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Short Research Communication

Methicillin Resistant Staphylococcus Aureus Sacroiliac Joint Septic Arthritis in an Adult Patient Treated with Daptomycin

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Abstract

Sacroiliac joint septic arthritis is a rare disease entity representing 1-2% of all cases of septic arthritis. Establishment of the diagnosis is often challenging given the non-specific presenting features and the potential cross-over with other pathologies. We report the case of a 50 year old gentleman who suffers with psoriasis and presented with sacroiliac joint septic arthritis complicated by Methicillin Resistant Staphylococcus Aureus (MRSA) bacteraemia and an iliopsoas abscess. This was successfully treated conservatively with a course of the novel antibiotic Daptomycin.

Key words: Pyogenic sacroilitis, Psoas abscess, Daptomycin

Introduction

Acute Sacroiliac joint pyogenic infections are rare and account for 1-2% of orthopedic infections[1]. Up to 60% of these patients have predisposing risk factors such as previous trauma, immune deficiency, intra-venous drug abuse, pelvic inflammatory diseases and pregnancy.

MRSA has been implicated as a causative pathogen in pyogenic sacroiliac infections since 2007[2]. Most of the reports however are of cases in children and adolescents with limited reports in adults[3,4]. The case outlined in this report adds to the body of knowledge by highlighting the difficulty in diagnosing the infection in patients with inflammatory arthropathy and by challenging the long-held belief that all such cases require surgical intervention. In addition we believe the report demonstrates the efficacy of Daptomycin in the treatment of Orthopaedic infections related to MRSA.

Case report

We report the case of a 50-year-old gentleman who presented to the accident and emergency department at our institution with a 2 week history of malaise, fever and lower back pain. He had a longstanding history of Psoriasis. His examination revealed a fever of 39^{o}C and he was tender on palpation over the left side of the lower back and left sacroiliac joint. His range of left hip movements was normal and pain free.

Radiographs of the lumbosacral spine and sacroiliac joints demonstrated evidence of lumbar spondylosis and reduced disc space between L5 and S1 (Figure 1).

Laboratory investigations revealed raised inflammatory markers with a C-reactive protein of 324 mg/L (Normal 0-10), White blood cell count of 18x 10^9 /L (Normal 4-11) and a neutrophilia of 14.9x10^9 /L (Normal 2.0-7.5). Blood cultures taken at

the time were subsequently found to be positive for MRSA infection.

Despite the evidence pointing towards sepsis as a cause for the gentleman's symptoms, preliminary examination and investigations failed to identify a clear focus for this. An MRI scan of the lumbosacral spine and pelvis was requested on the presumption that this was the most likely source of the infection.

Figure 2 shows the MRI scan of the lumbosacral spine demonstrating degenerative changes in the L5-S1 disc with reactive endplate changes. There was no MRI evidence of spondylo-discitis.

MRI images extended over the pelvis revealed a left iliopsoas collection measuring 7x4 cm with inflammatory changes and oedema involving the Iliacus muscle and extending into the left groin. There was a fluid collection inside the left sacroiliac joint (Figure 3).

A CT scan was also performed to further evaluate the sacroiliac joint and showed erosive changes within the left sacroiliac joint (Figure 4). This may have been secondary to the infective process but equally there was a suggestion that these changes may be secondary to sacroiliac joint arthritis secondary to Psoriasis.

