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Case Report

Microbiology Section

Leclercia Adecarboxylata Isolation: Case Reports and Review

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ABSTRACT

Leclercia adecarboxylata is usually isolated as a part of polymicrobial cultures in immunocompetent patients, and as a pure culture in immunocompromised persons. Although generally sensitive to most antibiotics, there are reports of resistant strains. Two case reports of *L. adecarboxylata* isolation in the lab in pure culture in immunocompetent persons are presented here, *L. adecarboxylata* being isolated from a vaginal swab in the first case and from a gluteal abscess in the second case. Both the isolates were sensitive to most of the antibiotics tested.

Keywords: *Escherichia adecarboxylata*, Gram negative bacillus, Immunocompetent patients *Leclercia adecarboxylata*, Polymicrobial cultures

CASE REPORTS

Case report 1: A 31-year-old female patient with a history of foul smelling vaginal discharge since one week was referred to the lab. There was no known previous history of vaginal discharge and fever. A high vaginal swab was taken and processed in the lab. Her total WBC count was 8900 cells/cmm, with polymorphs being 66%, lymphocytes 29%, monocytes 4%, eosinophils 1%. The direct smear of the vaginal swab showed few pus cells and epithelial cells, with Gram negative bacilli and few lactobacilli. Culture was done on Blood agar and MacConkey agar. Culture yielded pure growth of large grey non haemolytic colonies on Blood agar, and on MacConkey's agar the colonies were pink, lactose fermenting, like *Escherichia*. The organism was identified as *Leclercia adecarboxylata* (99% probability) using Microscan autoSCAN 4 (SIEMENS). Her CD4 count was 1000 cells/cmm (no immunocompromised state). The antibiotic susceptibility testing was done using Microscan autoSCAN 4 (SIEMENS). The isolate in this case was sensitive to amikacin (MIC<16µG/ml), gentamicin (<4µg/ml), ampicillin (<8µg/ml), mezlocillin (<16µg/ml), piperacillin/tazobactam (<16µg/ml), cefazolin (<4µg/ml), cefepime (<4µg/ml), cefoxitin (<8µg/ml), cefuroxime (<4µg/ml), moxifloxacin (<0.5µg/ml), levofloxacin(<1µg/ml), tetracycline (<8µg/ml), imipenem (<4µg/ml), ertapenem (<2µg/ml), meropenem (<1µg/ml), tigecycline (<1µg/ml). The isolate here was resistant to fosfomycin (MIC>32µg/ml). The patient was treated with moxifloxacin 400mg once daily for 10 d, and had recovered uneventfully.

Case report 2: A 50-year-old male presented with a gluteal abscess running a temperature of 102^{0}F. A pus sample from gluteal abscess was collected. His total WBC count was 11600 cells/cmm, with polymorphs 75%, lymphocytes 20%, monocytes 3% and eosinophils 2%. The direct smear in this case showed plenty of pus cells, with few epithelial cells and plenty of Gram-negative bacilli. The sample was inoculated on to Blood agar and MacConkey agar. The organism grew as non-hemolytic colonies on blood agar and pink lactose fermenting colonies on MacConkey's agar. As in case report 1, the culture yielded a pure isolate of *Leclercia adecarboxylata* with 99% probability. His CD4 count was 899cells/cmm (no immunocompromised state). The isolate was sensitive to all tested antibiotics, including amikacin (MIC<16µG/ML), gentamicin (<4µg/ml), ampicillin (<8µg/ml), mezlocillin (<16µg/ml), piperacillin/tazobactam (<16µg/ml), cefazolin (<4µg/ml), cefepime (<4µg/ml), cefoxitin (<8µg/ml), cefuroxime (<4µg/ml), moxifloxacin (<0.5µg/ml), levofloxacin(<1µg/ml), tetracycline (<8µg/ml), imipenem (<4µg/ml), ertapenem (<2µg/ml), meropenem (<1µg/ml), tigecycline (<1µg/ml) and fosfomycin (MIC<16µg/ml. The patient here was treated with doxycycline 100mg BID for 10 days, and had recovered without any sequelae.

DISCUSSION

Leclercia adecarboxylata, a motile, aerobic, Gram negative bacillus, first described by Leclerc in 1962, is ubiquitously distributed in nature and has been isolated from food, water, and other environmental sources [1]. The name *Leclercia adecarboxylata* is proposed for a group in the family *Enterobacteriaceae* previously known as *Escherichia adecarboxylata*. *Leclercia adecarboxylata* was phenotypically differentiated from other species of *Enterobacteriaceae* by extensive biochemical tests, DNA hybridization studies and computer identification studies, and thus a new genus in the family *Enterobacteriaceae* with a generic name Leclercia was proposed [1]. The members of this species are positive for motility, indole production, methyl red, growth in the presence of KCN, malonate utilization, esculin hydrolysis, gas and acid production from D-glucose and D-lactose; the organisms are negative for Voges-Proskauer, citrate (Simmons), H_2S (Kligler), amino acid decarboxylases, phenylalanine deaminase, gelatinase and DNase [1]. The organism is universal in distribution, found in a variety of foods, water, and animals (snails and slugs), and exists as a commensal in the gut. Only a few instances of pathogenicity have been reported so far, thus emphasizing its nature as an opportunistic agent [2]. It has been reported as an opportunistic pathogen in immunocompromised hosts and in polymicrobial infections in immunocompetent hosts, which suggests the dependence of this micro-organism on co-flora to cause a disease [3]. This led to the suggestion by some authors that it is exclusively an opportunistic pathogen in humans. The paucity of reports of human infection may reflect misdiagnosis, as the organism shares many biochemical features with *E. coli*, rather than a true infrequency of human infection [4]. Hence, the importance in advancements in isolation and culturing techniques that have led to accurate identification and segregation of *L. adecarboxylata* from *E. coli* are: unlike *Eschericia*, these organisms are positive sometimes for urease hydrolysis, grow in the presence of potassium cyanide, are positive for malonate utilization and are positive for yellow pigment production by some of the strains. Unlike *Escherichia coli*, they are negative for lysine and ornithine decarboxylase tests. They ferment salicin and cellobiose and do not ferment d-sorbitol unlike *E. coli* [5]. Rishi Bali et al., [2] have reported *Leclercia adecarboxylata* isolation in their pharyngeal and peri-tonsillar abscess sample, which was sensitive to most of the antimicrobial agents, although resistant to ceftazidime, cefotaxime, aztreonam, and cefepime. Lee Bora et al., [6] have reported an exceptionally rare case of isolation of *L. adecarboxylata* endocarditis complicated with embolization of the kidney and the spleen in a 48-year-old female suffering with endocervical cancer. The patient recovered after four weeks of anti-microbial treatment without any sequelae. Zelalem Temesgen

