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Escherichia Coli Septic Arthritis of A Shoulder in A Uremic Patient ： A Case Report

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Abstract

Infections are common causes of morbidity in the chronic renal failure population, but infectious arthritis is rarely encountered. Septic arthritis is usually of hematogenous origin and is increasingly being reported in elderly patients, who often have underlying medical conditions such as diabetes or rheumatoid arthritis. *Escherichia coli* septic arthritis is rare and usually occurs in patients with underlying systemic disorders. We report a case of *Escherichia coli* monoarthritis and a concomitant urinary tract infection with *Escherichia coli* sepsis in a uremic patient and consider the prevalence, possible predisposing factors and treatment for the infection. (J Intern Med Taiwan 2005; 16: 241-245)

Key Words ： Escherichia coli, Septic arthritis, Uremia

Introduction

Septic arthritis is usually of hematogenous origin[1]. There is usually an infectious focus, which predisposes to the infection of the joint and underlying pathology in the affected joint. Septic arthritis in the elderly is frequently described in the literature[2] and has a worse prognosis than that in the younger age group with high incidence of osteomyelitis, secondary arthritis and a higher mortality rate[3]. There are often underlying medical conditions such as diabetes, malignancy, chronic renal failure, rheumatoid arthritis and alcoholism[4]. We described a 76-year-old patient with diabetes mellitus complicated with end stage renal disease who developed Escherichia coli

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bacteremia and septic arthritis of a shoulder. Rarely, Escherichia coli may cause septic arthritis, which usually involves the hip and is associated with hematogenous cause or with intraabdominal abcesses.

A case report

The 76 year-old man has been diagnosed as type 2 diabetes mellitus complicated with end stage renal disease and had been on a regular hemodialysis for more than ten years. He came to the emergency department to report chills, fever and anorexia that had been lasted for two days without further symptoms. Physical examinations on admission, the patient was alert and oriented with the weight was 50 kg, the blood pressure of 120/70 mmHg, and pulse was 101/min without orthostatic change. In addition, his oral temperature was 39.4 ℃.

He reported to have no history of hypertension, gouty arthritis or viral hepatitis in the past. He had arteriovenous fistula of his right upper arm for five years along with hemodialysis. He denied unknown allergies to medications, smoking and ethanol abuse. His general condition was good and he had a good hemodialysis quality with adequate control of calcium - phosphate product, serum albumin, KT/V. Bedsides, he used low dose insulin injection for sugar control and erythropoietin injection for anemia. His daily urine output was less than 50 cc after starting hemodialysis.

The patient was alert, awake and oriented based on physical examinations on admission. His skin was moist and warm, and there was no rash or petechiae. The neck was supple, and lungs and heart were normal. In the abdomen, liver and spleen were non-palpable. There was no knocking pain over bilateral kidneys and no tenderness after prostate massage.

Laboratory investigations revealed a hemoglobin of 11.7 g/dl, a white cell count of 9670 /ul (88 % neutrophils, 5 % lymphocytes, and 5 % monocytes) and a thrombocytopenia of 73000 /ul; blood urea nitrogen, blood creatinine, blood glucose, and C-reactive protein were 66 mg/dl, 9.1 mg.dl, 180 g/dl, and17.2 mg/dl, respectively. The liver enzymes, electrolytes and stool routine were within normal. Urinalysis after Foley catheter insertion showed trace protein, trace occult blood, positive urine nitrite, and RBCs 5-10, WBCs > 100, and visible bacteria on high power filed. Under the diagnosis of urinary tract infection, the patient was initially given intravenous Cefazolin 1 gm every day.

