Altay et al.

Case Report / Olgu Sunusu

A case of endovascular stent graft infection firstly seen made by *E. faecium* and *E. coli*; with an overview of subject

E. faecium ve *E.* coli'ye bağlı ilk kez görülen endovasküler stent greft enfeksiyonu ve konuya genel bakış

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ABSTRACT

Endovascular stent- graft use is superior to conventional surgery in aneurysm repair by short times of hospitalisation and returning to normal life. Infection is one of the major complications occuring after endovascular stent-graft administration. We present a stent graft infection caused by *Enterecoccus faecium* and *E.coli* together which is reported firstly and look over the approach to diagnose and medical treatment of a infection due to endovascular stent-graft surgery.

Key words: endovascular stent graft, stent graft infection, *E. faecium,* abdominal aort aneurysm

ÖZET

Anevrizma onarımında endovasküler stent greft kullanımı hospitalizasyon süresi ve normal yaşama dönme süresinin kısalığı nedeniyle konvansiyonel cerrahiye üstündür. Endovasküler stent greft uygulamasından sonra görülen en önemli komplikasyonlardan biri enfeksiyondur. Bu yazıda ilk kez *Enterecoccus faecium* ve *E.coli* birlikteliği ile ortaya çıkan stent greft enfeksiyonu sunduk ve endovasküler greft stent cerrahisine bağlı gelişen enfeksiyonun tanı ve medikal tedavisine yaklaşımı gözden geçirdik.

Anahtar kelimeler: endovasküler stent grefti; stent greft enfeksiyonu; *E. Faecium,* abdominal aort anevrizması

INTRODUCTION

Abdominal aort aneurisym is a progressive vascular disease that is chracterised by abnormal dilatation of subdiaphragmatic aorta (1). Although the cause is not known for the majority of the cases, inheritance, infections, trauma, hypertension, connective tissue diseases and smoking are the major risk factors determined. Many patients are asymptomatic and the disease is usually realised when examining another pathology, incidentally. It causes palpable abdominal mass, waist and stomach ache, weight loss, jaundice, melena and leg pain if it is symptomatic (1). Conventional surgery or endovascular stent graft surgery which is newly more popular are preferred for treatment (1). Endovascular stent- graft use is superior to conventional surgery by short times of hospitalisation and returning to normal life. It's an advantegous procedure especially in the population which conventional surgery cannot be made because they are elderly and having comorbidities (1,2). Infection is one of the major complications occuring after endovascular stent-graft administration (3). But infection rate is lower than conventional surgery (1). We aimed to present our patient having stent graft infection caused by *Enterecoccus faecium* and *E.coli* together which is reported firstly and to look over the approach to diagnose and medical treatment of a patient who had had an infection due to endovascular stent-graft surgery, by the way.

CASE REPORT

A 68 years old male has applied to our policlinic with intermittent high fever and trembling lasting for 8 months and nearly 30 kg weight loss during this time. He claimed that his fever was coming every four or five days and raising usually in the evenings with trembling. He told that he had undergone endovascular stent-graft operation at another hospital 9 months ago because an aneurisym had been incidentally detected at his abdominal aort and iliac artery by abdominal ultrasonography while he was staying at hospital because of prostatism. He had been well for a month after the operation until fever had begun. He was thought to have repeating E. coli bacteremia due to former prostat biopsy and had been given sulperazon for 14 days as the treatment. But his fever had repeated intermittently during the following months. He had been given several oral antibiotics and finally he was hospitalised by us to be investigated and treated.

His blood pressure was 120/80 mm Hg, body temperature was 36.5°C and pulse rate was 80/minute at first visit. He was conscious and general state was well. There was no pathological physical finding except bilateral inguinal scars due to prior surgery.

