

Systemic Lupus Erythematosus and *Neisseria gonorrhoea* A Case of the Arthritis-dermatitis Syndrome

KD Vaughan¹, AM Aquart²

INTRODUCTION

Systemic lupus erythematosus (SLE) is a systemic disease characterized by arthritis among other protean manifestations. Occasionally lupus flares occur and is associated with increasing joint pains. In this state, complement is activated and leads to precipitation of immune complexes. Neisserial infections are cleared by complement and so in the presence of deficient complement, these infections will flourish. Disseminated gonococcal infection (DGI) occurs infrequently. A case of *Neisseria gonorrhoea* presenting as the arthritis-dermatitis syndrome which mimicked a lupus flare is presented and the appropriate literature reviewed.

Keywords: *Neisseria gonorrhoea*, systemic lupus erythematosus

CASE REPORT

A 30-year old woman known to have SLE for the past 12 years, controlled on prednisone 10 mg/day, methotrexate 15 mg weekly, folic acid 5 mg/day, hydroxychloroquine 200 mg/day, diclofenac, famotidine and aspirin presented to her physician with a four-day history of fever, pain in most joints with swelling of the right wrist, ankle and thigh. She was thought to have a lupus flare and had dexamethasone 8 mg intramuscularly and prednisone 60 mg orally. This relieved her symptoms only temporarily. She presented 24 hours later with worsening pain and very active swelling of the involved joints along with dysuria. She denied any vaginal discharge. She had been with a new sexual partner for the past six months and had not been using a barrier contraceptive. As she had not responded to the high dose of steroid, it was thought that a lupus flare was unlikely and a septic or gouty arthritis had to be excluded. She was therefore referred to the Emergency Department of the hospital.

Examination revealed a temperature of 37°C, pulse 110/min with normal blood pressure and respiration. The right wrist was swollen, tender over the dorsum extending into the hand with pain on extension of the fingers. The right ankle was similarly swollen over the dorsolateral aspect with painful range of movements. She had no generalised skin

rashes, however, the right thigh had an erythematous macule on the anterior aspect. There were no pustules. A diagnosis of septic arthritis was made. The wrist was aspirated and the turbid fluid admixed with blood was sent for Gram stain, culture and sensitivity testing.

Initial investigations showed a haemoglobin of 12.6 gm/dL, white cell count of $17.5 \times 10^9/L$ with a neutrophilia. The erythrocyte sedimentation rate (ESR) was 87 mm/hr, CRP of 23.3 mg/dL (normal < 0.5 mg/dL) and C3 levels of 103 mg/dL (normal 90–180 mg/dL). Blood cultures were sterile. Urea, electrolytes, creatinine and bleeding indices were all normal. An endocervical swab was not done. Serological test for syphilis, the VDRL, was negative as was that for HIV. She was started on intravenous ceftriaxone 1 gm daily while awaiting full identification of the organism. Her wrist and dorsum of the hand were drained surgically and the ankle aspirated. The gram stain from the wrist aspirate showed gram negative cocci which were later identified as *Neisseria gonorrhoea* with broad susceptibility to a number of antibiotics including penicillin. Therapy was continued with norfloxacin, doxycycline and metronidazole.

DISCUSSION

Disseminated gonorrhoeal infection occurs in 1–3% of patients with gonorrhoeal infection and usually presents in one of three forms (1). The first is an arthritis-dermatitis syndrome with tenosynovitis, a non-purulent arthritis and dermatitis. The tenosynovitis usually involves several tendons (1–3). Skin lesions occurring in gonorrhoeal infections range from classic embolic lesions, haemorrhagic macules, papules, necrotic lesions and palmar maculopapular rashes (2, 3). In its acute presentation, there is usually fever, malaise and chills in the arthritis-dermatitis syndrome.

The second form is a purulent arthritis without skin lesions. Patients are usually afebrile and the polyarthritis is usually asymmetrical. There may be overlap with these two distinct presentations (1). The third rare form involves systemic spread which may cause meningitis, pericarditis with tamponade, endocarditis, and hepatitis among other systemic involvement (2–5). In pregnancy, a high index of suspicion is required to make the diagnosis of DGI; such patients may present with migratory joint pains. The index case represents a classic case of the arthritis-dermatitis syndrome.

Patients with SLE are predisposed to particular organisms such as salmonella, streptococcus and neisseria (3). This predisposition is due to a number of factors such as corticosteroid and immunosuppressive therapy, the low levels of

From: ¹Division of Orthopaedics, Department of Surgery, Radiology, Anaesthesia and Intensive Care, and ²Department of Medicine, Faculty of Medical Sciences, The University of the West Indies, Kingston 7, Jamaica, West Indies.

Correspondence: Dr KD Vaughan, University Hospital of the West Indies, Kingston 7, Jamaica, West Indies, Fax: (876) 927-2101, e-mail: vaughan.kenneth@hotmail.com

circulating complement as well as a reticuloendothelial system which is saturated with immune complexes (6).