Two days after admission, the urine and blood culture grew *E. Coli*; the organism was sensitive to all antibiotics tested except ampicillin and piperacillin. Four days after admission, the patient complained about gradually increasing pain and swelling of the right shoulder. The pain was constant and radiated from the right shoulder to elbow. Mobility was severely restricted because of severe pain. Physical examinations revealed mild swollen over right side shoulder with local heat and tenderness. The condition got worse the next day though no significant finding on X-ray of right side shoulder. The erythrocyte sedimentation rate was 110 mm/hour. Yellow cloudy synovial fluid was aspirated from right shoulder and laboratory study showed that: WBC was 46200 /mm3 (PMNs: 92 %, monocyte: 6 %, and lymphocyte: 2%) and RBCs were 400 /mm3. Many PMNs and Gram-negative bacilli were found in Gram's stain. The antibiotics was switched to ciprofloxacin 200 mg every day. *E. coli* grew subsequently from synovial fluid and showed same sensitivity pattern with that of *E. coli* cultured from urine and blood previously. Repeated blood cultures were sterile. The orthopedist consulted believed that a repeat aspiration should be done instead of arthroscopy. X-ray of right side shoulder was followed, and it showed periarticular erosion and osteoporotic change over right humeral head and mild wideness over right shoulder joint space (Fig. 1). Patient was discharged under a stable condition with limitation of movement over right upper arm.

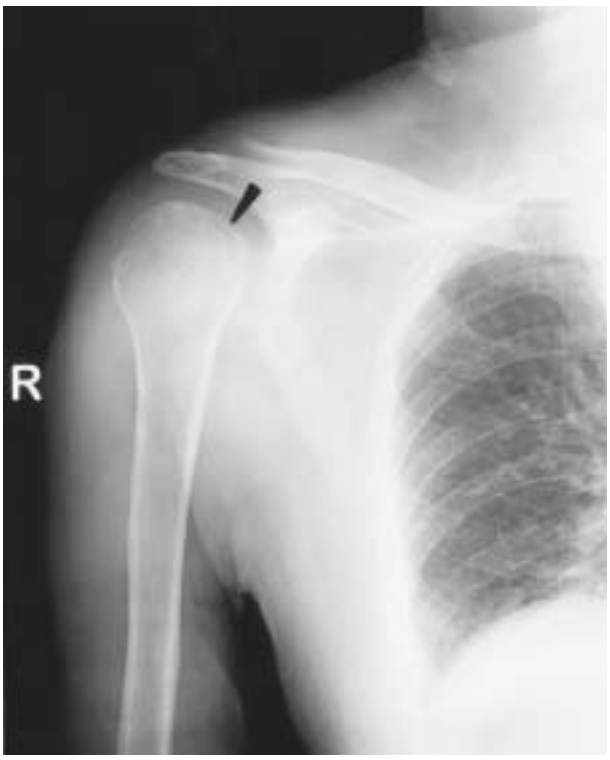

Fig.1.Peri-articular erosion and osteoporotic change in the right humeral head (arrow line) and mild widening of right shoulder joint space

Discussions

Bacterial arthritis is the most rapidly destructive joint disease. The yearly incidence of bacterial arthritis varies from 2 to 10 per 100000 in the general population to 30-70 per 100000 in patients with rheumatoid arthritis and in patients with joint prostheses [3,6,7]. Irreversible loss of joint function develops in 25-50 % of patients [7,8]. Despite better antimicrobial agents and improved hospital care, the case fatality rate for bacterial arthritis has not been changed substantially in the past 25 years, ranging from 5 % to 15 %.

We present a case of spontaneous bacterial arthritis in a patient with end stage renal disease. E. coli was isolated from both the urine, blood and the joint fluid, which suggests that the route of infection was hematogenous because the sensitivity was all the same. The most common route of spread is hematogenous seeding of a joint during a transient bacteraemia [1,4]; and other routes include trauma or inoculation as during steroid injections. Infection may develop from direct injection of synovial space or by direct extension from infected bone.

