CASE REPORT

INVASIVE INFECTION DUE TO *MORAXELLA LACUNATA*, AN UNUSUAL PATHOGEN

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Absract. *Moraxella lacunata*, a commensal bacterium, is associated with serious invasive disease. We describe a patient with diabetic nephropathy who developed septicemia with metastatic abscesses in the liver and spleen due to *Moraxella lacunata*. The patient also had multiple ring enhancing lesions in both the cerebral hemispheres, possibly due to the same organism.

INTRODUCTION

Bacteria of the genus *Moraxella* are aerobic, oxidase positive, gram-negative coccobacilli, which are generally considered as commensals of the human upper respiratory tract. *Moraxella* species other than *Moraxella catarrhalis* are mostly implicated as ocular pathogens in humans (Buchanan, 1998). Case reports, however, have established *Moraxella* as unusual causes of invasive infections in humans, including endocarditis, septic arthritis, cellulitis, meningitis, bacteremia and purulent pericarditis (Applebaum *et al*, 1974; Buchman and Pickett, 1991; Juvin *et al*, 1991; Cox *et al*, 1994; Johnson *et al*, 1995; Maayan *et al*, 2004). Here we report a case of invasive infection due to *Moraxella lacunata* in a patient with diabetic nephropathy who developed chronic renal failure.

CASE REPORT

A 40-year old female patient, who had diabetic nephropathy related chronic renal failure for the previous year presented with a history of intermittent high grade fever for the previous 3 months. The patient also complained of slurred speech and unsteadiness of gait for the previous 2 weeks. The patient was on regular hemodialysis but was not taking steroids or any other immunosuppressant medications at the time of presentation. Physical examination revealed fever of 37.5-38ºC and tenderness of both right and left hypochondriam with mild hepato-splenomegaly.

Investigations revealed leukocytosis (12,200/mm^3) with neutrophilia and toxic granules. An ultrasound of the abdomen showed a single multi-loculated liver abscess, splenic and para-splenic abscesses. MRI of the brain showed multiple ring enhancing lesions throughout both the cerebral hemispheres (Figs 1, 2). C.T. guided aspiration of the pus was done from both the liver and splenic lesions. The pus was sent for Gram stain, culture and sensitivity and cytological investigations. Blood culture was simultaneously obtained.

Examination of the pus revealed inflammatory exudates with the presence of gram-negative coccobacilli. The aspirate from both

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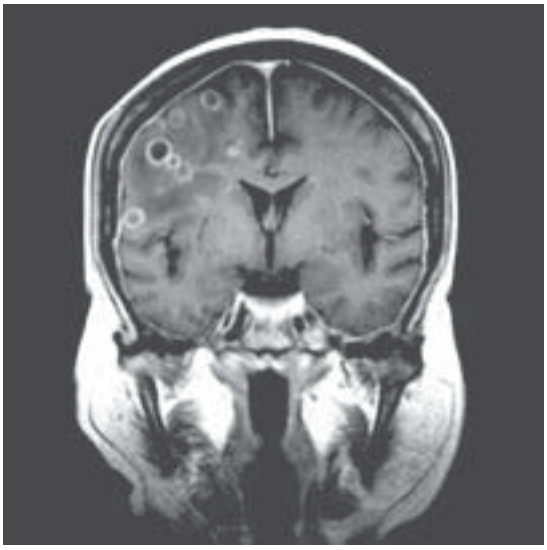

Fig 1–MRI film showing multiple ring enhancing lesions in the cerebral hemisphere.

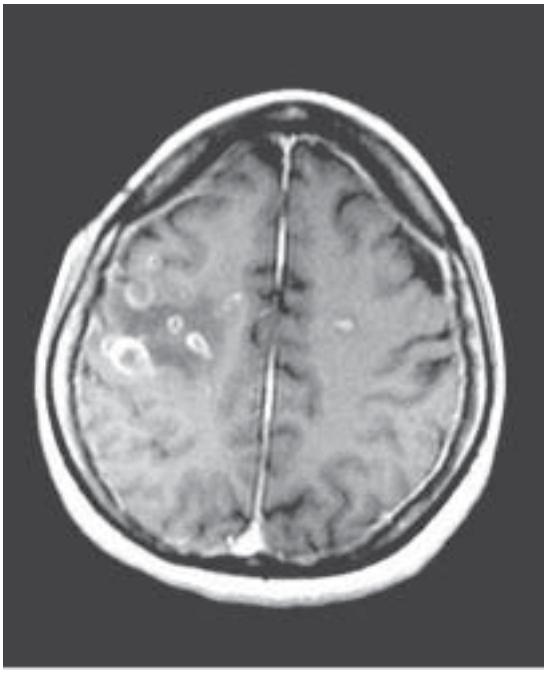

Fig 2–MRI film showing multiple ring enhancing lesions in the cerebral hemisphere.

