
Postgraduate Certificate in Cardio-Oncology (Belgium)

End-of-Life Care for Cardio-Oncology Patients

Cardio-Oncology – the interdisciplinary field that focuses on the prevention, detection, and management of cardiovascular complications arising from cancer therapies. In the context of end-of-life care, this term underscores the need to balance oncologic treatment goals with cardiac health, particularly when curative options are exhausted and the focus shifts to comfort and quality of life.

Cardiotoxicity – any adverse effect of cancer treatment on the heart, ranging from subclinical changes in myocardial biomarkers to overt heart failure. Understanding the spectrum of cardiotoxicity is essential for clinicians to anticipate, recognize, and address cardiac symptoms that may exacerbate suffering at the end of life.

Heart Failure – a clinical syndrome characterized by the heart's inability to pump blood effectively, leading to symptoms such as dyspnea, fatigue, and edema. In cardio-oncology patients, heart failure may be precipitated by anthracyclines, HER2-targeted agents, radiation, or immune checkpoint inhibitors. At the end-of-life stage, the priority is symptom relief rather than aggressive disease-modifying therapies.

Ejection Fraction (EF) – the percentage of blood ejected from the left ventricle with each contraction, commonly measured by echocardiography. An EF below 40 % often signals systolic dysfunction, whereas a preserved EF with signs of congestion may indicate diastolic heart failure. Knowledge of EF guides decisions about the intensity of cardiac medications in the palliative setting.

Biomarkers – laboratory measurements that reflect cardiac injury or stress, such as troponin, B-type natriuretic peptide (BNP), or N-terminal pro-BNP (NT-proBNP). In end-of-life care, serial biomarker trends can help differentiate reversible exacerbations from irreversible decline, informing discussions about the futility of further interventions.

NYHA Classification – a functional grading system ranging from I (no limitation) to IV (symptoms at rest) that describes the severity of heart failure. While primarily used in chronic management, it provides a quick reference for clinicians to gauge the patient's functional status and tailor palliative measures accordingly.

Advanced Care Planning (ACP) – a structured process through which patients, families, and healthcare providers discuss values, goals, and preferences for future medical care. In cardio-oncology, ACP must incorporate both oncologic prognosis and cardiac trajectory, ensuring that decisions respect the patient's wishes regarding life-sustaining therapies, hospitalizations, and hospice enrollment.

Do Not Resuscitate (DNR) – a medical order indicating that cardiopulmonary resuscitation (CPR) should not be performed in the event of cardiac or respiratory arrest. The DNR decision often co-exists with broader goals of care conversations, and its documentation must be clear, accessible, and consistent across care

settings.

Goals of Care – the overarching objectives that guide treatment choices, ranging from cure, life extension, to comfort-focused care. For cardio-oncology patients nearing the end of life, goals frequently shift toward alleviating distressing symptoms such as dyspnea, chest pain, and anxiety.

Symptom Management – the systematic approach to identifying, quantifying, and treating physical and psychological distress. Effective symptom management in this population requires an understanding of overlapping cardiac and oncologic manifestations, such as distinguishing chemotherapy-induced nausea from heart failure-related abdominal discomfort.

Dyspnea – the subjective sensation of breathlessness, a common and distressing symptom in patients with concurrent cardiac and pulmonary involvement. Management strategies include low-dose opioids, supplemental oxygen, positioning, and treatment of underlying fluid overload with diuretics, while being mindful of the risk of hypotension or renal dysfunction.

Pain Management – the use of pharmacologic and non-pharmacologic interventions to relieve nociceptive and neuropathic pain. In cardio-oncology, pain may arise from chest wall radiation fibrosis, tumor invasion, or myocardial ischemia. Opioid dosing must consider renal clearance and the potential for respiratory depression, especially when combined with benzodiazepines for anxiety.

Psychosocial Support – services that address emotional, social, and mental health needs of patients and families. The dual burden of cancer and heart disease often amplifies feelings of hopelessness, depression, and caregiver strain. Integration of counseling, support groups, and psychiatric care is essential for holistic end-of-life care.

