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*Enterococcus faecalis* infection of aortic graft without graft manipulation:

A case report

The names of the authors: Chang-Hua Chen, ¹* Ying-Cheng Chen²

Address of the authors:

The affiliations and addresses of the authors:

¹*Dr. Chang-Hua Chen,

Section of Infectious Diseases, Department of Internal Medicine, Changhua Christian Hospital, 135 Nanhsian Street, Changhua 500, Taiwan, R.O.C., e-mail: 76590@cch.org.tw

²Dr. Ying-Cheng Chen,

Section of Cardiovascular surgeon, Department of Surgeon, Changhua Christian Hospital, Changhua, 135 Nanhsian Street, Changhua 500, Taiwan, R.O.C., e-mail: 137448@cch.org.tw.
ABSTRACT

Introduction: We describe a rare case of aortic graft infection (AGI) due to Enterococcus faecalis (E. faecalis).

Case: A 61-year-old man was admitted emergently with a 3-days history of fever, chill, and myalgia. His remarkable past history was operation for aortic dissection at five years ago. Upon admission, he was febrile, and white blood cell count was 6,600/mm$^3$, and C-reactive protein was 14.68 mg/dL. On the 3rd admission day, the bacterium from blood was identified as E. faecalis. The ampicillin was exchanged to 2000 mg every 4 hours. The report of Gallium-67 (Ga-67) scan and single photon emission tomography (SPET) described increased accumulation of Ga-67 was noted in the aortic arch. AGI was diagnosed. Cardiovascular surgeons had been consulted to evaluate the surgical condition. The treatment course is smooth, and the total of antibiotics was prescribed for three months.

Conclusion: E. faecalis AGI is a life-threatening disease with devastating complications and a poor prognosis. In our patient, the infection was limited to the endograft. Cardiovascular surgeons should be involved to evaluate the operation in AGI patients. A Ga-67 scan and
SPET are helpful for diagnosis. We recommend high dose ampicillin and pay attention to the surgical correction to care all patients with *E. faecalis* AGI.

Keywords: *Enterococcus faecalis*, aortic graft, infection
INTRODUCTION

Aortic graft infection (AGI) is a rare and life-threatening disease. *Enterococcus faecalis* (*E. faecalis*) is a normal inhabitant of humans and relatively low-virulence, *E. faecalis* can cause serious infections [1]. The mortality associated with nonsurgical management of *Streptococcus pneumoniae* infectious aortitis may approach 90% [2]. Here we described a rare case of AGI due to *E. faecalis* without graft manipulation.
CASE PRESENTATION

A 61-year-old man was admitted emergently with a 3-days history of fever, chill, and myalgia. His remarkable past history was operation for aortic dissection at five years ago. An endograft was implanted without complications. Hence, he took warfarin and the international normalized ratio (INR) was controlled between 2 and 3. He also had a history of using the manure for farming about a week before the onset of symptoms. At initial, he presented with fever, and chills. Then he was brought to the emergency room of Changhua Christian Hospital, central Taiwan. There was no history of receipt of invasive procedures, or traumatic injury in recent three months. Upon admission, he was febrile with a temperature of 38.5 °C, blood pressure 128/80 mmHg, heart beat 92 per minutes, and respiratory rate 24 breaths per minute. Physically, no significant cardiac murmur was auscultated. Laboratory examination on admission revealed white blood cell count of 6,600/mm³, hematocrit 35.2%, platelet count 74,000/mm3, and C-reactive protein 14.68 mg/dL (<0.3 mg/dL). A chest X-ray showed that there are elongation and tortuosity of the thoracic aorta with cardiomegaly, no other abnormal pulmonary process or density, no pneumonia patch, and s/p surgical intervention with metallic wire suture
materials on the sternum. (Figure 1). Treatment was initially started with penicillin 3 mu every 6 hours and gentamicin 160 mg everyday after blood cultures performed. On the 3rd admission day, blood culture yielded positive, and the bacterium was identified as *E. faecalis* with the use of a Vitek-2 system (BioMérieux, Durham, N.C.). We exchanged penicillin into ampicillin 2000 mg every 6 hours. Cardiac echogram showed no vegetation, as well as liver echogram showed no liver abscess. For seeking the infectious foci, we arranged further examinations, including Gallium-67 (Ga-67) scan. The computed tomography (CT) showed no leak of contrast material from the graft (Figure 2). The report of Ga-67 scan and single photon emission tomography (SPET) described increased accumulation of Ga-67 was noted in the aortic arch (Figure 3). Clinically, AGI was suspected, and we adjusted the interval of ampicillin from every 6 hours into every 4 hours. Consultation of cardiovascular surgeon was arranged. No evidence of complications of AGI, including no aneurysm formation, no rupture of aorta, no bleeding from graft, no aortic thrombosis with embolization, no aortic dissection, no septic embolisms, no aortic insufficiency, and no acute coronary syndromes, and no need to operate immediately were answered. On the 6th admission day, he became
afebrile and follow-up blood culture became sterile. The follow-up laboratory data was WBC 12,900/mm$^3$, erythrocyte sedimentation rate (ESR) 49 mm/hr. He recovered well and was discharged on the 17$^{th}$ admission day. The follow-up laboratory data was WBC 6,600/mm$^3$, ESR 40 mm/hr. Then, he received oral amoxicillin 750mg every 8 hours. During the follow-up as an outpatient for two and half months, amoxicillin was discontinued until the ESR became normal. The follow-up blood culture did not grow *E. faecalis*, and he recovered well.
DISCUSSION

