

Hospital Medicine

Evidence-Based Information for Hospitalists
Intensivists, and Acute Care Physicians [ALERT]

ABSTRACT & COMMENTARY

Advance Care Planning Must Advance Forward

By Seema Gupta, MD, MSPH

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Dr. Gupta reports no financial relationships relevant to this field of study.

SYNOPSIS: In a systematic review of 795,909 people in 150 studies, researchers found many Americans have not completed an advance directive.

SOURCE: Yadav KN, Gabler NB, Cooney E, et al. Approximately one in three US adults completes any type of advance directive for end-of-life care. *Health Aff (Millwood)* 2017;36:1244-1251.

Advance care planning (ACP) is a continual process of preparing for future medical care in case patients are unable to make their own decisions. It includes engaging patients and families to reflect on patients' personal goals, values, and belief systems, which ultimately translate into informing medical care. This process helps prepare the patient for current and future decisions regarding medical treatment. Data show that Americans have fallen behind on this process. For example, a survey revealed that although many people say they would prefer to die at home, only about one in

three American adults have created an advance directive expressing their wishes for end-of-life care.¹ Only 28% of home healthcare patients, 65% of nursing home residents, and 88% of hospice care patients have created an advance directive.² Data show that among severely or terminally ill patients, < 50% have an advance directive. As many as three-quarters of physicians whose patients had an advance directive were not even aware that it existed.³ In fact, studies have shown that in ICU patients, as few as 17% of patients possessed advance directives.⁴ As components of ACP, advance directives such

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as durable power of attorney for health-care and living will ensure patients receive the care that is consistent with their wishes while significantly improving multiple outcomes in patients with serious medical conditions. Additionally, ACP improves communication for shared decision-making while reducing the level of anxiety in family members during times of high stress.

Yadav et al conducted a systematic review of the data on the prevalence of advance directives among U.S. adults collected between 2011 and 2016 to determine how many Americans had advance directives, both overall and specifically among people most likely to benefit from them, and how advance directive completion rates have changed over time. Researchers included 795,909 Americans who were part of 150 different studies. Approximately 63.6% were female, 65.1% were white, 80.6% were ≥ 65 years of age, and 62.7% were in a nursing home. The meta-analyses revealed completion proportions of 29.3% (95% confidence interval [CI], 25.0-34.0%) for living wills, 33.4% (95% CI, 29.5-37.6%) for healthcare powers of attorney, and 32.2% (95% CI, 27.2-37.7%) for undefined advance directives. Patients ≥ 65 years of age exhibited a significantly greater completion percentage of any advance directive (45.6%; 95% CI, 40.6-50.8%) compared to younger adults (31.6%; 95% CI, 28.4-35.0%; $P < 0.001$). There was a significant difference in any advance directive completion by patient type ($P < 0.001$), with the highest rates among patients in hospice or palliative care (59.6%; 95% CI, 41.8-75.1%) and nursing home patients (50.1%; 95% CI, 42.1-58.2%).

■ COMMENTARY

Using advance directives to plan for the end of life is viewed as a public health issue. Not only does this prevent unnecessary suffering and anxiety among families, but it can reduce unwanted and expensive treatment. However, as the research by Yadav et al demonstrated, the prevalence of advance directives remains low and stagnant. Recognizing a challenge in the field, effective Jan. 1, 2016, Medicare made

the decision to reimburse physicians for ACP counseling.¹ As Americans continue to live longer, many more are surviving with one or more chronic diseases and experience substantial disability before dying. For instance, 70% of Americans die of a chronic disease, and about 62% of all deaths each year are caused by five chronic diseases: cancer, COPD, diabetes, heart disease, and stroke. However, to ensure that more patients are able to create updated advance directives, it is critical to reduce the barriers to ACP. This includes increasing awareness among patients and their family members, and addressing denial about death and dying where it may exist. A discussion about palliative care, which may involve end-of-life care much earlier in a person's disease process, could help avoid the confusion while maintaining quality of life at the end of life. Finally, as physicians, we must recognize the cultural differences within our patients that result in certain patients' lower usage of hospice services and ACP, with the resultant increased likelihood of dying in hospital as well as use of intensive care and life-sustaining treatments.⁵ ■

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Palliative Care-based Intervention Improves Quality of Life in Chronic Heart Failure

By Van Selby, MD

Assistant Professor of Medicine, University of California, San Francisco Cardiology Division, Advanced Heart Failure Section

Dr. Selby reports no financial relationships relevant to this field of study.

