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CHRYSEOBACTERIUM GLEUM URINARY TRACT INFECTION

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ABSTRACT

Introduction: Chryseobacterium gleum is an uncommon pathogen in humans. It is a gram negative, nonfermenting bacterium distributed widely in soil and water. We present a case of urinary tract infection caused by Chryseobacterium gleum in a patient with right lower ureteric calculi. Case presentation: This case describes a 62- year-old male admitted for ureteric calculi to the Department of Urology in a tertiary care hospital in Kerala. A strain of Chryseobacterium gleum was isolated and confirmed by MALDI-TOF MS .The bacterium was sensitive to Piperacillin-Tazobactum (100/10µg), Cefotaxime(30µg),Ceftazidime(30 µg) and Ofloxacin(30 µg). It was resistant to Nitrofurantoin (300µg),Tobramycin(10µg),Gentamicin(30µg),Nalidixic acid(30µg) and Amikacin(30µg). Conclusion: Chryseobacterium gleum should be considered as a potential opportunistic and emerging pathogen. Resistance to a wide range of antibiotics such as aminoglycosides, penicillin, cephalosporins has been documented. In depth studies on Epidemiological, virulence and pathogenicity factors needs to be done for better diagnosis and management.

Keywords: Chryseobacterium gleum, Calculi, Flexirubin pigment, MALDI-ToF MS, Non-fermenter, UTI.

Contribution/ Originality

This study documents the first case of *Chryseobacterium gleum* associated UTI in South India.

1. INTRODUCTION

Chryseobacterium species are found ubiquitously in nature. This species was firstisolated from a clinical specimen and described by Yabuuchi *et al* in 1983. Yabuuchi and Hashimoto [1] The clinical significance of *Chryseobacterium* species has not been fully established yet as they are not frequently recovered from clinical specimens. Calderon, et al. [2] Literature search revealed few published cases of urinary tract infection caused by this bacterium.Members of genus

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Chryseobacterium are gram-negative, non motile bacilli which is aerobic, non-fermentative, oxidase and catalase positive. It produces a distinct yellow to orange pigment. Murray, et al. [3]

2. CASE REPORT

This is a case of *Chryseobacteriumgleum* infection in a 62-year-old patient with renal calculi and hydronephrosis.The man presented to the hospital in October 2014 with intermittent abdominal pain and vomiting of two days duration. He also complained of fever, nausea and dysuria for last four days. The patient had the history of chronic kidney disease. Other medical conditions included hypertension and diabetics. He was a non-smoker and non drinker. There was no recent history of hospitalisation or antibiotic usage.

On examination, his vital signs were stable (BloodPressure.180/100 mmHg, Pulse:100 beats/min). He was alert and was afebrile. Cardiopulmonary examination was unremarkable, negative for Murphy's sign and oedema absent. Abdominal examination revealed tenderness localised to right iliac fossa and suprapubic area, no mass was palpable. Blood test showed Hb:8.7gm/dl and leukocytosis (90% neutrophils) & liver function test was normal .Renal Function test gave, bloodurea:85 mg/dl, serum creatinine:3.5 mg/dl. Urine was sent for routine analysis and culture to the Microbiology Laboratory. Urine showed presence of pus cells.

2.1. Urology Workup

Ultrasound abdomen revealed right lower ureteric calculi measuring 7mm with hydro nephrosis and bilateral renal calculi of 10mm each. Urological workup also identified Prostatomegaly with grade II Benign Prostatic hypertrophy (BPH). A final diagnosis of bilateral renal calculi with right lower ureteric stone was made. The ureteric stone was found to be a matrix calculus with no crystalline component. Pus was present in the proximal ureter which was collected and sent for culture and sensitivity. Lithotripsy was done and right JJ stent was placed. Subsequently he underwent Extracorporeal Shock Wave Lithotripsy (ESWL) for bilateral renal calculi. The patient was given Piperacillin-Tazobactum and Ofloxacin for a period of seven days. The patient responded well to the antibiotics and was subsequently discharged.

2.2. Bacteriology Workup

Both the samples namely urine and pus (from the proximal ureter) were processed. Urine microscopy revealed 3-5 pus cells/ hpf and occasional RBCs. Culture from urine and pus came positive for C*hryseobacterium gleum(C.gleum)*. Samples were cultured on blood agar and Mac Conkey agar. Blood agar showed yellow-orange pigmented, non haemolytic, mucoid colonies with regular margins having a fruity odour o. Mac Conkey agar showed, non lactose fermenting colonies with entire edges.The organism from both the samples were gram negative,non motile bacilli, catalase and oxidase positive. Biochemical profile was done. Oxidative fermentative test