Cultural Considerations – the influence of cultural beliefs, values, and practices on health-related decisions. Some cultures place emphasis on collective decision-making, while others prioritize autonomy. Sensitivity to these nuances helps clinicians navigate discussions about life-sustaining treatments, organ donation, and funeral rites.

Ethical Principles – foundational concepts such as beneficence, non-maleficence, autonomy, and justice that guide clinical decision-making. In the context of end-of-life cardio-oncology, ethical dilemmas may arise when a patient requests continued aggressive cardiac interventions despite a limited oncologic prognosis.

Informed Consent – the process by which patients receive information about the risks, benefits, and alternatives of a proposed intervention, and voluntarily agree to proceed. When capacity is impaired, surrogate decision-makers must be engaged, ensuring that the patient's previously expressed wishes are honored.

Capacity – the mental ability to understand relevant information, appreciate the situation and its consequences, reason about treatment options, and communicate a choice. Capacity assessments are

critical when patients experience delirium, medication-induced confusion, or severe fatigue.

Shared Decision-Making – a collaborative model where clinicians and patients (or their proxies) exchange information and jointly decide on a care plan. This approach respects patient values while providing professional guidance on the likely outcomes of various therapeutic paths.

Interdisciplinary Team – a group of healthcare professionals from diverse specialties who work together to deliver comprehensive care. In end-of-life cardio-oncology, the team typically includes cardiologists, oncologists, palliative care physicians, nurses, pharmacists, social workers, chaplains, and dietitians.

Cardiologist – the physician specializing in heart disease, responsible for evaluating cardiac function, prescribing heart-failure medications, and advising on the risks and benefits of cardiac procedures in the terminal phase.

Oncologist – the physician overseeing cancer therapy, who must balance the potential benefits of continued chemotherapy or targeted agents against the patient's overall burden and likelihood of meaningful survival.

Palliative Care Specialist – a clinician with expertise in symptom control, communication, and psychosocial support, who can lead ACP discussions, coordinate hospice services, and ensure that comfort remains the primary focus.

Nurse Practitioner – advanced practice nurses who often serve as the frontline contacts for symptom assessment, medication titration, and patient education, bridging gaps between hospital and home settings.

Social Worker – professionals who assist with practical concerns such as insurance navigation, transportation, housing, and accessing community resources, thereby reducing non-medical barriers to comfort.

Spiritual Care Provider – individuals who address existential questions, provide ritual support, and facilitate connections with faith traditions, enhancing meaning for patients facing mortality.

Advance Directive – a legal document in which a person records preferences for medical treatment should they become unable to communicate. It may include a living will, DNR order, or designation of a health care proxy.

Living Will – a component of the advance directive that specifies desired medical interventions, such as mechanical ventilation, artificial nutrition, or dialysis, in scenarios of severe illness.

Health Care Proxy – an appointed individual authorized to make health-care decisions on behalf of the patient when capacity is lost. The proxy is expected to follow the patient's known wishes and values.

Resuscitation – emergency measures aimed at restoring circulation and breathing, including chest compressions, defibrillation, and advanced airway management. In the terminal setting, the decision to

forgo resuscitation often aligns with a focus on comfort.

Intensive Care Unit (ICU) – a specialized hospital unit equipped for continuous monitoring and life-supporting technologies. Admission to the ICU for a cardio-oncology patient at end-of-life should be carefully weighed against the likelihood of meaningful recovery.

Hospitalization – inpatient admission for acute management of symptoms or complications. While sometimes necessary for urgent symptom control, frequent hospital stays can increase patient distress and diminish time spent at home.

Home Hospice – a service model delivering palliative care in the patient's residence, emphasizing symptom control, psychosocial support, and family education. Home hospice is often preferred for its familiarity and reduced institutional burden.

Caregiver Burden – the physical, emotional, and financial strain experienced by family members or friends who assist with daily care. Recognizing caregiver burden allows clinicians to provide respite services, counseling, and practical assistance.