Table 1.The most common bacteria in septic arthritis (% of cases from three countries)

Bacterium	England and Wales	Australia	France
S aureus	40	37	56
All streptococci	28	21	10
S pneumoniae	10	1	0
Group A	8	16	9
Other	10	4	1
All gram-negative bacilli	19	4	16
H influenzae	7	1	0
E Coli	6	1	9
Pseudomonas	2	1	4
Other	4	1	3
N gonorrhoeae	0.6	12	3
Anaerobes	1.4	3	2

Staphylococci are the most common organisms that cause bacterial arthritis in adults. In three recent large series (Table 1) [5,9,10] Staphylococcus aureus was the primary cause of bacterial arthritis in 40 % of cases from Wales and England [9], 37 % of cases from tropical Australia [10] and 56 % of case from France [5]. S aureus cause 80 % of joint injections in patients with concurrent rheumatoid arthritis along with diabetes [1,4]. Lancefield group A β-hemolytic streptococci are the next most common bacterial isolated from septic joints in adult (Table 1). Arthritis caused by gram-negative bacilli is uncommon [11]. The most frequent are *pseudomonas* organisms and *E. coli*. Gram-negative bacilli are common causes of bacterial arthritis in intravenous drugs users, in the elderly, and in seriously immunocompromised hosts. *E. coli* arthritis is extremely rare and is usually monoarthritis, most involving the hip then knee and shoulder. It may also cause sacroiliitis in one report [12]. *E. coli* arthritis is usually suppurative, though cases of emphysematous septic arthritis have been reported [13]. Gram-negative bacilli and *Haemophilus influenzae* are the most common pathogens in newborn and in all children under the age of 5 years. Anaerobes are sometimes involved

in prosthetic joint infections and in diabetics who developed septic arthritis. Generally, bacterial invasion of the joint leads to suppurative arthritis and usually in one joint. Certain bacteria (such as *Neisseria gonorrhoeae*) and viruses may involve multiple joints during bacteremic or viremic stage.

Host factors that predispose to bacterial arthritis include the aged people, decreased immunocompetence and preexisting joint disease. With the age of more than 80 years, diabetes mellitus and rheumatoid arthritis were found to be important independent risk factors in a large-scale prospective study from Netherlands [14]. In a study by Goldenberg et al. [11], thirteen cases of septic arthritis caused by gram-negative bacilli, and two thirds of patients had systemic or local predisposing factors. These factors were diabetes mellitus, neoplasia, sickle cell anemia, parenteral drug abuse, rheumatoid arthritis, osteoarthritis, and cirrhosis of the liver.

The clinical presentation of *E. coli* septic arthritis shows no different from other causes of bacterial arthritis. History and physical examinations are sometimes sufficient to make a diagnosis. Other parameters that might be helpful are a complete blood cell count, erythrocyte sedimentation rate, and roentgenogram. Arthrocentesis is the tool to establish definite diagnosis and to identify the infecting microorganism. Synovial fluid analysis should include gram stain, culture, leukocyte with differential count, and crystal examination under polarized microscope [15]. Lavage may be necessary if no material can be aspirated from the patient. The use of blood culture methods for culture of synovial fluid has been suggested to increase the yield of microbes[16].

Antimicrobial therapy should be started immediately. Usually, *E. coli* is sensitive to most antibiotics such as ampicillin, sulfamethoxazole-trimethoprim, aztreonam, antipseudomonal penicillin, cephalosporins and imipenem [17]. Although the optimal length of therapy has not been established, most authorities recommend treatment for a minimum of 4 to 6 weeks. Intraarticular antibiotic instillation is not required. It may cause a chemical synovitis. Many joints can be drained with closed needle aspiration, and daily aspiration may be necessary at first [18]. Arthroscopy is often preferred in knee or shoulder infections for more adequate irrigation and better visualization of joint. If joint drainage cannot be maintained by needle aspiration or arthroscopy, open surgical drainage is necessary [9,10]. Immediate joint mobilization (eg, by means of continuous passive motion devices) will prevent contractures and promote nutrition to the articular cartilage[19].

The outcome of bacterial arthritis has not changed much in the past few decades despite more effective antibiotics and improved methods of joint drainage. Permanent joint damage develops in 50% cases and mortality is 10-16% [5,9,10]. The outcome is directly related to host factors, such as prior joint damage, and to virulence of the infecting organism. Physicians must always take into account septic arthritis in the high priority in evaluating any acute arthritis.