(OF) showed oxidative reaction. Indole was produced; nitrate reduced to nitrite, urea hydrolysed, esculin was hydrolysed. Methyl red and citrate were negative. The growth was subcultured on Nutrient agar. Yellow-orange colonies were observed. To confirm the flexirubin type of pigment ,10% KOH solution was added to the colonies.The observed colour change from orange to red confirmed the flexirubin nature.[Figure 1].Routine antibiotic susceptibility testing was done by Kirby-Bauer disc diffusion method and the isolate was found to be sensitive to Piperacillin-Tazobactum (100/10µg), Cefotaxime(30µg),Ceftazidime(30 µg)and Ofloxacin(30 µg) . It was resistant to Nitrofurantoin (300µg), Tobramycin(10µg),Gentamicin(30µg),Nalidixic acid(30µg) and Amikacin(30µg) The treatment was adjusted accordingly. We used zone diameters of non-fermenters as breakpoints according to CLSI-2010 guidelines. Clinical and Laboratory Standards Institute [4] Based on the colony morphology and biochemical profile, the organism was identified as *Chryseobacterium gleum* .Confirmation was done by Matrix assisted laser desorption ionisation time of flight mass spectrometry (MALDI-TOF MS).It was in accordance to the manufacturer's instruction with a score of above 2.

In this case the *Chryseobacterium gleum* was confirmed as the causative agent for urinary infection as evidenced from the culture reports. Confluent growth of the same strain of organism in pure form from urine and pus helped to rule out contamination. Repeat urine culture on follow up did not yield any growth.

3. DISCUSSION

Chryseobacterium gleum is the type species of the genus *Chryseobacterium* belonging to the family Flavobacteriaceae. The genus *Chryseobacterium*, formerly called *Flavobacterium*, was first defined in 1994 by *Vandamme* and is described in Bergey's Manual of Systematic Bacteriology [5]. The other species are *C.indologenes*, *C.balustinum*, *C.defluvii*, *C.indolotheticum*,*C.joostei*,*C.miricola* & *C.scophhalmum* [6] *Chryseobacterium spp* is an uncommon pathogen in humans. It is usually found in soil,water, plants and foodstuff. They can survive in hospital environment, chlorinated water, wet surfaces and serve as a potential reservoir of infection. Colonization of patients via contaminated medical devices involving fluids such as intubation tubes, respirators, humidifiers, incubators for newborns, syringes etc has been documented. Reported infections include bacteraemia, ventilator-associated pneumonia, indwelling device-associated infection, urinary tract infections, biliary tract infection, peritonitis, lumboperitoneal shunt infection, ocular infections, surgical and burn wound infections [4-6].According to SENTRY surveillance program, *Chryseobacterium* accounts for 0.03 % of the total isolates [7]. Nearly half of the published cases refer to nosocomial infections, and the vast majority of patients had underlying immune-compromising conditions. A recent case report from India showed that *C. indologenes* was isolated from blood cultures of a pre-term baby who was on ventilatory support in

the ICU [8]. The present case is the first known case of infection of the urinary tract in South India by *C.gleum*.

Several species of *Chryseobacterium* are naturally resistant to different antibiotics including carbapenems [8]. Antimicrobial susceptibility data for *Chryseobacterium* is limited. *C. indologenes* is intrinsically resistant to carbapenems and cephalosporins due to its production of molecular class A β-lactamase [9]. The results of evaluation of a worldwide collection indicate that newer quinolones may represent the most appropriate antimicrobials to treat infections caused by this pathogen [10]. Our isolate was found to be sensitive to Imipenem. So it was concluded that the isolate was not a Metallo β-lactamase (MBL) producer. Pathogenicity of *Chryseobacterium* is not well established. However, it is already known that biofilm and proteases production are important mechanisms involved in its virulence. Hsueh, et al. [11]

4. CONCLUSION

Chryseobacterium gleum is a rarely encountered pathogen. There is a need for accurate identification of this pathogen due to the relative high mortality rate. Because of their increased resistance to commonly used antibiotics, identification and antibiotic susceptibility testing, helps in better management of infections. For better understanding of this emerging pathogen, further study of its virulence and epidemiological factors are necessary.

REFERENCES

[1] Yabuuchi and E. Y. Hashimoto, "Ezaki Y.Ido Y,Takeuchi N.Genotypic and phenotypic differentiation of flavobacterium indologenes Yabuuchi et al. 1983 from flavobacterium gleum Holmes et al.1984 microbiol," *Immunol.*, vol. 34, pp. 73-76, 1990.

[2] G. Calderon, E. Garcia, P. Rojas, E. Garcia, M. Rosso, and A. Losada, "Chryseobacterium indologenes infection in a newborn: A case report," *J. Med. Case Rep.*, vol. 5, p. 10, 2010.

