NORTHWEST REGIONAL CANCER CENTER

DISCHARGE SUMMARY

DATE: April 10, 2025

ADMITTING DIAGNOSIS

1. Stage IV KRAS G12D-mutated non-small cell lung cancer with bone and lymph node metastases
2. Pathological fracture of left femoral neck
3. Symptomatic anemia requiring transfusion
4. Chemotherapy-induced neutropenia (resolved)

PROCEDURES AND OPERATIONS

1. Left hip hemiarthroplasty (04/02/2025)
2. RBC transfusion × 2 units (04/01/2025)
3. CT-guided biopsy of enlarging right hilar lymph node (04/05/2025)

PATIENT: William Miller
ID: SYN029
DOB: August 29, 1953 **GENDER:** M
DATE OF ADMISSION: April 1, 2025
DATE OF DISCHARGE: April 10, 2025
ATTENDING PHYSICIAN: Dr. Nathan Taylor, MD

HISTORY OF PRESENT ILLNESS

Mr. Miller is a 71-year-old male with a history of stage IV KRAS G12D-mutated non-small cell lung cancer diagnosed in February 2022. He initially presented with persistent cough, hemoptysis, and weight loss. Imaging studies revealed a 4.3 cm right upper lobe mass with hilar, mediastinal and retroperitoneal lymphadenopathy, and multiple bone metastases including the spine (T7, T10, L2), ribs, and left proximal femur.

Biopsy of the primary lung lesion confirmed adenocarcinoma. Molecular testing demonstrated KRAS G12D mutation with no other actionable alterations (EGFR, ALK, ROS1, BRAF, MET, RET, and NTRK negative). PD-L1 testing showed tumor proportion score (TPS) <1% (0%).

The patient initiated first-line therapy with carboplatin/pemetrexed/pembrolizumab on March 11, 2022. After 4 cycles, he transitioned to maintenance pemetrexed/pembrolizumab. He

demonstrated partial response initially with stable disease through December 2022. In January 2023, imaging showed disease progression with increasing size of primary tumor and new bone lesions. He subsequently received radiation to painful bone metastases (T7, left femur) and was transitioned to second-line docetaxel/ramucirumab, which he received for 6 cycles with stable disease.

In October 2023, disease progression was again noted. The patient enrolled in a clinical trial of an investigational KRAS G12D inhibitor from November 2023 to March 2024, with initial disease stabilization followed by progression. In April 2024, he began fourth-line therapy with gemcitabine/vinorelbine.

The patient was admitted to the hospital after experiencing sudden severe left hip pain while rising from a chair. Imaging confirmed a pathological fracture through a metastatic lesion in the left femoral neck. During admission, symptomatic anemia was noted with hemoglobin of 7.2 g/dL.

PAST MEDICAL HISTORY

1. Hypertension
2. Type 2 diabetes mellitus
3. Coronary artery disease s/p stent placement (2015)
4. Gout
5. Dyslipidemia
6. Benign prostatic hyperplasia
7. Chronic kidney disease stage 3 (baseline Cr 1.3-1.5)
8. 40 pack-year smoking history (quit 2015)

ALLERGIES

1. Penicillin (rash)
2. Contrast dye (mild itching)

HOME MEDICATIONS PRIOR TO ADMISSION

1. Gemcitabine 1000 mg/m² IV on days 1 and 8 q3wks
2. Vinorelbine 25 mg/m² IV on days 1 and 8 q3wks
3. Zoledronic acid 4 mg IV q4wks
4. Lisinopril 20 mg PO daily
5. Metoprolol tartrate 25 mg PO BID
6. Atorvastatin 40 mg PO daily
7. Metformin 1000 mg PO BID
8. Glipizide 5 mg PO BID
9. Allopurinol 300 mg PO daily
10. Tamsulosin 0.4 mg PO daily
11. Acetaminophen 650 mg PO q6h PRN for pain
12. Oxycodone 5 mg PO q6h PRN for breakthrough pain

PHYSICAL EXAMINATION AT ADMISSION

Vital Signs: BP 148/83, HR 92, RR 18, Temp 37.0°C, O_2 Sat 94% on room air

General: Elderly male in moderate distress due to left hip pain.

HEENT: Normocephalic, atraumatic. PERRL. Dry mucous membranes.

Cardiovascular: RRR. Normal S1, S2. No murmurs, rubs, or gallops.

Respiratory: Decreased breath sounds in right upper lobe. No wheezes or rhonchi.

Abdominal: Soft, non-tender, non-distended. Normoactive bowel sounds.

Musculoskeletal: Left hip with limited ROM and pain on minimal movement. External rotation of left lower extremity.

Neurological: Alert and oriented x3. CN II-XII intact. Motor strength 5/5 in upper extremities and right lower extremity, unable to assess left lower extremity due to pain.

