Nursing

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Petra Grami, Sorayah S. Bourenane, Danielle Milling, Karen McFarland, Robert T. Drew, and Linda Koppy

Emergency Nursing and Oncologic Emergencies

In 2011, the American Nurses Association recognized emergency nursing as a specialty practice. As a challenging and unique profession, this clinical practice area prepares nurses to provide prompt interventions to stabilize or prevent further patient deterioration. The fast-paced, high-acuity setting commands refined critical thinking, clinical assessment, communication, and prioritization skills. Additionally, emergency nurses (ENs) care for a diverse patient population with various medical conditions and acute care needs [1].

Of significance is the Emergency Nursing Association (ENA), founded in 1970 as the premier professional nursing association, devoted to illustrating the future of emergency nursing. The mission of ENA is to further excellence in emergency nursing [2].

Reflective of the diverse nature of healthcare, emergency medicine has multiple subspecialties. As such, different emergency departments (EDs) provide care to specific patient populations and health concerns. Some of the subtypes include trauma, stroke, cardiac, burn, neuro, disaster response, pediatric, and adult [3].

The same variations that exist in emergency medicine and EDs are also depicted among ENs. It is not surprising to find that most ENs assume multiple roles over the course of their career. Some of these roles include *trauma, triage, flight, critical care transport, pediatric, burn center, geriatric, and charge nurse* [3].

Professional advancement has also led to further specialization of ENs. This year, the Board of Certified Emergency Nursing recognized four different subspecialty professional certifications, including the *Certified Emergency Nurse*, *Certified Flight RN, Certified Pediatric Emergency Nurse, Certified Transport Registered Nurse, and Trauma Certified Registered Nurse* [3]. Notably, as professional advancement continues to detect emerging areas of subspecialty in emergency nursing, additional professional certifications, education, and targeted programs have been created to support quality care [3].

One emerging subspecialty is Oncologic Emergency Nursing (OEN), a clinical practice designed to provide care for patients presenting with cancer emergencies.

Consider this: the 5-year survival rate for all cancers increased from 39% in 1960 to nearly 70% in 2019 and thanks in part to new cancer treatment modalities, increased survival rates have led to approximately 15 million people in the United States with cancer. The majority of these individuals likely experience oncologic emergencies requiring an ED visit [4]. OEN is among the healthcare teams that assume multiple roles in the ED to provide quality care and ensure optimum health outcomes for the patients presenting with oncologic emergencies.

This chapter identifies high-frequency and high-risk conditions that an OEN may encounter when caring for an ED oncologic patient. For each condition, we then present a number of case studies to illustrate several medical diagnoses, associated risk factors, presenting signs and symptoms, potential causes, contributing factors, anticipated diagnostics, corresponding interventions, case dispositions, and specialty nursing considerations. We conclude with discussions of the impact of the pandemic (novel coronavirus) on cancer patients and an overview of regulatory bodies that guide ED practice in the oncologic setting.

P. Grami (✉)
Critical Care, Clinical Decision Unit and Acute Dialysis, Nursing Administration, MD Anderson Cancer Center, Houston, TX, USA
e-mail: pgrami@mdanderson.org

S. S. Bourenane (✉) · D. Milling · K. McFarland · R. T. Drew
L. Koppy
Emergency Department and Clinical Decision Unit, The University of Texas MD Anderson Cancer Center, Houston, TX, USA
e-mail: sbourenane@mdanderson.org

K. H. Todd et al. (eds.), *Oncologic Emergency Medicine*, https://doi.org/10.1007/978-3-030-67123-5_6

Triage and General Assessment of Oncologic Emergencies

Triage

At triage, patients presenting to ED will encounter the triage nurse as the first medical professional. The role of the triage nurse is to identify patients needing immediate attention and then prioritize among those who do not require immediate life-saving interventions. Triage tools, such as the Emergency Severity Index (ESI), are used to standardize the approach and to predict patient disposition and ED resource use [5]. The ESI is a reliable and valid tool that is now in its fourth version [5], and is the most commonly used ED triage system in the United States [6]. The tool provides clinically relevant grading of patients into five groups from 1 (*most urgent*) to 5 (*least urgent*). This stratification is based on patients' acuity and resource needs [7].

Typically, patients with cancer have an ESI level of 1, 2, or 3 because of their potential to use multiple resources due to the complexity of their condition. Beyond the primary assessment is the need to screen for patients' cancer diagnoses, last treatment and modality, and any other significant surgeries or procedures [7].

General Assessment

ED nurses' ability to perform an accurate initial comprehensive patient assessment after triage is imperative in order to recognize the urgency and treatment needs of patients and to develop baseline data from which any changes in the condition of patients may be measured against [8].

Omission of accurate and timely patient assessments has been reported to result in adverse patient outcomes [9].

The EN can also expect the medical team to order laboratory tests. General labs should be assessed on almost all cancer patients, as treatment and disease processes may alter values from day to day and can likely provide additional insight into the underlying issue. Obtaining a complete blood count (CBC) with differential and comprehensive metabolic panel (CMP) is indicated for the vast majority of patients with a concurrent cancer diagnosis. Determining a patient's pancytopenia status, electrolyte levels and overall metabolic status are critical, as many abnormalities may not have associated symptoms in early stages. Early detection and correction of imbalances may prevent patients from incurring further injury or deterioration [10].

Although patients with cancer may present with an array of medical emergencies, this population is also at a high risk for infection. As such, sepsis should always be considered. Any signs or symptoms of infection should be promptly noted and addressed, as these patients are immunocompromised and have little physiological defense mechanisms. The presence of a central line also increases infection risk [11]. Timely collection of blood cultures and prompt administration of broad-spectrum antibiotics for any suspected infection can significantly improve the patient's prognosis [12].

Frequent ED encounters for patients with advanced cancer may also indicate a patient nearing end of life [13]. Patients with advanced cancer may benefit from conversations about advance care planning and code status to ensure their wishes are followed in the care trajectory. Although such conversations may be difficult, they can significantly improve the patient and family experience. Sending patients home with hospice from the ED is, at times, a feasible and appropriate option [14].

Chief Complaint: Chest Pain and Shortness of Breath

Patients presenting with chest pain and shortness of breath should be evaluated immediately for acute myocardial infarction via EKG. If EKG results do not suggest an acute MI, additional diagnostics should be employed to determine the underlying issue [15]. Chest pain and shortness of breath in cancer patients can be caused by various conditions that are common among cancer patients. These include pulmonary embolism, pleural effusion, pneumonia, spontaneous pneumothorax due to tumor burden, pericardial effusion, and cardiac tamponade [16]. See case studies in Table 6.1 illustrating a number of presentations involving these chief complaints [17–25]. Due to coagulopathies and bleeding tendencies, cancer patients may be at higher risk of cardiopulmonary-related adverse events [26]. As increasing numbers of patients receive immune checkpoint therapy, some cardiac presentation may represent immune-related adverse effects [27].

Tumors are known to cause collections of fluid proximal to tumor location. Depending on known lesions, tumors in the thoracic cavity may provide further insight into contributing conditions [28]. Pleural effusions are a high-frequency finding in lung cancer patients or patients with lung metastases. In recurrent pleural effusions, patients may have a Denver catheter drain placed to manage the fluid collection and reduce symptoms. If pleural effusion is identified, patients may require thoracentesis. This will likely alleviate any shortness of breath or chest pain symptoms almost immediately [29].

Table 6.1 Case studies: chest pain and shortness of breath

Vital signs	Signs and symptoms	Risk factors/contributing factors	Potential tests/ interventions	Nursing considerations
Pulmonary embolism. *A 37-year-old female with myosarcoma currently on treatment presents with sharp left-sided chest pain and SOB since 0800 today. She has a past medical history of right deep vein thrombosis. The pain worsened with motion and deep breathing. The pain has been progressively increasing in severity and she now has severe left back and shoulder pain. She complains of SOB and "feels like she is going to die." She denies cough, fever, sputum production, or hemoptysis*				
BP 121/84 HR 121 T 37.2 R 25 SpO_2 89%	Symptoms and clinical presentation may vary depending on the size of embolus & preexisting cardiopulmonary status, including asymptomatic/ incidental findings via outpatient diagnostic imaging studies Chest pain, often angina type onset and worsens with deep breathing. Chest pain will progress to pleuritic Dyspnea with sudden onset, tachypnea, crackles/wheezes, diminished breath sounds Tachycardia Low-grade fever (~40% of patients with PE) Cough/hemoptysis Syncope Back or abdominal pain Diaphoresis	Venous stasis Coagulopathies (may be induced by therapy or disease process) Atrial fibrillation Increased fatigue/ decreased activity Lung disease	General labs ECG Oxygen support CT with contrast to identify PE Arterial blood gases D-dimer (not as specific in cancer population) Initiation of thrombolytic therapy	Teach self-injection of low molecular weight heparin Monitor cardiopulmonary status for changes/ deterioration, may be rapid onset IV catheter = 18 g minimum for chest CT PE study protocol
Pleural effusion. *A 68-year-old man with lung cancer, congestive heart failure, and a 40-year history of cigarette smoking two packs a day. The patient reports that he has stopped smoking because of the lung cancer diagnosis. The patient presents to ED with shortness of breath and right-sided chest pain that worsens with deep breathing.*				
BP 150/70 HR 104 T 36.6 R 26 SpO_2 86%	Signs/symptoms dependent on amount and rate of fluid accumulation Dyspnea Cough Chest discomfort Abnormal breath sounds/ presence of pleural friction rub	CHF Pneumonia Malignancy Pulmonary embolism Pericardial constriction Obstruction of pulmonary vessels by tumor or stenosis Shedding of malignant cells into pleural space	General labs Chest X-ray and/or CT scan VQ scan ABG Thoracentesis provides symptomatic relief May be eligible for discharge if thoracentesis provides relief Cytological analysis of pleural fluid to determine if malignant cells are present	Information about procedure Treatment plan and possible placement of self-managed drainage system for recurrent pleural effusions Follow-up plan for early diagnosis and intervention for recurrent pleural effusion
Pneumonia [17, 18]. *A 68-year-old man with prostate cancer presenting to ED with a productive cough, fever × 3 days, shaking, and chills. He describes the sputum as thick and yellow. He also adds that a day ago, he developed pain in his right chest that is worsened with inspiration.*				

