

Case [Number]

Case Details:

Microbiologist-in-charge:

Patient Name: Mrs. Juan Sagan

Type of Specimen: Urine

Microscopy:

Cells	Relative Abundance
White Blood Cells	50 x 10 ³ / ml

Lab Results:

Growth of Proteus species detected at 8.6 x 10⁴ / ml. No anaerobes detected.

Antibiotic	Result
Ampicillin	Resistant
Tobramycin	Susceptible
Cephalothin	Resistant
Gentamicin	Susceptible
Ciprofloxacin	Susceptible

Proteus species

Tests Conducted	Results
HBA O ₂	+++ swarming colonies
HBA + Neo ANO ₂	No growth
Gram Stain	Negative Rods
Growth in air / air + CO ₂	Positive
Growth on Mac O ₂	+++ colonies not pink colorless
Oxidase (controls performed – <i>Pseudomonas aeruginosa</i> and <i>E. coli</i>)	Negative
Lactose Fermentation	Negative
Urease Production	Positive

Organism	Antibiotic	Zone Size (mm)	Result
Proteus sp.	Ampicillin	10	Resistant
Proteus sp.	Tobramycin	20	Susceptible
Proteus sp.	Cephalothin	12	Resistant
Proteus sp.	Gentamicin	20	Susceptible

Proteus sp.	Ciprofloxacin	38	Susceptible
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Discussion

The specimen used for the microbiological examination was urine sample of a patient who was diagnosed with urinary tract infection. The patient had been experiencing frequency of urination, burning sensation during urination, back pain, bloating, and abdominal pain. She had recently taken a trip to the Maldives.

The specimen was grown on plates filled with HBA, MAC, and HBA+Neo media. The colonies that were obtained were carefully examined for their characteristic features, quantity, and color. These colonies were further used for gram staining and other microbiological tests. Finally, antimicrobial susceptibility testing was performed and the specimen was categorized as susceptible or resistant to specific antibiotics. All results were recorded and analyzed to identify the causative infectious organism.

The plates were checked after incubation in aerobic and anaerobic conditions, and there was found to be heavy swarming growth on the HBA plate cultured aerobically. No growth was seen on the HBA + Neo plate cultured anaerobically, proving that the organism is an aerobic organism. Growth was seen on MAC plates too, but the colonies were colorless and not pink, proving that it is a non-lactose fermenter. The colonies grown on the HBA plate were used for gram staining and microscopic examination of the stained specimen showed gram negative rods. Apart from these, a large number of white blood cells were observed, which is indicative of an infection.

These tests proved that the organism was an aerobic gram negative bacillus that is a non-lactose fermenter. The swarming growth on HBA plate under aerobic conditions is characteristic of the *Proteus* species. In order to confirm this, I performed an oxidase test and urease production test. The oxidase test was negative and the urease production test was positive, thus proving that the organism is *Proteus*.

Antimicrobial susceptibility tests were carried out using the antibiotics Ampicillin, Tobramycin, Gentamicin, Cephalothin, and Ciprofloxacin. The organism was found to be susceptible to Tobramycin, Gentamicin, and Ciprofloxacin, and resistant to Ampicillin and Cephalothin. These results indicate that the organism could be *Proteus vulgaris* as it is resistant to Ampicillin and Cephalothin.

Proteus vulgaris belongs to the Enterobacteriaceae family and it is found in the intestines of humans and animals. It is an opportunistic pathogen which causes infection in immunocompromised patients and does not affect healthy individuals. It may lead to urinary tract infections, wound infections, meningitis, and rheumatoid arthritis. It is particularly found to be involved in infections that occur following surgical interventions leading to pus, fever, and neutrophilia (Rozalski *et al.*, 2012).

In this case, the patient had taken a trip to the Maldives and had acquired a urinary tract infection. The results obtained in the microbiological tests were consistent with the common UTI causing microorganism belonging to the *Proteus* species. Based on the antimicrobial susceptibility tests, the

infection may be treated with Tobramycin, Gentamicin, or Ciprofloxacin, as the organism was found to be susceptible to these antibiotics.

References

- Różalski, A., Torzewska, A., Moryl, M., Kwil, I., Maszewska, A., Ostrowska, K., ... Stańczyk, P. (2012). Proteus sp. – an opportunistic bacterial pathogen – classification, swarming growth, clinical significance and virulence factors. *Folia Biologica Et Oecologica*, 8(1), 1–17. doi: 10.2478/fobio-2013-0001