Palliative Ultrasound for Home Care Hospice Patients

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Abstract

The evolving relationship between emergency and palliative medicine is expected to benefit patients of each. Two collaborative care encounters involving home hospice patients are discussed. Portable bedside ultrasound was performed in the home to diagnose ascites and to guide palliative paracentesis. Specific interventions and outcomes are reported. The interface of emergency and palliative care and the use of paracentesis in cancer palliation are briefly reviewed. It is concluded that home-performed ultrasound and ultrasound-guided procedures are promising palliative modalities for care at the end of life.

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Emergency physicians (EPs) have provided palliative care to patients in their daily practice since the inception of the specialty.[1] In 2006, the relationship between palliative and emergency medicine was formalized when the American Board of Emergency Medicine became one of 10 boards sponsoring the new specialty of hospice and palliative medicine.[2] Performance of limited bedside ultrasound is an established component of modern emergency practice.[3] One accepted indication is the guidance of invasive procedures, including those for draining fluid collections from body cavities.[4] This article will discuss patient encounters at the convergence of these two evolving practice elements.

The interface between emergency and palliative care has been characterized as insufficiently studied.[5,6] While sharing some important attributes, the traditional frameworks of the disciplines are distinct. More than two dozen differences in care processes between the two have been enumerated.[7] Efforts are under way to better describe the traits of palliative emergency department (ED) patients and to better assess their needs.[5,7,8] Specific protocols have been developed to facilitate appropriate withdrawal of life support and honoring of advanced directives for these patients.[9,10]

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A related commentary appears on page 330.

The medical and ethical underpinnings of appropriate end of life care as applied to emergency medicine are subjects of ongoing discussion.[11] A physician member of a palliative care focus group once commented, ''People have really different views of what 'comfort measures only' means.''[12] End-of-life care was the most frequently identified knowledge deficit of emergency medicine residents responding to a survey on bioethics issues.[13] Emergency practitioners sometimes misunderstand or undervalue palliative interventions.[6,12,14] These observations highlight current knowledge gaps and ambiguities surrounding palliative medicine, as well as call for their future resolution. On casual consideration, the performance of an ''invasive therapeutic procedure'' might seem inconsistent with care that ought to be rendered at or near the end of life. Upon closer examination, procedural intervention as we describe is intended not to cure but, rather, to promote comfort. It is not therapeutic, but palliative, and consistent with the goal of improving quality of life through the relief of distressing physical symptoms.[1] Such palliative interventions have resulted in better outcomes as measured by patients' own assessments of symptom management.[15]

CLINICAL ENCOUNTERS

A hospice medical director became aware of an ultrasound-credentialed academic EP who utilized portable sonography in volunteer work at a local migrant farmer clinic. Realizing the possibility of similar ultrasound use, the director sought the EP's collaboration in potential ultrasound-guided palliative procedures in the hospice setting. Two home care hospice patients were subsequently consulted upon by the EP.

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The first patient was an 84-year-old woman with end-stage pancreatic cancer who complained of worsening painful abdominal distension of several weeks' duration. Both maintenance and rescue opioid analgesics were adjusted with suboptimal relief of discomfort. Her medical history included stroke, and she ambulated with a cane at home with increasing difficulty. Her medical providers suspected ascites to be the cause of her symptomatically enlarging abdomen and considered possible palliative paracentesis.

The EP visited the patient and care-taking daughter at their home. On examination, the patient was a thin, frail-appearing, elder woman who moved gingerly into the supine position on her bed. She was alert and oriented with capacity to understand heath care recommendations. The abdomen was protuberant, tense, diffusely tender, and without peritoneal signs. A fluid wave was questionably palpable. Limited goal-directed bedside ultrasound of the abdomen was performed with a Sonosite-180 (Sonosite, Bothell, WA), which normally served as back-up machine to the EP's ED. Focused assessment by sonography for trauma (FAST) views were obtained that revealed free fluid throughout, most notably around the dome of the liver (Figure 1A). Findings were discussed with patient and daughter, and a recommendation made that paracentesis benefits would likely outweigh risks.