The mechanism for the susceptibility to *Neisseria gonorrhoea* involves the effects of C3 and C4 on the precipitation of immune complex solubility or on their processing through cell surface c4b/c3b receptors on phagocytes (7). Disseminated neisserial infections are common in patients lacking the constituents of the terminal membrane attack complex that are important in causing lysis of these organisms (7). The relationship between hypocomplementaemia and gonococcal infection is so strong that it has been suggested that gonococcal septicaemia in a patient is an indication to screen for complement deficiency (8–10).

This case highlights the clinical difficulty in differentiating an acute flare from an infection. Failure to respond to increased immunosuppressive therapy with the increased dosage of corticosteroid is suggestive of an alternative diagnosis. Complement levels can also aid in this differentiation. In lupus flares, serum complement levels are often decreased. The C-reactive protein (CRP) level is similarly used with levels being elevated in infections and normal or mildly elevated in lupus flare with the exception of flares with serositis (8). The CRP was markedly elevated in this case in keeping with an infection.

Mitchell *et al* (6) have suggested that disseminated neisserial infection with SLE is often seen in female patients with renal disease and hypocomplementaemia. The index case had normal renal function and a normal C3 complement level. Despite the disseminated nature of the infection, blood cultures are likely to be negative (11). Positive cultures are best obtained by culturing the primary sites of infection. The negative blood culture in this case may be the result of starting antibiotics before blood cultures were taken.

With the prevalence of resistant *N gonorrhoea*, the first choice of antibiotics is usually a cephalosporin. For DGI, parenteral antibiotics for 24–48 hours using any of the following: ceftriaxone, cefotaxime or ceftizoxime are recommended (12). This is followed by oral therapy with culture specific antibiotics for a week. This usually results in eradication of the organism. Presumptive treatment for chlamydia trachomatis should be routine (13).

Purulent arthritis usually requires open drainage or arthroscopic washout followed by a more prolonged course of antibiotics. Immunosuppressive therapy for SLE must be continued. The prognosis is usually good for recovery of full joint function. Occasionally, joint destruction may occur as a result of delayed diagnosis or inadequate treatment.

This case is a timely reminder of the association between SLE and *Neisseria gonorrhoea* infection. The role of complement in both is well known. In the SLE patient, not all episodes of joint pains should be attributed to a lupus flare, but the predisposition of SLE patients to DGI must always be remembered, especially when associated with elevated levels of CRP.

REFERENCES

1. Cucurull E, Espinoza LR. Gonococcal arthritis. *Rheum Dis Clin North Am* 1998; **24**: 305–22.
2. Fraser HS, Figueroa JP, James OBO'L, Liburd AL, Nicholson GA, Whitbourne F et al. Gonococcaemia with arthritis, dermatitis and myocarditis. *Postgrad Med J* 1974; **50**: 759–64.
3. Tikly M, Diese M, Zannettou N, Essop R. Gonococcal endocarditis in a patient with Systemic Lupus Erythematosus. *Br J Rheumatol* 1997; **36**: 270–2.
4. Martín MC, Pérez F, Moreno A, Moral A, Alvarez MA, Méndez FJ et al. *Neisseria gonorrhoea* meningitis in pregnant adolescent. *Emerg Infect Dis* 2008; **14**: 1672–4.
5. Coe MD, Hamer DH, Levy CS, Milner MR, Nam MH, Barth WF. Gonococcal pericarditis with tamponade in a patient with system lupus erythematosus. *Arthritis Rheum* 1990; **33**: 1438–41.
6. Mitchell SR, Nguyen PQ, Katz P. Increased risk of neisserial infections in systemic lupus erythematosus. *Semin Arthritis Rheum* 1990; **20**: 174–84.
7. Ruddy S. Rheumatic diseases and inherited complement deficiencies. *Bull Rheum Dis* 1996 **45**: 6–8.
8. Raychaudhuri M, Peall A, Page C, Browning M. A case of duplicitous diplococci. *Sex Transm Infect* 2009; **85**: 441–2.
9. Ellison TR III, Curd JG, Kohler PF, Reller LB, Jackson FN. Underlying complement deficiency in patients with disseminated gonococcal infection. *Sex Transm Dis* 1987; **14**: 201–4.
10. McWhinney PHM, Langhorne P, Love WC, Whaley K. Disseminated gonococcal infection associated with deficiency of the second component of complement. *Postgrad Med J* 1991; **67**: 297–8.
11. Potts DW. Poor Yield of *Neisseria Gonorrhoea* From Blood Culture. *Arch Intern Med*. 1981; **141**: 546–7.
12. Workowski KA, Berman SM. Sexually transmitted diseases treatment guidelines, 2006. *MMWR Recomm Rep* 2006; **55**: 1–94.
13. Wroblewski KA, Levine WC. Sexually transmitted diseases treatment guidelines, 2002. *MMWR Recomm Rep* 2002; **51 (RR-6)**: 63–4.