(continued)

Table 6.1 (continued)

Vital signs	Signs and symptoms	Risk factors/contributing factors	Potential tests/ interventions	Nursing considerations
BP 92/53 HR 120 T 39.0 R 26 SpO_2 90%	Fever, cough, sputum, hypoxemia, SOB Back pain, based on location of consolidation Vague, ill-defined symptoms Fatigue	Neutropenia Decreased activity Chronic obstructive pulmonary disease	General labs Blood cultures Lactic acid IV antimicrobial therapy Fluid resuscitation, ensure adequate cardiac status Sputum cultures Supplemental oxygen and use of noninvasive ventilation	Sepsis protocol Monitor changes in respiratory status, reposition as appropriate Maintain patent airway Promote normothermia Optimize fluid balance Encouraging coughing and deep breathing Promote adequate nutrition
Pneumothorax. *A 68-year-old female with a large tumor in the right lung presents with sudden onset shortness of breath. She is in acute distress and is breathing rapidly. Breath sounds are absent on the right.*				
BP 96/57 HR 119 T 38.6 R 27 SpO_2 88%	Signs/symptoms dependent on size/location of pneumothorax Respiratory distress/failure Dyspnea and chest pain Absent or decreased breath sounds on affected side Pneumothorax hyperresonant by percussion Deviation of trachea Unequal chest expansion Hypotension	Pulmonary malignancy Previous pneumothorax Procedures (i.e., central line insertion) Rupture of necrotic neoplastic tissue in pleural cavity [19] Tumor at lung periphery [20–22] Oncologic therapy [23]	Chest X-ray/CT scan Ultrasound Identification and treatment of underlying cause; may not require intervention Chest tube insertion	Monitor changes in respiratory status Assistance with chest tube insertion and management Pain management
Deep vein thrombosis. *A 54-year-old woman with uterine cancer and currently on treatment presents with left leg pain and swelling. She also reports that the swelling has been increasing over the course of 1 week. The affected leg is warm to touch, red, and edematous.*				
BP 152/74 HR 74 T 36.8 R 18 SpO_2 96%	Tight ache, tight feeling, or frank pain in calf or behind knee aggravated with standing or walking; alleviated with elevation Localized tenderness or pain over involved vein Tender, palpable venous cord of involved vein Swollen calf or thigh by measurement Calf swelling more than 3 cm in circumference in symptomatic leg Unilateral pitting edema in involved extremity Dilated superficial venous collateral vessels (non-varicose) Low-grade fever is possible	Procedures causing venous stasis (lengthy surgery) Active cancer (treatment or palliation within previous 6 months) Hypercoagulable state causing factors (physiological, environmental, iatrogenic) Presence of intravenous device (central venous access device) Coagulopathy induced by malignant cells Venous stasis (clot formation; pooling) Damage to blood vessel wall (endothelial)	General labs Laboratory: D-dimer Prothrombin/PTT Doppler ultrasonography Treatment: anticoagulants Surgical intervention: placement of vena cava filter to prevent PE in recurrent DVT Low-molecular-weight heparin (LMWH) may be self-administered	Minimize or prevent respiratory compromise Understand condition (signs & symptoms), risk factors, prevention and management Preventing further harm (adherence to treatment regimens, diet consistent with prescribed medication, health promotion) Safety measures: avoid contact sports, use of soft toothbrush for oral care and electric razor if there is a need to shave Monitor for changes and report leg pain, bleeding or signs of thrombophlebitis or PE
Pericardial effusion and cardiac tamponade [24, 25]. *A 55-year-old female with AML, currently on treatment, presents to the ED with complaints of a syncope episode with no injury. She endorses loss of consciousness for approximately "5 seconds" (verified by his adult son who was present at the time of fall). She reports that for the last 2 days, she has experienced increased fatigue associated with SOB. On assessment, her heart sounds are muffled on auscultation.*				

Table 6.1 (continued)

Vital signs	Signs and symptoms	Risk factors/contributing factors	Potential tests/ interventions	Nursing considerations
BP 108/60 HR 118 T 37.1 R 18 SpO_2 94%	Hoarseness, cough, hiccups, difficulty swallowing (compression of trachea, esophagus, vagal nerve) Muffled heart sounds Pericardial friction rub may be heard Increased jugular venous distension Kussmaul respirations Narrowing of pulse pressure – systolic blood pressure decreases and diastolic increases Paradoxical pulse (decline in systolic blood pressure on inspiration) Other signs of decreased cardiac output include tachycardia, anxiety, restless, peripheral cyanosis, oliguria, shock	Tumors most often associated with pericardial metastasis Some primary tumors (rare): sarcomas and mesotheliomas Lung and breast cancers can spread by direct extension of lymphatic metastasis Lymphomas and Leukemia routinely spread by hematogenous routes Radiation therapy of >4000 rad to the mediastinum Accumulation of excessive fluid within the pericardial sac (pericardial effusion) increasing pressure and compressing the heart	Primary goal to remove fluid and relieve/prevent impending cardiac collapse Chest X-ray, CT ECG Echocardiography Percutaneous pericardiocentesis Pharmacologic management to control heart rate	Patient teaching: early identification of signs/ symptoms Maximize safety with activities of daily life and ambulation Intervention to minimize severity: elevate head of bed; oxygenate; and manage pain and dyspnea Measures to enhance adaptation and rehabilitation

Patients undergoing cancer treatment may also reduce their activity, placing them at higher risk of developing thrombosis, leading to pulmonary emboli. The patient may be asymptomatic but should be treated with daily injections of anticoagulants. It is important to evaluate the patient's clotting times and platelet counts, as this may exclude them as candidates for anticoagulation therapies [30].

Chief Complaint: Altered Mental Status

Altered mental status (AMS) is a frequent chief complaint in oncologic patients presenting to the ED [31]. These mentation changes can result from metabolic disturbances, structural changes (such as metastatic disease or intracranial hemorrhage), or infection [32]. Ruling out the most life-threatening conditions is critical, as interventions are time-sensitive and require prompt identification to achieve desirable outcomes [33]. Table 6.2 illustrates presentations involving altered mental status [34–45].

Patients may present with varying degrees of AMS based on causative factors [32]. They may present as confused, somnolent, inattentive, or with seizure activity, both focal and widespread. Consider the type of cancer, risk factors associated with metabolic changes, infection risk, metastatic disease, and bleeding risk. Associated presenting symptoms and vital signs will also assist in identifying the underlying cause. Obtaining a thorough history from a family member or caregiver may also provide relevant information to AMS's cause, including the onset of mentation change, medications, medical history, and significant events. While the presence of malignancy creates an increased likelihood of atypical differential diagnoses, it is important to consider still acute ischemic stroke, hypoglycemia, and other common underlying conditions for patients presenting with changes in mentation.

Most oncologic patients presenting to the ED with AMS should receive a STAT head CT to determine if there is hemorrhage, as oncologic patients on active treatment are at higher risk for thrombocytopenia leading to bleeds [33]. Additionally, patients with known brain metastases are at risk due to the highly vascular nature of neoplasia. In addition to diagnostic imaging, a CBC and comprehensive metabolic panel (CMP) should be obtained. Platelets and white blood cell count may indicate additional causes, such as bleeding or infection. Many treatments cause pancytopenia and electrolyte disturbances that may be relevant to the patient's condition. Disturbances in electrolytes, bilirubin, and ammonia may cause changes in mentation. For example, hypo and hypernatremia can cause significant mental status changes and a common metabolic disturbance in certain lung cancer types. Ammonia can also cause AMS and may be present in cancers with hepatic involvement. All these components of the initial workup will assist in identifying the cause of AMS.