References

1.Goldenberg DL. Septic arthritis. Lancet 1998; 351: 197-202.
2.Gavet F, Tournadre A, Soubrier M, Ristori JM, Dubost JJ. Septic arthritis in patients aged 80 and older: a comparison with younger adults. J Am Geriatr Soc 2005; 53: 1210-3.
3.Vincent GM, Amirault JD. Septic arthritis in the elderly. Clin Orthop Relat Res 1990; 241-5.
4.Gristina AG, Rovere GD, Sho ji H. Spontaneous septic arthritis complicating rheumatoid arthritis. J Bone Joint Surg Am 1974 Sep; 56: 1180-4.
5.Kanndrop CJE, van Schaardenburg D, Krijnen P, habbema JDF, 6 Le Dantec L, Maury F, Flipo RM, et al. Peripheral pyogenic arthritis. A study of one hundred seventy-nine cases. Revue Rheum 1996; 63: 103-10.
6.Van de Laae MAFJ. Risk factors for septic arthritis in patients with joint disease. A prospective study. Arthritis Rheum 1995; 38: 1819-25.
7.Goldenberg DL, Reed JI. Bacterial arthritis. N Engl J Med 1985; 312: 764-71.
8.Yu LP, Bradley JD, Hugenberg ST, Brandt KD. Predictors of mortality in non-post-operative patients with septic arthritis. Scand J Rheumatol 1992; 21: 142-4.
9.Ryan MJ, Kavanaugh R, Wall PG, Hazelman BL. Bacterial joint

infections in England and Wales: analysis of bacterial isolates over a four year period. Br J Rheumatol 1997; 36: 370-3.
10.Morgan DS, Fisher D, Merianos A, Currie BJ. An 18 year clinical review of septic arthritis from tropical Australia. Epidemiol Infect 1996; 117: 423-8.
11.Goldenberg DL, Brandt KD, Cathcart MD. Acute arthritis caused by gram-negative bacilli: a clinical characterization. Medicine 1974; 53: 197-208.
12.Berg AS, Strampfer MJ, Cunha BA. Escherichia coli sacroiliitis: report of a case and review of the literature. Heart Lung 1988; 17: 371-3.
13.Bliznak J, Ramsey J. Emphysematous septic arthritis due to Escherichia coli. J bone J oint Surg 1976; 58: 138-9.
14.Kaandorp CJE, van Schaardenburg D, Krijnen P, Habbema JDF, van de Laae MAFJ. Risk factors for septic arthritis in patients with joint disease: a prospective study. Arthritis Rheum 1995; 38: 1819-25.
15.Swan A, Amer H, Dieppe P. The value of synovial fluid assays in the diagnosis of joint disease: a literature survey. Ann Rheum Dis 2002; 61: 493-8.
16.Kortekangas P, Aro HT, Lehtonen OP. Synovial fluid culture and blood culture in acute arthritis. A multi-case report of 90 patients. Scand J Rheumatol 1995; 24: 44-7.
17.Shirtliff ME, Mader JT. Acute septic arthritis. Clin Microbiol Rev. 2002; 15: 527-44.
18.Ho G Jr. How best to drain an infected joint: will we ever know for certain? J Rheumatol 1993; 20: 2001-3.
19.Hamel A, Guillard S, Rogez J M. The place of immobilization during treatment of septic arthritis. Retrospective review of a series of 28 children treated with and without immobilization. J Bone Joint surg 2003; 85: 255.

尿毒症病人合併大腸桿菌感染細菌性肩關節炎：一病例討論

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摘　要

傳染病常常好發於慢性腎臟衰竭病患，但是感染性關節炎卻是極少見的併發症。感染性關節炎通常是血行性傳染引起且好發於年紀大的病患，尤其是有合併內科疾病者，例如糖尿病、風濕性關節炎。大腸桿菌感染細菌性關節炎是極少見的疾病，但常見於有系統性疾病的病人。我們在此報告一尿毒症病人有大腸桿菌感染引起泌尿道敗血症且續發合併有單一細菌性關節炎，並且討論盛行率、好發因素及相關治療方法。