Communication Skills – the ability to convey information clearly, listen actively, and respond empathetically. Mastery of communication is vital when delivering bad news, discussing prognosis, or negotiating treatment limits.

Breaking Bad News – the structured delivery of unfavorable information, typically following protocols such as SPIKES (Setting, Perception, Invitation, Knowledge, Emotions, Summary). In cardio-oncology, the news may involve both cardiac decline and limited oncologic options.

Cultural Competence – the capacity to interact effectively with individuals from diverse backgrounds, respecting cultural differences in health beliefs, decision-making, and end-of-life rituals.

Legal Aspects – regulations governing consent, capacity, end-of-life orders, and reporting obligations. Clinicians must stay informed about national and regional statutes to avoid legal pitfalls while honoring patient autonomy.

Insurance – coverage policies that determine eligibility for certain treatments, hospice benefits, and home health services. Navigating insurance constraints can be challenging when recommended palliative interventions are not reimbursed.

Reimbursement – the financial compensation provided by insurers for services rendered. Understanding reimbursement structures helps teams advocate for necessary resources, such as multidisciplinary visits or medication adjustments.

Clinical Pathways – evidence-based, standardized protocols that outline step-by-step management of common clinical scenarios. For end-of-life cardio-oncology, pathways may integrate cardiac monitoring,

symptom-focused medication titration, and timely hospice referral.

Medication Reconciliation – the systematic process of reviewing all prescribed, over-the-counter, and supplement medications to prevent duplication, interactions, and adverse effects. At the end of life, simplifying regimens can reduce pill burden and improve adherence.

Diuretics – agents such as furosemide or torsemide that promote fluid excretion, alleviating congestion and dyspnea in heart failure. Dose adjustments may be required when renal function declines, a frequent occurrence in advanced cancer.

Beta-Blockers – drugs that reduce heart rate and myocardial oxygen demand, beneficial in chronic heart failure. In palliative care, the goal is to maintain hemodynamic stability while minimizing side effects like fatigue or bradycardia.

ACE Inhibitors/ARBs – medications that lower blood pressure and attenuate ventricular remodeling. Their continued use near the end of life depends on the balance between symptomatic benefit and potential risks such as hyperkalemia.

Opioids – analgesics ranging from low-dose morphine to high-potency agents like fentanyl, essential for controlling cancer-related pain and refractory dyspnea. Careful titration, monitoring for constipation, and use of rescue doses are key components of safe prescribing.

Non-Pharmacologic Interventions – strategies such as positioning, breathing exercises, fan therapy, and relaxation techniques that complement medications in relieving dyspnea and anxiety.

Fluid Management – the careful assessment of fluid intake and output, especially in patients with both renal impairment and heart failure. Over-hydration worsens pulmonary edema, while under-hydration may precipitate renal dysfunction and hypotension.

Electrolyte Monitoring – regular checks of sodium, potassium, magnesium, and calcium, given the propensity for diuretics and certain chemotherapeutic agents to cause imbalances that can trigger arrhythmias.

Arrhythmia – an abnormal heart rhythm that may manifest as palpitations, syncope, or sudden cardiac death. In the terminal phase, the presence of a ventricular arrhythmia may be addressed with anti-arrhythmic drugs, device deactivation, or acceptance of the rhythm as part of the dying process.

Implantable Cardioverter-Defibrillator (ICD) – a device that detects and terminates life-threatening ventricular tachyarrhythmias. Decisions about ICD deactivation are ethically complex; patients may choose to forego shock therapy while retaining pacing for bradycardia.

Device Deactivation – the process of turning off an ICD or pacemaker, often requested by patients who no longer wish to receive life-prolonging shocks. This procedure must be approached with clear

communication, documentation, and respect for the patient's autonomy.

Electro-cardiogram (ECG) – a non-invasive test that records the heart's electrical activity, useful for detecting ischemia, conduction blocks, or rhythm disturbances. In palliative settings, ECGs are ordered when results will directly influence symptom-focused management.