In the presence of new metastases identified in diagnostic imaging, corticosteroids can reduce edema around the lesion and subsequently diminish AMS symptoms [46]. If an acute ischemic stroke is suspected, it is critical to verify the platelet count to determine if the patient is an appropriate candidate for

Table 6.2 Case studies: altered mental status

Vital signs	Signs and symptoms	Risk factors/ contributing factors	Potential tests/ interventions	Nursing considerations
AMS related to metastatic disease [34]. *A 50-year-old female with history of breast cancer with bone/liver metastases presenting with altered mental status. Her boyfriend states she has increased confusion over last few days. He states she is not answering questions appropriately and has not been taking her medications as directed. Patient oriented to person and place but does not know what year it is. She is inattentive and takes a long time to respond to simple questions.*				
BP 117/68 HR 84 T 37.0 R 16 SpO_2 98%	Confusion (may be intermittent) Somnolence Seizures (may be focal)	Metastatic breast cancer Breast cancer has high metastatic risk in late stages	CT head Steroids (dexamethasone) Emergent neurosurgery to alleviate intracranial pressure if causing edema or ventricular obstruction	Frequent neuro vital signs Around the clock steroids to avoid additional edema Notify provider of any changes in mental status from initial baseline Elevate HOB and promote proper body alignment
AMS related to metabolic disturbances – sodium [35–40]. *A 56-year-old male with small-cell cancer of right lung, metastatic disease to bone/brain. He presents with altered mental status exhibiting delayed responses, confusion, and decreased concentration. Oriented to place/person but not time, GCS eye 3, verbal 4, and motor 6.*				
BP 117/68 HR 124 T 37.0 R 16 SpO_2 98%	Confusion Decreased PO intake Fatigue	Small cell lung cancer Most common electrolyte abnormality with small-cell lung cancer is hyponatremia Advanced disease increases likelihood of metabolic complications	General labs Head CT scan r/o bleed or metastatic progression Sodium replacement	Rebound cerebral edema with hypertonic solutions Seizure precaution Frequent neuro vital signs to identify subtle changes
AMS related to metabolic disturbances – ammonia [41–45]. *A 49-year-old female with metastatic colon cancer presents with altered mental status. Oriented to self only. GCS eye 4, GCS verbal 5, GCS motor 6. Patient has a history of hyponatremia, hyperkalemia, liver metastases. Finger stick glucose 105 mg/dL.*				
BP 93/58 HR 82 T 36.4 R 18 SpO_2 98%	Aggressive Confusion Lethargic Dehydration Hypotensive	Duodenum adenocarcinoma Cirrhosis of the liver Three cycles of chemotherapy Kidney damage and/or liver damage Drug, alcohol abuse Chemotherapy Colon cancer Liver failure	CBC, CMP, UA/C, PT/PTT, ammonia, liver enzymes CXR, EKG, CT head to r/o bleed Fluid resuscitation to flush Lactulose	Place on seizure precautions Monitor cognitive facilities May need restraints if aggressive If patient is unconscious, may have to administer lactulose through NG tube or rectal Lactulose will induce diarrhea and can contribute to falls

tissue plasminogen activator (tPA) [47]. If an infection is suspected, the patient should promptly receive broad-spectrum antibiotics. Timely administration of antibiotics can significantly improve patient prognosis in the presence of sepsis, with AMS being a frequent symptom indicating infection [48]. Patients with metabolic imbalances will improve upon the correction of the underlying disease process. Neurosurgery or neurology services may be consulted to address any neurological interventions based on ED findings [49].

Throughout the ED encounter, the EN should perform frequent neuro assessments to detect early deterioration signs. Placing the patient in semi-fowlers, elevating the head of the bed to 30 degrees or higher, and ensuring proper body alignment may also benefit patients with increased intracranial pressure [50]. Any changes in status should be immediately communicated with the provider. If steroids are ordered, they should be administered at scheduled times to reduce associated edema [49].

Chief Complaint: Back Pain

While back pain is a common chief complaint in EDs, the presence of back pain with cancer diagnoses can indicate metastatic spinal cord compression (MSCC), a time-sensitive emergency that requires prompt intervention. Although back pain is the most common complaint with MSCC, patients may also present with numbness, pain, or tingling in their extremities, bowel or bladder retention or incontinence, and even paralysis or gait disturbances. Patients with breast, lung, prostate, and renal cancer, as well as lymphomas and myelomas are at the highest risk, with men outnumbering women 2:1 [51]. See case study in Table 6.3 [51, 52].

Presenting symptoms will depend on the level of involvement and the degree to which the metastatic lesion is invading the spinal column. The degree of vertebral lesion invasiveness directly correlates with symptom severity. Symptoms may be alleviated with steroids by reducing the pressure on the spinal column [53]. Although symptoms may improve, these patients are at high risk for falls due to sudden sensory and motor function disturbances [54]. The patient's position may influence symptoms, activity level, level of involvement, and lesion location. Identifying a patient's position that reduces pain is important, and those with severe pain should be log rolled to avoid further injury. Range-of-motion assessments should also be conducted with caution, as they can cause additional injury in the presence of osteolytic lesions. These patients are at high risk for spinal instability, pathological fractures, and caudal equine syndrome.

Assessing for urinary retention and post-void residual are also necessary to determine if urinary catheter placement is necessary. Although patients may feel that they have fully emptied their bladder, there may be significant post-void residual, causing additional complications if not completely emptied. Patients may not state any bladder or bowel malfunctions due to loss of sensory perceptions, so assessment is necessary, regardless of patients' perceptions.

The radiological imaging modality of choice is magnetic resonance imaging (MRI) without contrast. If the patient cannot tolerate an MRI, a CT or X-ray may reveal findings but are not sensitive [55]. Treatments may include corticosteroids, radiation therapy, surgical intervention, and palliative chemotherapy [56]. Spinal cord metastases indicate late stages of cancer, and depending on patient functional status, treatment focus may be symptom management. Patients with MSCC may be candidates for advance care planning conversations, as this condition indicates advanced disease and poor prognosis [57].

Chief Complaint: Abdominal Symptoms

For patients with a concurrent cancer diagnosis, abdominal symptoms may indicate a variety of medical emergencies. Table 6.4 illustrates a number of presentations associated with these symptoms [58–80]. Oncologic patients are at high risk for bowel obstruction due to medication and antineoplastic treatments. Without prompt gastric decompression or surgical intervention, this can progress to perforation and severe infection. These patients may also present with nausea and vomiting due to the obstruction [81].

Table 6.3 Case study: back pain

Vital signs	Signs and symptoms	Risk factors/ contributing factors	Potential tests/ interventions	Nursing considerations
Metastatic spinal cord compression [52]. *A 67-year-old male with a history or metastatic prostate cancer presents to the emergency department with lower back pain 8/10 that has been progressing over the last week. He states he has some tingling in his legs and feels weak when he is ambulating.*				
BP 130/82 HR 77 T 36.8 R 16 SpO_2 97%	Primary complaint = back pain Weakness Paraplegia Sensory disturbances (numbness, neuropathy) Autonomic disturbances (incontinence, urinary retention)	Men out-number women 2:1 [51] Most prevalent in breast, lung, prostate, renal, lymphoma & myeloma Caused by vertebral body metastasis invading the spinal column Level of involvement directly reflects functional status and clinical presentation Symptoms may be affected by positioning (i.e., sitting vs. standing vs. laying down)	Diagnostics: radiological imaging of choice = MRI without contrast CT or X-ray if patient unable to tolerate MRI, not as sensitive Assessments: serial neurological evaluations, post-void bladder scan Treatments: corticosteroids, radiation therapy, surgical intervention, chemotherapy	Post-void bladder scan to evaluate for urinary retention Avoid range-of-motion testing if concern for spinal instability Best to immobilize patient as much as possible to prevent pathological fractures or additional pressure on the spinal cord High fall risk Strict bed rest for patients with poor performance status or spinal cord instability Indicates advanced disease = warrants advance care planning conversation

Table 6.4 Case study: abdominal symptom

Vital signs	Signs and symptoms	Risk factors/contributing factors	Potential tests/ interventions	Nursing considerations
Bowel obstruction [58–61]. *A 66-year-old female with a history of ovarian cancer presents with severe abdominal pain (9/10). Pain has progressed and began 4 days ago. She has a history of abdominal surgery, followed by radiation and chemotherapy treatment for her ovarian cancer. She has known metastatic peritoneal disease. Patient has not had a bowel movement in 5 days and feels nauseated. Chronic opioid use for pain related to cancer pain and radiation.*				
BP 146/90 HR 106 T 37.8 R 22 SpO_2 96%	Abdominal pain, cramping, distention Nausea and vomiting Loss of appetite Constipation and inability to pass gas	Previous abdominal surgery and scar tissue History of colon or rectal cancer or from other organs that has spread to the abdomen Inflammatory bowel disease Diverticulitis Previous abdominal or pelvic radiation Radiation and previous abdominal surgery Opioid induced constipation Age Intra-abdominal lesions and surgical scarring	General and coagulation labs Abdominal imaging Nasogastric tube insertion for decompression Antibiotics, fluids, pain control Possible surgery	Monitor for changes, if bowels perforate may quickly progress to sepsis Neuro checks Support B/P Possible sepsis NPO Pain management Strict I&O (Foley) Fall risk
Diverticulitis [62, 63]. *A 52-year-old white female history of melanoma, diverticulosis, and constipation with recent chemotherapy. The patient complains of abdominal pain in the lower left side over the past week progressively getting worse last night. Her pain level is 7/10.*				
BP 160/88 HR 94 T 38.0 R 20 SpO_2 97%	Pain lower left side of abdomen progressively getting worst over the last 5 days Nausea and vomiting Fever Abdominal tenderness, cramping Constipation	Advanced age Obesity Smoking Diet high in animal fat and low in fiber Certain medication Genetics Diverticulosis Immunocompromised Constipation	CT scan of the abdomen and pelvis, CBC, chemistries Rest, oral antibiotics, liquid diet More severe IV antibiotics, hospital admission, surgery Mild case may be discharged home if able to tolerate PO	Pain management Hydration GI rest clear liquids Nutrition education high-fiber diet, starting with low fiber initially
Gastrointestinal bleeding [62, 64]. *A 72-year-old Hispanic male with esophageal cancer presents to the ED with abdominal pain over the last month and hematemesis this morning, reports black tarry stools and weakness progressing over the last week. History of pulmonary embolism 2 months ago, on coumadin.*				
BP 82/50 HR 121 T 36.0 R 20 SpO_2 97%	Hematemesis Black tarry stool, rectal bleeding in or with stool Abdominal pain Weakness Low blood pressure	History of peptic ulcer disease or GI bleed Advanced age NSAID, anticoagulants Esophagitis IBD, colon polyps, hemorrhoids, diverticular disease, proctitis, anal fissures Esophageal tumor	CT scan of abdomen and pelvis with IV contrast CBC, PT with INR, PTT, D Dimer, fibrinogen, type and screen, CMP, magnesium, phosphorus, amylase, lipase, UA, urine culture EKG 12 lead, FOBT, endoscopy, colonoscopy, angiography Cardiac monitoring May be given PPI, may be taken off blood-thinning medications, pain medication	Assess for bleeding in stool ECG Strict I&O Administer pantoprazole Monitor heart rate and blood pressure Monitor H&H and clotting times Assess patient history and medications Support