We describe a rare case of AGI due to *E. faecalis*. To establish an early diagnosis of AGI is extremely important, because this condition is potentially life-threatening. Here we described this patient who was diagnosed on the 4\textsuperscript{th} admission day. Because of no development of complications of AGI and early diagnosis and effective antibiotics and low-virulence of *E. faecalis*, we successfully treated this patient without surgical correction. The diagnosis is frequently delayed since clinical manifestations are usually nonspecific. The most important clue of early diagnosis is the history of cardiovascular operation, and no significant evidence of infection focus for *E. faecalis*, hence we focused at the aortic graft. The important diagnostic tools included CT scan, and Ga-67 scan and SPET. CT scan with contrast enhancement is widely available in most medical centers, but milder degrees of inflammation or wall edema may be missed. [3-4]. Increased accumulation of Ga-67 was noted in the aortic arch on 4\textsuperscript{th} admission day. In this patient, Ga-67 scan and SPET are more sensitive than CT scan.

Here, we reported one case report of AGI with *E. faecalis* infection. After literature review, various microorganisms have been associated
with infectious thoracic aortitis, most commonly Staphylococcal, Enterococcus, Streptococcus, and Salmonella species [5]. *E. faecalis* is an uncommon cause of graft infection. The *E. faecalis* could result from manure through the abrasion wound of hands. The *E. faecalis* is susceptible to ampicillin, and we used ampicillin for 3 months totally to eradicate *E. faecalis*. *E. faecalis* is relatively low-virulence, *E. faecalis* [1]. We thought the pathogenesis of this patient was that direct bacterial inoculation of *E. faecalis* at the time of minor trauma when using manure for farming, and *E. faecalis* seeding of an existing endo-graft.

Lopes described that antibiotic therapy in combination with complete surgical excision of the infected aorta is the best choice of treatment [5]. The intent of surgery is to confirm the diagnosis, control sepsis, control hemorrhage, and reconstruct the arterial vasculature [5]. Because he did not happen complications (including no evidence of aneurysm formation, no rupture of aorta, no bleeding from graft, no aortic thrombosis with embolization, no aortic dissection, no septic embolisms, no aortic insufficiency, and no acute coronary syndromes) and low-virulence of *E. faecalis*, he did not receive surgical manipulation. Our patient was treated with high-dose of ampicillin therapy alone. Bronze described that the
mortality associated with nonsurgical management may approach 90% if only aggressive antimicrobial therapy and no surgical approach [2].

CONCLUSIONS

*E. faecalis* AGI is a life-threatening disease with devastating complications and a poor prognosis. In our patient, the infection was limited to the endograft. Cardiovascular surgeons should be involved to evaluate the operation in high-risk patients. It is extremely important to establish an early diagnosis of ITA, because this condition is potentially life-threatening. The diagnostic key is clinical awareness with a high index of suspicion. The most important clue is the history of cardiovascular operation. Ga-67 scan and single photon emission tomography (SPET) are helpful for diagnosis. We recommend high dose ampicillin and pay attention to the surgical correction to care all patients with *E. faecalis* AGI.
Abbreviations

AGI: aortic graft infection; Ga-67 scan: Gallium-67 scan; SPET: single photon emission tomography; CT: computed tomography; INR: international normalized ratio; ESR: erythrocyte sedimentation rate.
Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.
Competing interests

Both of authors declare that they have no competing interests
**Authors' contributions**

Both C CH and C YC proved primary medical care to serve this patient. C CH analyzed the patient data regarding the infectious diseases and wrote this manuscript. Both authors read and approved the final manuscript.
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References


Figure legends  (temp)

Fig. 1

The chest plain film showed that there are elongation and tortuosity of the thoracic aorta with cardiomegaly, no other abnormal pulmonary process or density, no pneumonia patch, and s/p surgical intervention with metallic wire suture materials on the sternum.

Fig. 2

The chest CT showed no evidence of aortic aneurysm, and no gas formation of graft.

Fig. 3

The Gallium-67 scan and single photon emission tomography showed increased accumulation of Ga-67 was noted in the aortic arch.