysts in kidney and a 2-cm round soft tissue mass in posterior cecum with adjacent posterior mesentery and mesenteric lymphadenopathy.

Colonoscopy was positive for edematous ileocecal valve but biopsy was negative for any malignant features. No other mass lesions were identifiable on colonoscopy. The liver biopsy was positive for malignant cells, adenocarcinoma type compatible with colonic primary. Further staining was negative for K-ras mutation and CK7 but positive for CD20. Patient also had an elevated CEA and CA 19-9 but normal AFP. Other labs were significant for CEA-9918.7 µg/L, CA 19-9- 520 U/ml, AFP-1.9 µg/L, uric acid 9.7 mg/dL and LDH 1196 U/L. Patient was given a diagnosis of stage IV colon cancer. Patient improved with supportive treatment and was discharged with oncology follow-up.

After about 20 days, patient was started on FOLFOX regimen, which consisted of leucovorin (772 mg IV), 5-fluorouracil (4632 mg IV) and oxaliplatin (164 mg IV). Next day, patient presented to the emergency

department with abdominal pain, nausea, vomiting and diarrhea. Patient was found to have acute kidney injury with creatinine of 1.9 mg/dl. In addition, patient was hyperkalemic (6.4 mEq/L), hyperuricemic (20.3 mg/dl) and hyperphosphatemic (5.5 mg/dl) with normal calcium level (Table 1). There was no seizure activity or cardiac arrhythmia on telemetry monitor (Cairo-Bishop grade II TLS). Patient was admitted to the step down unit with a diagnosis of Tumor lysis syndrome and managed with aggressive intravenous hydration, furosemide and single dose of rasburicase (6 mg). In two days, symptoms resolved with improvement in potassium (4.6 mEq/L) and uric acid (5.6 mg/dl) creatinine (1.4 mg/dl) (Table 1). Patient was transferred to the general oncology floor and was discharged four days later with oncology follow-up.

DISCUSSION

There have been reports of about 100 cases of TLS in patients with solid tumors [9]. Irrespective of the cancer type, there is a 20–50% increase in mortality for undiagnosed or late-diagnosed cases of TLS in solid tumors [9]. The fatality rate for these 100 reported cases was 41% [10].

Tumor lysis syndrome is characterized by constellation of electrolyte abnormalities. Cellular material rich in potassium, phosphorous and uric acid is released as a consequence to cellular death, either mediated by cancer therapy or spontaneously in rapidly dividing tumors. This leads to hyperkalemia, hyperuricemia and hyperphosphatemia. Due to binding of calcium with phosphorous, hypocalcemia is observed. This in turn may lead to acute impairment of renal function, cardiac arrhythmogenicity, central nervous system toxicity, and eventually death [11].

Large tumor burden, liver metastases, elevated pretreatment LDH, use of combination chemotherapy drugs and dehydration are major risk factors, which place a patient at higher risk of developing TLS [2]. Hence a watchful monitoring is essential to prevent, diagnose and manage the metabolic complications associated with TLS.

There have been so far six published cases, reporting TLS in metastatic colon adenocarcinoma. Four of these were after FOLFIRI (5-fluorouracil, leucovorin, and irinotecan) or irinotecan chemotherapy, one after cetuximab therapy and one after FOLFOX therapy in the setting of pretreatment with FOLFIRI therapy. Our case is the first of its type to demonstrate that TLS can occur in a metastatic colon cancer patient after a single cycle of FOLFOX therapy even in the absence of any pretreatment. Our patient had all known risk factors for developing TLS like large tumor burden, liver metastases, elevated pretreatment LDH, use of combination chemotherapy drugs and dehydration. Unlike previously reported six cases where TLS resulted in death, our patient survived. Therefore, a clinician should maintain high index of suspicion for TLS among metastatic colon cancer patients

Table 1: Comparison of laboratory parameters at initial visit, after single FOLFOX cycle and after TLS treatment

Laboratory Parameters	Initial visit (Before FOLFOX chemotherapy)	Second Visit	
		After FOLFOX chemotherapy	After rasburicase and intravenous hydration
Total Bilirubin (mg/dL)	2.3	10.1	6.0
Direct Bilirubin (mg/dL)	1.7	7.7	4.8
Alkaline Phosphatase (U/L)	646	732	415
AST (U/L)	205	344	136
ALT (U/L)	119	95	56
Uric Acid (mg/dL)	9.7	20.3	5.6
Potassium (mEq/L)	5.1	6.4	4.6
Blood Urea Nitrogen (mg/dL)	36	61	30
Creatinine (mg/dL)	1.3	1.9	1.4

and should do prompt intervention to prevent potentially life threatening complications like cardiac arrhythmias, acute renal failure, seizures, or death.

CONCLUSION

Tumor lysis syndrome (TLS) has been rarely described in metastatic colon cancer. This is the first case describing TLS in a patient with metastatic colon cancer after single cycle of FOLFOX chemotherapy. Henceforth, it is important to maintain high suspicion for TLS while treating metastatic colon cancer with chemotherapy like FOLFOX to prevent potentially life-threatening complications like cardiac arrhythmia, acute renal failure, seizure or death.

Author Contributions

Akanksha Agrawal – Substantial contributions to conception and design, Analysis and interpretation of data, Drafting the article, revising it critically for important intellectual content, Final approval of the version to be published

Deepanshu Jain – Substantial contributions to conception and design, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Mark Morginstin – Substantial contributions to conception and design, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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