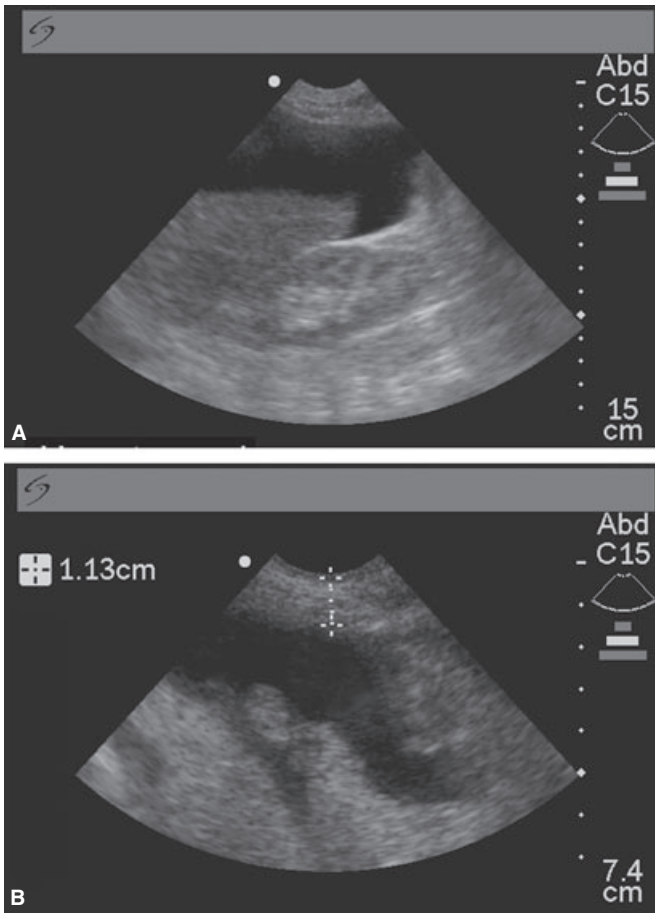

Figure 1. (**A**) Hepatorenal ultrasound view demonstrating intra-abdominal free fluid in Morrison's pouch and over the dome of the liver. (**B**) Right lower quadrant parasaggital ultrasound view demonstrating free fluid 1.13 cm below the skin surface.

Following the EP's discussion and arrangement with the hospice primary care physician, both returned to the home the following day where palliative paracentesis was performed. The procedure was explained to the patient who then provided her signed consent. A FAST was repeated, yielding findings without significant interval change. A right lower quadrant–dependent point was selected where free fluid was evident at shallow depth beneath the skin surface (Figure 1B). Utilizing a standard commercial paracentesis kit, sterile technique, and local infiltrative anesthesia, the hospice physician performed the procedure with ultrasound guidance provided by the EP. Approximately 2 L of straw-colored fluid was drained. Detailed volumetrics were not done and laboratory studies were not sent. The patient reported a significant decrease in her discomfort, an effect that persisted until her death 27 days thereafter. During this interval, she required no escalation of opioid dosing.

The second patient was a 26-year-old woman with end-stage metastatic colon cancer who experienced worsening abdominal discomfort and distension with vomiting. She had been a home hospice patient for 4 months. Her father had died from colon cancer 2 years previously, and cancer had caused the deaths of several other family members. Medications included sustained-release morphine and oxycodone for pain and prochlorperazine, metoclopramide, and dexamethasone for vomiting. Cough from pulmonary metastases was treated with baclofen. She spent most of her day in a second-floor bedroom. Movements and transfers often produced pain and vomiting requiring rescue medication. To assess for drainable ascites as contributor to her worsening symptoms, a limited abdominal ultrasound was requested to be done in the patient's home.