Skin: Pale. No rashes or lesions.

DIAGNOSTIC STUDIES DURING ADMISSION

Laboratory Studies

Complete Blood Count (04/01/2025):

- WBC: 1.8 × 10^9/L (Low)
- Hemoglobin: 7.2 g/dL (Low)
- Hematocrit: 22.6% (Low)
- Platelets: 112 × 10^9/L (Low)
- Absolute Neutrophil Count: 0.7 × 10^9/L (Low)

Comprehensive Metabolic Panel (04/01/2025):

- Sodium: 136 mmol/L
- Potassium: 4.2 mmol/L
- Chloride: 101 mmol/L
- CO_2: 24 mmol/L
- BUN: 32 mg/dL (High)
- Creatinine: 1.8 mg/dL (High)
- eGFR: 39 mL/min/1.73m^2 (Low)
- Glucose: 153 mg/dL (High)
- Calcium: 8.4 mg/dL
- Total Protein: 6.2 g/dL
- Albumin: 3.1 g/dL (Low)
- AST: 38 U/L
- ALT: 32 U/L
- Alkaline Phosphatase: 186 U/L (High)
- Total Bilirubin: 0.8 mg/dL

Coagulation Studies (04/01/2025):

- PT: 12.1 seconds
- INR: 1.1
- PTT: 28 seconds

Additional Studies:

- C-reactive protein: 38 mg/L (High)
- Erythrocyte sedimentation rate: 65 mm/hr (High)
- HbA1c: 7.6%
- Serum Protein Electrophoresis: No monoclonal protein identified

Imaging Studies

Pelvis & Left Hip X-ray (04/01/2025): Pathological fracture through a lytic lesion in the left femoral neck. Multiple additional lytic lesions in the left proximal femur and acetabulum.

CT Chest/Abdomen/Pelvis with contrast (04/03/2025):

- Right upper lobe primary mass measuring 5.8 cm (increased from 4.9 cm in January 2025)
- Enlarging hilar and mediastinal lymphadenopathy with right hilar node measuring 3.2 cm
- Multiple bone metastases with increased size and number, including new lesions in the right iliac bone
- Stable small bilateral pleural effusions
- No evidence of visceral metastases

PET/CT (04/04/2025):

- Hypermetabolic primary right upper lobe mass (SUVmax 16.3)
- Multiple hypermetabolic hilar and mediastinal lymph nodes (SUVmax 10.8-14.2)
- Multiple hypermetabolic bone lesions, including spine (T7, T10, L2, L4 [new]), ribs, pelvis, and bilateral proximal femurs
- No evidence of brain metastases

Biopsy of Right Hilar Lymph Node (04/06/2025): Microscopic examination: Metastatic adenocarcinoma consistent with lung primary

- Immunohistochemistry: TTF-1 positive, Napsin A positive, CK7 positive, CK20 negative
- Molecular testing: KRAS G12D mutation confirmed
- PD-L1 repeat testing: TPS remains <1% (0%)
- Next-generation sequencing identified a new STK11 mutation not previously reported

HOSPITAL COURSE

The patient was admitted with a pathological fracture of the left femoral neck and symptomatic anemia in the setting of stage IV KRAS G12D-mutated NSCLC.

Orthopedic Management

Orthopedic surgery was consulted on admission. Given the extensive metastatic disease in the proximal femur and limited life expectancy, the patient underwent left hip hemiarthroplasty on 04/02/2025 rather than total hip replacement. The procedure was uncomplicated. Pathology from the excised femoral head confirmed metastatic adenocarcinoma consistent with lung primary. Post-operatively, the patient participated in physical therapy twice daily with gradual improvement in mobility.

Hematologic Management

The patient received 2 units of packed red blood cells on admission for symptomatic anemia (Hgb 7.2 g/dL). Post-transfusion hemoglobin improved to 9.6 g/dL. He was also neutropenic on admission (ANC 0.7 × 10^9/L), consistent with recent chemotherapy (last dose of gemcitabine/vinorelbine on 03/22/2025). Filgrastim 480 mcg SC was administered daily for 3 days with recovery of neutrophil count to 2.1 × 10^9/L by 04/06/2025.

Oncologic Management

CT and PET/CT imaging demonstrated clear disease progression with enlarging primary tumor, lymphadenopathy, and new bone metastases. A biopsy of an enlarging right hilar lymph node was performed to assess for new molecular alterations and to guide further therapy. Next-generation sequencing identified a new STK11 mutation in addition to the previously known KRAS G12D mutation. Given the progression on previous therapies and poor prognosis, the multidisciplinary tumor board recommended transitioning to fifth-line therapy with either clinical trial participation or single-agent immunotherapy (nivolumab).

