To treat or not to treat: managing bacteriuria in elderly people

A recent *CMAJ* article and commentary go against a lot of the principles for diagnosing and managing urinary tract infections in elderly people that those of us who work in long-term care institutions have been following for many years.[1,2] I disagree with the definition Susan Walker and colleagues provide for asymptomatic bacteriuria: the presence of bacteria without urinary symptoms.[1] Is a previously stable patient with dementia who exhibits acute delirium asymptomatic? I do not think so. My colleagues and I are unable to elicit information on lower urinary tract symptoms from many of our patients because of their dementia and incontinence.

The important question in the long-term care facility is, How does one assess the cause of an episode of acute delirium, especially if there is fever? Such cases are fairly common, yet Lindsay Nicolle suggests that acute changes in clinical status such as fever and delirium should not be attributed to urinary tract infection and that urine samples should not even be obtained. How then are we to tell if a urinary tract infection is indeed causing the delirium? How are we to manage residents with dementia who exhibit delirium with no other obvious cause, particularly if the resident is febrile?

I have seen many residents with dementia who suffer an acute worsening of confusional state, often with behavioural changes and agitation, who show a urine sample positive for white blood cells and are treated with antibiotics and promptly get better. We are now being told that this is strictly coincidence: the antibiotics were not of any help, the urinary tract infection was asymptomatic and there was some other cause for this acute delirium. I do not believe the point has been proven.

I do agree with Walker and colleagues that many elderly residents who have minimal symptoms are inappropriately treated for urinary tract infection. It is clear that a negative dipstick result for white blood cells reasonably excludes the diagnosis of a urinary tract infection but that a positive urine dipstick result or culture is not to be relied upon to diagnose significant infection. Our policy here is to discourage urine cultures and not to look for or treat truly asymptomatic urinary tract infections.

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[Two of the authors of the research article respond:]

The definition of asymptomatic bacteriuria as the presence of bacteria in the absence of urinary symptoms[1] is based on inclusion criteria from clinical trials assessing the effect of antibiotic therapy on subsequent urinary symptoms in institutionalized elderly people with bacteriuria.[2-4] Residents with cognitive impairments similar to those described by John Miller were included in these studies. No relationship between bacteriuria and symptoms such as anorexia, fatigue, malaise or weakness was noted in a prospective study.[5] Unfortunately, these types of symptoms often lead to antibiotic treatment in elderly people with bacteriuria.[6]

We agree with Miller that a resident with fever and an acute confusional state is not asymptomatic. The empiric use of antibiotics for a severely ill resident may be appropriate after the resident has been carefully assessed. It is important to note that the presence of bacteria or of white blood cells in the urine does not automatically mean that a urinary infection has caused the symptoms. In febrile residents who do not have a urinary catheter, the predictive value of bacteriuria for urinary infection is 10%.[7] The cause of the fever, therefore, is most often not a urinary infection, and other explanations for the fever or delirium need to be considered, including the possibility of pneumonia or skin and soft tissue infections. Similarly, pyuria, which is present in up to 90% of residents with bacteriuria, is not a predictor of symptomatic urinary infection.[8] For residents with mild to moderate illness with no localizing symptoms or signs of urinary infection, we agree with Lindsay Nicolle that nontreatment with close clinical monitoring is a reasonable clinical strategy, although more research is needed to validate this approach.[9]

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[The commentator responds:]

John Miller highlights an important diagnostic challenge. If fever and an acute confusional state are the only presenting signs, when is urinary infection the cause of clinical deterioration in elderly residents of nursing homes? In this situation, although a positive urine culture is necessary to diagnose a urinary infection, it is not sufficient. At any given time as many as 50% of residents without symptoms have a positive urine culture, usually with pyuria, and a positive culture has a low predictive value for symptomatic urinary infection.[1] Unfortunately, in the absence of localizing genitourinary findings such as costovertebral angle tenderness or hematuria, the relatively small proportion of these episodes that are due to urinary infection in the noncatheterized resident cannot be differentiated from episodes due to other causes.[2] In the face of this uncertainty, the practitioner must base the treatment decision for each episode on his or her clinical judgement. The management issue here is not the treatment of asymptomatic bacteriuria, but the diagnosis of symptomatic urinary infection and the lack of specificity of that diagnosis.

A major plea of my commentary is that physicians acknowledge this diagnostic uncertainty and consider a management approach of observation for residents who have only mild or moderate symptoms.[3] In patients who are seriously ill, empiric antimicrobial therapy is certainly appropriate, given the diagnostic limitations. However, further systematic evaluation of diagnostic and management strategies in this population is necessary to identify optimal approaches to care.

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Patient-controlled analgesia

Patient-controlled analgesia (PCA) is a computer-based medical technology now used extensively in Canada to treat postoperative pain. A typical PCA machine contains an embedded microcomputer programmed to give, for instance, 1 mg of morphine intravenously every time the patient pushes a button on the end of a cable. To prevent excessive drug administration, the onboard computer ignores further patient demands until a lockout period (usually set for 5–10 minutes) has passed.

Recently, the Institute for Safe Medication Practices reported that a patient had received a lethal morphine overdose while connected to the Abbott Lifecare 4100 PCA Plus II machine.[1] This machine is easily misprogrammed by caregivers, who must manually enter the PCA parameters, and it needs a more sensible and forgiving user interface.[2] A number of patients have received opiate overdoses as a result of PCA errors: insertion of a 5 mg/mL morphine cartridge when the machine is expecting a 1 mg/mL concentration, or acceptance of the default (initial) drug concentration when the correct action is to scroll up to the correct value, among other errors.[3,4]

In 1997, ECRI documented 3 deaths that occurred while patients were connected to the Lifecare 4100.[5] In at least 2 of the cases, the alleged reasons for the deaths were the same. In the mode of operation in use, when nurses program the drug concentration the Lifecare 4100 display shows a particular concentration (e.g., 0.1 mg/mL). Nurses can either accept this initially displayed value or modify it using the arrow controls. The critical flaw in the design is that in this situation the Lifecare 4100 offers the minimal drug concentration as the initial choice. If nurses mistakenly accept the initially displayed minimal value (e.g., 0.1 mg/mL) instead of changing it to the correct (and higher) value (e.g., 2.0 mg/mL), the machine will "think" that the drug is less concentrated than it really is. As a result, it will pump more liquid, and thus more narcotic, into the patient than is desired.

The purpose of this letter is to warn clinicians of continuing fatal drug overdoses from the Abbott Lifecare 4100 PCA Plus II machine. If you use this machine, please contact your risk management officer and your biomedical engineering department for advice. Fortunately, Abbott is not the only supplier of PCA machines.

We have informed American and Canadian regulatory authorities; they are, of course, now studying the problem.

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[A representative from Abbott Laboratories Inc. responds:]

Patient-controlled analgesia (PCA), introduced by Abbott 17 years ago, inaugurated a new standard for the safe management of pain by simplifying the