Table 6.4 (continued)

Vital signs	Signs and symptoms	Risk factors/contributing factors	Potential tests/ interventions	Nursing considerations
Diarrhea [65, 66]. *A 35-year-old Asian female with breast cancer presents with 2 days of watery stool, abdominal cramping, and low-grade fever. She received chemotherapy approximately 3 days ago and feels weak and exhausted. Her primary oncologist recommended she come to the ED.*				
BP 102/58 HR 107 T 37.9 R 18 SpO_2 96%	Abdominal pain Watery stool Fever Abdominal distention	Viruses, bacteria, parasites Medications, including chemotherapy Graft versus host disease Lactose intolerance Surgery Recent chemotherapy Infection Food contamination	CBC, CMP, magnesium, phosphorus, stool culture, stool for C-diff, FOBT, colonoscopy Antibiotics, adjusting medications being taken Treatment plan to replace lost fluids and electrolytes Observation pending test results May discharge home after hydration and diarrhea resolves	Assess for abdominal discomfort, loose stools, cramping Inquire about: tolerance to milk and other dairy products, food preparation, medications patient is or has been taking, and current stressors Check for history of abdominal radiation, GI diseases, foreign travel, and drinking untreated water
Constipation [67, 68]. *A 76-year-old male with sigmoid adenocarcinoma presents seeking treatment for increasing abdominal pain and constipation persisting for 3 weeks. He is on Oxycontin. The patient complains of passing dry, hard stool every 5 days and a desire to defecate. Strains without relief after having a bowel movement.*				
BP 168/88 HR 86 T 36.9 R 18 SpO_2 98%	Dry hard stools Passing fewer than 3 stools a week Straining to have bowel movements Abdominal pain	Age Diet low in fiber Little to no physical activity Taking certain medications including sedatives, opioid pain medications, antidepressants or medications to lower blood pressure Cancer Poor hydration	CBC, chemistries CT of abdomen and pelvis, colonoscopy, X-ray, anorectal manometry, defecography (outpatient) Increase fiber intake, increase exercise, prescription medication and laxatives Surgery Admit to observation Discharge home if able to provide relief with enema/medication and CT negative	Classify medication usage that may lead to constipation Assess patient's activity level Assess patient's diet and eating habits Check frequency and consistency of stool Check for history of neurogenic diseases
Nausea and vomiting [69–71]. *A 40-year-old African American female with uterine carcinoma on active treatment presents to the ED complaining of nausea and vomiting. She has vomited 4 times in the last hour and is unable to keep anything down orally. Her nausea is increased with certain smells.*				
BP 95/60 HR 116 T 37.1 R 20 SpO_2 96%	Nausea and vomiting Weakness and fatigue	Cancer treatment Emotional distress Medication Gender BMI Motion sickness History of migraine Tumor Obstruction	CT abdomen/pelvis w/ contrast General/abdominal labs EKG, cardiac monitoring Clear liquids IV hydration Electrolyte replacement Antiemetics Patient may be managed at home with instructions and antiemetics as needed if improves and test are negative	NPO, may progress to clear liquids with PO challenge Assess medications that may lead to nausea/ vomiting Asses abdomen for distention and cramping, frequency of vomiting and emesis contents Strict I&O Fall risk

(continued)

Table 6.4 (continued)

Vital signs	Signs and symptoms	Risk factors/contributing factors	Potential tests/interventions	Nursing considerations
Urinary retention [72–76]. *A 73-year-old male with bladder cancer and suprapubic catheter presents with urinary retention for 3 days and abdominal pain worsened by tactile pressure.*				
BP 166/90 HR 106 T 36.8 R 20 SpO_2 94%	Acute suprapubic pain Anuria Distended bladder Urgency	Benign prostatic hyperplasia Bladder cancer Hemorrhagic cystitis History of hypertension and diabetes mellitus Increased age Affects men more than women Postop complication (s/p TURP) Medication related Blockage (stone, mass) Urinary tract infection Abscess Inflammation (cystitis, urethritis) Pelvic radiation Cord compression Penile trauma Fecal impaction	Bladder scan, CBC, CMP, UA/UC, indwelling catheter placement Medication for bladder spasm (hyoscyamine) Antibiotic for UTI Urology consult	Assess for previous surgeries/trauma/tumor Place catheter, preferably 16Fr or large enough to pass blood clots for that is determined to be the issue, may have to use coudé tip if patient has enlarged prostrate Consult urology if unsuccessful with catheter placement Monitor patient for electrolyte abnormalities, dehydration, hypotension after rapid bladder decompression Maintain adequate fluid intake
Acute kidney injury [77]. *A 65-year-old male with prostate cancer and chemotherapy 2 days ago presents to the ED with asymptomatic abnormal elevation of creatinine from routine office appointment.*				
BP 122/80 HR 76 T 36.9 R 16 SpO_2 97%	Leg swelling Potassium 6.7 Creatinine 8.32	Bladder cancer Nephrotoxic medications, including chemotherapy Obstructive hydronephrosis (tumor, clot)	Repeat labs, CBC/CMP, BUN UA, serum and urine electrolytes EKG and cardiac monitoring Renal ultrasound Fluid resuscitation Renal consult Possible surgical intervention (percutaneous nephrostomy) Kayexalate, albuterol nebulizer, 10 units insulin, calcium gluconate, 1 amp, D25, bicarb 50 meq	Review medications to discontinue nephrotoxic medications Anticipate adjusted medications according to renal function Monitor pulmonary and cardiovascular events due to fluid overload and electrolyte imbalances Monitor I/O Monitor changes in mental status Complications of acute kidney injury in cancer patient may limit the patient's ability to continue treatment Monitor blood glucose before and after insulin dose
Hematuria. *A 79-year-old male with bladder cancer and renal cancer presents to the ED with complaint of lower abdominal pain and blood in urine for the past 12 hours. The patient was seen at an outside facility and found to have creatinine 2.4, pyelonephritis, and cystitis.*				
BP 164/74 HR 90 T 36.5 R 20 SpO_2 90% (on 2 LPM via nasal cannula)	Hematuria Blood clots Urinary retention Pain	Bladder, urethral or kidney cancer UTI Trauma (pelvic area, renal) Hemorrhagic cystitis Pelvic radiation Chemotherapeutic agents (ifosphamide, cyclophosphamide) Medications Nephritis Calculi Renal cysts Enlarged prostate (causing to strain and rupture vessels)	Labs (CBC, CMP, UA/UC), adequate fluid intake Continuous bladder irrigation Diagnostic imaging (renal U/S, cystoscopy) Antibiotics for treatment of UTI Urology consult	Bladder irrigation via 3-way catheter, titrate drip to light pink, almost clear output, continuous irrigation If interrupted, clot may form If leaking at catheter insertion site, catheter most likely blocked with blood clot and clot will need to be irrigated May have to use coudé tip catheter if patient has enlarged prostate. Monitor hemoglobin and electrolytes

Table 6.4 (continued)

Vital signs	Signs and symptoms	Risk factors/contributing factors	Potential tests/ interventions	Nursing considerations
Bile duct obstruction [78–80]. *A 72-year-old female with pancreatic cancer on active treatment presents to the ED with vomiting and fatigue for the past week. She is jaundiced and slightly confused. She states she has generalized pruritus and abdominal cramping.*				
BP 104/66 HR 76 T 36.9 R 16 SpO_2 99%	Projectile vomiting Upper right abdominal pain Lethargy, anorexia/decrease in appetite Severe heartburn/ reflux	Pancreatic cancer Female Increased age Diabetes mellitus Type II	General labs, bilirubin, alk phos, liver enzymes CT scan GI endoscopy consult for stent placement or G-tube placement	If undergoing biliary drainage patient should receive broad-spectrum antibiotics within 1 hour of start of procedure due to transit bacteremia during or after the procedure Monitor for bleeding, leakage around the tube and subsequent skin breakdown, catheter related pain, pancreatitis, sepsis

Cancer-related treatments may also cause acute kidney injuries (AKI) present as abdominal pain, oliguria, and flank pain. Depending on cancer location and gastrointestinal involvement, disease progression may be the primary factor causing pain or obstruction. Location of the pain, severity, onset, aggravating and alleviating factors, as well as medical and oncologic history is important in determining the cause of abdominal pain and necessary interventions. Due to pancytopenia caused by many treatments, bleeding and infection should also be considered if indicated in clinical presentation [81].

Unfortunately, cancer treatment frequently causes nausea and vomiting. Prevention of dehydration and symptom management are most important in chemotherapy-induced nausea and vomiting and depending on the severity, patients may require scheduled administration of multiple antiemetics. Sensations, including smell and taste, are also impacted with chemotherapies, and something as innocent as perfume may trigger emesis. Nurses should avoid wearing any creams, lotions or perfumes with strong scents that may trigger episodes of nausea and vomiting [82]. When attempting oral intake, small volumes of plain food and drink are best, as foods with strong flavors or smells may also increase the risk for emesis or even aspiration. Additionally, elevating the head of the bed to prevent aspiration is an important safety measure, as vomiting episodes may be sudden without warning [83].