The EP's home assessment revealed an alert and oriented, severely cachectic young woman seated in an upholstered chair. The abdomen was massively distended, with protuberance equivalent to multiple gestation third-trimester pregnancy. She was given an explanation of the fundamentals of the planned ultrasound, to which she provided verbal consent. She was then assisted with some difficulty and discomfort onto her bed where goal-directed ultrasound was performed. FAST views revealed absence of drainable free fluid and extensive tumor mass within the abdominal cavity (Figure 2). An assessment that paracentesis would not produce significant benefit was discussed with the patient and care-taking mother and communicated to the primary hospice care physician. The patient died at home 2 months thereafter.

DISCUSSION

In the case of the first patient, decompression of a tense, ascites-filled abdomen reduced her pain and distress. While likely not altering the trajectory[1,16] of her approaching death, it made it more tolerable. In receiving the intervention in her home, she avoided the difficulty, disruption, and discomfort of transport to and from a medical facility. The performing practitioner

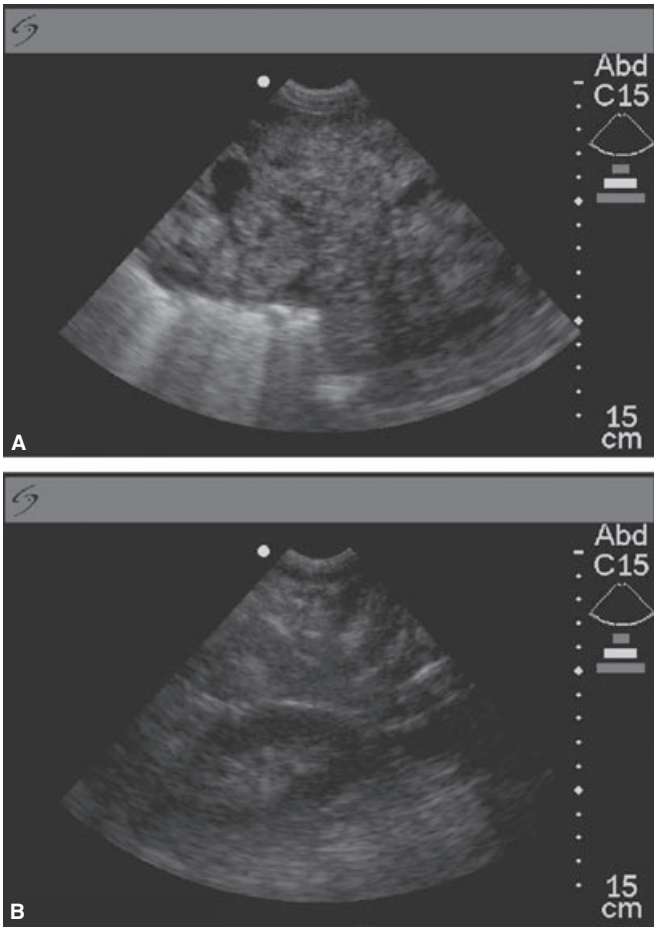

Figure 2. (**A**) Attempted hepatorenal view showing nonvisualization of the right kidney, the absence of free fluid, and a grossly enlarged liver with heterogeneous and cystic tumor infiltration. (**B**) Splenorenal view showing absence of free fluid and presence of perisplenic heterogeneous tumor mass.

was familiar to patient and family and with the landmark-based traditional technique for the procedure. Preprocedure elucidation and concurrent facilitation with ultrasound reduced associated risks and exposed the proceduralist for the first time to the use of ultrasound guidance.

The second patient was found on ultrasound to be unsuitable for paracentesis. She and her family were contemporaneously so informed by the performing physician. There was no information delay consequent to sonographer and sonologist being separate individuals engaging in asynchronous communication between themselves and an ordering physician. As with the first patient, she was not subjected to out-of-home transport which, given her known discomfort, would likely have been painful and problematic. Although she did not ultimately undergo palliative paracentesis, the ultrasound she received was done specifically with this goal-directed intent. One could, therefore, include such imaging in the realm of the palliative more so than the strictly diagnostic.