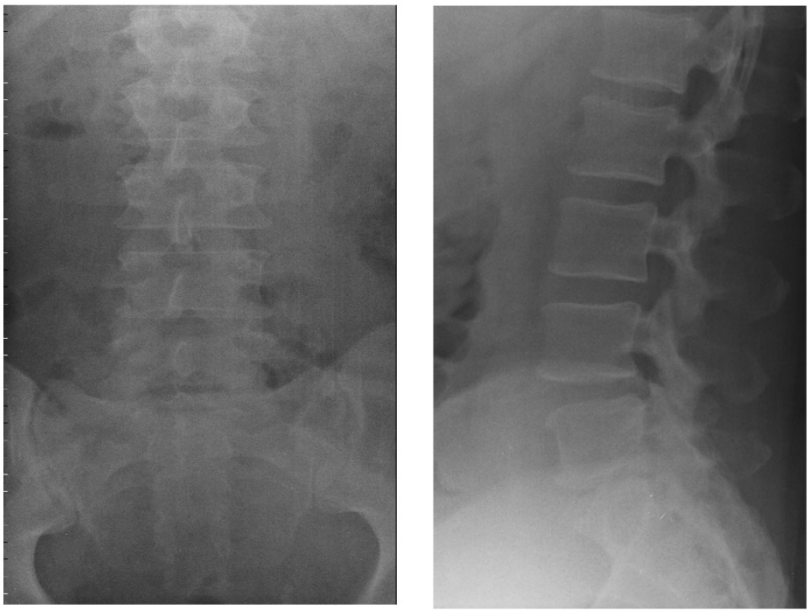

Figure 1. AP and lateral views for lumbosacral spine and sacroiliac joints.

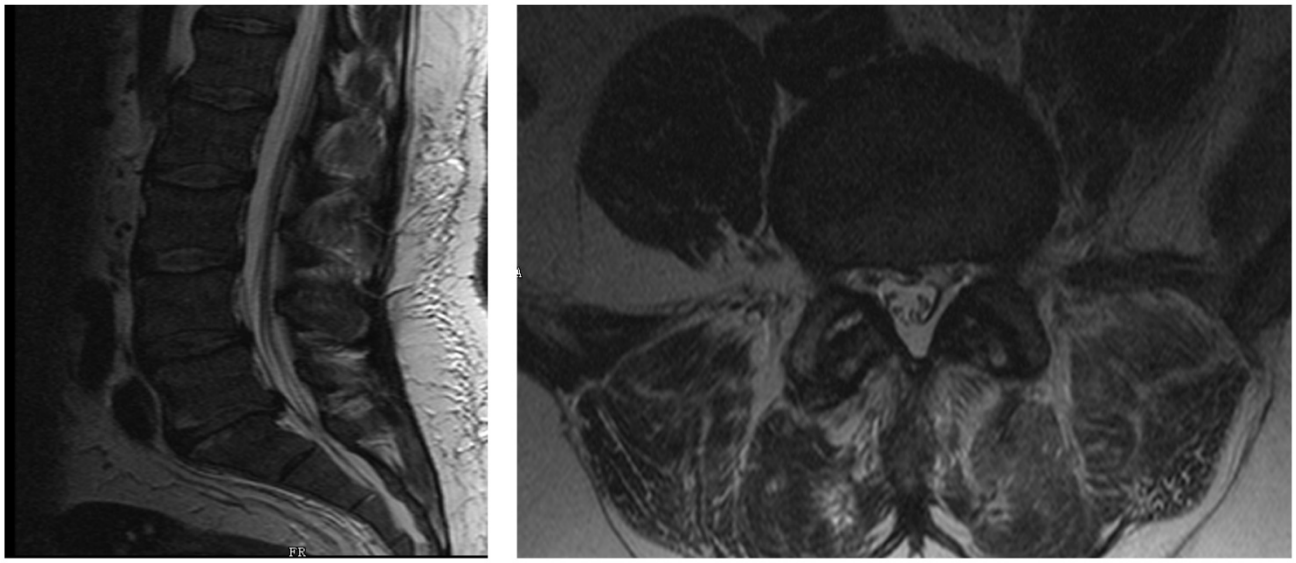

Figure 2. Sagittal and axial MRI images showing no evidence of discitis, only degenerative changes in L5-S1 disc.