In addition to upper GI symptoms, cancer treatments can cause lower GI symptoms such as constipation and diarrhea. Severe constipation can develop with both treatment and symptom management therapies, such as opioids for pain management. All cancer patients should be on a stool softener to prevent fecal impaction that can lead to additional complications. Before administering an enema, platelet levels should be verified to ensure no bleeding risk. In cases of diarrhea, dehydration can quickly progress and electrolyte imbalances may occur. Prompt replacement of fluids and electrolytes is necessary to prevent further complications related to electrolyte deficiency. While treatments can induce adverse events, patients with previous stem-cell transplants may experience similar symptoms due to graft-versus-host disease (GVHD). In these cases, tacrolimus levels should be monitored and steroids are generally the treatment of choice [84].

Ascites and abdominal distention are commonly seen in patients with metastatic peritoneal disease. Ascites may be recurrent and require frequent removal of peritoneal fluids via paracentesis. For patients with recurrent ascites due to metastatic disease, a peritoneal drain may be indicated to allow the patient to self-drain fluid build-up in the abdomen and prevent frequent ED visits. Patient education and discussion with the primary oncologist will help determine if the patient is an appropriate candidate for peritoneal catheter placement [85].

With cancer patients being at high risk for infection, the presence of colitis, gastritis, and diverticulitis should also be assessed to determine if a patient requires antibiotic therapy. Infection should always be addressed in any cancer patient presenting with abdominal symptoms to prevent further deterioration [81].

Abdominal symptoms are common for both general ED patients and cancer patients and are caused by various conditions. The patients' medical and oncological history can guide patient diagnoses, including cancer type and associated events leading up to the ED encounter. Evaluation of laboratory findings, including hepatic functions, pancreatic enzymes, CBC and CMP, is also essential in determining an appropriate treatment course.

Chief Complaint: Infection

Many cancer patients undergoing treatments experience pancytopenia, including neutropenia. This places them at significantly higher risk for developing an infection and becoming septic. Patients may present initially with a fever and neutropenia and otherwise stable vital signs. That said, these patients have a minimal metabolic reserve and no immune defense mechanisms, so they can quickly decline without the initiation of appropriate interventions. A central line is frequently standard in patients receiving chemotherapy regimens. This direct access to the bloodstream also places patients at higher risk for bacteremia and sepsis [86].

Development of a sepsis protocol and standing parameters for early interventions can help decrease the time from door to antibiotic administration, resulting in more favorable outcomes. Once the infection source is identified, antibiotic therapy should be tailored based on the organism's susceptibility to promote antibiotic stewardship [87].

Patients presenting with fever can be quickly identified as having a potential infection or sepsis. Some patients experience a condition called "tumor fever," which is the most frequent cause of pyrexia unrelated to infection. This is most commonly present in leukemias, lymphomas, sarcomas, renal cell carcinomas, and patients with liver metastases, but may present in any type of cancer. Although the cause may be unknown, patients should be treated as if an infection is present until otherwise ruled out [88].

There are some cases where patients are afebrile but exhibit tachycardia, tachypnea, or hypotension. These may indicate infection but are nonspecific in cancer patients. These could be caused by many other conditions common in cancer patients, including anemia, dehydration, or different physiological responses to malignancy. Infection is frequently the culprit in these cases, but does not rule out other diagnoses. Additionally, ED nurses should identify if the patient is taking any medications that could reduce the temperature before ED arrival, such as acetaminophen or ibuprofen. This may mask the fever and cause infection to be overlooked [88]. Table 6.5 illustrates typical presentations for neutropenic fever and sepsis [89–93].

Chief Complaint: Newly Diagnosed Cancer in the Emergency Department

Although less common, patients may present to EDs without a cancer diagnosis, only to be diagnosed during treatment in the ED [94]. These situations can be high acuity and high stress, as the patient's medical management may be complicated, and the emotional stress of the patient and family will likely be heightened. The initial presentation will vary based on underlying cancer diagnosis but may range from nonspecific complaints to a growing tumor site. Regardless of the final cancer diagnosis, the patient and family will need significant psychosocial support to begin their journey as cancer patients [95].

For patients without established primary care, the ED may be their only access to medical services. Unfortunately, patients presenting with an invasive solid tumor without

Table 6.5 Case studies: infection

Vital signs	Signs and symptoms	Risk factors/ contributing factors	Potential tests/ interventions	Nursing considerations
Neutropenic fever [89]. *A 52-year-old female currently undergoing treatment for recent diagnosis of AML presents with fever of unknown origin. History of stage III breast cancer; treatment completed 2 years ago. White blood cell counts this morning showed absolute neutrophil count (ANC) < 500.*				
BP 98/68 HR 104 T 39.2 R 20 SpO_2 94%	Fever Fatigue	Poor performance status Advanced oncologic disease Low blood cell counts Chemotherapy Hematologic cancers Opportunistic infection	CBC with diff Blood culture Broad-spectrum antibiotics	Timely administration of antibiotics to prevent further deterioration and sepsis cascade
Sepsis [90–93]. *An 86-year-old female presents with fever, SOB, fatigue. She states she has back pain worsening over past 24 hours. Had chemotherapy for Stage III breast cancer approximately a week and a half ago. She has a double lumen peripherally inserted central catheter (PICC) line in her right arm.*				
BP 77/47 HR 127 T 38.9 R 24 SpO_2 89%	Hypotension Tachycardia Fever	Central venous access Neutropenia - nadir from chemotherapy Increased age Chemotherapy Hematologic cancers	CBC with diff Blood cultures Lactic acid Broad-spectrum antibiotics	Sepsis mortality increases Poor tissue perfusion

prior cancer diagnosis tend to have a poor prognosis. Patients diagnosed with cancer in the ED are usually in late stages of the disease, with a 75% higher risk of being diagnosed as stage 4 cancer, versus stage 1 [96]. These patients may not have access to healthcare in a primary care setting, causing them to utilize the ED for access to treatment. Patients may not have symptoms severe enough to prompt an ED encounter until cancer has progressed. Delays in cancer diagnosis significantly increase the likelihood of metastatic disease being present upon initial diagnosis. Because of the poor prognosis, advance care planning should be discussed with the patient and family to ensure the quality care that supports the patient and family's wishes. Generally, solid tumor patients will not require immediate antineoplastic therapy in an emergency setting. ED nurses should focus on symptom management, oncologic plan of care post-ED visit, and appropriate supportive services such as social work, case managers, nutritionists, and pain management specialists [96].

In contrast with solid tumors, different types of acute leukemias may present as a medical emergency and require prompt cancer treatment and immediate antineoplastic therapies. These cancers are frequently diagnosed in the ED and are sometimes only identified via blood work. Patients with acute leukemias tend to have nonspecific symptoms of infections. The proliferation of immature white blood cells causes insufficient immune defense mechanisms required to fight an infection, and this may be the only indication of the underlying issue. An analysis of blood work and subsequent bone marrow biopsy will identify the specific cancer type and appropriate treatments. These patients are at high risk for sepsis due to an ineffective immune system and coagulopathies due to increased blood viscosity and thrombocytopenia secondary to leukemia [97].

Patients with newly diagnosed leukemia should be regularly monitored for status changes, as they can quickly deteriorate. Those with a white blood cell count of 50,000 or greater will require immediate therapy to reduce the number of immature blasts in circulation. The type of cancer will determine the induction phase of treatment, which the ED nurse will likely initiate. Due to the high-risk and time-sensitive nature of induction therapies, protocols should be developed by both emergency and oncologic departments to ensure there are no administrative barriers that may prevent the patients from receiving immediate induction therapy in the ED. This collaboration between these specialties can be a significant factor influencing the patient's care course and subsequent outcome [97].

The ED nurse's role in newly diagnosed cancer patients is essential for their quality-of-life trajectory. Ensuring adequate education and resources can completely alter the patient's experience in the presence of a life-changing diagnosis, such as cancer. Although not all patients will be candidates for curative therapies, providing patients with all potential treatment options and plans of care will ensure they are on track for course best suited to their medical and psychosocial needs. Along with coordinating the various services, including patients and families, the care team should be prioritized by the ED nurse once medically stabilized [97]. Table 6.6 illustrates presentations for newly diagnosed acute myeloid leukemia and acute promyelocytic leukemia [98–105].

Chief Complaint: Malignancy Progression, Antineoplastic Treatments, and General Medical Emergencies

Complications may arise with patients throughout the course of their cancer diagnosis. These may arise both from disease progression and impact on physiological processes and antineoplastic therapies and the associated adverse effects. These can range from mild to severe, and a thorough patient medical history can help determine the underlying cause. As previously mentioned, treatments can cause pancytopenia resulting in anemia, thrombocytopenia, and neutropenia. These can lead to more severe complications such as infection or bleeding if not promptly addressed with the appropriate replacement or supportive therapy [106].

Disease progression will generally be related to the tumor's location and associated symptoms. Patients with primary or metastatic osteolytic lesions may develop pathological fractures as the disease progresses. These osteolytic lesions may initially cause the patient mild-to-moderate pain at the tumor site with an acute event producing a pathological fracture [107]. Patients with large abdominal or thoracic tumors can develop superior vena cava syndrome as the tumor grows, placing pressure on blood's systemic return to the heart. Certain neuroendocrine tumors can cause significant disturbances in hormonal and metabolic function, possibly resulting in diabetes insipidus, acute adrenal crisis (Addisonian crisis) and hypophysitis [108]. The tumor location and associated symptoms will greatly assist with determining differential diagnosis and appropriate treatments.