Echocardiography – an ultrasound examination of cardiac structures and function. Serial echocardiograms can track progression of cardiotoxicity, guiding decisions about dose reduction of cardiotoxic agents or initiation of heart-failure therapy.

Cardiac MRI – an advanced imaging modality offering detailed tissue characterization, valuable for diagnosing myocarditis or fibrosis. Its role at end of life is limited to cases where imaging outcomes will alter the care plan.

Radiation-Induced Heart Disease – cardiac injury resulting from thoracic irradiation, encompassing pericarditis, coronary artery disease, valvular dysfunction, and restrictive cardiomyopathy. Recognizing this entity enables clinicians to anticipate late-stage complications that may affect quality of life.

Immune Checkpoint Inhibitor (ICI) Cardiotoxicity – a rare but severe adverse effect of immunotherapy, presenting as myocarditis, arrhythmias, or heart failure. Prompt identification and high-dose steroids are indicated, but in the terminal phase, treatment may be limited to symptom control.

Prognostication – the estimation of disease trajectory based on clinical indicators, imaging, biomarkers, and functional status. Accurate prognostication informs timing of hospice referral and helps patients and families prepare for the anticipated course.

Prognostic Scores – tools such as the Seattle Heart Failure Model or the Palliative Prognostic Index that quantify survival risk. While not definitive, these scores assist clinicians in framing realistic expectations.

Transition of Care – the handover of responsibility from one care setting to another, such as from oncology clinic to hospice. Effective transition requires comprehensive documentation, medication reconciliation, and clear communication of goals.

Medication Adherence – the degree to which patients follow prescribed regimens. In palliative care, simplifying dosing schedules and using liquid formulations can improve adherence when patients experience dysphagia or cognitive decline.

Constipation Management – a common side effect of opioids and reduced mobility, addressed with stool softeners, laxatives, dietary fiber, and hydration. Preventing constipation reduces discomfort and potential complications like bowel obstruction.

Anxiety – a frequent emotional response to disease burden and impending death. Management includes counseling, relaxation techniques, and low-dose benzodiazepines, balancing anxiolytic benefits against

sedation risk.

Depression – a mood disorder that may exacerbate pain perception and diminish motivation for self-care. Antidepressants, psychotherapy, and support groups are integral components of comprehensive palliative care.

Spiritual Distress – the feeling of loss of meaning, purpose, or connection to a higher power. Chaplaincy services, rituals, and personal reflection can alleviate spiritual suffering, contributing to overall well-being.

Family Meetings – scheduled gatherings where the interdisciplinary team discusses the patient's condition, updates the family, and revisits goals of care. Structured meetings foster transparency, reduce misunderstandings, and align expectations.

Documentation – the accurate recording of clinical findings, discussions, and decisions in the medical record. Precise documentation of ACP conversations, DNR orders, and medication changes safeguards continuity and legal compliance.

Electronic Health Record (EHR) Alerts – automated notifications that remind clinicians of pending ACP discussions, upcoming medication reviews, or hospice eligibility criteria. Leveraging EHR alerts can improve adherence to palliative care protocols.

Quality Metrics – performance indicators such as timely hospice referral, pain control scores, or patient-reported outcome measures that assess the effectiveness of end-of-life care. Monitoring these metrics drives continuous improvement.

Research Ethics – the consideration of patient participation in clinical trials during the terminal phase. While some studies may offer symptom benefit, enrollment must be voluntary, with thorough informed consent and minimal burden.

Clinical Trials – research protocols evaluating new therapies. In cardio-oncology, trial participation may involve novel cardioprotective agents, but patients near death should be cautioned about the experimental nature and limited therapeutic intent.

Patient-Reported Outcome Measures (PROMs) – questionnaires that capture the patient's perspective on symptoms, functional status, and quality of life. Routine use of PROMs enables early identification of distress and timely intervention.