Ultrasound imaging of nontraumatic intraperitoneal fluid was clinically described more than 30 years ago.[17] It is a reliable modality for the detection of small volumes, particularly in the pelvis. Real-time transabdominal sonography performed on hysterosalpingogram patients reliably detected 100 mL of instilled pelvic fluid.[18] An average threshold volume of 157 mL was reported for similar detection during peritoneal infusion in the ED.[19] Sonographic absence of fluid can itself be an important clinical finding. In a study of ED patients for whom drainage of ascites was planned, 14 of 56 had these plans canceled due to absence or paucity of demonstrable fluid.[20]

Malignancy is the cause of approximately 10% of all cases of ascites.[21] Paracentesis is the most commonly used first-line treatment and provides adequate symptom relief for 90% of patients.[21,22] As was the experience for our first patient, drainage of modest volumes can be effective in reducing symptoms.[22] Postprocedure hypotension, a known risk of the procedure, is rare if the quantity of evacuated fluid is less than 5 L. Current practice guidelines discourage use of protracted drainage times and routine intravenous access unless the volume removed exceeds this.[21,23] Specialists in palliative care performing paracentesis were found in one study to omit intravenous access more frequently than their surgical and radiologic colleagues.[22] Discharge from the outpatient setting of stable tolerant patients and after overnight observation of others are each acceptable disposition options.[23] A 2006 British survey revealed that 19% of paracenteses for ovarian cancer palliation were performed on an outpatient basis. Ultrasound guidance was routinely used by 44% of respondents, 1% of whom were clinical nurse specialists who acted as primary proceduralists.[22] Paracentesis performed in the home setting has been previously reported in limited numbers.[23,24]

Management of cancer complications including pain are part of the emergency medicine ''core domains'' of palliative care.[16] Twelve generalist and four specialist ''core skills'' of palliative medicine extrapolated from a national consensus project[25] did not explicitly include procedural competence among them.[1] The experiences we report indicate potential roles for home-performed ultrasound and ultrasound-guided procedures at the end of life. These can serve as valuable adjuncts to the expert analgesic and anxiolytic pharmacotherapy already required in this setting. In addition to paracentesis to mitigate abdominal discomfort, analogous use of thoracentesis for chest discomfort or dyspnea could be considered.[11,26,27] Further potential home-based palliative or therapeutic uses include guidance of intravenous access[26,28] and assessment and incision of cutaneous abscesses. More strictly diagnostic applications for palliative patients at home include assessment of urinary retention[29] and deep venous thrombosis.[30]

Modern portable ultrasound technology and practitioners skilled in its use can enable the extension to home hospice of modalities traditionally restricted to the medical office or hospital settings. Additional aggressive symptom-relieving options can be thereby added to the palliative physician's armamentarium. There is opportunity for collaboration between EPs with competence in ultrasound-guided procedures and hospice physicians to benefit patients at the end of life. There is also opportunity to put to rest a presumption that ''measures that provide comfort and support'' mandate a ''shift away from technologic care.''[11]

CONCLUSIONS

Palliative care is best practiced under an interdisciplinary team model with involvement of emergency, palliative, and outpatient providers.[1,12] The collaboration described in this report provides an example. Inclusion of the knowledge, skills, and attitudes of palliative medicine into emergency medicine training and practice can create a new synthesis[6,15] that yields new approaches to patient care and promises new benefits. This future avenue is a two-way street. EPs, heretofore exclusively treating patients on stretchers in hospitals, could competently render care and teaching in a patient's home. Palliative care physicians trained in the cognitive specialties could see, learn, and eventually incorporate ultrasound and ultrasound-guided procedures into their own routine practices. Patients at the end of life could avoid unnecessary uncomfortable transports to medical facilities and, instead, receive at home palliative interventions previously unable to be safely provided there.

