Rare coexistence of gouty and septic arthritis: a report of 14 cases

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Abstract

Objective

To analyse the characteristic features of patients with coexistence of gouty arthritis and pyarthrosis at our university hospital in southern Taiwan, an area with high prevalence of hyperuricemia and gout.

Methods

A retrospective chart review was performed for patients who had concomitant gouty and septic arthritis from July 1998 to June 2008. Clinical and laboratory data of these patients were analysed. Furthermore, a comparison was made with published cases in English literature.

Results

Fourteen cases with coexistence of gouty arthritis and pyarthrosis have been identified during the past 10 years. There were 13 male and 1 female, all of Han Chinese in ethnicity, with ages ranging from 45 to 85 and an average of 63.7 years. At disease presentation, there were 11 oligoarticular cases (78.6%), 2 monoarticular cases (14.3%) and 1 polyarticular case (7.1%). Ankle and knee joints were most commonly involved. Bacteriological analyses demonstrated gram-positive cocci in 12 cases, of these 10 were oxacillin-sensitive Staphylococcus aureus *(71.4%). Multiple tophi deposition was noted in 13 patients (92.9%) and among them 11 patients (84.6%) had associated chronic kidney disease.*

Conclusion

Different clinical presentations and bacteriological characteristics have been identified in the present series. While the mechanisms responsible for such a coexistence remain to be elucidated, these cases underline the importance of thorough evaluation of the aspirated synovial fluid. Our report adds a novel insight into the understanding of the clinical and microbiological manifestations of such a rare concurrence of gouty and septic arthritis.

Key words

Gouty arthritis, septic arthritis, *Staphylococcus aureus*.

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Introduction

Gout is caused by the deposition of monosodium urate (MSU) crystals in and around joints with clinical manifestations including acute gouty arthritis, tophi deposition in joints, chronic arthropathy and renal complications such as renal calculi and renal insufficiency, as well as chronic comorbidities including obesity, diabetes, hypertention and coronary heart disease (1, 2). Although gouty arthritis is an ancient disease and its management is largely based on empirical practice, there are increased evidence-based recommendations for treatment of acute and chronic gouty arthritis (3). Furthermore, the national evidence-based guidelines for the management of such patients have been developed (4). Taiwan, located in the Western Pacific off the southeast coast of China, is a world-famous high prevalence area of hyperuricemia and gout (5). A large series study from northern Taiwan area demonstrated a changing clinical pattern with earlier age of onset, a greater frequency of familial gout and proportionally more female involvement (6). Moreover, there were increased reports of unusual concomitant gout and infection such as septic arthritis and necrotizing fasciites in that area (7, 8). Polyarticular gout and septic arthritis can both induce fever and swollen, warm, erythematous joints (1, 9). To distinguish them from each other is difficult, and bacterial cultures as well as Gram stain are necessary to rule out septic arthritis. Even in the ready presence of MSU crystals, microorganisms identified later from the aspiration of gouty joints have been documented. Although this phenomenon has not frequently been recognised clinically, a 15-year report in analyzing such cases was demonstrated from a university hospital located in northern Taiwan area (7).

There is no available report of concomitant gouty arthritis and pyarthrosis in southern Taiwan. In the present study, we performed a retrospective 10-year chart review from 1998 to 2008 from our university hospital located within southern Taiwan (10). Different clinical observations and bacteriological analyses have been identified in the patients who had coexistent gouty and septic arthritis. Our report adds a novel insight into the understanding of clinical and microbiological manifestations of the rare coexistence of gouty arthritis and pyarthrosis.

Patients and methods

Patients

A retrospective chart review was performed from July 1998 to June 2008 for patients who had gouty arthritis and/or pyarthrosis and were admitted to the National Cheng Kung University Hospital. The diagnosis of gouty arthritis was made according to the 1977 American Rheumatism Association Criteria (11). The coexistent gouty and septic arthritis was defined in those patients who had concomitant positive bacterial culture and MSU crystal in aspirated synovial fluid from the same joints. Permissions were obtained from our institutional review board for this retrospective study.

Clinical and laboratory assessments

Clinical and laboratory data in these patients were analysed, including age/sex, presence of fever, involved joints with duration of attacks, associated medical conditions, surgical procedures, disease outcome, synovial fluid white cell counts with differentials and bacteriological analyses including microorgamism identification and Gram stain, and blood culture. Furthermore, a comparison was made with published cases from northern Taiwan and other patients reported in English literature (7, 12-28). The comparative features contained demographic characteristics, clinical presentations, survival outcome and microbiological analyses.

Results

Fourteen patients altogether met the required definition of concomitant positive bacterial culture and MSU crystal in aspirated synovial fluid from the same joints. Their demographic, clinical and laboratory characteristics and bacteriological analyses were shown in Table I. There were 13 male and 1 female, all of Han Chinese in ethnicity, with ages ranging from 45 to 85 and an average of 63.7±10.9 years. Fever was noted in 10 out of 14 patients (71.4%).

Table I. Clinical and laboratory data of 14 patients with concomitant gouty and septic arthritis at the National Cheng Kung University Hospital from 1998 to 2008.