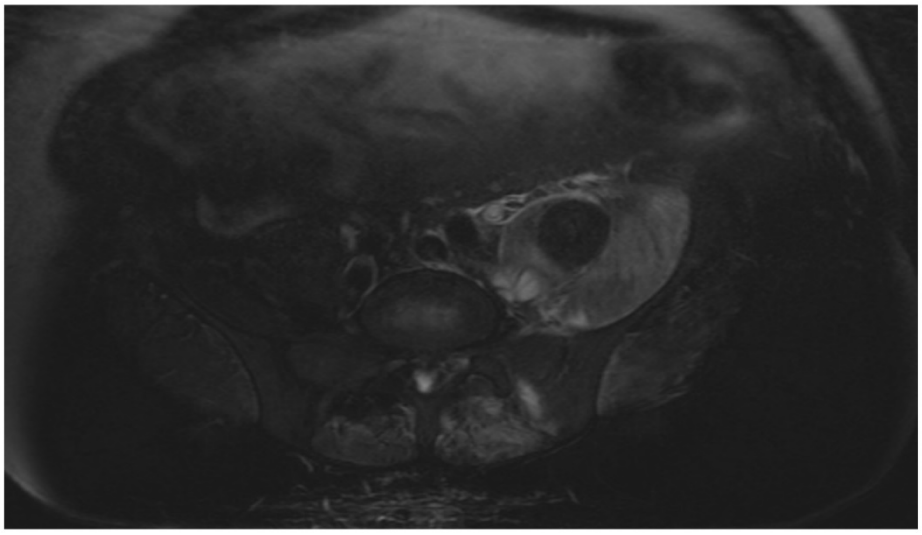

Figure 3. Axial MRI T2 weighted Image showing the large iliopsoas abscess.

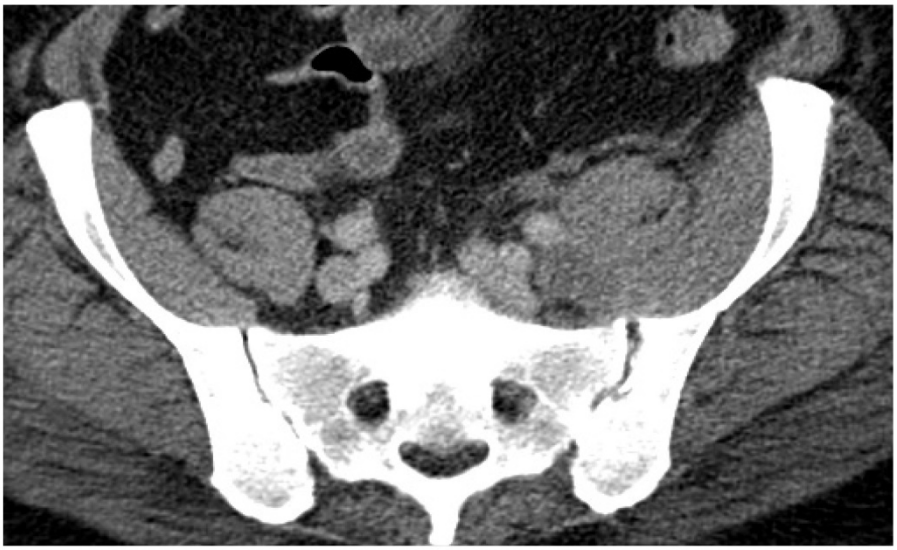

Figure 4. Axial CT showing sclerosis and erosion of sacroiliac joint.

The patient had been commenced on intravenous Vancomycin and Linezolid on the basis of the blood cultures. This was following the recommendation of the microbiology consultant. The basis for an aggressive first line combined treatment was the absence of a clear septic focus prior to the MRI findings and the abnormally high inflammatory markers. He was however unable to tolerate this regimen and developed severe diarrhoea. The treatment was converted to Daptomycin on the advice of the microbiologists.

Following the findings of the MRI scan a surgical opinion was sought from the pelvic team who felt that access to the joint and the deep lying abscess was technically difficult. This was further compounded by the presence of active psoriatic plaques across the patient's abdomen and groin, impeding the surgical approach. In the context of the patient already having shown signs of improvement on the antibiotics, a decision was taken to continue to treat this gentleman conservatively. The patient did continue to improve and was treated with an 8 week course of Daptomycin in all. His inflammatory markers remained marginally high (CRP and ESR between 40-50) for a period after his treatment but this coincided with a flare up of his Psoriasis which was now being treated with Ultraviolet light therapy.

The patient had serial liver function and renal function tests, performed throughout his treatment with Daptomycin and these remained within normal range. The creatinine kinase (CK) was also normal. This was necessary whilst the patient was treated with Daptomycin due to the reported side effects such as myositis, acute renal failure secondary to

rhabdomyolysis and impairment of liver functions.

Serial follow up MRI scans demonstrated complete resolution of the Iliopsoas abscess and iliacus muscle oedema. The fluid collection within the SI joint also improved (Figure 5).