sites was cultured aerobically, anaerobically and for fungal pathogen. The pus cultured aerobically showed the presence of circular grayish translucent non-hemolytic colonies measuring about 1 mm in diameter after overnight incubation. There was also growth on MacConkey agar in the form of pale translucent colonies measuring up to 1mm in diameter. The organism was oxidase and catalase positive. Further tests revealed that the organism was assacharolytic, negative for indole, urease production, and citrate utilization. Similar bacteria with identical biochemical reaction patterns were isolated from the blood culture. There was no growth anaerobically and no fungal pathogen was isolated from the pus samples. Detailed identification of all the three bacterial isolates from the different sites was done by API ID 32 GN (Bio Merieux). All three isolates were identified as *Moraxella lacunata* (%ID = 99.6) and displayed similar antimicrobial susceptibility profile. All the three bacterial isolates were uniformly sensitive to penicillins, cephalosporins, fluroquinolones and carbapenems when sensitivity was performed in the API system (Biomerieux). Other investigations carried out did not yield any significant findings. CSF study was within normal limits for biochemical and cytological parameters and was bacteriologically sterile. CSF TB PCR was negative. The patient was sero-negative for HIV antibodies and *Toxoplasma gondii* antibodies. An echocardiographic study was within normal limits and there was no evidence of vegetations.

She was started on parenteral antibiotics (Piperacillin / Tazobactam and Metronidazole – after dose adjustment for renal failure). Her condition improved; she became afebrile within a week and her neurological signs and symptoms started resolving. She preferred to leave the hospital after 2 weeks of therapy with the advice to take the oral antibiotics (Ciprofloxacin 500 mg twice daily for two weeks). At the time of discharge, she was afebrile with nearly normal gait and speech. Two months later, a repeat MRI showed almost complete resolution of the ring enhancing cerebral lesions. There

was no evidence of residual neurological deficits in her follow-up visits.

DISCUSSION

Moraxella and *Branhamella* are two subgenera of bacteria belonging to the genus *Moraxella*. Members of the subgenera *Moraxella* are short plump gram-negative cocco-bacilli that are catalase and oxidase positive and are strict aerobes (Buchanan, 1998). They are mostly parasitic on the mucous membranes of humans and animals. Most species require serum or blood enriched media for their growth. *Moraxella lacunata* was first isolated from cases of conjunctivitis by Morax and Axenfield (Buchanan *et al*, 1998). This organism is classically associated with chronic angular blepharo-conjunctivitis, although it is the cause of a small percentage of such eye infections. Published reports show that *Moraxella lacunata* can cause invasive infections such as septicemia, endocarditis, meningitis, and septic arthritis (Pavlatou and Athanasiades *et al*, 1953; Juvin *et al*, 1991; Nagano *et al*, 2003; Maayan *et al*, 2004). It has been implicated as a causative agent of endocarditis of both native and prosthetic valves, although the number of such case reports is few (Robles *et al*, 1998). In one series of studies the frequency of clinical isolation of *Moraxella lacunata* was 0.9% of all glucose non-fermenting gram-negative rods (G NF-GNR) (Suzuki *et al*, 1995). To the best of our knowledge, this is the first case report of *Moraxella lacunata* being implicated as a causative agent for septic lesions in multiple organs, such as the liver and spleen. In this case, the organism was also possibly the cause of the ring enhancing lesions in the brain since investigation for the other causes of such lesions such as tuberculosis and toxoplasmosis, yielded negative results. This fact is substantiated by the observation that the neurological signs and symptoms improved along with the resolution of fever and regression of the liver and splenic abscesses following parenteral antibiotic therapy.

Moraxella lacunata are described as fastidious organisms which require serum enriched media for their growth. In this case the organism grew well on 5% sheep blood agar and on MacConkey agar. This raises the possibility that this organism was *Moraxella liquefaciens*, which has fewer fastidious growth requirements and can grow without the addition of natural animal proteins (Buchanan, 1998). This variant is included by bacterial taxonomists in the species *Moraxella lacunata*, since the difference between the two is considered minimal (Tonjum *et al*, 1992; Buchanan, 1998). *Moraxella liquefaciens* has been implicated in serious invasive disease more frequently than *Moraxella lacunata* (Silberferb and Lawe, 1968; Sellers *et al*, 1971; Cooperman and Friedman, 1975; Buchanan, 1998).

In conclusion, *Moraxella lacunata* (var. *liquefaciens*), an unusual pathogen, is associated with serious invasive disease in an immunocompromized patient. This case report highlights that this organism has the potential to invade and cause disseminated infection in susceptible humans.

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