Reactive Arthritis Caused by Urinary Tract Infection

Yuji Nishizaki¹, Shinichiro Yamagami², Hisashi Inoue³, Yuki Uehara⁴, Shigeto Kobayashi⁵ and Hiroyuki Daida¹

Abstract

We report the case of a 58-year-old man presenting with chest pain who underwent percutaneous coronary intervention (PCI). The patient subsequently developed a fever over 38°C, pain on micturition, and cloudy urine 3 days following PCI. Urine cultures were positive for *Escherichia coli* and *Enterococcus faecalis*, whereas blood cultures were negative. Arthritis occurred two weeks following urinary tract infection (UTI). We herein present a rare case of reactive arthritis caused by UTI following PCI.

Key words: catheter-associated urinary tract infection, *Enterococcus faecalis*, *Escherichia coli*, percutaneous coronary intervention, reactive arthritis

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Introduction

Reactive arthritis (ReA) is defined as arthritis occurring following an infection despite the inability to culture pathogens from fluid extracted from the affected joints. ReA is an uncommon inflammatory joint disorder that typically occurs in young adults (1). Although urogenital infection by *Chlamydia trachomatis* is commonly associated with ReA (2), *Escherichia coli* (*E. coli*) and/or *Enterococcus faecalis* urinary tract infections (UTIs) are conditions that very rarely cause ReA. We herein report an unusual case of a 58-year-old man who developed ReA following *E. coli* and *Enterococcus faecalis* UTI following percutaneous coronary intervention (PCI).

Case Report

A 58-year-old man presented at the outpatient clinic of the cardiovascular department of our hospital with dyspnea on exertion. He had baseline dyslipidemia and hypertension and a history of cholelithectomy for cholelithiasis. He had experienced lower back pain several times in his thirties, but it resolved without any treatment. There was no appreciable family history relevant to this case. After the initial consultation, he was admitted to our hospital for coronary angiography as he also complained of chest pain at rest. The coronary angiography results revealed 99% stenosis of the left anterior descending coronary artery. PCI was successfully performed with a bare metal stent placed in the left anterior descending coronary artery. At 3 days following PCI, the patient developed a fever of over 38°C, pain on micturition and cloudy urine. Although blood cultures were negative, urine cultures were positive for *E. coli* (≥10⁷ colony forming units/mL) and *Enterococcus faecalis* (≥10⁵ colony forming units/mL), which we assumed to be a urethral catheter-associated UTI due to the placement of a urethral catheter during PCI. Targeted intravenous antimicrobial therapy was administered for nine days and the patient was subsequently discharged from our hospital without any further complications.

The patient began to complain of cervical pain approximately 2 weeks following the treatment for UTI. He was admitted to a neighboring hospital with a chief complaint of difficulty in walking due to right Achilles enthesitis and left knee joint pain. A definitive diagnosis was not established; however, he was treated with prednisolone (PSL) and methotrexate based on suspected connective tissue disease.

¹Department of Cardiology, Juntendo University Graduate School of Medicine, Japan, ²Department of Cardiology, Institute of Sasaki Foundation, Kyoudou Hospital, Japan, ³Department of Orthopaedic Surgery, Juntendo University Graduate School of Medicine, Japan, ⁴Department of General Medicine, Juntendo University Graduate School of Medicine, Japan and ⁵Department of Internal Medicine, Juntendo University Koshigaya Hospital, Japan

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Correspondence to Dr. Yuji Nishizaki, ynishiza@juntendo.ac.jp
ReA is associated with a number of infectious agents. The most common enteric bacterial pathogens are *Yersinia*, *Salmonella*, *Shigella*, *Campylobacter*, and *Clostridium difficile*. Other pathogens reported to cause the development of ReA include *Chlamydophila pneumoniae* (1). In patients with bladder cancer, intravesical *Bacillus Calmette-Guerin* (BCG) treatment has also been reported to be a rare cause of ReA (3).

Although *Chlamydia trachomatis*, *Ureaplasma urealyticum*, and *Mycoplasma genitalium* are commonly associated with ReA in urogenital pathogens (1), *E. coli* and/or *Enterococcus faecalis* are very rare. To the best of our knowledge, ReA triggered by *Enterococcus faecalis* has not yet been reported. Renou et al. reported the case of a young woman with acute oligoarthritis associated with bilateral anterior uveitis following an episode of UTI caused by *E. coli* (4). There are a number of reports of ReA caused by *E. coli* UTI (5, 6).