Clinically the patient's pain resolved and he was discharged. He was monitored in the outpatients department with serial MRI scans. He however developed claustrophobia over the course of his many scans and for this reason his final imaging was with a CT scan (Figure 6).

Discussion

Septic arthritis of the sacroiliac joint is a rare disease entity with non- specific symptoms and signs contributing towards the difficulty in diagnosing this condition. This can be further compounded by coexisting disease processes such as inflammatory arthritis and this has been demonstrated in the case reported above.

Cases of sacroiliac joint infections in adults have been reported in the literature since the early nineties[5]. It has been postulated that infections in the pelvic area occur due to the sluggish circulation in the venous plexus of Batson. This coupled with the slow sub-chondral circulation initiates infections on the iliac side of the sacroiliac joint. Once the sacroiliac joint infection is established there are different directions of spread. The common routes taken are along the iliopsoas tendon, into the hip joint or the lower spine[6].

Staphylococcus Aureus has been reported as the commonest causative organism in sacroiliac joint infections and this is in keeping with most other orthopedic infections. Blood cultures from our patient revealed infection with MRSA. Methicillin is a semi-synthetic group of penicillin that was introduced in the 1960s to overcome the resistance that Staphylococcus Aureus had developed to the conventional penicillin. It has an additional acyl group on the beta lactam ring that gives it resistance to the penicillinase enzyme produced by the organism[7].

Resistance to Methicillin is attributable to the mec A gene, which is a component of the staphylococcus cassette chromosome (SCC). This gene encodes for the expression of an alternative penicillin binding protein PBP2a that renders Methicillin ineffective[8].

