Facilitator's Guide

Section I: OMM Case Presentation. Prior to the next OMM session, Residents should read the case below and be prepared to discuss the questions in Section II.

Case Presentation

Chief Complaint:

Rib stiffness, status post left thoracotomy and constipation

History:

The patient is a 61-year-old white male admitted for a scheduled left thoracotomy for biopsy and resection of left lung mass. The patient initially presented with shortness of breath and an associated chronic cough. The shortness of breath was worse with exertion, but he was also occasionally short of breath at rest. The patient denied ever experiencing shortness of breath before this year. An approximately 1 cm lung nodule was found in the left upper lobe of the lung on computed tomography (CT) of the chest and further imaging studies and pain out-of-proportion in the right rib cage and left wrist, suggested possible metastatic lesions on the right tenth rib and the left first metacarpal.
During the current admission, a thoracotomy with wedge resection of the mass in the left upper lobe of the lung was performed for further characterization of the lesion. The patient underwent a small standard posterolateral thoracotomy with incision in the posterolateral aspect of the axillary line at about the T8 level. The patient tolerated the procedure well, was extubated and sent to the Intensive Care Unit for monitoring.

Family History : Father and paternal uncle deceased of lung cancer and mother deceased of cerebral hemorrhage. Brother deceased from a myocardial infarction at age 48 and another brother living with coronary artery disease and emphysema. Son with Barrett's esophagitis and a daughter with Hashimoto's disease.

Social History: Retired plumber with an 80 pack year smoking history that is currently smoking 2 packs per day, significant past alcohol abuse of one case of beer per day ending 20 years ago with abstinence since that time, and he denies any illicit drug use. Married with five children and 4 grandchildren.

Trauma History:

Allergies: *Codeine, morphine, Keflex(cephalexin) and Soma(carisoprodol)*

Lab Tests & Results:

Meds:
1. *amitriptyline 100 mg at bed time.*
2. *levothyroxine 100 mcg daily.*
3. *Toprol XL (metoprolol) 50 mg daily at night.*
4. *doxepin 25 mg at bedtime.*
5. *Tagamet (cimetidine) 400 to 800 mg as need for heart burn.*
6. *ibuprofen 800 mg daily.*
7. *hydrocortisone cream 0.2% apply to affected areas three times daily as needed.*

PMH: 1) Chronic obstructive pulmonary disease with pulmonary function testing revealing moderately severe airway obstruction with a diffusing capacity of less than 50% of predicted, representing severe loss of reserve capacity and possible difficulty in weaning from mechanical ventilation; 2) Migraine headaches; 3) High thyroid antibodies; 4) Peptic ulcer disease with major bleeding; 5) Colonic polyposis; 6) Hemorrhoids; 7) Benign prostatic hypertrophy; 8) Degenerative joint disease; 9) Peripheral vascular disease with claudication at less than two blocks distance; 10) Restless leg syndrome; and 11) Non-seizure activity, physical convulsions associated with his experience of extreme pain (occurred with past back surgeries).

Review of Systems

Constitutional: Denies weakness, fever, chills, recent unintended change in weight, and night sweats.

Skin: Admits skin dryness. Denies new moles, bumps, bruises, and rashes.

HEENT: non-contributory

Resp: Admits shortness of breath and cough. Denies sputum production and hemoptysis.

CV: Admits dyspnea with exertion. Denies chest pain, palpitations, and hypertension.

GI: Denies black tarry stools and bright red blood in stools. Denies anorexia, nausea, and vomiting. Denies any changes in bowel movements. Admits some constipation.

GU: Denies dysuria, frequency, urgency, incontinence.

Neuro: Denies paresthesias, sensory deficits, and seizures.
Musculoskeletal: Admits chronic low back pain, tender left wrist, exquisite localized tenderness to his right rib cage, and acute pain to left chest wall post thoracotomy.

Psych: Denies anxiety and depression.

OMM Focused Structural Exam

- Cold, scaly, and fibrotic tissue texture changes palpated in the cervical, cervical-thoracic junction, thoracolumbar junction, and lumbar spine.
- Warm, erythremic, and edematous tissue texture changes in the mid thoracic, lower lumbar, and sacral regions. Increased thoracic kyphosis and lumbar lordosis.
- Decreased range of motion of the shoulders, hips, knees, and lower back. Tight paraspinal musculature throughout thoracic and lumbar spine.
- OA ESIRr. C3FSrRr. C4-5 ESrRr. Thoracic inlet rotated left, sidebent left, and flexed. Very poor rib motion left ribs 4-9. Left ribs 4-7 inhaled. Left ribs 8-10 exhaled. T4 ESIRl. T8 FSIRl. T9-12 NSrRl with markedly restricted motion. L1 FSIRl. L3-5 display markedly restricted motion in all planes.

