Case Report

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Stenotrophomonas maltophilia mimicking *Klebsiella* on Chromogenic Media

Microbiology Section

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ABSTRACT

Chromogenic media are being used now-a-days for identification of many microorganisms in the clinical microbiology laboratories. They are being used for screening purposes especially in case of urine cultures, environmental surveillance and also for detection of multidrug-resistant organisms like Methicillin-resistant *Staphylococcus aureus* (MRSA), Vancomycin-resistant *Enterococci* (VRE) and Carbapenem-resistant *Enterobactericeae* (CRE) etc. Organisms produce specific colour due to digestion of chromogenic substrates present in the medium. Thus the Organisms are identified on basis of colour production. These media are specific in detecting common pathogens which are isolated. But they can give different results when uncommon organisms are encountered. In this case report the uncommon organism that is *Stenotrophomonas maltophilia* produced colour similar to *Klebsiella* spp. on chromogenic media.

Keywords: CHROMagar, Non-fermenter, Urine Culture

CASE REPORT

A 59-year-old female with complaint of difficulty in voiding urine for last one year with history of repeated catheterizations visited Urology OPD of our hospital. From last one week she also started having febrile episodes. On investigation her kidney function test revealed elevated urea (95mg/ml) and creatinine (6.28 mg/ml), WBC was also elevated (12.83x10^3/mL) with predominant neutrophils. Urine microscopy revealed > 50 pus cells/ hpf along with occasional RBC. Her urine was negative for sugar, ketones and protein. She was catheterised to relieve the bladder dysfunction. Her urine sample was collected and sent to laboratory for culture & sensitivity. The received urine sample was cultured on HiChrome UTI agar (HiMedia Labs, Mumbai) using standard loop. The plates were incubated for 24 hours at 37°C. Blue green colonies (>10^5 CFU/mL) were obtained on HiChrome agar resembling *Klebsiella pneumoniae* [Table/Fig-1]. As per our laboratory protocol, conventional biochemical tests were done for confirming identification of the isolate. The results of biochemical tests were: Triple Sugar Iron (TSI) agar: K/ no change (i.e., non-fermenter), Oxidase negative, Nitrate reduction: positive, Indole: negative, Citrate: utilized as sole source of carbon, Urease – negative. The isolate showed zone size of more than 16 mm with Co-trimoxazole disk.

Organism was provisionally identified as *Stenotrophomonas maltophilia* on basis of conventional biochemical reactions and its virtue of being sensitive to Co-trimoxazole [1]. The identification was confirmed using Micro Scan Walk Away (Beckman Coulter Diagnostics, USA) which also identified it as *Stenotrophomonas maltophilia*. It was sensitive to Co-trimoxazole, Levofloxacin, Minocycline, and resistant to Ceftazidime.

The second sample of urine received within 24 hours grew the same type of isolate. Patient was taking oral Cefixime (400 mg; daily) since sending the sample for culture. After 7 days of antimicrobial therapy her urine became sterile. Her serum urea and creatinine levels also decreased significantly (46 mg/ml, 2.76 mg/ml, respectively).

[Table/Fig-1]: Comparison of colony of *Stenotrophomonas maltophilia* (left side) and *Klebsiella pneumonia* (right side) on HiCrome UTI Agar.

DISCUSSION

Stenotrophomonas maltophilia was first isolated in 1943 and classified as Bacterium bookeri and then renamed *Pseudomonas maltophilia*. Later, it was grouped the genus *Xanthomonas*. After DNA-rRNA hybridization studies it has been reclassified into genus *Stenotrophomonas* [2,3]. *Stenotrophomonas maltophila* is an aerobic non-fermentative, motile, Gram negative bacilli. It is emerging as one of the important bacterial pathogen associated with device related infection e g. catheter related blood stream and urinary tract infections [4].

