

Subacute Bacterial Endocarditis Associated with Upper Endoscopy

Byoung Chul Cho¹, Jae Hyun Lee¹, Jung Won Park¹, Chein Soo Hong¹, June Myung Kim¹, Seok-Min Kang^{1,2}, and Yong Soo Kim^{1,3}

¹Departments of Internal Medicine, ²Cardiology Division and ³Gastroenterology Division, Yonsei University College of Medicine, Seoul, Korea.

Transient bacteremia associated with various endoscopic procedures is a well-documented phenomenon. Clinically important bacteremias are very rarely seen, however, this malady has significant morbidity in susceptible patients with valvular heart disease, liver cirrhosis, malignancy and immune deficiency. This bacteremia is a complication that is generally observed secondary to upper endoscopy and other associated invasive procedures in at risk patients, and the more serious manifestations include spontaneous bacterial peritonitis, septic arthritis, meningitis, brain abscess and infective endocarditis. Infective endocarditis is an extremely rare complication of gastrointestinal endoscopy, and it has been convincingly documented in only seven cases. We report a case of native valve endocarditis due to *Streptococcus intermedius* in a patient with valvular heart disease as a consequence of routine upper endoscopy.

Key Words: Endoscopy, endocarditis, bacteremia, antibiotic prophylaxis

INTRODUCTION

Bacterial endocarditis is a life-threatening disease, although fortunately it is uncommon.^{1,2} Because of its high morbidity and mortality, primary prevention of endocarditis is very important. For this purpose, antibiotic prophylaxis is routinely recommended for certain high-risk patients prior to procedures that have been associated with bacteremia.^{1,3,4} Transient bacteremia in

human beings is a well-known phenomenon.⁵⁻⁹ This occurs as a consequence of minor trauma to the mucous membranes that harbor large numbers of bacteria, such as oral cavity, urogenital tract or gastrointestinal tract. Iatrogenic procedures that damage these tissues, such as dental manipulations,¹⁰ urologic instrumentation¹¹ and GI endoscopy⁵⁻⁹ may result in bacteremia and subsequent endocarditis. In normal, healthy people, the bacteria are rapidly cleared from the bloodstream without adverse sequelae. However, in people with prosthetic heart valves or certain types of organic heart disease, transient bacteremia can result in bacterial endocarditis.^{1,5-9} Although the reported incidence of transient bacteremia during various GI endoscopic procedures is as high as 50%,^{3,4} there are only a few documented cases of endocarditis associated with GI endoscopic procedures,¹²⁻¹⁸ and the relationship between the endoscopic procedures and endocarditis has not been well established. Prophylactic antibiotics are recommended only for patients at a high-risk of endocarditis prior to high risk endoscopic procedures, while the physicians are given considerable leeway for other clinical scenarios.^{3,4} However, even in most recent guidelines, it is not clear which patients should receive prophylactic antibiotics and such grey areas makes medical practice unstandardized. We report here on a case of endocarditis caused by *Streptococcus intermedius* occurring after upper GI endoscopy in a patient with mitral regurgitation due to mitral valve prolapse (MVP). In addition, we reviewed seven previously reported cases of well-documented endocarditis secondary to upper endos-

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Reprint address: requests to Dr. Chein Soo Hong, Departments of Internal Medicine, Yonsei University College of Medicine, 134 Shinchon-dong, Seodaemun-gu, Seoul 120-752, Korea. Tel: 82-2-361-5421, Fax: 82-2-393-6884, E-mail: cshong@yumc.yonsei.ac.kr

copy procedures.