Initial test results were as follows: Hb: 9 g/dl , WBC: 14.000 /mm3(90% polymorphonuclear at peripheral blood smear), plt: 334.000 /mm3 ; CRP: 87 mg/dl , ESR: 71 mm/h. Liver enzymes were normal, BUN : 66 mg/dl and Cr : 1.5 mg/dl (because of chronic renal disease). There was no infiltration at chest X ray and no pyuria at his urine sample; also no growing at his urine culture. Thyroid function tests were normal. Brucella lam and tube agglutination tests were negative. Transthorasic ultrasonography did not show any vegetations at heart valvules. Only pathological results of the abdomen ultrasonography were enlarged prostate and cysts at bilateral kidneys. Occult blood test of faeces was performed two times and seen negative. After four days of normal body temperature, his fever raised over 38°C by trembling. *Enterococcus spp* was grown in 2 sets of blood cultures those were taken by fever . Vankomicin 1 gram q 12 h and gentamicin 80 mg q 12 h were begun. The microorganism was named Enterecocus faecium by API-Strep (BIOMERIEUX) test and was susceptible to penicillin, ampicillin/sulbactam, high level gentamicin, rifampicin and vancomycin by disc-diffusion test in standards of CLSI 2011 .

Daptomycin susceptibility was not studied . MIC was studied by E-test regarded to CLSI 2011 criteria. Penicillin MIC was measured as 24 µg/ml. The treatment was rearranged as ampicillin/sulbactam and gentamicin instead of vancomycin. Because endocarditis was excluded by transeosephagial echocardiography, gentamicin was stopped. Colonoscopy was performed to investigate the reason of enterococcus bacteremia. There wasn't any pathological finding except internal hemorroids. Contrasted abdominal computerised tomography (CT) was planned because he had been operated to place an endovascular graft to his aort aneurysm at another centre 8 months ago and stent infection was suspected. It couldn't be performed because he had chronical kidney disease.. His toracoabdominal aorta CT angiography of 1 month ago was reached . There was minimal collection of fluid including air zones around main body of the graft and mess at fat plans. Also adjoining gas echos were seen at each iliac frames of the stent by doppler ultrasonography (USG). Radiologist and cardiovascular surgeon consulted the imagings and the patient and stent graft infection was diagnosed. Surgery was not planned because of the high risk of mortality. So ampicillin/sulbactam treatment was continued. Because fever did not decline and acut phase reactants did not improve despite blood cultures were sterile, the treatment was rearranged at the 15th day as daptomycin which was known efficacious on enterococci and had biofilm effect (4). His fever declined under daptomycin treatment. But 36. day of total treatment and 22nd day of daptomycin, fever exceeded 39⁰C again with trembling and E. coli was isolated from blood cultures. Ceftriaxone was added conformably to the antibiogram. Fever declined at the third day. Control abdominal aort doppler ultrasonography did not show the previous iliac gas echos and central fluid collection . His fever repeated occasionally. After receiving a treatment of 8 weeks for enterococcus and 3 weeks for E.coli, he was discharged with amoxicillin/clavulanate 1 gr q 12 h and rifampicin 600 mg q24 h for suppression to be controlled regularly at his district.

DISCUSSION

Usually, open abdominal operations are known as the "gold standard method" for the treatment of abdominal aort aneurysms. The mortality rates of elective operations are reported between 1.4 - 5.3 % (2).But these rates may uprise to even 15% when there are multi organ problems having a potential to complicate this major surgical procedure. Thus, endovascular stent-graft applications have been being preferred instead of classical surgery because they have relatively low mortality and morbidity rates in older patients having multiorgan diseases besides abdominal aort aneurysm (5).

The majority of reports about complications of endovascular graft surgery is about noninfectious events, and they are often related to surgical techniques (1). The data about infectious complications is limited and new outcomes are needed to develop protocols on diagnosis and treatment.

