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## Emergency Department Care of an Older Patient with Sepsis- A Brief Topic Review

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### Introduction

Sepsis is a leading cause of death in the United States. It is much more common and deadly in older adults.<sup>1</sup> Sixty-five percent of ED patients with sepsis are over 65 years of age. These older adults are between 3 and 10 times more likely to die of sepsis than younger patients. Prognosis and overall outcomes are worse among those aged 85 years and older and likewise are worse for those who have poor functional status.<sup>2-4</sup>

The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3) defines sepsis as life-threatening organ dysfunction caused by a dysregulated host response to infection.<sup>5</sup> It highlights that early recognition and treatment of sepsis is key to improving mortality and preserving function. However, older adults often present without classic signs and symptoms of infection or an obvious source. Physiologic changes of aging, medication effects, multimorbidity, and cognitive impairment further confound early recognition. The initial inflammatory response of infection which normally produces symptoms and



signs of sepsis are blunted or may be absent in the elderly. Further, an older person's presentation later in their course of illness may lead to a severe stage of disease with very rapid progression to septic shock.<sup>6</sup> Atypical presentations of illness make sepsis in the older population challenging to diagnose.<sup>7</sup> Nuanced presentations for older adults often include complaints of weak and dizzy, accelerated functional decline, falls, lethargy, new onset of incontinence, and confusion. Table 1 suggests improvements and additions to existing emergency department early recognition practices useful for older adults with sepsis.

Most emergency departments screen all patients for sepsis, just as they screen for stroke and myocardial infarction. Sepsis screening, be it with SIRS criteria, qSOFA, laboratory parameters, or fever, is less sensitive and specific in older adults. Further, older patients are less likely to mount a fever, tachycardia, or show absolute hypotension with significant infection. Data such as WBC count, lactic acid, and CMP lose diagnostic and prognostic value in the setting of chronic organ dysfunction. In short, older persons may present with a myriad of clinical complaints but may not be recognized as having sepsis.

**Table 1: Five Key Steps to the Evaluation of an Older Adult with Sepsis**

- 1. On initial evaluation, keep sepsis high on the differential for older adults with nonspecific presentations** such as weakness/functional decline, change in mental status/delirium, and falls. Recognize that sepsis screening is not as sensitive and specific in older adults, especially those with frailty, multimorbidity, polypharmacy, immunosuppression, and cognitive impairment.
- 2. Fever is not reliably present and is defined differently in older persons.** Fever in older adults is defined as:
  - a single oral temperature of >37.8 C (>100 F)
  - an oral temperature > 37.2 C (>99 F) repeated ≥2 times
  - repeated rectal temperatures >37.5 C (99.5 F)
  - an increase in >1.1 C (>2 F) over baseline temperature. When present, fever signifies infection approximately 90% of the time.
- 3. Classic signs of sepsis are often absent in older adults:** tachycardia, hypotension, elevated respiratory rate, and elevated WBC and lactic acid, are not reliably present in older adults. These patients often have higher BP and lower HR at baseline. Consider changes in baseline BP and HR to improve sensitivity of these vital signs in older patients.
- 4. Improve recognition of sepsis by:**
  - Reaching ancillary historians to discuss baseline cognitive and functional status (ADL's ; iADL's) and the velocity of decline.
  - Considering additional testing, such as CT chest and/or abdomen. CT may identify pneumonia with serious complications, intra-abdominal sepsis, and renal stones. These serious infections often present atypically and are not diagnosed with history, physical examination, or CXR alone.
  - Reviewing recent records and the medication list to identify high-risk features, such as recent admissions, procedures, and antibiotic use.
- 5. Consider sepsis in all older patients diagnosed with delirium/or accelerated functional decline** of uncertain etiology after initial ED evaluation.

## Initial Management of the Older Patient with Sepsis

As with all patients, an older patient's best chance for survival is rapid sepsis care. Table 2 outlines practical steps in the early management of older patients with sepsis in the emergency department. The foundations of treatment, early and aggressive fluids and antibiotics, do not change with

age. However, specific considerations regarding volume and medications are more complicated in the older population. Confounding issues include chronic cardiac, renal, and/or immune function problems, as well as recent treatments, such as antibiotics or immunosuppression. Gram-negative pathogens are more frequently isolated in older patients probably because of frequent hospitalizations and procedures, which lead to antibiotic resistance.<sup>8,9</sup> Blood cultures and site culture may be negative in up to a third of cases.