CASE REPORT

A 62-year-old woman was admitted to our hospital because of fever, poor dietary intake and weight loss that had occurred for 1 month. The patient has a history of bronchial asthma and usage of inhaled corticosteroid, and she had an asymptomatic murmur due to mitral incompetence that had been noted 3 years ago. At the time of diagnosis for her mitral valve problem, no further investigation or management was indicated. Two months prior to hospitalization, the patient underwent routine upper endoscopy, which showed chronic atrophic gastritis. Gastric biopsy was not done. The patient reported frequent use of antacids due to epigastric pain. She had last visited a dentist three years before. On admission, she had a fever, lethargy and anorexia, but she did not complain of symptoms of dental or pharyngeal-tonsillar diseases. Her lungs were clear, and her cardiac examination revealed an apical grade III/VI holosystolic murmur. Her abdomen was soft and nontender without hepatosplenomegaly. The patient showed no lymphadenopathy or peripheral signs of endocarditis. Laboratory examination showed a WBC $12,000/\text{mm}^3$ (normal: $4,000 - 10,000/\text{mm}^3$) with 80% neutrophils, and Hb was 10 g/dL (normal: 12 - 16 g/dL). Blood chemistry revealed ESR 35 mm/h (normal: 0 - 20 mm/h), C-reactive protein 10 mg/dL (normal 0 - 0.8 mg/dL) and fibrinogen 514 mg/dL (normal 200 - 400 mg/dL). The other laboratory results were normal. Blood culture yielded growth of *Streptococcus intermedius*, which was sensitive to all β -lactams. A transthoracic echocardiography revealed prolapse of the posterior mitral leaflet with moderate regurgitation, and the leaflet seemed to bear vegetation. A subsequent transesophageal echocardiography confirmed oscillating echogenic materials attached at posterior mitral leaflet, which was highly suspicious of vegetation (Fig. 1, 2). The patient was treated with *i. V.* ampicillin for 4 weeks and gentamycin for 2 weeks. She gradually became afebrile and made an excellent recovery thereafter. Follow-up transthoracic echo-



Fig. 1. Two dimensional transesophageal echocardiography showing 2.9×1.4 cm sized oscillating, echogenic materials (arrow), attached at prolapsed posterior mitral leaflet. LV, Left ventricle; LA, Left atrium; Ao, Aorta.

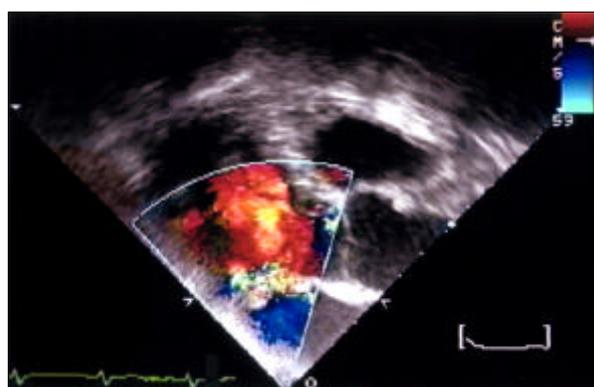


Fig. 2. Color Doppler echocardiography showing moderate mitral regurgitation.

cardiography, performed after two weeks of antibiotics, showed no increase in size of the vegetation or further aggravation of mitral regurgitation. After 2 more weeks of antibiotic treatment, the decision was made to proceed with valve replacement surgery.

DISCUSSIONS

Upper endoscopy is a frequently performed diagnostic procedure associated with minimal discomfort.^{3,4} Because of its widespread use as diagnostic tool, it is important to assess potential complications so that these problems may be avoided. Visualization of gastric mucosa requires considerable manipulation of oropharyngeal areas that normally have a very large and varied

bacterial population, and minor trauma to upper GI mucosa often occurs.⁵⁻⁸ Therefore, it is not surprising that this procedure might be followed by an appreciable incidence of bacteremia. The reported incidence of bacteremia after diagnostic upper GI endoscopy and colonoscopy is only 2-5% of all cases.³⁻⁹ The risk of bacteremia does not seem to increase with biopsy or polypectomy. More invasive endoscopic procedures associated with a higher incidence of the bacteremia are esophageal stricture dilatation (45%), sclerotherapy for esophageal varices (50%), laser therapy in the upper GI tract (31-34%) and PEG (30-43%).^{3,4} The pathogen frequently involved is *Streptococcus viridans*, *Streptococcus pneumoniae*, *Staphylococcus aureus* and *Cardiobacterium hominis*⁶ and most of these bacteria are normal inhabitants of GI tract. In a normal subject, bacteremia does not cause symptoms and has no clinical significance. It does become important in patients who are at risk for developing infective endocarditis and in patients with ascites or prosthetic joints. Although the theoretical risk is high, pyogenic complications such as endocarditis in patients at risk are considered to be extremely

rare.¹ The duration of bacteremia, the type of bacteria, and the underlying disease are critical factors in the development of bacterial endocarditis.^{1,2,6,7} A dozen cases of infective endocarditis have been causally linked to upper endoscopy in English literature, but the precise diagnoses were available only in seven cases¹²⁻¹⁸ according to Duke criteria² (Table 1). All these patients had underlying valvular heart diseases and underwent upper endoscopic procedures without antibiotic prophylaxis. The need for prophylactic antibiotics in patients with valvular heart disease that are undergoing endoscopic procedures is less well defined in contrast to the clinical setting of dental manipulation, in which the risk of bacteremia and a subsequent endocarditis and the value of antibiotic prophylaxis are clear.¹⁹ In the late 1990's, several guidelines regarding the use of prophylactic antibiotics before GI endoscopy were published by the American Heart Association (AHA),¹ the American Society for Gastrointestinal Endoscopy (ASGE)³ and British Society for Gastroenterology (BSG),⁴ respectively. However, these guidelines are not uniform or sufficient enough to make firm recom-