While cancer itself can produce adverse events seen in an emergency setting, the treatments patients receive can also have severe therapy-related adverse events. Patients who have received a stem-cell transplant (SCT) may also present with graft-versus-host disease (GVHD) complications. These can affect all organs and systems and are frequently treated with high-dose steroids [109]. Along with pancytopenia and associated conditions, many chemotherapies are nephrotoxic and cardiotoxic. Depending on the patient's ability to tolerate the treatment and underlying comorbidities, some patients may have more severe reactions than others [110]. Reviewing the patient's wallet insert that identifies

Table 6.6 Case studies: newly diagnosed cancer in the ED

Vital signs	Signs and symptoms	Risk factors/ contributing factors	Potential tests/ interventions	Nursing considerations
Acute myeloid leukemia (AML) [98–102]*: A 32-year-old male presents with abnormal lab results from his primary care provider who instructed his to present to the ED. The patient had an upper respiratory infection for 2 weeks that prompted him to see her PCP. PCP prescribed PO antibiotics and obtained a CBC. The patient has no significant medical history. CBC results showed WBCs 173 k, Platelets 4 k, Hgb 6.1. The patient is a smoker (1/2 per day) and works at a chemical plant.*				
BP 117/76 HR 107 T 37.7 R 18 SpO_2 97%	Frequently present after unresolved infection and discover abnormal blood counts May have weight loss, bleeding/bruising and fatigue due to counts	AML more common in males than females Risk factors for AML are exposure to certain chemicals (work exposure), radiation and smoking	General labs Hydroxyurea for leukocytosis Bone marrow biopsy PRBC and platelet transfusions to replace counts Chest X-ray to evaluate for potential pulmonary infiltrates Antibiotic and antiviral therapy to prevent infectious complications	High-risk for bleeding with thrombocytopenia Disseminated intravascular coagulation Highly viscous blood due to increased WBCs At risk for tumor lysis syndrome due to systemic cancer involvement
Acute promyelocytic leukemia (APL) [103–105]*. A 48-year-old male presents with low-grade fever, weight loss, increased fatigue, and increased bruising. The patient has worked at a crude-oil processing plant for 22 years and has no significant health history. Lab results show severe neutropenia, anemia, and thrombocytopenia*				
BP 110/68 HR 96 T 37.2 R 20 SpO_2 99%	Anemia Thrombocytopenia Neutropenia	Middle aged Long-term exposure to petroleum products Unknown May be associated with work exposure	General labs All-trans-retinoic acid (ATRA) Bone marrow biopsy PRBC and platelet transfusions to replace counts Chest X-ray to evaluate for potential pulmonary infiltrates Antibiotic and antiviral therapy to prevent infectious complications	High-risk cancer, but highly curable if treated timely Extremely rare subtype of AML Requires pathology evaluation of cell morphology to determine if APL versus other types of acute leukemia

the antineoplastic agent they are receiving may be beneficial. Obtaining this information as early as triage can help determine the differential diagnosis as well as medical management [110].

Dedication of resources to cancer treatment research has led to new therapies, emerging as first-line treatments producing promising outcomes. One of these recent advances is the increase of immunotherapies. Although these generally have a lower risk of associated adverse events, immunotherapies such as chimeric antigen receptor (CAR) T-cell therapy can induce specific emergent conditions, most frequently being cytokine release syndrome (CRS) and CAR-related encephalopathy syndrome (CRES). These emergent conditions may develop after receiving immunotherapies and must be treated timely to prevent long-term deficits. CRS and CRES have specific grading systems that should guide medical management and determine the severity of the condition [111].

Patients with cancer may have comorbidities, such as diabetes, hypertension, psychiatric conditions, cardiac dysrhythmias, and other chronic illnesses, and patients may present with conditions completely unrelated to their cancer or treatment. General medical emergencies such as ischemic stroke, myocardial infarction, or diabetic ketoacidosis (DKA) should still be considered, even in the presence of concurrent cancer, if the clinical presentation is consistent with the noncancer-related condition [112]. Notwithstanding, precautions should be taken when determining therapy for the medical emergency and how the patient's cancer may impact the typical course of management. For example,

patients exhibiting signs of ischemic stroke may not be candidates for tissue plasminogen activator (tPA) based on platelet count, coagulation studies, and bleeding risk. All factors should be considered when determining medical management for the patient. The ED nurses' role is imperative to ensure a holistic approach to patient care [113]. Table 6.7 illustrates the wide variety of patient presentations discussed above [114–144].

Chief Complaint: End of Life in Advanced-Stage Cancer

Although advances in oncologic treatments have greatly improved the overall survival rate of cancer, end of life, patients with advanced cancer disproportionately represent cancer-related visits to emergency departments. The high-acuity and fast-paced environment in the ED has been conventionally felt to be incompatible with end-of-life (EOL) discussions. The delicate topic is rarely addressed in EDs and can increase the psychosocial burden on the patient and family, increased costs, and futile care initiation. By providing a holistic approach and initiating conversations to establish care goals, the ED can help enhance the value and quality of care for EOL cancer patients [13]. Table 6.8 describes a typical presentation for a cancer patient presenting to the ED at the end of life [145–147].

Although the ED is not typically a setting where EOL discussions occur, initiating a palliative care (PC) consultation to assist with determining care goals with the patient and family member can greatly assist ED personnel in navigating the complex sequelae of the dying process in all domains [13]. Patients and families will require substantial physical, emotional, and spiritual support to ensure a smooth transition to hospice care. The ED nurse plays a central role in coordinating this care by ensuring all necessary services can provide expertise and guidance for the multifaceted needs associated with dying. These will include palliative, pain, hospice, nutrition, social work, case management, chaplaincy, and other multidisciplinary services based on the patient and family's unique needs. This experience can be the difference between a traumatic and peaceful death for both the patient and their loved ones [13].

As a gateway to hospitalization, the ED plays a vital role in the quality and value of EOL cancer patients' care. It is the tendency of ED personnel to choose life-saving interventions over meaningful conversations about advance care planning (ACP). EDs should ensure proper training and education are provided to staff to provide quality care and ensure dignity, compassion, and comfort for EOL patients. Altered mental status, dyspnea on minor exertion, and poor performance status (ECOG 3 or 4) were found in previous studies to be the "Triple Threat" predictors of mortality in advanced cancer. Patients with two or more of these conditions had a predicted 30-day mortality of 49% (95% CI. 34%, 64%) [145]. This may be used as a triage screening tool to identify advanced cancer patients who may benefit from care goals conversation.

In 2014, the Institute of Medicine (IOM) released the report, "Dying in America," calling for significant reform of the healthcare system to improve the quality and value of EOL care in America. The report cited recommendations to improve EOL care, including patient-centered and family-oriented EOL discussions, professional education and development of palliative care, healthcare policies to support EOL initiatives, and public education and engagement [148].

The National Quality Forum endorses multiple ED visits within the last 30 days of life to indicate poor-quality cancer care. Additional indicators of poor-quality cancer care include admission to the intensive care unit (ICU) within the last 30 days of life, death in the ICU, curative chemotherapy treatment in the last 14 days of life, and hospice admission for less than 3 days before death. ED nurses should advocate for EOL cancer patients to avoid poor-quality outcomes, enhance care value, and provide a positive experience for patients and families [148].

Ideally, these conversations would be initiated in an outpatient setting allowing ample time for discussion between providers, patients, and families. However, this is not always the case, and patients may only find out they are dying upon presentation to the ED. Although it may be perceived as challenging or inopportune, initiating a discussion of care goals in the ED can be one of the greatest gifts a nurse can provide to a patient [149].

Pandemic Response: SARS CoV 2 – Novel Coronavirus

Novel coronavirus disease (COVID-19), also termed SARS-COV-2, has emerged as a global threat and healthcare concern [150]. The virus first cases were reported in Wuhan, China, and marked the beginning of a global pandemic that completely upended daily life and the world's healthcare system [151]. Human-to-human transmission of COVID-19 occurs via respiratory droplets (by coughing or sneezing) and through direct contact with infected individuals or indirect contact with fomites of the affected individuals' environment [150]. Since its outbreak in China at the end of 2019 and until the April 5, 2020, the pandemic has affected > a million persons and caused 62,773 deaths worldwide [152].

Table 6.7 Case studies: malignancy progression, antineoplastic treatments, and general medical emergencies

