AMS ≠ UTI
Rethinking Bacteriuria as a Cause of Delirium & Altered Mental Status

Current guidelines recommend to NOT give antibiotics to older patients who have delirium (acute mental status change, confusion) and bacteriuria unless they also have local genitourinary (GU) symptoms or other systemic signs of infection (eg, fever, hemodynamic instability). Instead, the patient should be carefully observed, and assessment of other causes of delirium should be pursued.[1-3] The recommendation to withhold antibiotics remains even if the patient has pyuria or foul smelling/cloudy urine.

Here is the rationale behind these recommendations:

1. Data showing that bacteria in the urine <u>causes</u> delirium without causing other symptoms are lacking.[1,4] There is an <u>association</u> between bacteriuria and delirium, but there is an even stronger association between bacteriuria and dementia, schizophrenia, and mood disorders.[5] Therefore, we can't assume <u>causation</u> from the <u>association</u>. Since both mental status changes and bacteriuria are common among the elderly (one study found that 25-50% of nursing home residents had bacteriuria[6]), it is not unexpected that many patients have both conditions simultaneously. The relationship between delirium and bacteriuria is likely attributable to underlying host factors, which results in a high frequency of both of these in the elderly, rather than a true infection-related connection.[1] Therefore, for patients without a urinary catheter, delirium should not be considered an independent symptom of a UTI; local GU symptoms (eg, dysuria) or fever* need to be present.[7-9]

2. Treating patients who present with a change in mental status and bacteriuria (without other UTI symptoms) <u>does not help</u>. There is no benefit in survival, behavioral outcomes, admission to hospital, functional status, development of sepsis, or recurrence of bacteriuria.[4,10-12]

3. Treatment is associated with <u>harm</u>. Treating asymptomatic bacteriuria (ASB) in the elderly is associated with increased antibiotic resistance, increased rates of *C. difficile* infection, and longer duration of hospitalization.[10,13,14] Some studies have actually shown worse functional status with treatment.[14] In younger patients, treating ASB is associated with increased incidence of symptomatic UTIs. It is hypothesized that antibiotics eradicate colonizing bacteria thereby allowing pathogenic bacteria to invade and cause disease.[12,15]

4. Assuming a patient's altered mental status (AMS) is due to their bacteriuria can delay an investigation of other causes of AMS, such as medications, ischemic stroke, dehydration, or an actual infection at a different site.[12]

In considering this topic, two caveats need to be acknowledged. First, most studies examining the relationship between AMS and bacteriuria have serious methodologic limitations. Second, there is often some diagnostic uncertainty when dealing with the frail elderly, including determining what "non-localizing" signs may be an indication of infection.[17] Therefore, one should not be excessively dogmatic with recommendations regarding the issue of delirium and UTIs. However, there is almost unanimous agreement that altered mentation in patients with asymptomatic bacteriuria leads to many unnecessary courses of antibiotics. More recent data as well as expert opinion strongly favor that we jettison the common practice of attributing AMS in an elderly patient to a UTI, unless GU symptoms are present. This change in practice has the potential to avoid adverse effects in one of our most vulnerable populations and improve antimicrobial stewardship for our entire community.

* For SNF residents &/or community dwelling older adults who are frail, &/or > 80 yrs, fever is defined as: (1) A single oral temp >100F; or (2) repeated oral temps >99F or rectal temps >99.5F; or (3) an increase in temp of >2° F > baseline temp[16]

References
[1]Nicolle. Clin Infect Dis 2019;68(10):e83-110. [2]Mody. JAMA 2014;311:844-854. [3]Nance. JAMDA 2014;15:133-139. [4]McKenzie. Am J Med 2014;127:255-257. [5]Chae. J Psychiatr Pract 2015;21:402-11. [6]Nicolle. Clin Geriatr Med 2016;32:523-38. [7]Beveridge. Clin Interv Aging 2011;6:173-80. [8]Nance. JAMDA 2018;19:765-769. [9]Stone. ICHE 2012;33:965-977. [10]Rotjanapan. Arch Intern Med 2011;171:438-43. [11]Potts. Arch Gerontol Geriatr 1996;23:153-161. [12]Cortes-Penfield. Infect Dis Clin North Am 2017;31:673-688. [13]Linday. JAMA IM 2019;179:1519-1527. [14]Dasgupta. Arch Gerontol Geriatr 2017;72:127-34 [15]Cai. Clin Infect Dis 2012;56:771-7; [16]High. J Am Geriatr Soc 2009;57:375-394; [17]Rowe. ICHE 2022;43:417-426