Rapid and accurate source identification is important in the initial management. Urinary tract infections are often over diagnosed in older persons while, in fact, the patient may be septic from another source. Intra- abdominal infections (such as biliary tract disease and complicated infections of ureteral stones) are often missed in the initial emergency department work up. This miss can lead to delayed treatment and higher mortality.

A particular challenge in older patients is measurement of intravascular volume during fluid administration. Measurement of changes in stroke volume using a noninvasive cardiac output monitor and passive leg raise do not decrease fluid overload states in clinical studies. Clinician judgment and usual care in guiding resuscitation is equivalent to quantitative noninvasive physiologic measurements. Lung ultrasound can be helpful in earlier ED detection of pulmonary edema.<sup>10</sup>

Initial antibiotics must provide broad coverage of Gram-negative pathogens and other potential organisms while considering geriatric-specific medication guidelines. Specifically, fluoroquinolones risks outweigh their benefits for UTI, bronchitis, and sinusitis. They increase the risk of hypoglycemia, can cause psychiatric adverse reactions, particularly confusion in older patients with dementia, and increase the risk of abdominal aortic aneurysm rupture by attenuating collagen expression. Sulfamethoxazole/trimethoprim may similarly cause hypoglycemia. The Beers List of potentially inappropriate medications for older adults has issued a strong recommendation against its use due to increased risk of hyperkalemia when used concurrently with an ACEI or ARB in the presence of decreased creatinine clearance.

**Table 2: Five Key Steps in the Management of an Older Adult with Sepsis**

1. **Tailor fluids and antibiotics** to the patient's chronic organ dysfunction and recent medical history. Consider that older adults with cognitive and/or functional impairment (reliant on others for fluids) and those on diuretics are likely more severely intravascularly volume depleted with sepsis.
2. **Be careful when attributing sepsis to UTI in older adults.** Urinalyses and urine cultures are difficult to interpret in older adults, as asymptomatic bacteriuria is exceedingly common. If sending a UA, collect a clean sample. Consider other potentially subtle sources of sepsis, including intrabdominal, indwelling line, skin/ulcer, and CNS, before attributing sepsis to UTI.
3. **Consider the best disposition for each older adult.** Communicate with the next provider to design an inpatient or outpatient care plan. Consider alternatives to admission such as SNF, LTC, Hospital at Home, or community paramedicine, for older adults for whom the hazards of hospitalization may outweigh benefits.
4. **With an uncertain source, rule out intra-abdominal sepsis, especially biliary tract disease.** Abdominal sources are very common and difficult to diagnose in older adults, who often do not have abdominal pain with an abdominal infection. Delayed diagnosis is common, and mortality rates for emergent abdominal surgery are approximately 20%, significantly higher than for STEMI.
5. **Align with What Matters** to older adults with sepsis and pre-existing life-limiting disease by discussing goals of care and scope of treatment with the patient or surrogate decision maker. Sepsis is the terminal event for many older adults with dementia, cancer, COPD, and frailty. Consider referral to palliative care or hospice for septic older adults with poor prognosis or those in whom these dispositions are consistent with goals of care.

## Conclusion

There is much nuance in the emergency care of septic older adults. Sepsis is more common and dangerous, while simultaneously more difficult to detect in this population. Older patients are often more intravascularly depleted, yet volume responsiveness is more challenging to assess. Antibiotic selection is complicated by physiologic changes, multimorbidity and polypharmacy. Cognitive and functional impairment determine prognosis, which, in turn, informs a more complicated disposition decision.

While more complex in older adults, timely sepsis care is an important quality indicator for hospitals. Hospital Compare is a website for healthcare consumers to compare the care of older patients in Medicare-certified hospitals. One

component of this data is timely and effective sepsis treatment. Early recognition and implementation of evidence-based sepsis care bundles in the Emergency Department play a key role in the quality data for the hospital, which may impact collections.<sup>11</sup> More importantly, this care impacts the morbidity and mortality of sepsis patients.

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