Physical Exam

Vitals: T 98.0 R 16 BP 110/65 P 80 Wt 160 lbs. Ht 5’ 8” BMI 24.3

General: 61year old Caucasian male appearing older than stated age in no acute distress.

SKIN: Warm and dry without edema present. Dressing clean, dry intact on left thoracic wall.

Midline posterior lumbar scar.

***Head**:* Is normocephalic, no masses or lacerations noted. EOMI. PERRLA. TMs clear bilaterally. Nasal mucous
membrane is moist and pink. Edentulous, no oral mucosal lesions or ulcerations present. Pharynx unremarkable and without post-nasal drainage.

Eyes:

ENT:

Chest Wall:

CV:: RRR without murmur, gallops, or rubs. All peripheral pulses are weak +1/4, but equal bilaterally. The chest is symmetrical.

***Respiratory**:* Respirations are regular and rate is rhythmical with the use of accessory muscles. Normal breath
sounds on the right lung fields. Course breath sounds on the left lung fields with minimal breath sounds
auscultated at the left upper lobe.

Diaphragm:

GI:

***GU**:*

***Musculoskeletal**:*

***Neurologic**:*

Lymphatic:

Section II: Focus of the Case *(approximate time 20–30 minutes)*

Discussion Questions	Teaching Points
1. Propose an appropriate differential diagnosis / assessment	**Differential Diagnoses:** • Primary pulmonary neoplasm • Metastatic pulmonary neoplasm • Acute exacerbation of COPD • Pneumonia • Infectious bronchitis • Granulomatous lung diseases • Lung abscess • Empyema • Pulmonary tuberculosis • Pneumonia • Acute Respiratory Distress Syndrome • GERD • Upper Respiratory Infection • Congestive Heart Failure

<table>
<tr><td>2. What are the appropriate laboratory tests and their results?</td><td>Gross tumor size of 1.0 cm x 1.0 cm x 0.8 cm. A final diagnosis of large cell neuroendocrine carcinoma of the lung was determined. This is suspected to be stage IV non-small cell carcinoma of the lung due to the probability of metastasis to the right tenth rib and possible metastasis to the left wrist.
Table 1 Pre-operative Spirometry Results. In general, these results were not changed with bronchodilators.
Forced vital capacity, FVC 3.1 L (73%)
Forced expiratory volume in first second of expiration, FEV1 0.7 L (23%)
FEV1/FVC ratio 25%
Forced expiratory flow in the middle 1/2 of an expiration, FEF 25-75 0.2 LPS (6%)
Total lung capacity, TLC9.7 L (150%)
Diffusing Capacity corrected for alveolar volume, DLCO/VA 0.9 (19%)

Table 2 Post-operative Arterial Blood Gas Results.
Partial pressure of oxygen (PaO2): 80 mm Hg
Partial pressure of carbon dioxide (PaCO2): 55 mm Hg
pH: 7.20
Bicarbonate (HCO3): 35 mEq/L
Oxygen content (O2CT): 25%
Oxygen saturation (O2Sat): 92%
fraction of inhaled oxygen (FiO2) 30%</td></tr>
<tr><td>3. What is your final diagnosis?</td><td>Primary Diagnosis: Malignant neoplasm, Left Upper Lobe of Lung
Secondary Diagnosis: Status post pulmonary wedge resection, COPD,
Somatic dysfunction related to diagnosis: Somatic dysfunction related to diagnosis: Somatic dysfunction related to diagnosis: Most findings are potentially participants in viscerosomatic or somatovisceral reflexes. Postural strain makes a strong contribution to this clinical scenario.
The past back surgeries contribute significantly to the lower back/lumbar findings.</td></tr>
<tr><td>4. How do you explain the current structural findings in the context of this case?
Are any relevant structural findings missing?
What would you do differently? Why?</td><td>Some of the findings are recent and likely the result of surgery:
1. The extended occiput may be acute on chronic, the result of repeated intubations (note the surgery history)

2. The rib spreader will elevate the ribs below and depress the ribs above the incision, making the rib dysfunctions around it acute.
3. COPD will leave the diaphragm flattened.
4. The Chapman's reflexes mentioned may relate to the lung or surrounding viscera (heart, thyroid, etc.)
5. The past back surgeries contribute significantly to the lower back/lumbar findings.</td></tr>
</table>