In the present case, ReA may have been caused by a urethral catheter-associated UTI. *E. coli* and *Enterococcus* have been reported as typical causative pathogens in catheter-associated UTI (7). Furthermore, an advanced age is known to be a risk factor for catheter-associated UTI (8). Moreover, many patients receiving PCI are middle-aged or older. For the reasons discussed above, we believe more attention should be paid to the risk of a catheter-associated UTI and ReA following PCI despite the uncommon clinical manifestations in this case.

The association between HLA-B27 and bacterial antigens is suspected of being one of the causes of ReA through increased responsiveness of cytotoxic T lymphocyte to autoantigens (9). Whereas specific bacteria such as *Chlamydia*, *Yersinia* and *Salmonella* are thought to induce ReA attributing to their individual characteristics, the association between ReA and *E. coli* and/or *Enterococcus faecalis* as was shown in the present case is very rare. Lipopolysaccharide (LPS) is believed to be associated when the mechanism of ReA caused by *E. coli* is considered. LPS in synovial tissue can induce the secretion of a range of inflammatory cytokines, largely via the nuclear factor-κB pathway, such as IL-8 from chondrocytes. It also induces the production of monocyte chemotactic protein, and enhances the secretion of neutrophil chemotactic protein.

Regarding the long-term prognosis of ReA caused by *Chlamydia trachomatis*, *Yersinia*, *Salmonella*, which are typical pathogenic bacteria, the data, categorized by family and species, are as follows: arthralgia: *Chlamydia trachomatis* 68%, *Yersinia* 20%, *Salmonella* 20%; recurrent arthritis: *Chlamydia trachomatis* 38%, *Yersinia* 6%, *Salmonella* 22%; chronic arthritis: *Chlamydia trachomatis* 17%, *Yersinia* 4%, *Salmonella* 19%; radiologic sacroilitis: *Chlamydia trachomatis* 49%, *Yersinia* 20%, *Salmonella* 14% (10). As for *E. coli* and/or *Enterococcus faecalis*, further accumulation of data

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Figure 1. Plain radiography demonstrating bony sclerosis, joint space narrowing, and partial ankylosis of both sacroiliac joints (Grade 3).

The symptoms resolved with treatment and the patient was discharged; however, further treatments were commenced at the outpatient orthopedic department of our hospital at the patient’s request.

At the initial consultation, the patient reported pain affecting the right shoulder joint, the left knee joint, both ankle joints, and Achilles tendinitis. Plain radiography revealed Grade 3 sacroilitis (Fig. 1). Blood laboratory examinations were negative for rheumatoid factor, anti-nuclear antibodies, and positive for HLA-B27 (HLA-B*27:04/HLA-B*54:01).

A diagnosis of ReA was established based on the following observations: The arthritis occurred 2 weeks following treatment for the UTI and, other causes of arthritis including septic arthritis, inflammatory bowel disease, crystal-induced arthritis, rheumatoid arthritis, and systemic lupus could all be excluded based on the clinical history and laboratory findings.

According to this diagnosis, methotrexate, commenced by the other clinic, was suspended following the initial consultation at our hospital, and 12 mg/day of PSL was administered, tapering the dosage by 1 mg every 2 weeks until discontinuation at 8 months. Anterior uveitis occurred during treatment and was successfully treated with an intraocular glucocorticoid injection. At the last outpatient clinic visit, slight lower back stiffness remained, but it was adequately controlled with the oral administration of NSAIDs. Fig. 2 demonstrates the treatment strategy and changes in the serum C-reactive protein (CRP) levels.

In the present case, we considered that baseline axial spondyloarthritis (SpA) was present due to persistent lower back stiffness, a mildly increasing CRP level, the grade 3 sacroilitis found in Fig. 1 and the existing anterior uveitis. The onset of ReA revealed the presence of baseline axial SpA. Treatment with biologics is discussed for SpA, but patient consent has not yet been obtained.
Figure 2. The time course of development of arthritis and enthesitis, treatment strategies, and changes in the serum C-reactive protein levels. Cervical pain, enthesitis of the right Achilles tendon, and arthritis affecting the left knee joint initially developed with right shoulder pain, arthritis of both ankle joints, and enthesitis affecting the left Achilles tendon subsequently developing. At the last outpatient clinic, slight stiffness affecting the lower back was observed. PSL: prednisolone.

and their analyses should be conducted because the data on the long-term prognosis of ReA caused by *E. coli* and/or *Enterococcus faecalis* as was shown in the present case are insufficient.

In the present case the patient was diagnosed with reactive arthritis, but the validity of our conclusion was limited by the possibility that the baseline axial SpA was exacerbated and manifested itself as a result of a urinary tract infection.

In conclusion, we herein presented a rare case of a middle-aged male patient who presented with ReA caused by an *E. coli* and/or *Enterococcus faecalis* UTI following PCI.

The authors state that they have no Conflict of Interest (COI).

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References