SYNOPSIS: Among patients with advanced heart failure, implementation of an interdisciplinary palliative care intervention was associated with improved quality of life.

SOURCE: Rogers JG, Patel CB, Mentz RJ, et al. Palliative care in heart failure: The PAL-HF randomized, controlled clinical trial. *J Am Coll Cardiol* 2017;70:331-341.

Advanced heart failure (HF) is associated with substantial morbidity, mortality, and reduced quality of life (QOL). Standard therapies focus on slowing disease progression and improving survival, but do not address patient suffering. Palliative care has been shown to improve QOL among patients with cancer and may be helpful in those with advanced HF.

The Palliative Care in Heart Failure (PAL-HF) trial randomized patients with advanced HF and a high predicted six-month mortality to usual care (UC) alone or UC with an additional palliative care intervention (UC+PAL). The palliative care intervention was led by a nurse practitioner who assessed and managed multiple domains of QOL, including physical symptoms, psychosocial and spiritual concerns, and advance care planning. The nurse practitioner worked with a palliative medicine physician in close collaboration with the advanced HF clinic. Nearly all patients were enrolled during an HF hospitalization and subsequently followed in the outpatient setting for six months. The two co-primary endpoints were validated measures of HF-specific QOL and general and palliative care-specific, health-related QOL.

A total of 150 patients were randomized, with an average age of 71 years. Most patients exhibited New York Heart Association Functional Class III symptoms. Over six months of follow-up, patients randomized to UC+PAL saw significantly greater improvement in measurements of HF-specific QOL ($P = 0.03$) as well as palliative care-specific QOL ($P = 0.035$). Compared to those randomized to UC alone, patients receiving the palliative care intervention also demonstrated significantly greater improvement in depressive symptoms ($P = 0.02$), anxiety ($P = 0.048$), and spiritual well-being ($P = 0.03$). There were no significant differences in rehospitalization rate or mortality. The authors concluded that an interdisciplinary palliative care intervention improves health-related QOL in advanced HF patients and represents an important component of the holistic care of these patients.

■ COMMENTARY

Incorporating palliative care into the management of chronic HF receives a class I recommendation in current HF practice guidelines. However, the evidence supporting the use of palliative care in HF is sparse. PAL-HF is the first randomized, controlled trial of a palliative care intervention in advanced HF and shows clear improvements in a wide range of patient-reported outcomes, including QOL, depression, anxiety, and spiritual well-being.

PAL-HF is an important study for many reasons, particularly the focus on endpoints not usually studied in HF clinical trials. Although reducing hospitalizations and mortality are important goals, measures of suffering and QOL may be more important to some patients and are inadequately assessed with the current treatment approach.

The primary limitation of this study is its single-center design. All patients were followed at Duke University Medical Center, a large academic hospital with access to resources not always available in the community. With 5.7 million Americans living with HF, one major limitation of any plan to expand access to palliative care programs is availability of palliative care specialists. Comprehensive, longitudinal follow-up similar to what was implemented in PAL-HF just may not be feasible in many areas of the country. That said, one major strength of this study is the use of a nurse practitioner as the team leader. When faced with the current nationwide shortage of palliative care physicians, shifting care to other members of the healthcare team may help scalability of palliative care-focused interventions. For many HF patients, the important job of implementing palliative care ultimately will fall on cardiologists and other providers already caring for them. Therefore, palliative care will have to fit into already-full clinic visits. With that in mind, another limitation of PAL-HF is that we don't know exactly which components of the palliative care intervention are most effective in HF

patients. The multicomponent program implemented in PAL-HF is likely too complex for the average cardiologist. Hopefully, future studies will help clarify exactly which components are most beneficial to patients with advanced HF.

For now, providers caring for patients with advanced HF should try to incorporate principles of palliative

care into their practice to the extent possible. This will require basic training in palliative care for cardiologists and other providers who care for patients with HF. Those who do not feel comfortable implementing palliative care and do not have access to palliative care specialists should consider referral to a HF specialty center for patients with advanced disease who are not responding to guideline-based therapies. ■

Percutaneous Coronary Interventions in Nonagenarians

By Michael Crawford, MD, Editor

Dr. Crawford reports no financial relationships relevant to this field of study.