No.	Age Sex	Organism	Fever	Gram stain	Joint fluid WBC count (neutrophil %)	Involved joints with duration	Associated systemic diseases	Surgery	Outcome
1	60 Male	*Pseudomonas aeruginosa*	No	Nil	ND	Ankles, 2 weeks	Tophaceous gout, CKD	Bilateral amputation	Survived
2	52 Male	Streptococcus Group G	Yes	GPC	ND	Rt. Knee, Rt. Ankle, 3 days	Tophaceous gout, CKD, DM	Nil	Survived
3	47 Male	ORSA	Yes	GPC	ND	Rt. Wrist, Ankles, Knees, 3 days	Tophaceous gout, CKD	Nil	Death
4	85 Male	OSSA	Yes	GPC	ND	Rt. Knee, 2 days	Tophaceous gout,	Nil	Death
5	61 Male	OSSA	Yes	GPC	85,000 (94%)	Ankles, 3 days	Tophaceous gout,	Nil	Survived
6	45 Male	OSSA	Yes	GPC	13,700 (87%)	Ankles, 5 days	Tophaceous gout	Nil	Survived
7	59 Male	*Klebsiella pneumoniae*	Yes	Nil	49,000 (87%)	Lt. Ankle, Lt. Knee, Rt. Elbow, 1 week	Tophaceous gout, CKD	Debridement	Survived
8	67 Male	OSSA	No	GPC	11,610 (99%)	Lt. Knee, Lt. Ankle, 1 week	Tophaceous gout, CKD	Debridement	Death
9	81 Female	OSSA	No	GPC	ND	Rt. Ankle, 2 weeks	Tophaceous gout, CKD	Nil	Survived
10	68 Male	OSSA	Yes	GPC	ND	Rt. Knee, Rt. Ankle, 2 days	Tophaceous gout, CKD	Debridement	Survived
11	66 Male	OSSA	Yes	GPC	ND	Rt. Elbow, Rt. Ankle, 10 days	Tophaceous gout, CKD, DM	Nil	Death
12	71 Male	OSSA	No	Nil	ND	Rt. MTPs (1st to 3rd), 1 week	Tophaceous gout, CKD	Debridement	Survived
13	65 Male	OSSA	Yes	GPC	23,600 (97%)	Rt. Elbow, Knees, 10 days	Tophaceous gout CKD	Debridement	Survived
14	65 Male	OSSA	Yes	Nil	81,700 (96%)	Rt. Knee, Rt. Ankle, 4 days	Nil	Nil	Survived

GPC: gram-positive coccus; CKD: chronic kidney disease, GFR <60 ml/ min and/or kidney damage; DM: diabetes mellitus; MTP: metatarsophalangeal joint; ND: not done; ORSA: oxacillin-resistant *Staphylococcus aureus*; OSSA: oxacillin-sensitive *Staphylococcus aureus*.

The numbers of joints involved at disease presentation were oligoarticular in 11 cases (78.6%), monoarticular in 2 cases (14.3%) and polyarticular in only 1 case (7.1%) with the duration ranging from 2 days to 2 weeks and an average of 6.5±4.0 days. The most commonly involved joint area was ankle (78.6%), followed by knee (57.1%) and elbow (21.4%). Except for the patient No.14, the other 13 patients had the gout history for more than 10 years. The most common associated conditions were tophi deposition in 13 cases (92.9%), followed by chronic kidney disease in 11 cases (78.6%) and diabetes mellitus in 3 cases (21.4%). The surgical managements included debridement in 5 cases (35.7%) and amputation in one case (7.1%). The disease outcome was improvement and survival in 10 cases (71.4%). The synovial white cell counts were done in 6 cases with numbers varying from 11,610 to 85,000/mm^3 and an average of 44,102±30,306, and a classification dominant in neutrophil (87 to 99%). The bacteriological analyses demonstrated gram-positive cocci in 12 cases including oxacillin-sensitive *Staphylococcus aureus* in 10 patients (71.4%), oxacillin-resistant *Staphylococcus aureus* (ORSA) in one patient (7.1%), group G streptococcus in one patient (7.1%), and gram-negative bacilli in 2 cases including *Pseudomonas aeruginosa* in one patient (7.1%) and *Klebsiella pneumoniae* in another patient (7.1%). Positive gram stains of joint fluid samples were found in 10 cases (71.4%) and positive blood cultures were in case no. 1, 3, 4, 5, 8, 11 and 13 (50%).

Table II demonstrated the comparison of our patients with earlier reported cases. There were similar demographic data with male predominance; however, the average age was slightly younger in the series reported from northern Taiwan. The oligoarticular presentation was frequently seen in our patients and those observed in English literature outside Taiwan, and rarely polyarthritis in all series. Although the ankle is the most commonly affected joint in our cases, knee joint involvement is frequently observed in all series. Tophi deposition was noted in most patients reported from northern and southern Taiwan areas. Possibly due to the high frequencies of associated systemic diseases such as chronic kidney disease, the survival outcome was slightly lower in the present series. Gram-positive

Table II. Comparative features of concomitant gouty and septic arthritis in different reported series.