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COMMENTARY

Hospice and Palliative Medicine Ultrasound: a New Horizon for Emergency Medicine?

The article by Mariani and Setla[1] in this issue of *Academic Emergency Medicine* delineates a logical expansion of point-of-care ultrasonography in hospice and palliative medicine, an evolving realm of subspecialty practice. Hospice and palliative care is reserved for patients with chronic conditions that are recognized as beyond cure by all currently available therapeutic interventions. This would seem to be the farthest extreme from the usual paradigm of emergency medicine (EM). However, as the current report demonstrates, palliative care does not mean ''no care.'' Although the treatment of patients with terminal diseases may not be curative, such patients require management of intercurrent conditions that undermine the quality of the precious time that remains to them before death. Just as patients with known metastatic disease may undergo surgical or pharmaceutical interventions to mitigate the effects of their malignancy without any expectation of cure or even prolonged life expectancy, it is likely that there will be increasing numbers of patients in the terminal phases of incurable diseases who require interventions to relieve focal causes of pain, suffering, or physical or neurologic impairment. Although the use of ultrasound (US) in hospice and palliative medicine has been previously reported,[2–7] it is not a defined part of the model of practice for the subspecialty.[8]

Due to the time-sensitive nature of critical illness, and the delays involved in most forms of diagnostic testing, emergency physicians (EPs) are accustomed to relying solely on the information available from the history and physical examination for medical decision-making. Extensive training in clinical decision-making without the benefit of diagnostic tests equips an EP with the skill sets to provide care in resource-poor settings, as reflected by the existence of EM subspecialties in wilderness, altitude, travel, international, and space medicine. Domiciliary or hospice settings are similarly resource-poor. The leadership of the specialty societies of both Emergency Medicine and of Hospice and Palliative Medicine are to be applauded for recognizing this shared clinical ground, as well as the potential for mutually synergistic benefits as the latter subspecialty grows.

One of the threads of Western medicine has been a quest for information about the inner workings of a patient's body without physical violation of his or her integument. It is for this reason that the invention of the stethoscope and discovery of radiographic imaging are celebrated as such important developments. The century since the discoveries of the Curies has witnessed enormous refinements in the use of x-rays, the development of computed tomography, and the invention of other imaging modalities such as magnetic resonance imaging and nuclear isotope scanning. A limitation of all these modalities is need for massive, fixed, and expensive structural installations and relatively sophisticated supporting infrastructure, and their reliance on specially trained technicians to obtain images, which are in turn transmitted to and interpreted by dedicated imaging specialists. Until recently, US, although more mobile, was deployed using the same paradigm as other forms of diagnostic imaging. The miniaturization of digital circuitry and other technological advances have resulted in increasingly portable and user-friendly US machines with steadily improving image quality. Like computers, US technology has become progressively less expensive. In the 1960s, when the median house price was $15,000, ultrasound machines cost in excess of $200,000. In 2010, many machines are smaller than a laptop computer, generate better images than the best equipment of two decades ago, and cost less than $40,000. At the time of writing of this commentary, second-hand models of the machine used in the report (which are no longer in production) are available for less than $1,000, and new devices are on the market that easily fit into a lab coat pocket. These advances, combined with the absence of radiation and the need for minimal infrastructural support, have led a variety of analysts, clinicians, and organizations to advocate clinician-performed ultrasonography (also referred to as ''clinical ultrasonography'') as the modality of choice for diagnostic imaging in resource-poor settings in both the developing world and industrialized nations.[9–14]

The cardinal feature of clinical ultrasonography is that images are both generated and interpreted in real time at the patient's bedside by the clinician who is caring for the patient. The findings of the imaging study contemporaneously form an integral component of both diagnostic and therapeutic management. Because the clinician is acutely aware of the immediate clinical questions at issue in the patient's care, the US exam is *focused* in enquiry and *limited* in scope. Clinician-performed US frequently addresses clinical syndromes that

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cut across the regional boundaries traditionally observed by imaging specialists, e.g., ''focused assessment by sonography in shock,'' which might include the evaluation of the heart, great vessels of the abdomen, lungs, and pleura, depending on the clinical setting and pretest suspicions of the sonologist.