Telemedicine – remote delivery of healthcare services via video or telephone. Telehealth can facilitate follow-up visits, medication adjustments, and psychosocial support without the need for travel, especially valuable for home-bound patients.

Home Health Services – professional nursing visits, physical therapy, and wound care provided in the patient's residence. Coordination with home health agencies ensures that necessary equipment and

expertise are available.

Medical Equipment – devices such as portable oxygen concentrators, suction machines, or infusion pumps that support symptom control. Decisions about equipment provision should consider patient comfort, caregiver ability, and cost.

Medication Disposal – the safe removal of unused or expired drugs, preventing accidental ingestion or environmental contamination. Guidance on proper disposal is part of discharge planning.

Legal Capacity Assessment – a formal evaluation performed when there is doubt about a patient's decision-making ability. Psychologists or psychiatrists may be consulted to determine competence and recommend guardianship if needed.

Surrogate Decision-Maker – an individual appointed to act on the patient's behalf, guided by the patient's known preferences or best-interest standards. Surrogates often experience emotional distress and benefit from clear communication and support.

Ethical Consultation – a service that provides multidisciplinary analysis of complex moral dilemmas, such as continuing life-supporting devices in a patient with terminal cancer. Engaging ethics committees can help resolve conflicts and document rationale.

Medication Side-Effects – adverse reactions that may mimic disease progression, such as beta-blocker-induced fatigue or ACE-inhibitor cough. Differentiating side-effects from symptom burden is essential to avoid unnecessary escalation of therapy.

Renal Function Monitoring – regular assessment of creatinine and glomerular filtration rate, especially when using nephrotoxic agents or high-dose diuretics. Renal impairment influences dosing of many cardiac and oncologic drugs.

Electrolyte Replacement – supplementation of potassium, magnesium, or calcium when deficiencies arise from diuretic therapy or chemotherapy. Prompt correction can prevent arrhythmias and improve muscle function.

Nutrition Assessment – evaluation of caloric intake, weight trends, and swallowing ability. Malnutrition is common in advanced cancer and heart failure; dietitian referral can help tailor oral supplements or consider enteral feeding, respecting patient wishes.

Cachexia Management – targeted interventions for severe weight loss, including high-protein nutritional drinks, appetite stimulants, and anti-inflammatory agents. While cachexia is often irreversible, supportive measures can improve comfort.

Sleep Disturbances – insomnia or restless leg syndrome, frequently exacerbated by steroids, pain, or anxiety. Sleep hygiene education, low-dose hypnotics, and environmental modifications can enhance rest.

Fatigue – a pervasive sense of exhaustion not relieved by rest, influenced by anemia, medication side-effects, and metabolic derangements. Management includes activity pacing, energy conservation techniques, and addressing contributing factors like anemia.

Anemia Management – treatment of low hemoglobin through iron supplementation, erythropoiesis-stimulating agents, or transfusion, balancing the benefits of improved oxygen delivery against the risk of fluid overload in heart failure.

Transfusion Decisions – weighing the symptomatic relief of blood product administration against the potential for volume overload, especially in patients with compromised cardiac function. Shared decision-making ensures that transfusions align with patient goals.

Fluid Overload – the accumulation of excess fluid causing pulmonary congestion, peripheral edema, and ascites. Clinical assessment combined with chest radiography guides diuretic therapy and may prompt hospice referral if refractory.

Escalation of Care – the process of intensifying interventions, such as initiating mechanical ventilation or vasopressor support. In the end-of-life context, escalation is considered only when it aligns with the patient's defined goals.

De-escalation of Care – the intentional reduction or cessation of invasive treatments to focus on comfort. De-escalation may involve withdrawing ventilatory support, stopping chemotherapy, or simplifying medication regimens.

Time-Limited Trials – brief periods during which a specific therapy is administered to assess its effectiveness, after which a reassessment determines continuation or discontinuation. This approach respects patient hope while maintaining realistic expectations.

