Case Report

Urinary Tract Infection by *Corynebacterium Urealyticum* – Look Twice

Microbiology Section

SUSHMA KRISHNA, RAJANI K., INDIRA BAIRY, SHOBHA K.L.

ABSTRACT

Corynebacterium urealyticum though rare, is known to cause alkaline-encrusted urinary tract infections and struvite calculi. Identification of the bacilli and administration of the right antibiotic therapy is important in preventing persisting infections and complications. This report describes one of the rare cases which was encountered on routine urine culture of a long term catheterized patient following a road traffic accident. This case highlights the importance of the proper identification of gram positive bacilli and suggests that they may not be disregarded as urinary contaminants.

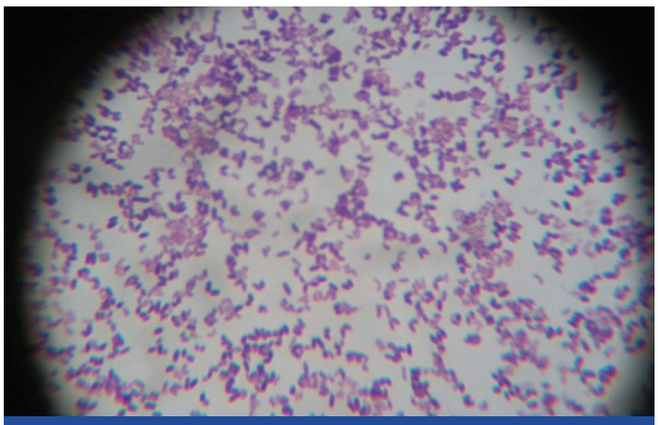
Key Words: *Corynebacterium urealyticum*, Urinary tract infections, India

INTRODUCTION

Corynebacterium urealyticum (formerly known as *Corynebacterium* CDC group D2) is a gram-positive, slow growing, urease-positive microorganism with a diphtheroid morphology. Urinary tract infections (UTIs) which are caused by C*. urealyticum* are a known entity in some parts of the globe and there have been reported cases and small reviews This organism has long been recognized as a uropathogen because of its urease activity, which plays an important role in the pathogenesis of UTIs, resulting in the alkalinization of urine, further leading to encrusted cystitis or stuverite stone formation. The risk factors constitute the elderly age group, a prolonged hospital stay, immunosuppression, urological procedures, prior broad spectrum antibiotic therapy, and underlying genitor-urinary disorders [1, 2]. This has also been associated with nosocomial outbreaks [3]. *Corynebacterium urealyticum,* being a known multi-drug resistant organism, its treatment with the right antibiotic becomes significant, as failure in therapy leads to persistant infections [4]. We report here, the first encountered case of *C. urealyticum* which caused uncomplicated UTI in a young patient with prolonged urinary catheterization.

CASE REPORT

A 25 year old youth with no pre-morbid conditions, was brought to the emergency room with temporary loss of consciousness, vomiting and nasal and ear bleeding, following a road traffic accident. On examination, he was found to have a decerebrate posture, he was not opening eyes and he was on an ET-tube with a GCS of 4, tachycardia, normotension and an absent left pupilary reflex. His higher mental functions were significantly affected. His right, black eye had a sutured and lacerated wound. Investigations revealed his complete blood picture and ESR to be within the normal limits. His liver enzymes were elevated (SGOT 206, SGPT 282, Alk Po4 240). His chest X-ray and his CT chest were normal. His CT head showed right fronto-temporal subdural haemorrhage (SDH) with right temporal lobe and sub-arachnoid membrane multiple contusions. There was evidence of tentorial bleeding, brain stem contusion at the level of the midbrain and diffuse cerebral odema with fracture of the right temporal bone. He was managed conservatively in the vegetative state. In the next few days, an LP was done and his CSF was drained, following which the SDH showed resolution. He however developed high grade fever with haematuria. The urinary catheter (catheterized from over 25 days) showed clot retention. Grossly, the urine was turbid and the catheter was clogged. Urine microscopy showed many pus cells, RBCs and RBC casts with a pH of 7.1. The urine culture, after 36 hrs of incubation, revealed gram positive bacilli which were isolated [$>10^5$ cfu/ml (preliminarily reported the same)] and after 4 days, they were identified biochemically as *Corynebacterium urealyticum.* It showed resistance to all the beta-lactum group of drugs, macrolides and rifampicin, and sensitive to vancomycin and tiecoplanin. USG abdomen showed coarse internal echoes within the bladder, without any evidence of a calculus, hydronephrosis or any mass. He received cefotaxime with gentamicin for two weeks and continued with cefaperazone-sulbactum for the subsequent week. Finally, vancomycin was administered for 5 days repeated bladder wash was given and the bleeding stopped. His blood cultures remained sterile throughout the study. On follow up, there was no documentation of recurrent UTI for the next two months.