Reference	Southern Taiwan	Northern Taiwan	English Literature
Year	1998-2008	1987-2001	1971-2008
Case number	14	30	23
Clinical evaluation			
Age (Average)	45~85 (63.7)	30~83 (52.8)	47~84 (66.3)
Sex (Male)	92.9%	86.7%	82.6%
Fever	71.4%	66.7%	69.6%
Monoarthritis	14.3%	90%	52.2%
Oligoarthritis	78.6%	10%	43.5%
Polyarthritis	7.1%	0%	4.3%
Knee involvement	57.1%	80%	65.2%
Ankle involvement	78.6%	20%	13%
Tophus deposition	92.9%	83.3%	13%
Survival outcome	71.4%	93.3%	91.3%
Bacteriological study			
GPC	85.7%	76.7%	65.2%
Staphylococcus aureus	78.6%	53.3%	36.4%
OSSA / ORSA	10/1	9/7	6/2

GPC: gram-positive coccus, OSSA: oxacillin-sensitive *Staphylococcus aureus*; ORSA: oxacillin-resistant *Staphylococcus aureus*.

cocci were identified in most infected joints with oxacillin-sensitive *Staphylococcus aureus* as the leading microorganism in southern Taiwan.

Discussion

In spite of the rare copresence of gouty arthritis and pyarthrosis in English literature, some characteristic features have been observed (7, 12-28). Fever was a usual clinical feature at initial presentation, and the knee joint was commonly involved in all reported series. Subcutaneous tophi deposition is often observed in patients with gout from southern Taiwan, and the foot is a commonly accumulated part (29, 30). Since the Tropic of Cancer runs across the middle of our island, southern Taiwan has a tropical climate with higher temperature and a popular local footwear custom with sandals or slippers. The exposed foot with tophi deposition is susceptible to injury with abrasion and subsequently prone to bacterial infection, which could explain much more ankle involvement (78.6% *vs*. 20% and 13%) in our series. The oligoarticular presentation was frequently seen in our patients and those reported outside Taiwan, and polyarticular involvement was hardly seen in all series. Gram-positive cocci were identified in most of the aspirated joint fluid, and oxacillin-sensitive *Staphylococcus aureus* was the most commonly isolated microorganism (71.4%) in southern Taiwan.

Several mechanisms for simultaneous occurrence of gouty and septic arthritis have been reported (12, 13, 28, 31). Joint sepsis brings about an increased local production in lactic acid by influx neutrophils with a fall in pH, and subsequently results in decreased sodium urate solubility and further crystal precipitation (13). Factors other than pH such as certain plasma proteins and polysaccharides altered by the septic process could also contribute to the precipitation of MSU crystals (31). Our reported cases had a long-term gout history and multiple subcutaneous tophi deposition, and these patients were vulnerable to local trauma with ulceration and subsequent susceptibility to *Staphylococcus aureus* infection. Most likely, staphylococcal bacteremia leads to metastatic infection in inflamed joints with intraarticular crystal deposition. Indeed, most (53.8%) of our patients with tophi deposition had positive blood culture. Furthermore, the first case report of gouty arthritis complicating pyarthrosis from the Temple University Hospital in 1971 had clinical manifestations very similar to our patients (12). In that report, an 84-year-old male victim of gout for 15 years with multiple tophaceous deposits had inflamed right knee, followed by left knee arthritis and fever. The joint aspiration revealed MSU crystals, and oxacillin-sensitive *Staphylococcus aureus* was identified from both synovial fluid and blood cultures. In addition, the underlying systemic diseases such as chronic kidney disease and diabetes mellitus could predispose our patients to septic arthritis, and the MSU crystal-induced local environment abundant with inflammation and effusion could provide the milieu for the accumulation of blood-borne microorganisms and growth of bacteria (28).

Septic arthritis is an emergent rheumatological problem due to its rapidly destructive process and high mortality and the diagnosis acumen is required to distinguish if it concurs with gouty arthritis. As bacterial and gouty arthritis resemble each other clinically, some efforts have been tried to use quick laboratory tests as the diagnostic aids for bacteriological examinations (32). Although the diagnosis of acute gouty attack could be immediately reached by the identification of MSU crystals from the joint aspiration, these crystals might not be the sole answer to the arthritis presentation. Therefore, if clinical suspicion of the concomitant bacterial arthritis is high, it is imperative to treat with empirical antibiotics first (33). While the coexistence of pyarthrosis and gouty arthritis is clinically unusual, our patients had a chronic history of gout with multiple tophaceous deposition and a high association with chronic kidney disease, and presented with fever and oligoarthritis involving the ankle and/or knee joints.

In conclusion, fourteen cases of the coexistent gouty and septic arthritis have been reported. While the mechanisms responsible for such a coexistence remain to be elucidated, these patients underline the importance of thorough evaluation of the aspirated synovial fluid from acutely inflamed joints. The diagnosis of isolated gouty arthritis, even in the presence of synovial MSU crystals, should be carefully made after the exclusion of coincident infection in high risk patients.

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