Our Patients Do Not Need Endocarditis Prophylaxis for Genitourinary Tract Procedures: Insights From the 2007 American Heart Association Guidelines

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Abstract

The 2007 American Heart Association guidelines for the prevention of infective endocarditis have dramatically reduced both the types of eligible procedures and the types of eligible cardiac lesions that require prophylaxis. Antibiotic prophylaxis to prevent infective endocarditis is not indicated for any patient undergoing obstetric and/or gynaecological procedures, not even for patients with underlying cardiac lesions with the highest risk of developing complications from endocarditis. This sharp departure from previously published guidelines relies on the recognition that endocarditis is more likely to develop from "randomly occurring" bacteremia (e.g., from brushing teeth) than from invasive procedures and that antibiotic prophylaxis has not been proven to be effective. A short discussion on enterococcal infections associated to obstetric and gynaecological procedures and therapeutic implications is presented.

Résumé

Les lignes directrices 2007 de la *American Heart Association* en ce qui a trait à la prévention de l'endocardite infectieuse ont entraîné la baisse spectaculaire tant des types d'intervention admissibles que des types de lésion cardiaque admissibles nécessitant une prophylaxie. L'antibioprophylaxie visant à prévenir l'endocardite infectieuse n'est pas indiquée pour quelque patiente devant subir une intervention obstétricale et/ou gynécologique que ce soit, pas même pour les patientes présentant des lésions cardiaques sous-jacentes les exposant au risque le plus élevé de présenter des complications attribuables à l'endocardite. Ce changement brutal, par rapport aux lignes directrices publiées précédemment, se fonde sur la reconnaissance du fait que l'endocardite est plus probablement attribuable à une bactériémie « d'apparition aléatoire » (p. ex. attribuable au fait de se brosser les dents) qu'à l'exécution d'interventions effractives et du fait que l'efficacité de l'antibioprophylaxie n'a pas été prouvée. Une brève discussion au sujet des infections entérococciques associées aux interventions obstétricales et gynécologiques, et de leurs implications thérapeutiques est présentée

Key Words: Infective endocarditis, obstetric and gynaecological practice, antibiotic prophylaxis

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INTRODUCTION

In April 2007, the AHA published a revised version of the guidelines for the prevention of infective endocarditis that have been in use since the 1960s.[1] These guidelines are the first to be endorsed by both the Infectious Diseases Society of America and the Pediatric Infectious Diseases Society. The revisions to the guidelines were prompted by the recognition that there is an "extremely small number" of cases of endocarditis, that endocarditis is more likely to develop from "randomly occurring" bacteremia (e.g., from brushing teeth) than from invasive procedures and that antibiotic prophylaxis has not been proven to be effective[1,2] but has clear potential adverse effects. The first of these is the emergence of antibiotic resistance associated with antibiotic use,[3] and the second is the possibility of a

hypersensitivity reaction, which with use of beta-lactams occurs at the rate of 1% to 10%.[4]

In the new guidelines, the AHA has dramatically reduced both the types of eligible cardiac lesions and the types of eligible procedures that require prophylaxis. Patients eligible for endocarditis prophylaxis under the new guidelines have cardiac conditions associated with the highest risk of developing complications from endocarditis (Table).[1] However, eligible procedures no longer include those involving the GU (or GI) tract, even for cardiac lesions listed in the Table. (The reader is referred to the AHA document for a discussion of eligible procedures). A fuller discussion is warranted on what pertains to obstetric and gynaecological procedures and related infections, particularly enterococcal infections.

Patients at the highest risk of developing complications from infective endocarditis[1]

1. Patients with previous infective endocarditis
2. Patients with prosthetic cardiac valve
3. Cardiac transplant recipients who develop valvulopathy
4. Patients with specific congenital heart diseases:
   a. A completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter interventions, during the first six months after the procedure
   b. Any repaired congenital heart defect with residual defect at the site or adjacent to the site of a prosthetic patch or prosthetic device

THE PATHOGENESIS OF ENDOCARDITIS

Infective endocarditis requires both "receptive" cardiac tissue and transient bacteremia. Most commonly, abnormal heart structures cause turbulent blood flow within the heart, resulting in damaged endothelium to which bacteria may adhere and proliferate; other receptive tissues include prosthetic cardiac material or valvular vegetations. The bacteria that have particularly high adherence to receptive cardiac tissue are Viridans group Streptococci, *Staphylococcus aureus,* and *Enterococcus* species (particularly *Enterococcus faecalis*).

With respect to *Enterococcus* species, the 2007 AHA guidelines state that in patients with cardiac conditions listed in the Table who also "have an established GI or GU tract infection, or . . . who receive antibiotic therapy to prevent wound or sepsis associated with a GI or GU procedure, it may be reasonable that the antibiotic regimen include an agent active against enterococci." They go on to say that "no published studies demonstrate that such therapy would prevent enterococcal infective endocarditis."

