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Breaking an Old Habit

It's both surprising and humbling to realize that something we've been doing for the last 50 years appears to have been entirely unnecessary and possibly even harmful.

We now know that's exactly the case when it comes to prescribing prophylactic antibiotics before dental and other invasive procedures for the majority of our patients with benign and even most nonbenign heart conditions. Old habits are hard to break, but we now must do just that.

In September, the American Academy of Pediatrics endorsed the new guidelines from the American Heart Association on the prevention of infective endocarditis, published earlier this year (Circulation 2007 April 19 [Epub ahead of print]). In essence, they whittle down the previous long list of moderate and severe cardiac conditions for which antimicrobial prophylaxis is recommended to just these six highest-risk conditions:

- Prosthetic cardiac valve.
- Previous infective endocarditis.
- Unrepaired cyanotic congenital heart disease, including palliative shunts and conduits.
- Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first 6 months after the procedure (the time in which endothelialization of prosthetic material occurs).
- Repaired congenital heart disease with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibit endothelialization).
- Cardiac transplantation recipients who develop cardiac valvulopathy.

That's it. No other conditions meet the criteria. In addition, among patients with the conditions listed above, the only procedures that still require prophylaxis are dental procedures that involve manipulation of the gingival tissue or the periapical region of teeth or perforation of the oral mucosa, and respiratory tract procedures for which there is a risk of mucosal perforation. Procedures involving the gastrointestinal and genitourinary tracts are no longer on the list.

The AHA first recommended antibiotics to prevent infective endocarditis back in 1955, and had revised those guidelines frequently thereafter until 1997. The rationale was reasonable enough: Infective endocarditis (IE) is a life-threatening condition. Although rare, there is an increased risk of IE among people with certain underlying heart conditions who developed transient bacteremia as a result of procedures that induce bleeding.

Animal data had suggested that antibiotics could prevent such infections, and it was presumed that the same would be true in humans. There was never any human data, although there were case reports of endocarditis cases that were temporally associated with dental procedures. It just seemed to make sense that "premedication" with antibiotics was the way to safely and effectively prevent IE.

Dentists in particular have felt such a strong sense of responsibility about this, both professionally and legally, that many have refused to perform procedures on any child with even the most benign of heart murmurs without the "protection" of antibiotics.

The development of IE is thought to be a result of turbulent blood flow produced by congenital or acquired heart disease, creating a predisposition for deposition of platelets and fibrin on the endothelial surface, resulting in nonbacterial thrombotic endocarditis. This could lead to subsequent invasion of the bloodstream with certain microbial species—most commonly viridans group streptococci, staphylococci, or enterococci—that have the potential to colonize the site, which then could result in IE.

We know that transient bacteremia is common when you manipulate the teeth in periodontal tissues. It is estimated to occur approximately 10%-100% of the time during tooth extraction, 36%-88% with peridontal surgery, and up to 40% with simple teeth cleaning. But—and here's the kicker—transient bacteremia also occurs at least as often in routine daily activities

such as tooth brushing and flossing (20%-68%), use of wooden toothpicks (20%-40%), use of water irrigation devices (7%-50%), and even chewing food (7%-51%)!

When you consider that these activities are performed daily, whereas dental visits occur just once or twice a year, the idea that we can prevent IE by simply giving antibiotics prior to dental procedures seems short-sighted at best.

In fact, one author found that the cumulative risk to a child of transient bacteremia from tooth brushing twice daily for a 1 year was 154,000 times greater than from a single tooth extraction, the dental procedure believed most likely to cause bacteremia. And, the cumulative risk from ALL daily activities may be as high as 5.6 MILLION times greater than that of a single tooth extraction (Pediatr. Cardiol. 1999;20:317-25)!

Even if antimicrobial prophylaxis were 100% effective, and assuming that dental procedures are responsible for 1% of all IE cases, you could only prevent about 1 case for every 14 million dental procedures performed. And of course, we need to consider the risks of antibiotic overuse as well as the cost. No matter how you look at it, there's no bang for your buck in any patients other than those with the most severe cardiac conditions.

Now is the time to begin educating families that antimicrobial prophylaxis for dental procedures is no longer necessary. Admitting we've been wrong all along won't be easy, but I believe patients will understand if we take the time to carefully explain the rationales then and now. With the increasing emphasis on an evidence base for everything we do, this may not be the last time we'll have to revise our thinking. ■

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'One woman told me that the hospital's policy of using three different collection agencies was "protecting" me and my credit score. "We'd do this if it was only $30,"' she said.

Dr. Bryan R. Fine, p. 61