Prognostic Uncertainty – the inherent difficulty in predicting exact survival time, especially when multiple organ systems are involved. Clinicians should convey uncertainty honestly, using ranges rather than precise dates.

Hope – a vital psychological construct that can coexist with realistic acceptance of limited prognosis. Maintaining hope for quality experiences, such as meaningful conversations or symptom relief, supports emotional well-being.

Grief – the emotional response to loss, experienced by patients, families, and even healthcare providers. Normalizing grief, offering counseling, and providing bereavement resources are essential components of comprehensive care.

Bereavement Support – services offered after death, including follow-up calls, memorial services, and grief counseling. Supporting families after loss reflects the continuity of compassionate care.

Documentation of Death – accurate recording of time, location, and circumstances of death, including whether life-sustaining measures were in place. This information is important for medical records, legal purposes, and quality audits.

Post-mortem Review – a reflective analysis of the care provided, identifying strengths and areas for improvement. Conducting a post-mortem review fosters learning and enhances future end-of-life practices.

Education and Training – ongoing professional development in palliative principles, communication techniques, and cardio-oncology updates. Regular workshops, simulation exercises, and case discussions improve competence and confidence.

Simulation Scenarios – realistic role-play exercises that allow clinicians to practice delivering difficult news, discussing DNR orders, and managing acute symptom crises in a safe environment.

Continuing Medical Education (CME) – accredited courses that keep providers current on emerging therapies, guideline revisions, and ethical standards relevant to end-of-life cardio-oncology care.

Guideline Adherence – following evidence-based recommendations from societies such as the American Society of Clinical Oncology, European Society of Cardiology, and International Society of Geriatric Oncology. Alignment with guidelines ensures best practice.

Multidisciplinary Rounds – regular meetings where the entire care team reviews each patient's status, updates goals, and coordinates interventions. Rounds promote shared understanding and reduce fragmented care.

Patient Education Materials – brochures, videos, or web resources that explain disease processes, medication side-effects, and hospice options in plain language. Providing written material reinforces verbal discussions.

Health Literacy – the ability of patients and families to comprehend health information and make informed decisions. Assessing health literacy allows clinicians to tailor communication and avoid misunderstandings.

Language Barriers – obstacles arising when patients speak a different language than the care team. Professional interpreters, translated documents, and culturally appropriate counseling are essential to ensure equitable care.

Ethnicity-Specific Risks – certain cardiac toxicities may be more prevalent in specific ethnic groups, such as increased susceptibility to anthracycline-induced cardiomyopathy in African-American patients. Awareness of these disparities informs monitoring and counseling.

Medication Interactions – potential harmful effects when cardiac drugs combine with chemotherapy agents, for example, the potentiation of QT-prolongation between certain tyrosine-kinase inhibitors and anti-arrhythmics. Vigilant review prevents iatrogenic complications.

Pharmacogenomics – the study of genetic variations influencing drug metabolism, which can affect both cancer and cardiac medication efficacy. Though not yet routine, emerging evidence may guide personalized dosing in the future.

Advance Care Planning Documentation Templates – standardized forms that capture patient preferences, designated proxies, and specific treatment limits. Using templates ensures completeness and facilitates retrieval across care settings.

Legal Documentation Storage – secure, accessible repositories for advance directives, DNR orders, and power-of-attorney documents, often integrated within the EHR. Proper storage prevents loss of critical information during transitions.

Quality Improvement (QI) Projects – systematic efforts to enhance care processes, such as reducing time to hospice referral or improving pain assessment compliance. QI initiatives rely on data collection, analysis, and iterative change.

Data Collection Tools – instruments like audit forms, symptom checklists, and satisfaction surveys that capture performance metrics. Accurate data enable benchmarking and identification of gaps.

Peer Review – evaluation of clinical decisions by colleagues, fostering accountability and shared learning. Peer review of end-of-life decisions can highlight bias, reinforce ethical standards, and support best practice.