et al., [7] had reported isolation of *L. adecarboxylata* as part of polymicrobial aetiology from wound and sputum samples, and pure isolation of *L. adecarboxylata* in duplicate blood cultures from an immunocompromised person who had undergone bone marrow transplantation, suffering from acute non-lymphoblastic leukemia. Stock et al., [8] in their study on natural susceptibilities of 101 Leclercia strains to 70 antimicrobial agents using microdilution procedure in cation-adjusted Mueller-Hinton broth found that they were naturally sensitive to tetracyclines, aminoglycosides, all but two beta-lactams, quinolones, folate pathway inhibitors, chloramphenicol, nitrofurantoin and azithromycin. They were naturally resistant to penicillin G, oxacillin, erythromycin, roxithromycin, clarithromycin, ketolides, lincosamides, streptogramins, linezolid, glycopeptides, rifampicin, fusidic acid and fosfomycin. One of the isolates from high vaginal swab in our study was resistant to fosfomycin and susceptible to all other antibiotics, and the other isolate from gluteal abscess was sensitive to all tested antibiotics. Thierry de Baere et al., [9] had reported isolation of *L. adecarboxylata* from a patient with a chronically inflamed gallbladder, together with *Enterococcus* species. The organism was considered clinically significant and was susceptible to all antibiotics tested. They reported another strain of isolation of *L. adecarboxylata* from blood, together with *Escherichia hermannii* and *Enterococcus faecalis* from a patient with sepsis. Joseph D Forrester et al., [10] had described a polymicrobial growth (including L. adecarboxylata) from blood stream and central venous catheter cultures in a male patient admitted to a trauma ward after an accident and concluded that *L. adecarboxylata* catheter-related blood stream infections developed in the setting of both underlying immunosuppression and polymicrobial infection. They also opined that molecular typing techniques should continue to improve so that *L. adecarboxylata* is likely to be an increasingly recognized Gram-negative pathogen; and interactions between *L. adecarboxylata* infection, immunosuppression, and polymicrobial infections have to be elucidated. Col Michael Zapor et al., [11] had described a case of wounded soldier with a gluteus infection from which *Leclercia adecarboxylata* was isolated as a pure growth, and opined that as the ability of diagnostic assays to distinguish *L. adecarboxylata* from other closely related *Enterobacteriaceae* would improve, the reporting of the organism as a potential human pathogen also would increase. MV Nelson et al., [12] had described a case of late-onset neonatal sepsis due to *Leclercia adecarboxylata*. Their report described the clinical and laboratory features of this isolate, and reviewed the significant features of infection associated with this emerging pathogen, and opined that the epidemiology, aetiology and outcome of neonatal sepsis are changing with time. Eilandl Il et al., [13] had described a case of *Leclercia adecarboxylata* induced pneumonia which was resistant to multiple drugs; but *L. adecarboxylata* is usually susceptible to most of the antimicrobials. Shio SJ et al., have reported *L. adecarboxylata* bacteremia in a patient with peptic ulcer who was on chronic abuse of NSAIDs, and opined that chronic use of NSAIDs could lead to immunosuppression [14]. Although many reports suggest the organism to be associated with polymicrobial infections (immunocompetent persons) or monomicrobial infections in immunocompromised persons, we support our isolates to be clinically significant pathogens (in immunocompetent persons and in pure culture) correlating with other case reports [2-4,11]; since they were isolated in pure culture and also there was an association with plenty of pus cells in the direct smears. Also the organisms being a part of the family *Enterobacteriaceae*, could be part of the normal intestinal flora [2], and could have caused infection in the sites reported here (high vaginal swab and gluteal abscess) due to the close proximity and may be improper hygiene. Also the modern methods of identification could have increased the chances of reporting this organism as a potential human pathogen. Repeat organism isolation could not be done since the samples in the lab were obtained from a distant location. The identity of the bacterium could not be confirmed by molecular methods which were not available in the lab.

CONCLUSION

Leclercia adecarboxylata can cause mono -microbial infections in immune competent hosts. Institution of advanced methods of culture and identification of bacteria clearly would increase the reporting of the organism as a potential human pathogen. Clinical microbiologists must be alert to identify these organisms and coordinate with the treating physicians for timely diagnosis and appropriate therapy for patients.

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