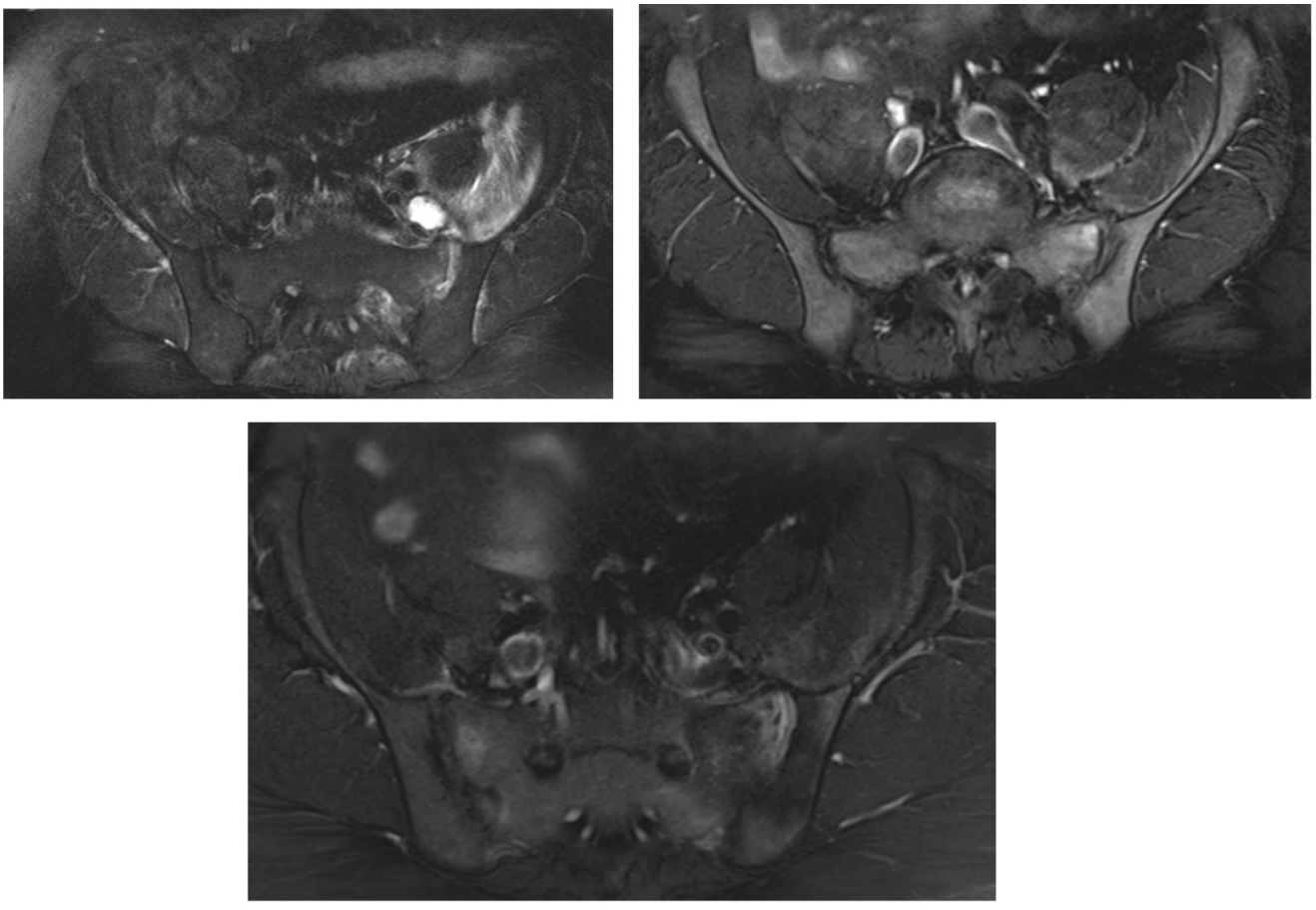

Figure 5. Serial MRI show improvement in the size of the collection and SI joint fluid.

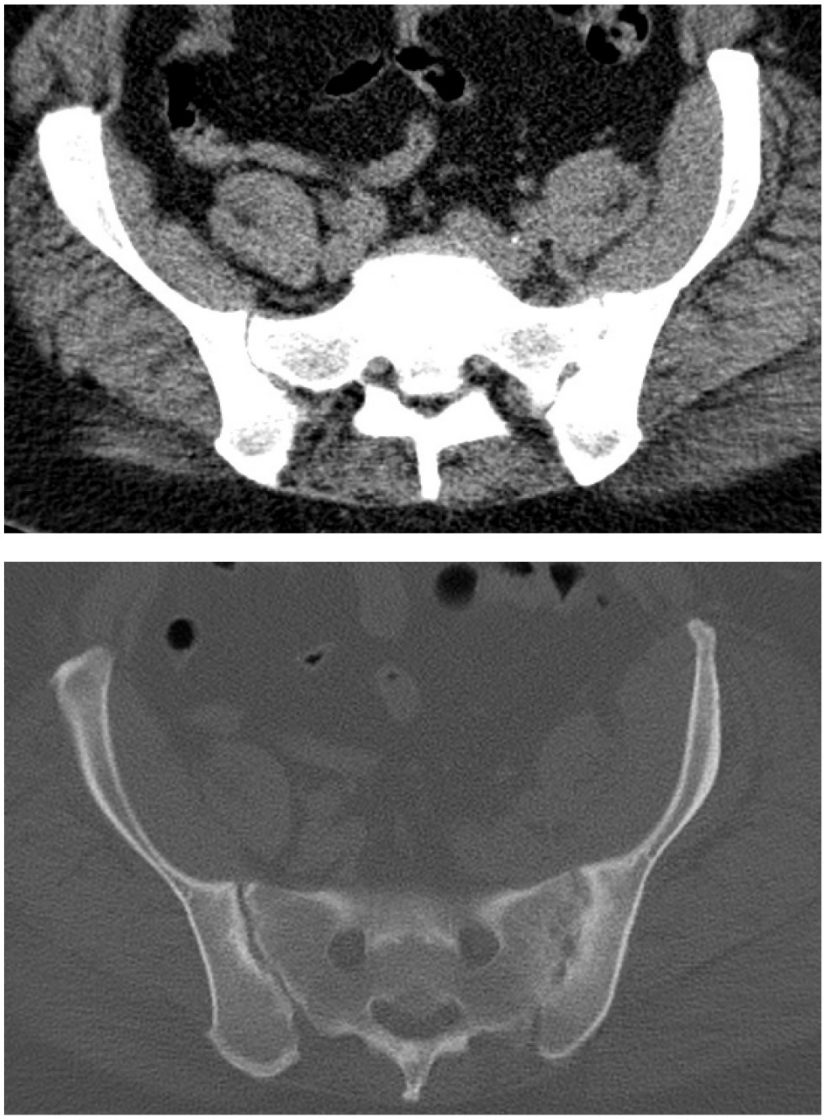

Figure 6. Final CT follow up showing ankylosis of the left sacroiliac joint and sclerosis as a result of the infective process.