Ethical Dilemmas – complex situations where values conflict, such as whether to continue a cardiotoxic chemotherapy regimen that offers modest tumor control but aggravates heart failure. Structured ethical analysis assists in reaching balanced resolutions.

Resource Allocation – considerations of how limited healthcare resources, like ICU beds or expensive novel therapies, are distributed. Transparent policies and equitable decision-making help prevent disparities.

Patient Autonomy – the right of individuals to make choices about their own health care, even when those choices differ from medical recommendations. Respecting autonomy is foundational to ethical practice.

Beneficence – the obligation to act in the patient's best interest, providing treatments that offer benefit and avoiding those that cause unnecessary harm. In the terminal phase, beneficence often translates to comfort-focused interventions.

Non-Maleficence – the principle of "do no harm," guiding clinicians to avoid interventions that may prolong suffering without meaningful gain. This principle underlies decisions to withhold or withdraw life-supporting measures.

Justice – fairness in the distribution of healthcare resources and access to care. Ensuring that cardio-oncology patients receive equitable palliative services aligns with the principle of justice.

Professionalism – the conduct, demeanor, and commitment to ethical standards expected of healthcare providers. Demonstrating professionalism includes maintaining competence, compassion, and integrity throughout end-of-life care.

Self-Care for Clinicians – recognizing and addressing the emotional impact of caring for dying patients, through debriefings, counseling, and work-life balance strategies. Provider resilience contributes to sustained quality care.

Case Example: Mrs. A – a 68-year-old woman with metastatic breast cancer treated with trastuzumab, who develops a reduced left-ventricular ejection fraction of 35 % after six cycles. She presents with dyspnea at rest, peripheral edema, and a persistent cough. A multidisciplinary meeting reviews her cardiac function, oncologic status, and personal values. She expresses a desire to avoid hospitalization and prioritize time at home with her family. The team initiates low-dose furosemide, titrates a beta-blocker, and prescribes morphine for dyspnea. An advance directive is completed, naming her daughter as health care proxy, and a DNR order is placed. Home hospice services are arranged, providing nursing visits, medication delivery, and psychosocial support. Over the following weeks, her symptoms are stabilized, and she spends her remaining days in the comfort of her home, surrounded by loved ones. This case illustrates the integration of cardiac management, symptom control, and patient-centered planning.

Case Example: Mr. B – a 55-year-old man with acute myeloid leukemia undergoing induction chemotherapy, who develops a new-onset atrial fibrillation with rapid ventricular response. He also reports severe chest pain and shortness of breath. Echocardiography reveals a mildly reduced ejection fraction but no wall-motion abnormalities. The oncology team informs him that cure is unlikely, and the patient wishes to focus on quality of life. The cardiology team decides to manage the atrial fibrillation with rate control using a low-dose calcium-channel blocker, avoiding anticoagulation due to bleeding risk from thrombocytopenia. A palliative care consult addresses his pain with a short-acting opioid and non-pharmacologic techniques. An advance care plan is documented, and hospice enrollment is initiated. This scenario highlights the need to balance cardiac rhythm management with bleeding risk, and to align treatment choices with the patient's comfort-focused goals.

Practical Application: Medication Simplification – For a patient on multiple cardiac agents (ACE inhibitor, beta-blocker, diuretic) and a chemotherapy regimen, the team reviews each drug's necessity in the context of limited life expectancy. The ACE inhibitor is continued for blood pressure control, the beta-blocker dose is reduced to minimize fatigue, and the diuretic is adjusted based on daily weight monitoring. The chemotherapy is discontinued, and the patient is switched to a low-dose oral corticosteroid for symptom relief. This simplification reduces pill burden, improves adherence, and aligns with the patient's desire for a less invasive regimen.

Challenge: Managing Conflicting Recommendations – An oncologist recommends continuation of a life-prolonging targeted therapy that carries a risk of worsening cardiac function, while the cardiologist advises cessation due to deteriorating ejection fraction. The patient's family is divided, with some members

favoring aggressive treatment and others prioritizing comfort. The interdisciplinary team convenes an ethics consultation, clarifies the patient's previously expressed wishes, and presents a balanced view of benefits versus burdens. A consensus is reached to pause the cardiac-toxic therapy, monitor symptoms, and focus on palliative measures, honoring the patient's autonomy and minimizing harm.