SYNOPSIS: Nonagenarians can undergo percutaneous coronary interventions with low in-lab complication rates, but 30-day and one-year mortality is considerably higher than in younger patients.

SOURCES: Sawant AC, Josey K, Plomondon ME, et al. Temporal trends, complications, and predictors of outcomes among nonagenarians undergoing percutaneous coronary intervention: Insights from the Veterans Affairs Clinical Assessment, Reporting, and Tracking program. *JACC Cardiovasc Interv* 2017;10:1295-1303.

Holmes DR Jr. Four score and 10 years. *JACC Cardiovasc Interv* 2017;10:1304-1306.

As longevity increases, more patients ≥ 90 years of age are presenting for percutaneous coronary interventions (PCI), especially since coronary bypass surgery is less attractive in these patients. However, there are little data in clinical trials concerning this age group. Investigators used the national database of the Veterans Affairs (VA) Clinical Assessment, Reporting and Tracking (CART) program to determine the prevalence of nonagenarians undergoing PCI between 2005-2014, and their clinical characteristics and PCI complications, compared to younger patients. CART identified 67,148 veterans who underwent PCI during these 10 years. The National Cardiovascular Data Registry (NCDR) Cath PCI score was evaluated for risk-stratifying nonagenarians. Also, the authors used a multivariable frailty model to adjust the one-year mortality data. Any patients who died < 30 days after PCI were excluded from the one-year data. Of the 67,148 patients, 804 were nonagenarians (1.2%) and of these, 274 (34%) had PCI. Most of the patients were male (98%) and Caucasian (81%). Compared to younger veterans, the nonagenarians had a lower body mass index and were less likely to be smokers, diabetics, or have family history of coronary artery disease. They were more likely to suffer from hypertension, systolic heart failure, cardiovascular disease, and chronic kidney disease. They also were more likely to experience acute coronary syndrome, cardiogenic shock, or renal failure on presentation. After PCI, nonagenarians were more likely to develop acute cardiogenic shock (0.73% vs. 0.12%; $P = 0.04$) and no reflow (2.9% vs. 1%; $P = 0.02$). The 30-day post-PCI mortality was higher than in

younger patients (10.6% vs. 1.4%; $P < 0.0001$) as was adjusted one-year mortality (16.2 vs. 4%; $P < 0.0001$). Also, the adjusted 30-day mortality hazard ratio (HR) was 2.14 (95% confidence interval [CI], 1.42-3.22) and one-year mortality HR was 1.82 (95% CI, 1.27-2.62). The NCDR Cath PCI risk score was highly predictive of both 30-day (HR, 2.29; 95% CI, 1.86-2.82) and one-year mortality (HR, 1.43; CI, 1.07-1.9). The authors concluded that nonagenarians are a small but growing proportion of PCI patients who experience worse outcomes, and the NCDR Cath PCI risk score is an excellent predictor of mortality in these patients.

■ COMMENTARY

As a general cardiologist, I have noticed an increasing number of nonagenarians presenting with acute coronary syndromes, usually non-ST elevation myocardial infarction, who potentially could benefit from PCI. Because of comorbidities, they often are not good candidates for bypass surgery. Family members, who often are enthusiastic about PCI, push their loved ones toward more aggressive management short of surgery. However, once coronary angiography reveals severe calcific three-vessel disease, our enthusiasm wanes, but we usually push on with the PCI. Unfortunately, the outcomes after PCI are not always good in this group, and we wonder if we did the right thing. When we go to the guidelines or the randomized trial data, we don't find much to help us. Consequently, this study was of great interest to me.