5. What pathophysiology & functional anatomy knowledge is pertinent for diagnosing/treating this patient	A. **Pathophysiology—** Lung carcinoma is ultimately the result of genetic predisposition coupled with environmental factors that lead to the unhindered propagation of mutated cells. A history of cigarette smoking is almost universally identified. Long-term exposure of carcinogens on respiratory epithelial cells and an accumulation of multiple genetic mutations lead to neoplastic growth. Mutations in genes that stimulate cell growth (K-RAS, MYC), code for growth factor receptors (EGFR, HER2/neu), and inhibit apoptosis (BCL-2) contribute to proliferation of abnormal cells. Mutations that inhibit tumor-suppressor genes (p53, APC) also contribute. When enough of these mutations accumulate, lung carcinoma results. Risk factors associated with COPD can contribute to the development of lung neoplasms, while it can also mask the signs and symptoms of a lung cancer. COPD also contributes to breathing difficulties through the natural consequences of an obstructive lung disease. B. **Functional Anatomy-** Viscerosomatic and somatovisceral reflexes. Co-morbid factors including lung pathology (from tobacco abuse, COPD, and lung carcinoma), liver pathology (from a history of significant alcohol abuse), and gastric pathology (peptic ulcer disease) might augment or mask somatic dysfunction findings traditionally found with a solitary pulmonary lesion. Stress related to a retired lifestyle, new diagnosis of cancer, an extensive list of co-morbid conditions, and post-surgical status may contribute to changes in autonomic function. A history of multiple back surgeries and vertebral fusions of the lumbar spine can produce a somatovisceral reflex predisposing the patient to constipation and ileus. In conjunction with previous abdominal surgery, the patient has a risk for possible bowel obstruction.
6. What will be your highest yield regions?	
7. How does previous trauma influence these regions?	

8. Which 1 or 2 of the aspects below has the greatest influence on the patient complaint? • Pain • Fluid congestion • Hyper-sympathetic influence • Parasympathetic influence	
9. What are the acute or chronic aspects?	**Acute:** **Chronic:** **Acute & Chronic:**

10. Devise an appropriate treatment plan based on musculoskeletal components involved in the patient complaint	**Goals for OMM Management:** Normalize sympathetic/parasympathetic tone • Improve lymphatics • Address acute somatic dysfunction • Minimize postoperative complications including atelectasis and ileus • Increase ribcage motion, maximize respiratory effort • Support homeostasis • Minimize somatic pain **The treatment plan could include:** • Suboccipital release (parasympathetic up to splenic flexure) • Cervical techniques: Indirect technique of choice • Thoracic inlet: Indirect myofascial release • Thoracic, Rib , Lumbar : Indirect technique of choice • Sacral techniques (parasympathetic tone): indirect technique of choice, sacral rocking • Mesenteric lift • Paraspinal muscle inhibition • Inferior mesenteric ganglion inhibition • Abdominal and Pelvic diaphragms, indirect technique • Lymphatic pump technique, gentle technique
11. How soon would you see the patient for OMM follow-up?	
12. What are the outpatient, inpatient, and emergency room considerations?	
13. How are you going to talk to your patient about their complaint and your treatment?	.

14. How will you communicate your findings, diagnosis, and rationale for OMM treatment to your preceptor?	
15. What coding and billing information for evaluation and management and procedural services will you generate?	(See Procedure Services Chart Below)
16. How would you record your encounter and OMT on your patient care logs?	- Enter patient data, diagnosis date, and any special comments.

Procedure Services: Osteopathic Manipulative Treatment		
	Code	**Description**
	98925	Manipulation, 1-2 areas
	98926	Manipulation, 3-4 areas
	98927	Manipulation, 5-6 areas
	98928	Manipulation, 7-8 areas
	98929	Manipulation, 9-10 areas

CPT Diagnostic Codes: Rank in order of Importance

Diagnosis			**Somatic Dysfunction**				
Code	Description		Code	Description		Code	Description
			739.0	Head		739.5	Hip/Pelvis
			739.1	Cervical		739.6	Lower Extremity
			739.2	Thoracic		739.7	Upper Extremity
			739.3	Lumbar		739.8	Rib
			739.4	Sacrum/Sacroiliac		739.9	Abdomen

Section III: Workshop/Lab (approximate time 60 minutes)

1. Divide into groups at the tables.
2. At each table, discuss and practice the appropriate palpatory diagnosis for this patient.
3. Facilitator demonstrates the key treatment techniques.

- Suboccipital release (parasympathetic up to splenic flexure)
- Cervical techniques: Indirect technique of choice
- Thoracic inlet: Indirect myofascial release
- Thoracic, Rib , Lumbar : Indirect technique of choice
- Sacral techniques (parasympathetic tone): indirect technique of choice, sacral rocking
- Mesenteric lift
- Paraspinal muscle inhibition
- Inferior mesenteric ganglion inhibition
- Abdominal and Pelvic diaphragms, indirect technique
- Lymphatic pump technique, gentle technique

4. Practice the techniques on each other.
5. At each table, while the techniques are being practiced:
    - Identify and practice good body mechanics for the physician and patient in treatment.
    - Discuss the treatment plan.
    - Discuss what palpatory findings should change on the patient after OMM treatment.

6. **Documentation**

Residents demonstrate an appropriate documentation of this case including findings and treatment here...

Section IV: Final Wrap-up and Questions/Answers