[Table/Fig-1]: Gram positive pleomorphic bacilli with diptheroid morphology

DISCUSSION

UTIs which are caused by *Corynebacterium urealyticum* are relatively a rare entity in India and one must have a high index of suspicion, as it can be easily missed out on the culture plates.

The clinical evidence of the disease is a supporting clue for the microbiologist to look for the organism. It is quoted in the literature, that it takes about 48hrs to grow in the culture, during which time the urine cultures are generally not further incubated in the laboratories. It is equally important to study the grown gram positive baciili further by doing biochemical tests and to not disregard it as a skin contaminant/urethral flora. The bacteraemia status too must be known in such cases of UTIs [5]. The colonies which were grown on blood agar were > 10^5 cfu/ml, 0.5-1cm, moist, opaque, high convex and non-haemolytic. Alkaline urinary Ph with microscopic findings such as cellular casts, stuverite stones etc is diagnostic but has to be synergestic with the culture findings as in our case [6]. Evidently, no selective media was required to enhance the growth as the other studies have mentioned [7]. Other important tests which aided the identification of the organism were urea hydrolysis, the non-reduction of nitrates, non fermentation of the serum sugars and the typical multidrug resistant pattern [8]. Further, *API coryne* confirmed the stored isolate at a later date. The importance of antibiotic sensitivity testing and thus, the administration of the right antibiotic play a significant role, as a failure in the therapy leads to persistant infections. The recommended choice of therapy is vancomycin or teicoplanin for about 2 weeks [9, 10]. This patient had a prolonged recovery for over a month, which could most likely be attributed to the improper choice of antibiotics (cefotaxime, cefoperazone-sulbcatum) until he was started on vancomycin. His recovery was supplemented by bladder and catheter care. Fortunately, the complication phases like crustations, leading to obstructive uropathy or end stage renal disease, where the dissolution of the crusts becomes the priority, were not seen in this patient. His renal function tests were monitored serially and they remained normal. The only important risk factor which was identified in this case was his prolonged stay with catheterization. Since this isolate is associated with nosocomial outbreaks and is known for catheter adherence, the catheter care and the infection control measures of the hospital needs to be stepped up.

CONCLUSION

Any gram positive bacilli in urine with a clinical evidence of UTI should be promptly identified; its susceptibility pattern should be carefully determined for the administration of adequate antibiotic therapy with essential nursing care, to prevent persistant infections and recurrence. An extensive search for *C. urealyticum* is required in patients with encrusted cystitis or pyelitis. This case is also a paradigm for the practising microbiologists to bridge the clinico-microbiological gap.

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AUTHOR(S):
1. Sushma Krishna
2. Rajani K.
3. Indira Bairy
4. Shobha K.L.

PARTICULARS OF CONTRIBUTORS
1. MD Post graduate, Department Of Microbiology, Kasturba Medical College, Manipal, India
2. Msc PhD, Associate Professor Melaka Medical College, Manipal, India
3. MD, Professor and HOD Department Of Microbiology Kasturba Medical College, Manipal, India
4. MD, Professor and HOD Melaka Manipal Medical College Manipal, India

PLACE OF STUDY:
Kasturba Medical College, Manipal.

NAME, ADDRESS, TELEPHONE, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Sushma Krishna
Assistant Professor, Department Of Microbiology,
Amrita Institute of Medical Sciences,
Cochin, Kerala, India - 682041
Phone: 9109539134600, 0484-2851234 Extn 8012 (Office}
E-mail: sushmakrishna@aims.amrita.edu

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