This study confirmed my experience and observational

reports that the number of nonagenarians presenting with coronary artery disease is increasing. The number of such patients doubled in this study between 2010 and 2014, and it confirmed that PCI can be performed with a low in-lab complication rate. They reported no myocardial infarctions, strokes, tamponade, or perforations in the lab. Also, they confirmed a higher mortality rate post-PCI but less than some studies have reported. This suggests that 21st century VA cardiac care is quite good. What is new about this report is the demonstration of the predictive ability of the NCDR Cath PCI risk equation, which uses the following variables: age, cardiogenic shock, heart failure, vascular disease, chronic lung disease, glomerular filtration rate, New York Heart Association class, and PCI characteristics to estimate mortality. In this study, the survival at 30 days and one year was particularly poor

in the highest risk quartile of patients (score of 40-95 points). Also, none of the nonagenarians who presented in cardiogenic shock survived 30 days. Although the NCDR Cath PCI score should be tested prospectively, it gives clinicians some guidance on who is at highest risk and confirms the futility of PCI in nonagenarians who present in cardiogenic shock.

This study has limitations. One big one is that it involves only those sent to PCI; there is no conservative therapy comparison group. Also, most nonagenarians are women, yet this is largely a study of men. There was little use of fractional flow reserve (< 4%), and we are not provided with coronary anatomic data. Despite these limitations, I believe this study will aid me in decision-making regarding nonagenarians presenting with coronary disease. ■

Frailty as a Patient Assessment Tool Prior to Aortic Valve Replacement

By Jeffrey Zimmet, MD, PhD

Associate Professor of Medicine, University of California, San Francisco; Director, Cardiac Catheterization Laboratory, San Francisco VA Medical Center

Dr. Zimmet reports no financial relationships relevant to this field of study.

SYNOPSIS: Assessment of frailty adds important prognostic information about risk of death and disability following both surgical aortic valve replacement and transcatheter aortic valve replacement. Among the available instruments for assessing frailty, a scale known as the Essential Frailty Toolkit demonstrated the best correlation with outcomes.

SOURCE: Afilalo J, Lauck S, Kim DH, et al. Frailty in older adults undergoing aortic valve replacement: The FRAILTY-AVR study. *J Am Coll Cardiol* 2017;70:689-700.

As the options for treating aortic stenosis by surgical and transcatheter procedures have increased, assessment of patients' suitability for the procedure and subsequent prognosis has become more complex. Tools such as the Society of Thoracic Surgeons (STS) risk score and EuroSCORE are highly useful in predicting short-term risk of surgical aortic valve replacement (SAVR), but these instruments neglect many important details and are not validated for predicting outcomes for transcatheter aortic valve replacement (TAVR). Among the unmeasured variables is frailty, which carries great intuitive appeal in this realm, but clinicians have used it on a limited basis. Reasons for this restrained uptake include the time and effort involved in performing the various tests and, more importantly, a lack of consensus on which tools should be used to measure frailty. Although gait speed as a single measure has been the most commonly used test, multidomain frailty scales are preferred to achieve higher degrees of specificity for clinical outcomes. Most of these scales have been validated in individual studies,

but head-to-head comparisons are lacking.

Accordingly, Afilalo et al presented the results of the FRAILTY-AVR study, which sought to prospectively evaluate the value of seven different frailty assessment tools in predicting outcomes in patients undergoing SAVR and TAVR. For the trial, patients > 70 years of age anticipating SAVR or TAVR were enrolled at 14 centers in Canada, the United States, and the Netherlands. Data were collected, and frailty was assessed by trained individuals using the Fried, Fried+, Rockwood, Short Physical Performance Battery, Bern, Columbia, and the Essential Frailty Toolset (EFT). The primary outcome measure was all-cause death at one year, with secondary outcomes of death at 30 days and a composite of death and increased disability at 12 months. Over the five-year study period, 1,020 older adults were enrolled, of whom 646 underwent TAVR and 374 underwent SAVR. The median age was 82 years, and the average STS score (predicted risk of mortality) was 4.3% (5.4% in the TAVR group, and 2.7% in the SAVR group). Notably, although

frailty was assessed by these tools on a scale from least to most frail, it was reported as a dichotomous variable; patients either were judged to be frail or not. Frailty was approximately two-fold higher among TAVR patients compared to SAVR patients.

As expected, frailty was predictive of hard outcomes, with substantial variability among the different scales. The results showed that the EFT frailty assessment outperformed the other scales and was most strongly associated with one-year mortality, with an odds ratio of 3.72. The EFT also was the strongest predictor of death at 30 days and of worsening disability at one year. Further, it added incremental value to prediction models using the STS predicted risk of mortality score and procedure type in terms of predicting these hard outcomes.