Vital signs	Signs and symptoms	Risk factors/ contributing factors	Potential tests/ interventions	Nursing considerations
Cytokine release syndrome (CRS) & CAR-related encephalopathy syndrome (CRES) [114]. *A 61-year-old male presents to triage with tachycardia, hypotension, and shortness of breath. He received a chimeric antigen receptor T-cell (CAR-T-cell) therapy infusion for treatment of lymphoma approximately 3 days ago and was instructed to present to the ED.*				
BP 88/54 HR 126 T 37.2 R 20 SpO_2 89%	Looks a lot like sepsis Fever, myalgias, anorexia, evidence of multiple organ involvement (dyspnea, hypotension, arrhythmias, confusion seizures)	Recent CAR-T cell therapy infusion Liquid tumor, potential high tumor burden can cause increased cytokine release A therapy-induced immune systemic reaction Release of IL-6 proteins causes systemic inflammatory process	Tocilizumab is first line treatment Supportive therapy Rule out infection	CRS & CRES grading system Assess for CRES in the presence of CRS, may be concurrent Maintain $SpO_2 > 92\%$
Pathological fractures [115–117]. *A 55-year-old female with metastatic breast cancer with known bone metastasis. She has been experiencing right groin pain that started approximately 3 months ago and got significantly worse over the last 3 days. The patient is experiencing severe pain and is unable to bear any weight on her right leg, prompting her to present to the ED. The patient is slightly tachycardia (112), all other vitals are WDL.*				
BP 130/88 HR 112 T 37.2 R 18 SpO_2 95%	Pain, sometimes chronic with acute exacerbation Acute change in functional abilities of affected limb	Metastatic breast cancer to the bones Weight bearing activities on a bone that has a metastatic lesion	X-ray to evaluate for acute pathological fractures Orthopedic consult to evaluate for possible surgical reconstruction if patient is a candidate Pain control	Log-roll patients to avoid further injury Premedicate with analgesia prior to movement Stabilize with pillows to avoid positional exacerbation Be aware of other bone lesions and take extra precautions as appropriate
Diabetic Ketoacidosis (DKA) [118–120]. *A 64-year-old male undergoing treatment for prostate cancer with Lupron and prednisone. He presented to the ED with chief complaints of progressive weakness, confusion, loss of appetite, and nausea. The patient was diagnosed with new onset diabetes presenting with DKA, hyperglycemia, and acute kidney injury. Glucose 520 mg/dL on serum chemistry, bicarb 17, and anion gap 2.*				
BP 114/74 HR 102 T 37.3 R 20 SpO_2 94%	Glucose greater than 250 mg/dL Dry mouth, dry skin Polyuria, polydipsia, polyphagia Changes in mentation Kussmaul respirations	Diabetes type 1 Diabetes type 2 Long-term steroid use Non-compliance with insulin therapy Infection Trauma	Urinalysis and culture Serum ketones Arterial blood gas Blood culture CBC and chemistry Cardiac monitoring Neuro assessments Critical care Insulin therapy, hydration, electrolyte replacement	Fluid volume status Increased risk for infection Knowledge deficit regarding glucose management
Addisonian crisis [121, 122]. *A 67-year-old undergoing treatment for recurrent metastatic uterine leiomyosarcoma. She presented with fatigue and altered mental status. The patient was diagnosed with adrenal insufficiency secondary to hypophysitis following immunotherapy.*				
BP 78/54 HR 116 T 36.2 R 22 SpO_2 96%	Tachycardia Altered mental status Dry skin Hypotension Low fasting blood glucose	Addison's disease Prolonged administration of glucocorticoids Infection Cancer Stress ACTH deficiency Hypopituitarism Hypothalamic-pituitary disease	Serum cortisol level Chemistries High-dose IV corticosteroid therapy Cardiac monitoring ACTH stimulation test (cosyntropin)	Fluid and electrolyte management Fall precautions

Table 6.7 (continued)

Vital signs	Signs and symptoms	Risk factors/ contributing factors	Potential tests/ interventions	Nursing considerations
Hypophysitis [119, 123, 124]. *A 57-year-old male with recurrent metastasis renal cell carcinoma s/p radical left nephrectomy and right femur radiation 2 years ago. Current therapy includes nicolumab and ipilimumab. Complicated with immunotherapy related hypophysitis and hypothyroidism requiring high-dose steroids, now being tapered down. He presented with new onset dizziness.*				
BP 104/68 HR 126 T 37.2 R 20 SpO_2 95%	Fatigue Headache Dizziness Nausea/vomiting Altered mental status Visual disturbances Fever	Immunotherapy with ipilimumab Hormone imbalances	ACTH Thyroid panel	Gastric ulcer prevention High risk for infection
Thyroid storm [125–129]**.** *A 59-year-old male with papillary carcinoma with metastatic disease to the cerebellum, cervical nodes, thoracic nodes, lungs, bones, and spine. The patient presented with tachycardia. The patient was diagnosed with thyrotoxicosis with atrial fibrillation.*				
BP 147/92 HR 120 T 37.6 R 22 SpO_2 97%	Tachycardia Anxiety Diaphoresis Atrial fibrillation Tremors	Type 1diabetes Thyroid cancer TSH-secreting pituitary adenoma Adrenal insufficiency Untreated hyperthyroidism	Thyroid panel Antithyroid medication Cardiac monitoring	Monitor cardiac status, at risk for decreased cardiac output
Acute ischemic stroke [130–135]. *A 73-year-old female with low-grade follicular lymphoma, atrial fibrillation who presented with tremors and altered mental status. Patient family stated approximately 1 hour ago, the patient started complaining of a headache and mentation began to deteriorate. The patient's daughter stated they brought her in when "she was not making sense when she was talking."*				
BP 166/82 HR 76 T 37.1 R 20 SpO_2 94%	Altered mental status Sudden headache Numbness Ataxia Dysphasia	Hypertension Diabetes Malignant tumor Atrial fibrillation	Stroke protocol Verify platelet statements	Ensure patient is eligible for tPA prior to initiation
Acute myocardial infarction [136–140]. *A 51-year-old male cancer patient. Current suspicion of cancer. The patient recently (2 days prior) had a lymph node biopsy of cervical nodules; biopsy results pending. The patient reporting to the ED with chest and back pain.*				
BP 160/98 HR 46 T 36.7 R 22 SpO_2 92%	Chest pain/pressure Dyspnea Diaphoresis	Hypertension, cardiac and pulmonary disease Diabetes Cardiotoxic medications Hypertension Hyperlipidemia	EKG CBC and chemistry Troponin trends Interventional radiology	Acute pain management Tissue perfusion Activity intolerance Risk for excess fluid volume
Pancytopenia [103, 141–144]. *A 42-year-old male with a recent diagnosis of AML and recent induction chemotherapy treatment. Presents with shortness of breath, gingival and rectal bleeding.*				
BP 90/60 HR 116 T 37.2 R 20 SpO_2 96%	Shortness of breath Pallor Fatigue Bleeding Tachycardia	Hematologic cancers Hepatitis Chemotherapy Recent chemotherapy Sepsis Malignancy	CBC with diff ABORh Blood product replacement	Risk for infection Shortness of breath caused by anemia exacerbation with activity Risk for bleeding, high-risk for fall with injury Replace lowest blood product first to prevent deterioration related to pancytopenia

COVID 19: An Enhanced Threat to Cancer Patients

It is believed that patients with comorbid conditions, if infected, are at a heightened risk of manifesting complications associated with the virus [153]. Patients with cancer therefore remain at the forefront of this concern. Based on a recent Chinese cohort, patients with cancer had an increased risk of suffering severe events (intensive care unit admission, assisted ventilation or death) compared to those without cancer (39% vs. 8%, p = 0·0003) [154]. The threat the virus poses to medically compromised and noncompromised populations has therefore prompted extensive operational safety measures.

Table 6.8 Case study: end of life in advanced-stage cancer

Vital signs	Signs and symptoms	Risk factors/ contributing factors	Potential tests/ interventions	Nursing considerations
Triple threat [145–147]. *An 89-year-old male with stage 4 lung cancer on a clinical trial treatment regimen presents to triage with shortness of breath, altered mental status, and increased lethargy over the last couple of days. The patient presents with his adult son who is his primary caregiver and provides the history. He has visited the ED 3 times in the last 2 weeks for similar chief complaints resulting in admission to the hospital.*				
BP 101/56 HR 113 T 37.2 R 24 SpO_2 92% (on 3 liters/min via nasal cannula)	Delirium, altered mental status, or confusion in the last week Shortness of breath or difficulty breathing at rest or on minor exertion, such as toileting Spending more than 50% of their time in bed, or poor performance status with decreasing independence	Advanced stage cancer "Triple threat" symptoms at triage presentation Clinical trial, potentially indicating "Hail Mary" attempt to cure cancer Multiple ED visits may increase in the last weeks of life Patient may be nearing end of life Does the patient have advance care planning documents in place?	Discuss goals of care early in the encounter to prevent unwanted ICU admissions or invasive procedures Establish code status and provide realistic expectations of care to patient and family Ensure holistic approach and provide all necessary parties to produce a positive outcome	Provide support to patients and families to the best of your ability Use available resources to help provide patients/families with information. It takes a whole team to successfully have "goals of care" conversation in the ED You do not need to have all the answers as an ED nurse. Consult the experts in their specific areas (chaplaincy, social work, case management, palliative medicine, hospice, etc.) to assist in planning for those specific needs Ensure advance care planning documentation is available for all to see in the medical record to minimize confusion in an acute event regarding what the patient's wishes truly are Ensure the patient is comfortable – just because you are not providing curative treatment for the cancer does not mean they shouldn't receive treatment for infections, reversible conditions, and symptom management

Preventing Cancer Patients from COVID-19 Exposure from ED to Disposition

Notably, public safety measures in place are designed to reduce preventable hospital admissions and elective procedures [155]. These measures do not fully serve the interests of patients with cancer, who require continuous care inclusive of, but not limited to, diagnostic tests and therapeutic interventions. In this sense, both limitations in medical care and potential COVID-19 exposure could be risky, or even fatal [156].

It is for these reasons that remarkable efforts are taken by hospital personnel to screen for exposure to COVID 19 at hospital entry points. The oncologic ED is a main entry point for patients with cancer and as such, it adheres to the guidelines and recommendations put forth by the Center for Disease and Control (CDC) [157]. We share our adapted screening and preventative measures below.

Screening for COVID-19 and Safety Measures

- Staff member(s) are stationed near all ED and facility entrances (outdoors if weather and facility layout permit), or in the waiting room area, to ensure patients are screened for symptoms and fever before entering the treatment floor.
- Patients are provided with a face mask upon ED entry.
- Patients are screened for fever or symptoms consistent with COVID-19.
- Patients are directed to designated waiting areas which are divided to separate symptomatic from asymptomatic.
- Patients are separated by at least 6 feet; the area for symptomatic patients is at least 6 feet away from the area for patients without symptoms.
- For patients in need of urgent care, ED providers are notified immediately.
- Alerts and signs are posted in strategic places around the ED and the facility at large, with instructions for patients with fever or symptoms of respiratory infection.

Considerations for ED Staff

- Staff members in charge of screening patients remain 6 feet away from the patient until he or she is determined to be symptom-free and afebrile (temperature is determined by active temperature monitoring).