In North America, EM has played the leading role in elucidating the scope and practice of clinical ultrasonography. This role has been driven by the time-sensitive nature of emergent illnesses as well as pressures to improve diagnostic efficiency, reduce exposure to ionizing radiation, conserve the spatial and staffing resources of the ED, and reduce patient throughput times.[15–17] The use of clinical ultrasonography in a hospice to assist in an invasive procedure with potentially serious complications both exploits the advantages of US in resource-poor settings and is a natural extension of its established use in our specialty.

The purpose of a short article such as that by Mariani and Setla is to stimulate thought about potential new directions in the evolution of our specialty practice. As such it is necessarily limited in the answers it provides, but begs questions for further exploration. What areas are particularly suited to hospice and palliative medicine practitioners with a background in EM, and conversely, what areas of weakness do such physicians have? It might be anticipated that EPs would be adept at managing procedural and acute issues, while colleagues from internal medicine or family medicine would be more familiar with the chronic effects of many drugs, such as the burgeoning number of antineoplastic agents. Do patients indeed prefer the arrangement of scanning and treatment at home to the alternative of transport to some form of treatment center, as asserted by the authors?[15] Are there cost savings that arise from this arrangement?[15–17] As usual for analysis of the costs and benefits associated with clinician-performed ultrasonography, it is important to factor in the cost of equipment and training. The cost of training is particularly difficult to assess, because it must be ''amortized'' over the length of time that the physician uses the learned skill in his or her practice, and the ''cost per procedure'' varies in inverse proportion to the frequency of its use during that period. Conversely, the costs of the traditional ''transport and treat'' arrangement are manifold and should include an assessment of the inconvenience and discomfort it inflicts on patients who have made a decision to spend their last days in hospice settings, avoiding where possible the physical and temporal dislocations of our health care system.

As with most of the procedural competencies of our specialty, there is little known about the most effective techniques for imparting knowledge or assessing its acquisition. This problem is particularly challenging with respect to clinical ultrasonography. Unlike skills such as airway management or vascular access, ultrasonography has a range of potential applications that continue to evolve in response to changing clinical settings. In hospice and palliative medicine, these may run the gamut from procedures, to evaluation of specific organs such as the lower extremities for deep vein thrombosis, to as yet undescribed syndromic approaches that will be developed by clinicians caring for this unique group of patients.

While EM has promulgated training guidelines endorsed by the American College of Emergency Physicians (ACEP) in 2001 and 2008,[18] it is unclear which of the applications of wide use in the ED will be of most use in hospice and palliative medicine or, indeed, whether others such as peripherally inserted central catheter line placement, not widely practiced in the ED, might need to be added. The ACEP training guidelines and accreditation process may serve as templates for a customized program of education and continuous quality improvement in hospice and palliative medicine.

In conclusion, the authors are to be congratulated on bringing a potentially interesting extension of the use of clinical US to the attention of our readers. Questions arise regarding the practicability or desirability of such an extension and the degree to which palliative care will resonate with the interests of many EPs. However, this article, by providing a platform for potential areas of growth and collaboration, serves a role that would seem essential to the mission of a scientific specialty journal such as *Academic Emergency Medicine*.

Editor's Note: The American Board of Emergency Medicine is one of 10 specialty boards that cosponsored the founding of the formal specialty of hospital and palliative medicine. Over 1200 physicians sat for the inaugural board exam in 2008, and subsequent exams will be held in even-numbered years. Further information is available at the American Academy of Hospital & Palliative Care's Web site, http://www.aahpm.org

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