The authors concluded that frailty is a strong predictor of mortality and disability following both SAVR and TAVR. Among available tools, the EFT demonstrated the most robust performance characteristics regarding predicting poorer outcomes following AVR.

■ COMMENTARY

Frailty as a concept in assessing patients for outcomes after cardiovascular interventions is intuitive and appealing, but in practice its measurement has been challenging to operationalize. The large number of measurement tools, some of which are challenging and time-consuming to administer, has led to confusion over the very definition of frailty, and has hampered its uptake as a clinical tool. In FRAILITY-AVR, the prevalence of frailty varied between 26% and 68%, depending on the particular tool used. This is a striking amount of variability, which highlights the need for this study. The tool that outperformed the others, EFT, is a relatively simple four-ele-

ment, 5-point scale. Patients are scored for time to stand five times from a seated position (1 point if ≥ 15 seconds, 2 points if unable to complete), cognition (1 point for Folstein Mini-Mental State Examination [MMSE] score < 24), hemoglobin (1 point if < 13 g/dL in men or < 12 g/dL in women), and serum albumin (1 point if < 3.5 g/dL). Patients with ≥ 3 points are deemed frail, while 5/5 points defines severe frailty. The tests can be conducted easily and fairly rapidly (the most time-consuming part of the exam is the MMSE) in the office environment, and inter-observer variability is relatively low.

Assessment of older patients with severe aortic stenosis increasingly involves not just the choice of treatment modality (SAVR vs. TAVR), but also the determination in some patients about whether to treat. In this study, although procedural success was very high and short-term outcomes were good, the incidence of death or marked disability at one year was more than one-third for the whole group of patients. For those deemed frail by the EFT, the number was $> 50\%$, while for those marked as severely frail (5 out of 5 points), 80% were dead or disabled at one year. These are sobering numbers.

With a relatively straightforward and validated tool, the assessment of frailty takes its rightful place as a central component in the evaluation of older adults with severe AS. Along with defining which patients are likely to benefit from AVR procedures, frailty assessment can assist in determining which patients are less likely to receive full benefit, either because they are unlikely to survive past one year, or because they will experience increased disability or worsened quality of life. Ultimately, patients and their families will benefit from this receiving this information as part of a shared decision-making process, as well as elements of informed consent. ■

Functional Outcomes After Receiving Life-sustaining Therapy in the ICU

By *Betty Tran, MD, MSc, Editor*

Dr. Tran reports no financial relationships relevant to this field of study.

SYNOPSIS: Among patients who have spent at least three days in an ICU and required even brief mechanical ventilation and/or vasopressor support, almost half are dead and only one-third return to their baseline at six months. Several factors present on the first day of admission are associated with not returning to baseline status.

SOURCE: Detsky ME, et al. Six-month morbidity and mortality among ICU patients receiving life-sustaining therapy: A prospective cohort study. *Ann Am Thorac Soc* 2017 Jun 16. doi: 10.1513/AnnalsATS.201611-875OC. [Epub ahead of print].

Limited data are available concerning long-term outcomes of a general ICU population that could inform ICU discussions with patients and surrogates regarding expectations and prognosis.

In this prospective cohort study of five ICUs (three medical, two surgical) within the University of Pennsylvania Health System, Detsky et al aimed to describe patients' survival and functional (physical

and cognitive) outcomes at six months following an ICU admission of at least three days during which they received life-sustaining therapy in the form of mechanical ventilation for > 48 hours and/or vasopressors for > 24 hours within their first six days in the ICU.

Of 473 patients who met inclusion criteria, 303 ultimately consented to participate. Median age was 62 years (interquartile range, 53-71), 57.1% were male, and 37% were non-white. Prior to their ICU stay, 94.1% of patients resided at home, 28.4% were employed, and 68.0% demonstrated normal baseline function, defined as living at home with no self-reported deficits in cognition or abilities to ambulate up 10 stairs and toilet independently. ICU admission diagnoses were most common for respiratory failure (27.4%), sepsis (21.8%), and non-emergency surgery (17.8%).