- Screening staff wear facemasks and shields (for source control) but do not need to wear PPE if they are separated from patients by a physical barrier such as glass or plastic window.
- Screening staff ensures these interactions as brief as possible by limiting the interaction to screening questions only.
- For staff members who must be within 6 feet of a patient, they are required to wear appropriate PPE, including an N95 or higher level respirator, gloves, and eye protection.

Post Patient Screening and Treatment Room Assignment

- Notification of direct patient care staff of the presence of a symptomatic patient.
- Safe and prompt transfer of symptomatic patients from triage to treatment rooms.
- Posting of appropriate isolation signs outside treatment rooms to communicate status.
- Immediate disinfection of waiting areas occupied by symptomatic/exposed patients and surfaces that were within 6 feet of the symptomatic patient; this is in addition to the regular (frequent) baseline cleaning and disinfection process that occurs for the entire waiting area.
- Items that cannot be disinfected remain with the patient or discarded.

Regulatory Standards for Oncologic Emergency Departments: Brief Introduction

Healthcare organizations that achieve accreditation through a Det Norske Veritas (DNV) or The Joint Commission (TJC) "deemed status" survey are determined to meet Medicare and Medicaid requirements and may receive payment from the Center for Medicare and Medicaid Services (CMS). Accreditation does not protect a hospital from an additional CMS survey. All healthcare organizations are still subject to a CMS survey based on a complaint or a validation survey [158]. Validation surveys usually occur within 60 days of the accreditation survey; however, TJC, in collaboration with CMS, has been working on redesigning the validation survey process. The objective of the redesign is to eliminate the validation survey and for CMS to oversee the accreditation process; thus, both may survey an organization at the same time [159].

CMS developed comprehensive Conditions of Participation (CoPs) and Condition for Coverage (CfC) that hospitals and other healthcare entities must meet to initiate or continue their participation in the Medicare and Medicaid programs [158]. All hospitals, including acute care, critical access, long-term care, children's, psychiatric, and cancer hospitals, are included. There are various key conditions of participation chapters for hospitals, and they all involve Emergency Services to varying degrees. Table 6.9 lists CMS subpart chapters applicable to an emergency setting but is not all-inclusive list of the regulatory standards [158].

Emergency services, one of the optional services that may be reviewed by CMS, are often an integral part of most hospital surveys. Thus, any organization with an ED will need to adhere to these standards. Table 6.10 displays additional subchapters that each hospital must examine to ensure compliance although some areas may not apply [158].

An emergency preparedness plan is required by all healthcare facilities. These guidelines will ensure compliance and demand a proactive approach to adequately plan for natural and man-made disasters. The CMS State Operations Manual, Appendix Z, Emergency Preparedness will guide the development of a comprehensive plan and will likely involve collaboration between the ED and the organization to meet the expectations or standards [160].

CMS is the single largest payer for healthcare in the United States, and the CoP health and safety standards are the foundation or *minimum* standards for its beneficiaries. There are other federal laws that all oncologic urgent or EDs or centers must follow. They include but are not limited to the Emergency Medical Treatment and Labor Act (EMTALA), originally part of the Consolidated Omnibus Budget Reconciliation Act (COBRA) passed in 1986 to address anti-dumping issues. Although motivated by the highly publicized anti-dumping incidents, EMTALA was intended to prevent inadequate care and delay or denial of

Table 6.9 Center for Medicare & Medicaid Services subpart chapters

482.11 Administration	482.25 Pharmaceutical services
482.12 Governing body	482.26 Radiologic services
482.13 Patients' rights	482.27 Laboratory services
482.15 Emergency preparedness	482.28 Food and dietetic services
482.21 Quality assessment and performance improvement program	482.30 Utilization review
482.22 Medical staff	482.41 Physical environment
482.23 Nursing services	482.42 Infection control
482.24 Medical record services	482.43 Discharge planning
	482.45 Organ, tissue & eye procurement

Table 6.10 Center for Medicare & Medicaid Services optional hospital services chapters

482.51 Surgical services	482.56 Rehabilitation services
482.52 Anesthesia services	482.57 Respiratory care services
482.53 Nuclear medicine services	482.54 Outpatient services
482.55 Emergency services	

Table 6.11 Reporting violations of the Emergency Medical Treatment and Labor Act (EMTALA)

EMTALA violations are reported to:	Purpose
Office of Inspector General (OIG)	To issue and enforce civil monetary penalties
Office of Civil Rights	To evaluate if there are any civil rights violations
Justice Department	To evaluate for Hill-Burton Act violations
Internal Revenue Service	To evaluate of tax-exempt status
Joint Commission or Det Norske Veritas (DNV)	To review accreditation status, patterns and trends

treatment of an emergent condition for the uninsured person to include pregnant women seeking medical advice. EMTALA is a federally mandated social policy calling for access to healthcare that hospitals and physicians must address [160, 161]. EMTALA violations are also reported to other regulatory entities listed in Table 6.11. Of note, the most common violation is an inappropriate Medical Screening Examination [161].

The CMS State Operations Manual interpretive guidelines Appendix V is devoted to Emergency Services and EMTALA and provides direction with the EMTALA demands [162]. CMS is responsible for all investigations of EMTALA violations and is partially responsible for enforcements through citations, often designated as "Notice of Termination from Medicare," which gives a hospital 23 days to come into compliance. A plan of correction will need to be submitted with credible evidence of compliance beyond the date of reinspection. On day 19, a notice of termination is published in local newspapers, unless a plan has been submitted, accepted, and re-survey shows compliance within the 23 days [163].

Possible EMTALA violations need to be reported by the receiving hospital within 72 hours, and healthcare organizations have significant sanctions for failure to report, to include termination from Medicare participation. Some states require any healthcare employee with knowledge of a violation to report timely. CMS expects organizations to self-report violations. However, organizational practices vary. Blatant violations may go uncited, while minor or even marginal incongruities may receive punitive enforcement. Often, this variability is related to the interpretation of the law. The Government Accounting Office has reported the variability to Congress, calling for improved consistency. Currently, the inconsistencies continue [162].

Any EMTALA or CMS investigation or validation survey is very demanding for most hospitals. Every detail of hospital operation is often under intense scrutiny. The evaluation of compliance is very black and white, and there is no gray. Either you are compliant, or you are not. Also note, there are no pre-termination appeal rights under EMTALA [158].

COP investigations often lead to "lengthy citations for every dirt mark or dust covering found on any location in the facility. Inspectors are reported to literally surveyed facilities using magnifying glasses and flashlights" [163]. Oncologic hospital administration or nurse leaders do not expect CMS or EMTALA surveys to be as concrete as they are known to be and may struggle significantly. Even minutes are reviewed in detail. There is no gray, only black and white, when determining compliance during a CMS survey. Again, either you are compliant, or you are not [163].

There are two types of citations that CMS can issue. The "condition-level" is considered more serious and indicates that a hospital is not in substantial compliance. A "standard-level" deficiency is cited when a hospital is out of compliance with one aspect of the regulations and it is considered less severe than the condition-level citation. Most surveys have a mix of both types once the final report is released. The hospital has only 10 days to submit a correction plan once they receive the Form CMS-2567 report. If the plan of correction is not accepted as written, the hospital is asked to submit a revised plan [158].

When surveyors determine that the hospital's noncompliance from regulatory standards constitutes an immediate threat to patients' health and safety, they will issue an "Immediate Jeopardy" (IJ) [164]. An IJ determination forces a hospital to immediately stop and correct the underlying problems and is considered the most serious type of violation. Once a hospital or healthcare organization receives an IJ citation, it is given a short time frame to fix the deficiency. If the organization fails to address the IJ as CMS demands, CMS will terminate the facility's Medicare and Medicaid funding. Losing accreditation has a significant impact and can be devastating since the government is the largest payer, and loss of accreditation will affect hospital insurance rates, among other things. It may erode a hospital's infrastructure quickly; physicians stop sending patients, the staff starts leaving, and an organization quickly spirals downward [164].

Over the last few years, there have been several oncologic hospitals that have been surveyed by CMS. The plans of correction are considered public knowledge and are available for review online. They are an excellent source of information to strengthen your organization. Hospitals grow significantly after a survey, becoming stronger and more focused.

Interdisciplinary Collaboration

An essential aspect of providing high-quality care to cancer patients in the ED is the interdisciplinary team's collaboration and cohesion. As displayed in the case studies in this chapter, the cancer patient requires many different needs when presenting to the ED and will encounter many different teams. The collective plan must be centralized around the

patient and family and closed-loop communication is vital to preventing errors and for the administration of appropriate treatment.

The cancer patient population's needs require multidisciplinary care to address all aspects and provide holistic and comprehensive care. Communication between teams is essential for preventing errors and identifying issues in the plan of care. High-reliability organizations promote a just culture environment, seeking to improve systems and prevent human error. This means facilitating an environment where every healthcare team member feels supported to identify patient safety issues and speak up when advocating for the patient and family [164].

Recommendations to promote interdisciplinary collaboration include discussions from all stakeholders with practice changes and an opportunity to provide input, professional practice recognition from interdisciplinary members, and establish clear policies and procedures that clearly and concisely delineate role responsibilities. Another great tool for enhancing teamwork is interdisciplinary high-fidelity simulation exercises [165]. This can reveal strengths and opportunities for improvement without patient safety being jeopardized.

This textbook is an excellent example of interdisciplinary collaboration in action. The information can help physicians work more effectively with their nursing partners by providing information relevant to their scope of practice and how it applies to oncologic emergencies while adhering to the regulatory requirements. As the field of oncologic emergencies continues to evolve, the integration of multidisciplinary teams must continue to develop cohesively to create a useful model for patient-centered care.

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