The patient opted for nivolumab therapy, with initiation planned for outpatient setting following recovery from surgery. He will continue to receive zoledronic acid for bone metastases. Radiation oncology was consulted for palliative radiation to the left hip (post-operatively) and symptomatic T7 and L4 lesions, scheduled to begin as an outpatient on 04/15/2025.

Pain Management

Pain was initially controlled with IV hydromorphone PCA, transitioning to oral oxycodone on post-operative day 2. By discharge, pain was well-managed with scheduled oxycodone 10 mg q8h and oxycodone 5 mg q4h PRN for breakthrough pain.

Other Management

1. Nephrology was consulted for acute kidney injury superimposed on chronic kidney disease. Creatinine peaked at 2.0 mg/dL and improved to 1.7 mg/dL by discharge with IV hydration and avoidance of nephrotoxic agents.
2. Diabetes was managed with adjusted insulin regimen during hospitalization, transitioning back to oral agents prior to discharge.
3. Hypertension remained well-controlled on home medications.

DISCHARGE MEDICATIONS

1. Oxycodone 10 mg PO q8h
2. Oxycodone 5 mg PO q4h PRN for breakthrough pain
3. Acetaminophen 650 mg PO q6h
4. Lisinopril 20 mg PO daily
5. Metoprolol tartrate 25 mg PO BID
6. Atorvastatin 40 mg PO daily
7. Metformin 1000 mg PO BID
8. Glipizide 5 mg PO BID
9. Allopurinol 300 mg PO daily
10. Tamsulosin 0.4 mg PO daily
11. Zoledronic acid 4 mg IV q4wks (next dose due 04/29/2025)
12. Enoxaparin 40 mg SC daily for 3 weeks (DVT prophylaxis post-surgery)
13. Docusate sodium 100 mg PO BID
14. Senna 8.6 mg PO BID

DISCHARGE DISPOSITION

The patient is being discharged to an inpatient rehabilitation facility for continued physical therapy and recovery from hip surgery.

FOLLOW-UP PLAN

1. Follow-up with Orthopedic Surgery: Dr. Marcus Wilson on 04/24/2025
2. Follow-up with Medical Oncology: Dr. Nathan Taylor on 04/22/2025 to initiate nivolumab therapy
3. Radiation Oncology: Dr. Samantha Lee on 04/15/2025 to begin palliative radiation therapy
4. Physical Therapy: Continues at inpatient rehabilitation facility
5. Next imaging assessment: CT chest/abdomen/pelvis scheduled for 07/10/2025 (after 3 cycles of nivolumab)

DISEASE COURSE AND TREATMENT SUMMARY

Mr. Miller was diagnosed with stage IV KRAS G12D-mutated non-small cell lung cancer in February 2022. His disease course has been characterized by initial response to therapy followed by progressive disease requiring multiple lines of treatment:

1. First-line therapy: Carboplatin/pemetrexed/pembrolizumab followed by maintenance pemetrexed/pembrolizumab (March 2022 - January 2023)
    - Best response: Partial response
2. Second-line therapy: Docetaxel/ramucirumab (February 2023 - September 2023)
    - Best response: Stable disease
3. Third-line therapy: Investigational KRAS G12D inhibitor clinical trial (November 2023 - March 2024)
    - Best response: Stable disease
4. Fourth-line therapy: Gemcitabine/vinorelbine (April 2024 - April 2025)
    - Best response: Initial partial response followed by progression
5. Planned fifth-line therapy: Nivolumab monotherapy (to be initiated April 2025)

The patient has also received palliative radiation therapy to symptomatic bone metastases (T7 and left femur in January 2023, with additional radiation planned for left hip, T7, and L4).

PROGNOSIS AND GOALS OF CARE

Mr. Miller has demonstrated progressive disease after 4 lines of therapy, with a new pathological fracture indicating worsening bone metastatic burden. The identification of an STK11 co-mutation with KRAS G12D suggests a more aggressive disease biology and potentially lower likelihood of response to checkpoint inhibitor therapy.

The estimated prognosis is 6-9 months based on disease trajectory, failure of multiple lines of therapy, declining performance status, and molecular features. The patient has expressed his understanding of the prognosis and wishes to continue with anti-cancer therapy as long as quality of life can be maintained. He has completed an advance directive designating his daughter as healthcare proxy, and has indicated he would not want mechanical ventilation or cardiopulmonary resuscitation in the event of further decline.

The multidisciplinary team will continue to monitor the balance between anti-cancer treatment and quality of life, with regular reassessment of goals of care.

Electronically signed by:
Nathan Taylor, MD
Medical Oncology
Northwest Regional Cancer Center
Date: April 10, 2025, 14:15