Case report - Cardiac general

Prostatic abscess associated with \textit{Bacteroides fragilis} mediastinitis after heart surgery

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Abstract

Anaerobic mediastinitis after cardiac surgery is a rare and poorly understood condition. We observed a patient with diabetes and myelodysplastic syndrome who developed \textit{Bacteroides fragilis} mediastinitis in conjunction with a prostatic abscess, several days after coronary artery bypass surgery; this hitherto unpublished observation suggests that suppurative infection of the genito-urinary tract may constitute a portal of entry for postoperative anaerobic mediastinitis in predisposed patients.

Keywords: Coronary artery bypass grafts; Mediastinal infection; Complication; Infection; Comorbidity

1. Introduction

Mediastinitis is a severe complication after coronary artery bypass grafts (CABG) surgery, with a reported incidence ranging between 1 and 2.5\% [1]. The most frequent pathogens are coagulase negative staphylococci (mainly found in chronic obstructive pulmonary disease or obese patients with sternal dehiscence), staphylococcus aureus (often resulting from preoperative contamination of the mediastinum), and aerobic gram-negative rods caused by spread from distant infectious sites [1]. Very rare cases of \textit{Bacteroides} species mediastinitis have been described after cardiac surgery. This gram-negative anaerobic pathogen has a high propensity to disseminate from distant suppurative sites [2].

2. Case report

A 66-year-old diabetic patient suffering from a myelodysplastic syndrome was admitted for management of unstable angina pectoris. A severe triple-vessel coronary disease was diagnosed, indicating emergent surgical revascularization. Preoperative assessment showed normal left ventricular contractility, elevated cardiac enzymes (Troponin I: 13.81 ng/ml; CPK: 378 IU/l) and C-reactive protein (7.09 mg/dl), normal leucocytosis (6700/\mu l), and mild thrombocytopenia (9.5\times10^9/\mu l).

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CABG through median sternotomy was performed the day after admission, using the left internal mammary artery and two saphenous vein grafts. A 16 Fr transurethral bladder catheter was inserted immediately before surgery. Prophylactic Cefazolin was given for 24 h.

On the second postoperative day, the patient developed high grade fever (40°C) with polyplea. Urinary symptoms were absent. A diagnosis of pneumonia was made, and Cefepime (6 g daily) was started. Sputum samples grew \textit{Serratia marcescens}. Urine culture was negative.

On the fifth postoperative day, the patient remained febrile despite respiratory improvement. At that time, purulent discharge was noticed at the lower part of the sternotomy wound. Blood cultures and sternal wound smears both grew \textit{Escherichia coli} and \textit{Bacteroides fragilis}.

Surgical debridement was performed; a purulent collection was evacuated, then drainage tubes were inserted into the mediastinum for daily irrigation with an iodine solution. The intraoperative bacteriology samplings confirmed the presence of \textit{E. coli} and \textit{B. fragilis}; antibiotic therapy was shifted to Ceftriaxone (2 g daily) and Metronidazole (1.5 g daily).

Due to unexpected recovery of anaerobic organisms from the mediastinum, a search for a primary focus of anaerobic infection was made; clinical, radiological and fibrescopic investigations allowed to exclude any dental, oropharyngeal, or digestive infection process. Computerized tomography (CT) scanning of the pelvis disclosed a low-density area in the left prostatic lobe compatible with a prostatic abscess (Fig. 1). Consistently, transrectal ultrasound revealed well-defined fluid collection within the prostate gland.
On day 14 (after seven days of targeted antibiotic therapy), a transurethral prostate resection was performed. Local fluctuation within the prostate was present at rectal palpation. During procedure, abundant discharge of purulent material from the left prostatic lobe was observed. Gram stains revealed polymorphonuclear cells and gram-negative bacilli which did not grow in culture media. Additionally, suspected neoplastic tissue was found in the right lobe (adenocarcinoma subsequently confirmed on histology).

Mediastinal irrigations were continued for three weeks. The patient progressively became afebrile and drainage tubes were removed from the mediastinum on day 48. Antibiotics were discontinued after six weeks of treatment. After prolonged rehabilitation for recovering from a critical illness polyneuropathy, he was discharged from hospital on day 95 with no sign of residual infection.

3. Discussion

Bacteroides fragilis is a gram-negative anaerobic bacillus that is commonly found in the gastrointestinal tract. It is involved in mixed (aerobic and anaerobic bacteria) suppurative infections, mainly in the gastrointestinal or urogenital tract, and has a high rate of induction of bacteremia [2]. After bacteremia, it may lead to infections in areas of low oxygen tension far from the original portal of entry [3].

To date, only four cases of Bacteroides species mediastinitis have been reported after median sternotomy incision, including two cases of B. fragilis, one case of B. rumicola, and one case of B. oralis [3–5]. Presumed sources of bacteremia in these involved oral mucosal injury during intubation in prior surgery [4], and aspiration pneumonia [3]. Perioperative use of cefepime as well as treatment with broad spectrum antibiotics were considered as contributing factors [3], since B. fragilis resist beta lactam antibiotics by producing the enzyme beta-lactamase [6].

Similarly, our patient received cefepime in the perioperative period; aspiration pneumonia or oral mucosal injury however was not documented before the occurrence of mediastinitis. A prostatic abscess, by contrast, was evidenced by ultrasound and CT imaging, and confirmed during transurethral prostate resection. Concurrent recovery of E. coli (in addition to Bacteroides fragilis) from the blood and mediastinum cultures further argues in favour of prostatic abscess as a causal factor for mediastinitis, since E. coli is also a common pathogen of urogenital tract. Accordingly, gram-negative bacilli were identified from prostatic abscess, although these did not grow at culture, probably due to prolonged antibiotic therapy before drainage procedure and/or difficulties in maintaining strict anaerobic conditions.

Prostatic abscesses are often difficult to diagnose because clinical symptoms are non-specific or even absent [7]; they mainly affect diabetic and immunosuppressed patients, and the most frequent pathogens are E. coli, Staphylococcus and anaerobes (mainly Bacteroides) [6, 7]. Polymicrobial infections involving Bacteroides and coliforms are common [6]. Also, anaerobes have a peculiar propensity to develop after transurethral instrumentation, and prostate gland is a common source for anaerobic bacteremia after transurethral catheterisation [6].

Several risk factors commonly associated with postoperative mediastinitis were also present in our patient, including diabetes and use of internal mammary artery. Additionally, myelodysplastic syndrome (with its neutrophil dysfunction) may also have predisposed to prostatic infection and/or its spread in the surgical site during the postoperative period [8].

Our observation underlines the need for anaerobic cultures in case of mediastinitis after cardiac surgery, specially when cefepime or gentamicin antibiotics have been used before. Anaerobic mediastinitis should prompt investigations to disclose undrained distant abscess, and appropriate antimicrobial and surgical therapy should be instituted. As illustrated by this case, unrecognised genitourinary tract infection may constitute a portal of entry for anaerobic mediastinitis in predisposed patients.

References