Stent infection following endovascular stent graft operation was firstly reported by Chalmers in 1993 (6) and incidence is 0.2 - 0.7% (7). In another multicenter study , aortoiliac endograft infection rate is 0.4% (8). The biggest review made on this topic is belong to Numan at all. (3). Totally 117 endovascular stent graft infections reported between 1991-2010 have been reviewed and the data about agent microorganism, treatment approach and life spans has been assessed in details. The pathogen had been determined by several methods in 64 % of cases and *Staphylococcus* species were found to be the mostly seen ones. *Enterococcus* spp. was reported in 11 cases but there was no report of *Enterococcus faecium* which we had isolated in our case. Five of the 11 reported cases of *Enterococcus spp* were having a second microorganism isolated as an infection agent in that review. Coexistence of *E.coli* and *Enterecoccus* was seen in 2 cases while *E.coli*

was solitary found in 8 cases. So, this is the first case of stent graft infection by *E. faecium* in the literature.

Enterococci are found in gut, urethra, mouth, vagina and bile tract of humans. They are responsible from hospital or community acquired severe infections especially in patients those who are immuncompromised or have serious comorbid conditions (9). Obvious and increasing resistance to numerous antibiotics has heightened their clinical importance (10). Acquired resistance which can be seen to all agents used in treatment besides intrinsic resistance to many antibiotics makes the treatment problematic (11).

E.faecalis and E.faecium are the most infection causing subtypes. They are known to produce some proteins and other several molecules which enable them to adhere into heart valvules, renal cells and make up biofilms on vascular catheters. Vancomycin resistant *enterococci* (VRE) now account for about 30% of enterococcal infections, with most of them being *E. faecium* (>90%) (12).

To diagnose endovascular aort stent-graft infection requires extensive anamnesis and physical examination. The patient can apply with nonspesific findings like fever and weight loss like ours. İnitial laboratory findings are usually not enough for early diagnose. It's more rational to investigate the stent graft infection after excluding other infections.

CT is the first method to detect stent- graft infection while CT angiography is the most important technique to imagine other endograft complications. CT is accurate in diagnosis of advanced graft infection (eg, periprosthetic abscess, aortoenteric fistula) but not low-grade infection, with overall specificity of 100% and overall sensitivity of 55.5% (12). USG, MR and fluorodeoxyglucose positron emission tomography (FDG-PET) are the other imaging techniques (13,14). But much more studies are needed to compare these techniques for detection of infection of endovascular grafts.

Sometimes a fistula may accompany to endovascular stent- graft infections, even enteric fistulas may be the causes of infection. CT is reported to have 33-80% sensitivity for this occasion (15). If contrasted imaging techniques are contraindicated as it is for our patient, doppler ultrasonography may be useful for diagnosis. Imaging options shoul be estimated on the features of the case.

The most aproppriate way of treatment is removing of the graft. But when surgery is not applicable because of the comorbid situations as our patient has, conservative treatment is made which includes percutaneous drainage and antimicrobial treatment. There is no consensus on optimal antibiotherapy for conservative treatment receiving group. It's emphasized that chosen antibiotic should be effective on the pathogen agent, bactericidal acting and at high concentration as possible as it could be (16). But there is not enough data about treatment time. It' s suggested to decide it individually by assessing clinical response, acute phase reactants and imaging results (17).

Mortality rates of stent graft infection is quite high regardless to the treatment modality. The review of 117 patients' series made by Numan et al., thoracic and abdominal graft infection mortality is determined as 40.1%. This ratio is 30.1% for abdominal endovascular graft infection solely (3). Mortality rate of infections of iliac or aortic endovascular grafts was 27.4% overall and 36.4% for conservatively treated patients in another big study by Fiorani et al.(8).

Although infection is rare complication of endovascular stent surgery, it's hardly needed to develope new strategies fo getting over the treatment difficulties and reducing these high mortality rates. Treatment focused studies are increasing in correlation with improvement of interventional radiology. In fact, to take notice on preventional measures is more rational than treatment options for this issue. The rules of sterilisation/ disinfection and surgical prophylaxis are as valid as they are for open surgical operations. Multidisciplinary approach of cardiovascular surgeon, radiologist and infectious diseases specialist is necessary for the

treatment if infection exists. Optimal treatment modality can be chosen by this way. Individually evaluation of each patient is the more reliable way till treatment protocols are developed on the results of enough data.

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