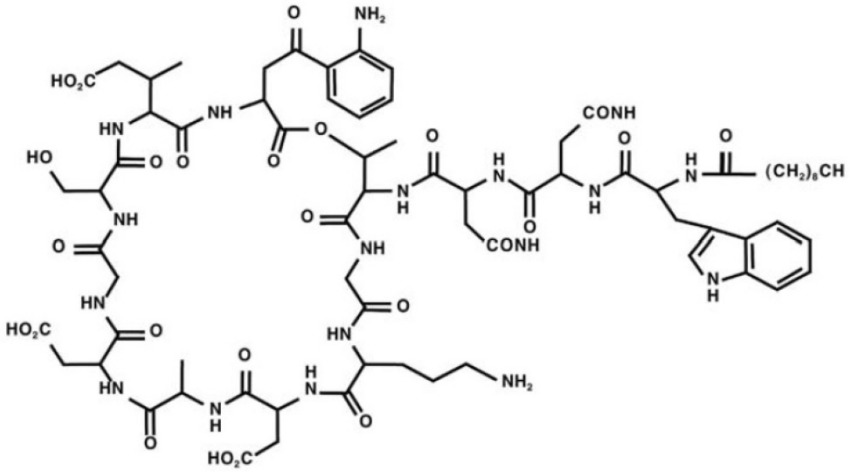

Figure 7. Daptomycin structure with its side chain

The main challenge in the early diagnosis of our patient was to differentiate septic sacroilitis from psoriatic sacroilitis. Arthritis afflicts 10-50% of patients with Psoriasis[9]. The original Moll and Wright criteria for diagnosis of psoriatic arthritis has been used prior to 2006[10]. The criteria included:

1. Inflammatory arthritis (peripheral, sacroilitis or spondylitis)
2. Presence of psoriasis
3. negative serological test for rheumatoid

In 2006 the new Classification of Psoriatic Arthritis (CASPAR) Study Group criteria were introduced. This included additional features such as dactylitis, nail psoriasis and positive family history to increase the sensitivity of the diagnosis particularly in patients without cutaneous manifestations of Psoriasis. [11]

Sacroilitis is present in 34-78% of psoriatic patients[12]. The patient in this report presented with bleeding Psoriatic patches and dactylitis in addition to the lower back pain. The presentation could well have been attributed to a flare up of his Psoriatic arthritis, however the presence of fever, elevated inflammatory markers together with leukocytosis and neutrophilia did not correlate with Psoriatic sacroilitis alone. The diagnosis of septic arthritis of the sacroiliac joint was supported by the MRI findings and the improvement seen in the patient's condition following antibiotic therapy.

Surgical debridement with or without fusion of the sacroiliac joint is the main surgical option for this condition and the largest series reported in the literature consisted of 22 patients[13]. We however managed to treat the patient in this report non-operatively in the form of an 8 week course of Daptomycin.

Daptomycin is a cyclic lipopeptide produced by fermentation of Streptomyces Roseosporous. It contains a 10 carbon lipid side chain which is produced by addition of decanoic acid to the growth medium during fermentation (Figure 7) [14].

Daptomycin works in a multi-step process suggested by Silverman et al [15]. The first step is calcium-mediated binding of the Daptomycin molecule to the cell membrane of the organism with conformational change and oligomerisation of Daptomycin. Membrane channels then open leading to outflow of intra-cellular potassium and this depolarises the membrane leading to cell death.

Side effects of Daptomycin have been determined in pre-clinical studies. The most significant of which is skeletal muscle toxicity and gasterointestinal disturbances. These are however completely reversible after drug cessation[16]. These side effects were not encountered during the 8 week course of treatment in our patient.

Conclusion

The case presented here contributes to the body of existing literature on the treatment of Sacroiliac joint septic arthritis. We believe this is the first case of an infection of this nature having been successfully treated with a course of Daptomycin. The case also highlights the difficulty in establishing the diagnosis in the presence of inflammatory arthropathy.

Competing Interests

The authors have declared that no competing interest exists.

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