Challenge: Cultural Differences in DNR Decisions – A patient from a cultural background that emphasizes collective family decision-making expresses reluctance to sign a DNR order, fearing it may be perceived as giving up. The team arranges a family meeting with a cultural liaison and a spiritual care provider, facilitating an open dialogue about the patient's values and the meaning of DNR in the cultural context. Through respectful communication, the family understands that a DNR can coexist with continued comfort-focused care, and they consent to the order while maintaining hope for a dignified death.

Challenge: Access to Home Hospice Services – In a rural region, a patient's home lacks reliable electricity and broadband, limiting the ability to provide telemedicine visits and operate certain medical devices. The care team collaborates with community health workers to arrange in-person nurse visits, secures a portable generator for essential equipment, and coordinates with a regional hospice agency to deliver medications. This adaptive approach ensures continuity of palliative care despite infrastructural constraints.

Challenge: Managing Opioid Side-Effects in Cardiac Patients – A patient receiving morphine for severe chest pain develops constipation and mild hypotension, complicating heart failure management. The team introduces a scheduled laxative regimen, adjusts the opioid dose, and adds a low-dose hydromorphone for breakthrough pain. Blood pressure is monitored closely, and the beta-blocker dose is temporarily reduced to mitigate hypotension. This careful titration balances effective pain control with hemodynamic stability.

Challenge: Ethical Decision-Making for Device Deactivation – An elderly patient with an implanted cardioverter-defibrillator (ICD) and advanced metastatic lung cancer requests deactivation of shock therapy to avoid painful jolts during his final days. The cardiology team explains the process, obtains informed consent, and documents the decision. The patient's surrogate is present to affirm the choice. The ICD is successfully deactivated, preserving pacing function to maintain heart rhythm. This case underscores the importance of clear communication, respecting patient autonomy, and following institutional protocols for device management.

Challenge: Prognostic Uncertainty in Dual Organ Failure – A patient with both severe heart failure (NYHA class IV) and progressive pancreatic cancer presents with recurrent hospitalizations for volume overload and cachexia. Predicting survival is difficult because either organ system could precipitate rapid decline. The team uses a time-limited trial of aggressive diuretic therapy for two weeks, coupled with hospice enrollment for symptom management. They schedule a follow-up to reassess the patient's status, thereby providing a structured framework that accommodates uncertainty while maintaining focus on comfort.

Challenge: Balancing Research Participation with Palliative Goals – A patient expresses interest in enrolling in a clinical trial investigating a novel cardioprotective agent, despite an advanced cancer stage. The research

team reviews eligibility criteria, potential benefits, and the added burden of frequent study visits. After thorough discussion, the patient decides to decline trial participation, prioritizing time at home with family. This decision exemplifies patient-centered care, where research opportunities are offered but not imposed upon those nearing end of life.

Practical Application: Use of PROMs in Routine Visits – At each outpatient encounter, the clinic administers a brief questionnaire assessing pain intensity, dyspnea, fatigue, and emotional distress. Scores are reviewed by the nurse practitioner, who flags any worsening symptoms for immediate intervention. This systematic approach enables early identification of deteriorating conditions, prompting timely medication adjustments and hospice referral when appropriate.

Practical Application: Telehealth for Symptom Monitoring – A patient residing in a remote area uses a tablet to conduct weekly video visits with the palliative care team. During the session, the clinician reviews weight trends, medication adherence, and symptom severity, adjusting diuretic doses as needed. The patient reports improved comfort and reduced travel stress, illustrating the value of telemedicine in extending specialist support to underserved locations.

Practical Application: Interdisciplinary Rounds for Care Coordination – Every Monday morning, cardiology, oncology, nursing, pharmacy, and social