Presence of indwelling devices (e.g., catheters), immunocompromised hosts, chronic respiratory diseases, underlying malignancy are the various risk factors for *Stenotrophomonas maltophilia* infection [1,5]. In a retrospective study, carried out in a paediatric hospital in India by Nayyar et al., 23 isolates of *Stenotrophomonas maltophilia* were isolated from various clinical specimens like urine, blood and respiratory secretions. Out of which 17% isolates were recovered from urine [6].

Over the last 20 years, a range of chromogenic media have been developed that are designed to target pathogens with high specificity. Such media exploit enzyme substrates that release coloured substances upon hydrolysis, thus, resulting in pathogens forming coloured colonies that can easily be differentiated from commensal flora. Chromogenic media are used to diagnose Urinary Tract Infections (UTI). The identification of common uropathogens like *E. coli*, *Klebsiella* spp. and *Enterococcus* spp. is done on the basis of differences in colony colour produced due to breakdown of

chromogenic substrate present in the medium by specific enzymes produced by the bacteria. These media help in rapid identification of the species and decrease the burden of biochemical tests for identification of organism [7]. Chromogenic media used for urine samples are based on detecting activity of enzymes β-glucosidase and/or β-galactosidase [8]. HiCrome UTI agar (HiMedia Labs, Mumbai) is one such media in which *E. coli* produces purple-magenta colonies due to the enzyme β-D-galactosidase. Other coliforms produce bluish purple coloured colonies due to cleavage of substrates for both enzymes galactosidase and glucosidase. Both the enzymes are also present in *Stenotrophomonas* spp [9]. This could be the reason of producing bluish green colony on Chrom agar. To the best of our knowledge this is the first report describing the appearance of *Stenotrophomonas maltophilia* on chromogenic media mimicking *Klebsiella* spp. on HiChrome agar from India.

CONCLUSION

Chromogenic media should be used with caution for identification of the organism due to emergence of pathogens like *Stenotrophomonas maltophilia* to prevent misidentification.

REFERENCES

[1] Brooke JS. *Stenotrophomonas maltophilia*: an Emerging Global Opportunistic Pathogen. Clin Microbiol Rev. 2012;25(1):2-41.
[2] Hugh R, Leifson E. A description of the type strain of *Pseudomonas maltophilia*. Int Bull Bacteriol Nomencl Taxon. 1963;13:(3)133–38.
[3] De Mauri A, Torreggiani M, Chiarinotti D, Andreoni S, Molinari G, De Leo M. *Stenotrophomonas maltophilia*: an emerging pathogen in dialysis units. J Med Microbiol. 2014;63(Pt 11):1407–10.
[4] Cheong HS, Lee JA, Kang CI, Chung DR, Peck KR, Kim ES, et al. Risk factors for mortality and clinical implications of catheter-related infections in patients with bacteraemia caused by *Stenotrophomonas maltophilia*. Int J Antimicrob Agents. 2008;32(6):538–40.
[5] Metan G, Hayran M, Hascelik G, Uzun O. Which patient is a candidate for empirical therapy against *Stenotrophomonas maltophilia* bacteraemia? An analysis of associated risk factors in a tertiary care hospital. Scand J Infect Dis. 2006;38(6-7):527–31.
[6] Nayyar C, Thakur P, Tak V, Saigal K. *Stenotrophomonas maltophilia*: An Emerging Pathogen in Paediatric Population. J Clin Diagn Res. 2017;11(1):DC08-DC11.
[7] Rajaratnam A, Baby NM, Kuruvilla TS, Machado S. Diagnosis of asymptomatic bacteriuria and associated risk factors among pregnant women in mangalore, Karnataka, India. J Clin Diagn Res. 2014;8(9):OC23-25.
[8] Perry JD, Freydière AM. The application of chromogenic media in clinical microbiology. J Appl Microbiol. 2007;103(6):2046–55.
[9] Coenye T, Vanlaere E, Falsen E, Vandamme P. *Stenotrophomonas africana* Drancourt et al. 1997 is a later synonym of *Stenotrophomonas maltophilia* (Hugh 1981) Palleroni and Bradbury 1993. Int J Syst Evol Microbiol. 2004;54(Pt 4): 1235–37.

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