[3] P. Murray, M. Pfaller, F. Tenover, and R. Yolken, *Manual of clinical microbiology*, 6th ed. Washington, DC: ASM Press, 1995.

[4] Clinical and Laboratory Standards Institute, *Performance standards for antimicrobial susceptibility testing :Twentieth Informational supplement M100-S20.* Wayne,PA, USA: CLSI, 2010.

[5] P. Vandamme, J. Bernardet, P. Segers, K. Kersters, and B. Holmes, "New perspectives in the classification of the flavobacteria: Description of chryseobacterium gen.nov. Bergeyella gen.nov., and empedobacter nom.rev," *Int. J. Syst. Bacteriol.*, vol. 44, pp. 827-831, 1994.

[6] E. Koneman, S. Allen, W. Janda, P. Schreckenberger, and J. Winn WC, *The non fermentative Gram negative bacilli. In: Color atlas and textbook of diagnostic microbiology*, 6th ed. Philadelphia: Lippincott, 1997.

[7] J. Kirby, H. Sader, T. Walsh, and R. Jones, "Antimicrobial susceptibility and epidemiology of a worldwide collection of chryseobacterium spp: Report from the SENTRY antimicrobial surveillance program (1997-2001)," *J. Clin. Microbiol.*, vol. 42, pp. 445-8, 2004.

[8] V. Sudharani Asiya and N. Saxena, "Chryseobacterium indologenes bacteraemia in a preterm baby," *Ind. J. Med. Microbiol.*, vol. 29, pp. 196-198, 2011.

[9] S. Bellais, L. Poirel, S. Leotard, T. Naas, and P. Nordmann, "Genetic diversity of carbapenem-hydrolyzing metallo-b-lactamases from chryseobacterium N(Flavobacterium) indologenes," *Antimicrob Agents Chemother*, vol. 44, pp. 3028-3034, 2000.

[10] G. Bhuyar, S. Jain, H. Shah, and V. Mehta, "Urinary tract infection by chryseobacterium indologenes," *Indian J. Med. Microbiol.*, vol. 30, pp. 370-372, 2012.

[11] P. Hsueh, L. Teng, P. Yang, S. Ho, W. Hsieh, and K. Luh, "Clinical and microbiological characteristics of flavobacterium indologenes infections associated with indwelling devices," *J. Clin. Microbiol.1908–1913*, p. 34, 1996.

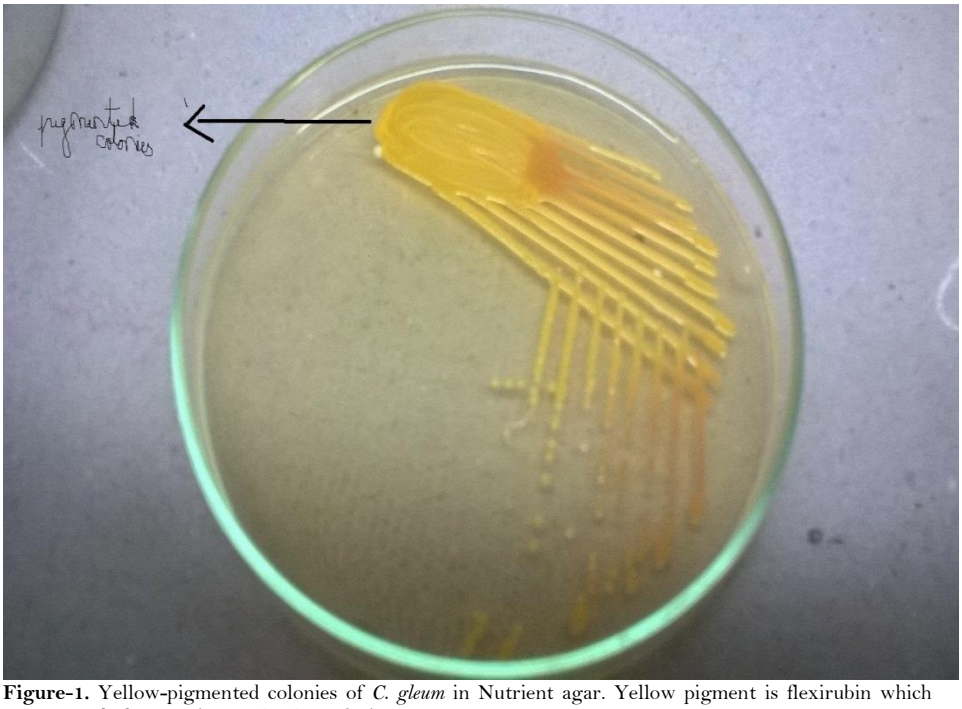

Figure-1. Yellow-pigmented colonies of *C. gleum* in Nutrient agar. Yellow pigment is flexirubin which turns to red after pouring 10% KOH solution