PREGNANCY

Bacteremia following obstetric procedures is short-lived and usually involves gram-negative bacilli (e.g., *Escherichia coli*), gram-positive bacilli (e.g., *Gardnerella vaginalis*), anaerobic gram-positive cocci and *Streptococcus agalactiae*[5,6] instead of VGS, *Stapylococcus aureus,* or *Enterococcus faecalis.* Reported risk factors for developing bacteremia in the obstetric setting include preterm delivery, chorioamnionitis,[5] and septic abortion.[7–9]

In the latest 2003–2005 Confidential Enquiry into Maternal And Child Health report[10] cardiac disease was the leading cause of maternal death (N = 81, 3.83/100 000 maternities). Four deaths were due to infective endocarditis, at least one case of which developed antepartum, giving a maximal rate of fatal postpartum endocarditis of 0.14 per 100 000 maternities. There was no information provided in the report about antibiotic prophylaxis. By comparison, the incidence of fatal anaphylaxis from beta-lactam antibiotics is comparable (0.01 to 0.40 per 100 000 exposures).[11]

Infective endocarditis is a rare complication of pregnancy, with an estimated incidence of 1 case per 8000 to 16 000 deliveries.[12,13] This incidence is likely lower nowadays as the prevalence of rheumatic valvular heart disease in developing countries has decreased.[14,15] Two overlapping reviews of infective endocarditis pertain to obstetric and gynaecologic practice; the first, covering the years 1940–1983, accounts for 126 cases,[16] and the second, covering the years 1966–2002, accounts for 68 cases,[17] in addition to 9 more cases reported between 2002 and the present.[18–27] For the purposes of this commentary, 71 cases, including all postpartum or abortion-related cases were reviewed in detail. Between 55.7% and 73.5% of cases of infective endocarditis developed during pregnancy and were unrelated to any procedure. Between 14.7% and 22.2% occurred in the first six weeks after delivery, termination of pregnancy or miscarriage, and had no alternative explanation for bacteremia (e.g., intravenous drug use). The two most common etiologic agents remained VGS (24.1%) and *Staphylococcus aureus* (21%). Only four cases of postpartum enterococcal endocarditis[16,27] were identified, three of these being reported prior to 1960, and two of them occurring in the setting of home delivery with forceps. Eleven cases of enterococcal endocarditis following abortion or a dilatation and curettage procedure have been reported, mostly among

ABBREVIATIONS

AHA	American Heart Association
GI	gastrointestinal
GU	genitourinary
VGS	viridans group streptococci

women with rheumatic valvular heart disease, and occurring prior to 1960.[16] Antibiotic prophylaxis failed to prevent endocarditis in the two cases that described its use: one case occurred in a woman with mitral and aortic prosthetic valves who underwent therapeutic abortion,[26] and the second occurred in a woman with pre-existing rheumatic valvular heart disease following vaginal delivery.[28] Additionally, *Streptococcus agalactiae* endocarditis developed in two women who received treatment with tetracycline following therapeutic abortion.[29,30] These reports suggest that postpartum endocarditis is rare, and that the potential benefits of antibiotic prophylaxis (unproven[2]) would not compare favourably with the risks of anaphylaxis in users of beta-lactams (0.6 to 3.2 per 100 000 exposures).[31]

A conservative approach, for women with the cardiac conditions listed in the Table, may be to ensure that treatment for infections potentially involving *Enterococcus* species include adequate antibiotic coverage against these organisms. A list of such infections includes, but is not limited to (1) serious lower urinary tract infection or upper urinary tract infection prior to microbiological diagnosis (after which time treatment can be narrowed)[32]; (2) fever with no identified focus, particularly if the patient is systemically ill; or (3) infections involving the biliary tract, compromise of GI tract integrity (e.g., bowel puncture during Caesarean section), or chorioamnionitis/endometritis, because these infections tend to be polymicrobial and can potentially include *Enterococcus* species. If women with the cardiac conditions listed are given antibiotics to prevent wound infection, it is reasonable to include an agent with enterococcal coverage. However, in the event of sepsis, any patient (including such women) requires expedited initiation of empiric antibiotic therapy, rather than prophylaxis.

GYNAECOLOGY

Termination of pregnancy and miscarriage have been discussed above. In the absence of bowel injury or opening of the vagina, gynaecological procedures are generally considered to be "clean." Bacteremia associated with a gynaecological procedure does not usually involve VGS or *Staphylococcus aureus,* and endocarditis prophylaxis is not required.

CONCLUSION

The 2007 AHA guidelines for the prevention of infective endocarditis do not recommend antibiotic prophylaxis for prevention of infective endocarditis in women undergoing procedures relevant to obstetric or gynaecology care providers. However, if a woman has an infection potentially involving *Enterococcus* species, and she has a cardiac lesion listed in the Table, it is prudent for care providers to ensure that the antibiotic regimen used for treatment of the clinical condition includes adequate enterococcal coverage (e.g., ampicillin, or in the face of either penicillin allergy or microbial resistance, vancomycin).

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