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Systematic Search for Present and Potential Portals of Entry for Infective Endocarditis

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ABSTRACT

BACKGROUND Looking for and treating the portal of entry (POE) of infective endocarditis (IE) is important, but published research on this topic is nonexistent.

OBJECTIVES The goal of this study was to systematically search for the POEs of present and potentially new episodes of IEs.

METHODS Patients were systematically seen by a stomatologist, an ear, nose, and throat specialist, and a urologist; women were systematically seen by a gynecologist; patients were seen by a dermatologist when there were cutaneous and/or mucous lesions. Colonoscopy and gastroscopy were performed if the microorganism came from the gastrointestinal tract in patients ≥50 years of age and in those with familial histories of colonic polyposis. Treatment of the POE was systematically considered.

RESULTS The POEs of the present IE episodes were identified in 74% of the 318 included patients. The most frequent POE was cutaneous (40% of identified POEs). It was mainly (62% of cutaneous POEs) associated with health care and with intravenous drug use. The second most frequent POE was oral or dental (29%). A dental infectious focus was more often involved (59% of oral or dental POEs) than a dental procedure (12%). POEs were gastrointestinal in 23% of patients. Colonic polyps were found in one-half of the patients and colorectal adenocarcinomas in 14%. Performance was good regarding the search for an oral or dental or a colonic potential POE, which were found in 53% and 40% of patients, respectively.

CONCLUSIONS Our search for the POEs of present IEs was often successful, as was searching for an oral or dental or a gastrointestinal POE of a new IE episode. We advise the systematic performance of stomatologic examinations in patients with IE and performance of colonoscopy in patients ≥50 years of age or at high risk for colorectal cancer. (J Am Coll Cardiol 2016;67:151–8) © 2016 by the American College of Cardiology Foundation. Published by Elsevier. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Infective endocarditis (IE) is a severe disease, with an in-hospital mortality rate of about 20% (1). Five percent to 10% of patients will have additional episodes of IE (2). Thus, looking for and treating the portal of entry (POE) of IE is particularly important. The POE of the present episode must be identified in order to treat it. The potential POE of a new episode must be searched for in order to eradicate it and thus lower the risk for a new IE episode. Yet published research on this topic is nonexistent. The search for and treatment of the POE are not even mentioned in the most recent guidelines on IE (3,4). We thus undertook a study of the performance of a systematic search for the POE of the present episode of IE and of a potential new episode of IE.

METHODS

Since January 2005, we have been prospectively enrolling all patients hospitalized at our tertiary

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ABBREVIATIONS AND ACRONYMS

ENT = ear, nose, and throat

IE = infective endocarditis

POE = portal of entry

hospital for definite IE according to the Duke-Li criteria (5). Since then, we have been systematically looking for the POE of the present IE episode and for the potential POE of a new IE episode (e.g., a patient's

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present IE is due to *Streptococcus gallolyticus*, the POE of the present IE episode is a colorectal adenocarcinoma, systematic stomatologic examination identifies several dental infectious foci, which are considered potential POEs for a new IE episode). Patients were informed of the study but did not have to provide individual consent, in accordance with French ethics laws.

Patients were systematically seen by a stomatologist (who performed an orthopantomogram), an ear, nose, and throat (ENT) specialist, and a urologist; women were systematically seen by a gynecologist. When there were cutaneous or periorificial mucous lesions on the initial examination, patients were seen by a dermatologist. Cerebral and thoracoabdominopelvic scans were systematically performed. Colonoscopy and gastroscopy were performed if the microorganism came from the gastrointestinal tract, in patients ≥50 years of age, and in those with familial histories of colonic polyposis. Because our center is a tertiary center with cardiac surgery facilities, most patients who are hospitalized for IE at our hospital are transferred from other hospitals. Either the whole antibiotic course and all investigations for the search for the POE were performed during the patient's stay in our hospital, or the patient was transferred to the hospital of origin before the end of the antibiotic course, and we requested that these investigations be performed there.

TABLE 1 Habitat and Potential Portals of Entry of the Causative Microorganisms of Infective Endocarditis*

Microorganisms	Habitat	Portals of Entry
Streptococci		
Oral streptococci		
Group *mitis/salivarius* (e.g., *S. sanguis*, *sanguinis*, *parasanguinis*, *gordonii*, *mitis*, *oralis*, *mutans*, *salivarius*)	Dental plaque, tongue, oral mucosa, oropharynx (Online Refs. 1–6)	Dental and periodontal diseases (Online Refs. 7–9)
Group *milleri* (*S. intermedius*, *constellatus*, *anginosus*)	Oropharynx, subgingival plaque, GI tract, vagina (*S. anginosus*) (Online Refs. 1,10–12)	Dental, periodontal or GI diseases, vaginal infection (uncommon) (Online Refs. 7,8,10,13,14)
Group D streptococci		
S. bovis group (including *S. gallolyticus* subsp. *gallolyticus*)	GI tract (Online Refs. 7,15,16)	Colorectal adenoma and adenocarcinoma (*S. gallolyticus* subsp. *gallolyticus* ++) (Online Refs. 8,16–20), biliary tract, GI tract
Enterococcus faecalis, *Enterococcus faecium*	GI tract, GU tract (Online Refs. 7,15)	Invasive procedures of the GU tract, including cystoscopy, lithotripsy, prostatectomy, cesarean section, curettage (Online Refs. 15,21)
Group B streptococci (*S. agalactiae*)	Oral mucosa, GI tract, vagina, anterior urethra (Online Refs. 1,22)	Colic tumors (benign or malignant) (Online Ref. 7), bacterial translocation from the GI tract (Online Ref. 22), soft-tissue infection, GU tract infection, drug injection (Online Ref. 23)
Group C and G streptococci		
Group C (*S. dysgalactiae*, *S. equi*, *S. equisimilis*, *S. zooepidemicus*)	Nasopharynx, skin, GU tract (Online Ref. 2)	Skin and respiratory tract infections, drug injection (Online Refs. 7,24)
Group C	Nasopharynx, skin, GU tract (Online Ref. 2)	Peripartum GU infections (Online Ref. 25)
Group A streptococci (*S. pyogenes*)	Oropharynx, skin (Online Ref. 26)	Skin and soft tissue infections, pharyngitis, endometritis (Online Ref. 27)
Streptococcus pneumoniae	Nasopharynx (Online Ref. 28)	Pneumonia, otitis media (Online Ref. 29)
Deficient streptococci (*Granulicatella* [*Abiotrophia*] *defectiva*)	Oral microbiota, dental plaque (Online Refs. 2,30)	Drug injection, periodontitis (Online Refs. 31,32)
Streptobacillus moniliformis	Oral cavity of rats, gerbils, mice, guinea pigs (Online Refs. 33,34)	Rat bite or abrasions (Online Refs. 34–36)
Staphylococci		
Staphylococcus aureus	Major sites: anterior nares, pharynx, perineal area Minor sites: skin, intestine (Online Refs. 1,37)	Health care–associated procedures, drug injection, skin and soft-tissue infections (Online Refs. 7,38–41)
Coagulase-negative staphylococci		
S. saprophyticus	Perineal area (Online Ref. 41)	GU tract infections (Online Ref. 42)
S. epidermidis, *capitis*, *haemolyticus*, *hominis*, *saprophyticus*, *schleiferi*, *lugdunensis*, among others	Skin (Online Refs. 1,43)	Skin infections, health care–associated procedures (Online Refs. 7,43)

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