Of the 303 enrolled patients, 72 (23.8%) died in the hospital, 21 (6.9%) were discharged to inpatient hospice, and 58 (17.5%) died between hospital discharge and the six-month follow-up. Of the surviving 173 patients at six months, 82.8% had returned to their original residence, 81.9% could toilet independently, 71.3% could ambulate 10 stairs independently, and 62.4% reportedly exhibited normal cognition. Surgical ICU patients experienced better survival and morbidity outcomes compared to medical ICU patients. Of the original 303 enrolled patients, 293 had complete data for six-month physical and cognitive outcomes and baseline characteristics, and were included in an analysis to identify predictors of return to baseline function. Of these, 91 (31.1%) returned to baseline at six months. Normal function prior to ICU admission was not associated significantly with increased likelihood to return to baseline. Independent predictors of not returning to baseline function included older age, being a medical (as opposed to a surgical) patient, non-white race, higher APACHE III score, hospitalization in the prior year, and a history of cancer, liver disease, neurologic condition, or any type of transplant.

■ COMMENTARY

This is a comprehensive cohort study that uncovered several important findings. First, six-month mortality among patients with ICU stays requiring life-sustaining therapy is quite high at 43%. Although hospitalization in the prior year was an independent predictor of poor return to baseline function in the multivariable model, it is notable that most patients (94.1%) resided at home, and 68% reported normal baseline function prior to their ICU hospitalization. Thus, an ICU

hospitalization requiring life-sustaining therapy is a defining moment. A similar pattern has been observed in multiple studies focused on outcomes after hospitalization for severe sepsis.^{1,2}

Second, the multivariable model presented is unique in its use of return to baseline status as an outcome that is important in ICU survivorship. Third, although six-month mortality is high, most patients who survive to six months are at home and functioning normally, albeit with cognitive impairments outnumbering physical ones. These findings are intriguing when viewed in the context of studies that have found that among patients on prolonged mechanical ventilation, only 9% are at home and independently functioning at the one-year mark.³ To the extent that functional status is an important component of quality of life for patients, data from the Detsky et al study are informative, although the results do not mitigate the complexity of real-time decisions in the ICU, especially when the decision involves whether to continue aggressive care (and possibly tracheostomy and G-tube placement) vs. pursue comfort care/hospice. For patients requiring life-sustaining ICU support, even briefly as defined by this study, these data suggest that mortality is high, but if they survive, the majority can return home and achieve some degree of normal function by six months. However, based on data from other studies, if patients continue to remain dependent on mechanical ventilation for a longer period, at some point a threshold is crossed such that their chances of functional independence decline drastically. It is interesting to note that surrogate ratings overall were more pessimistic than reports from patients in the study. Although independent risk factors for return to baseline are presented, they have yet to be validated as part of an accurate scoring system for predicting the outcome of return to baseline. Currently, data from this study are probably most helpful as part of patient and/or surrogate discussions regarding what to expect in terms of recovery, even after brief, but intense, ICU stays. ■

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CME QUESTIONS

1. In the systematic review and meta-analysis of the literature by Yadav and colleagues, what percentage of patients ≥ 65 years of age have completed any advance directive?

- a. 17.1%
- b. 26.5%
- c. 45.6%
- d. 88.7%

2. Which of the following outcomes did Rogers et al find in the randomized study of usual care versus usual care plus palliative care in patients with advanced heart failure?

- a. Increased 3-month mortality in the group receiving palliative care
- b. Decreased 6-month rehospitalization rate in the group receiving palliative care
- c. Improvement in quality of life measures in the group receiving palliative care
- d. Increased rates of depression in the group receiving palliative care
- e. All of the above

3. In the VA registry study of percutaneous coronary interventions reported by Sawant and co-investigators, what outcomes (mortality, cardiogenic shock, lack of reperfusion) were seen for nonagenarians compared to the rest of the study population?

- a. Higher mortality, greater risk of cardiogenic shock, and higher rate of non-reperfusion compared to younger patients
- b. Similar mortality, equal risk of cardiogenic shock, and equal rate of non-reperfusion compared to younger patients
- c. Lower mortality, lower risk of cardiogenic shock, and lower rate of non-reperfusion compared to younger patients

CME OBJECTIVES

Upon completion of this educational activity, participants should be able to:

- discuss pertinent safety, infection control and quality improvement practices;
- explain diagnosis and treatment of acute illness in the hospital setting; and;
- discuss current data on diagnostic and therapeutic modalities for common inpatient problems.

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