Table 1. Documented Cases of Infective Endocarditis Secondary to Upper Endoscopy

Casd No.	Source	Age/sex	Procedure	Cardiac condition	Organism	Echo finding	Complication	Outcome
1	12	60/M	Gastroscopy with biopsy	Mitral stenosis	<i>Non-hemolytic Streptococci</i>	N.D.	None	Alive
2	13	65/M	Esophageal dilatation	MR	<i>Streptococcus viridans</i>	vegetation	None	Died
3	14	47/M	Esophageal dilatation	s/p MVR	<i>Streptococcus viridans</i>	Chorda tendinae rupture	None	Alive
4	15	55/M	Gastroscopy	s/p AVR	<i>Cardiobacterium hominis</i>	vegetation	Fistulous tract aortic root	Alive
5	16	73/ M	Esophageal dilatation	MR	<i>Streptococcus capitis</i>	vegetation	Right hemiplegia	Died
6	17	45/M	Gastroscopy with biopsy	MVP with MR	<i>Streptococcus sanguis</i>	vegetation	None	Alive
7	18	78/F	Gastroscopy	MVP with MR	<i>Streptococcus oralis</i>	vegetation	None	Alive
8	present	62/F	Gastroscopy	MVP with MR	<i>Streptococcus intermedius</i>	vegetation	None	Alive

N.D., no data; MR, mitral regurgitation; s/p MVR, AVR, status post mitral/aortic valve replacement; MVP, mitral valve prolapse.

mendations. This is because they are based on individual experiences or anecdotal case reports, rather than well-designed prospective trials comparing prophylaxis with placebo for different procedures.^{1,3,4} Current practice guidelines recommend antibiotic prophylaxis only in patients at high-risk for endocarditis (e.g. prosthetic cardiac valve, previous bacterial endocarditis, cyanotic congenital heart disease) prior to high-risk endoscopic procedures (e.g. stricture dilatation, varix sclerosis, ERCP). Prophylaxis is not routinely recommended for patients with moderate-risk cardiac lesions undergoing low-risk procedures (e.g. gastroscopy with or without biopsy) or for patients with low-risk cardiac lesions (e.g. history of coronary bypass grafting, pacemakers) undergoing any procedures. In other clinical settings, the choice regarding antibiotic use is at the discretion of the attending physician. *Streptococcus intermedius*, which was isolated in our patient, is part of the normal flora of the oral cavity.² Due to its marked affinity for heart valves, but because of its low virulence, this bacterium is a common cause of subacute bacterial endocarditis. One possible mechanism for the *Streptococcus intermedius* bacteremia and endocarditis is the inoculation of the endoscope by oral flora as it passes through the mouth, and then it seeds the bloodstream after mucosal trauma.⁵ It is noteworthy that our patient was regularly taking antacids and inhaled corticosteroid prior to upper endoscopy. The former could promote bacterial overgrowth in a stomach with a decreased acidic environment, and the latter could induce immunosuppression²⁰ and a clinically relevant bacteremia. We believe that these factors might have promoted the development of endocarditis, with a mitral valve prolapse with regurgitation as the main risk factor. The time that elapsed between the upper endoscopy and the onset of fever (about 1 month) is also compatible with a typical incubation period for a subacute endocarditis. Although antibiotic prophylaxis prior to low-risk endoscopic procedures in immuno-compromised patients with moderate risk cardiac lesions has not been a part of the mainstay therapy, it could be in fact prove beneficial to these patients once implemented as a routine procedure in the future if sufficient amount of clinical data accumulate. We hope that

this prophylactic management can prevent infective endocarditis, which is potentially a life-threatening disease. Furthermore, we encourage the reporting of similar cases since our knowledge of the contribution of upper endoscopy to infective endocarditis is scanty, and its prophylactic treatment is still a debated issue.

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