

## *Prototheca wickerhamii* Algaemia in a Renal Transplant Recipient

Joanne Nixon<sup>1,2,3\*</sup>, Javid Mirza<sup>2,3</sup> and Rob Baird<sup>2,4</sup>

<sup>1</sup>Advanced Trainee Infectious Diseases and Acute and General Care Medicine

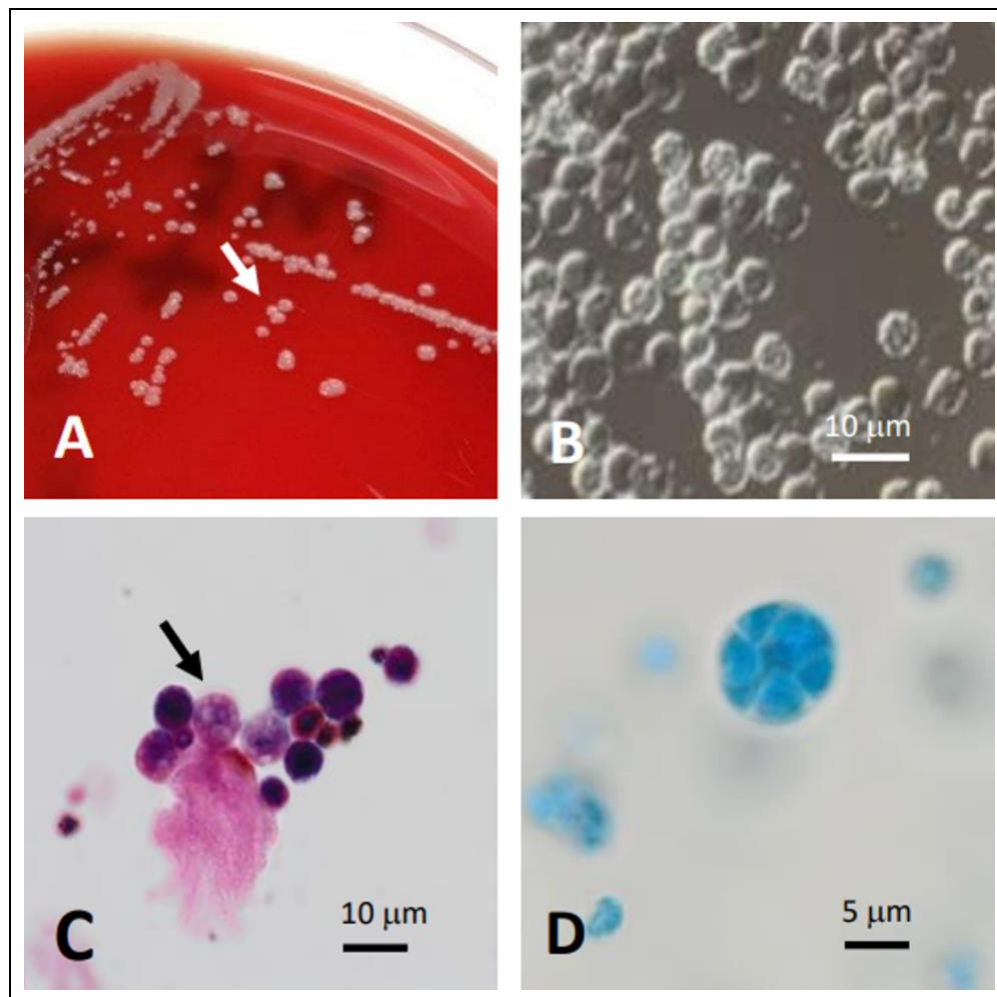
<sup>2</sup>Territory Pathology, Royal Darwin Hospital, Rocklands Drive TIWI NT 0810 Australia

<sup>3</sup>Department of Microbiology, Royal Darwin Hospital, Rocklands Drive TIWI NT 0810 Australia

<sup>4</sup>Clinical Microbiologist and Director of Pathology, Territory Pathology, Royal Darwin Hospital, Rocklands Drive TIWI NT 0810 Australia

\*Corresponding author: Joanne C Nixon, Territory Pathology, Royal Darwin Hospital, Rocklands Drive Tiwi, NT 0810 Australia. E-mail: [joanne.nixon@nt.gov.au](mailto:joanne.nixon@nt.gov.au)

Received: December 24, 2023; Accepted: January 06, 2024; Published: January 15, 2024



**Figure 1(A):** *Prototheca wickerhamii* growing on blood agar at 37 °C. They produce small greyish-white smooth moist yeast like colonies on blood agar after 48-72 hr; **(B):** Wet preparation of blood culture under phase contrast microscopy revealing yeast like bodies, but with no budding; **(C):** Gram stain revealed spherical Gram-positive organisms of various sizes and theca containing many endospores; **(D):** Theca containing autospores of *P. wickerhamii* which reproduces asexually.

## Clinical Image

A 73-year-old diagnosed with giant cell arteritis, requiring methylprednisolone, presented to hospital with headache. Her medical history is notable for a renal transplant on maintenance immunosuppression and insulin dependent diabetes mellitus.

Her admission was complicated by a gastrointestinal bleed and pneumonia. Chest X-ray indicated bilateral bronchopneumonia. Computerised tomography of the brain detected no acute intracranial pathology. A set of blood cultures grew *Escherichia coli*. Despite antimicrobials and supportive care, the patient rapidly deteriorated.

During the patient's deterioration, two aerobic blood culture bottles (BacTALERT, bioMerieux, France) grew cream, non-mucoid 'yeast-like' colonies on sheep blood and Sabouraud 4% dextrose agar (Thermo Scientific, South Australia). Gram stain of the colony showed Gram-positive large spherical cells. The organism was identified as *Prototheca wickerhamii* by VITEK (bioMerieux) and MALDI-TOF (VITEK MS, bioMerieux) mass spectrometry. The patient succumbed to multi-organ failure, and a diagnosis of *Prototheca* blood stream infection was made posthumously.

## Discussion

*P. wickerhamii* is a unicellular saprophytic achloric algae ubiquitous in nature [1,2]. There are eight species within the genus *Prototheca* of which *P. wickerhamii* predominates human infections [1]. Disseminated protothecosis can occur in solid organ transplant or chemotherapy patients, and most infections originate from traumatic cutaneous inoculation [1,3]. Of all immunosuppressant's, glucocorticoid use is associated with protothecal infections due to suppression of lymphocyte activation and neutrophil dysfunction [1].

Identification of *Prototheca* spp is based on characteristic morphology and vegetative cells. Reproduction is by theca containing sporangiospores which are asexually produced by nuclear division and cleavage of the cytoplasm [3]. Histopathology is variable due to periodicity of their life cycle, but the external capsule of *Prototheca* spp stains positive with periodic acid-Schiff and methenamine-silver histochemical stains to help differentiate *Prototheca* from green algae [1]. There is no standard treatment. Studies have shown that a combination of a medical and surgical approach is most effective, with most species susceptible to amphotericin B [1,2].

## REFERENCES

1. Lass-Flörl C, Mayr A. Human protothecosis. *Clin Microbiol Rev.* 2007; 20: 230-242.
2. Mayhall CG, Miller CW, Eisen AZ, et al. Cutaneous protothecosis. Successful treatment with amphotericin B. *Arch Dermatol.* 1976; 112: 1749-1752.
3. Ellis D, Davis S, Alexiou H, et al. *Descriptions of Medical Fungi Second Edition.* University of Adelaide. 2007.