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Case Report

Microbiology Section

Peritonitis due to *Galactomyces geotrichum*: A Rare Case Report

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ABSTRACT

Galactomyces geotrichum is the teleomorphic stage of several unnamed *Geotrichum* species. They are filamentous yeast like fungi that are ubiquitous in nature. They have been isolated from various sources such as fruits, vegetables, plants and soil and are also found to be a part of the normal flora of the human gastrointestinal tract.

It is an emerging pathogen associated with superficial or disseminated infections in an immunocompromised host or in patients with debilitating diseases. This report describes an unusual case of peritonitis due to *Galactomyces geotrichum* secondary to hollow viscus perforation in a young woman without any underlying co-morbidities.

Keywords: Filamentous yeasts, Fungal peritonitis, Ubiquitous

CASE REPORT

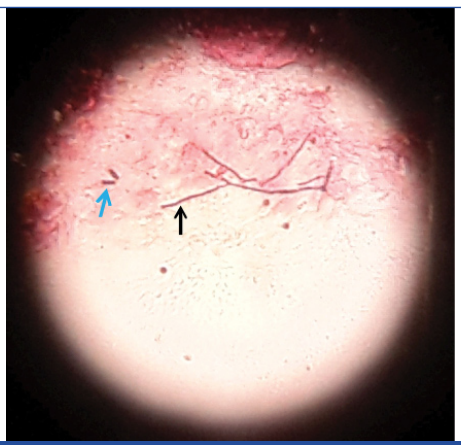
A 22-year-old woman came to the Emergency Department at tertiary care Hospital with abdominal pain since two days and no history of vomiting or loose stools. She was diagnosed with typhoid fever at a local clinic three weeks back and was treated with Cefixime 200 mg orally BD for five days. She had no other co-morbidities.

On examination, she had a pulse rate of 102 beats per minute and blood pressure of 100/70 mmHg. Examination of the abdomen revealed tenderness, guarding and rigidity. Bowel sounds were absent. Other systems were normal and WBC count was 10,100 cells/mm^3 with neutrophilia (91%).

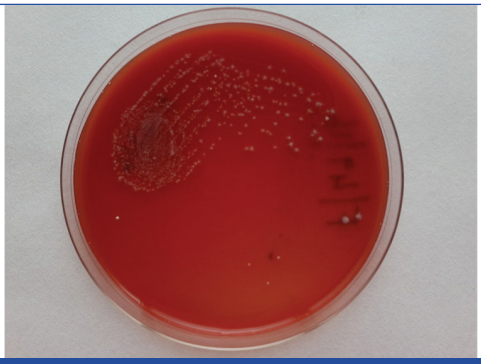
Based on these findings, a provisional diagnosis of peritonitis secondary to hollow viscus perforation was made and she underwent emergency exploratory laparotomy. Intra operatively, around 1000 mL of peritoneal fluid and whitish flakes covering the intestine and liver were noted and a pre pyloric perforation (0.5x1 cm) was discovered and repaired. The abdomen was closed with sub hepatic and pelvic drains in situ. The patient was started on empiric therapy of intravenous Piperacillin–Tazobactam 4.5 gm BD and Metronidazole 500 mg TID. In the post-operative period, the patient developed low grade fever and her general condition started deteriorating and the WBC count rose to 18,500 cells/mm^3 with neutrophilia (88%). An ultrasound of the abdomen revealed mild to moderate ascites with no other significant findings.

The peritoneal fluid that was collected intra operatively was sent for microbiological investigations. On gross examination, the fluid appeared turbid and brown with whitish flakes. Gram stain showed scanty pus cells and Gram positive fungal hyphae [Table/Fig-1]. Culture was done on Sabouraud's dextrose agar and blood agar which yielded pure growth of dry, whitish, hairy colonies after 24 hours of incubation [Table/Fig-2]. Lactophenol Cotton Blue (LPCB) preparation of the isolate showed true septate hyphae, arthrospores and no blastospores [Table/Fig-3]. It was presumptively identified as *Geotrichum* species [1]. The identity of the isolate was confirmed by a negative urease test and assimilation of glucose, xylose and galactose on yeast nitrogen medium [2].

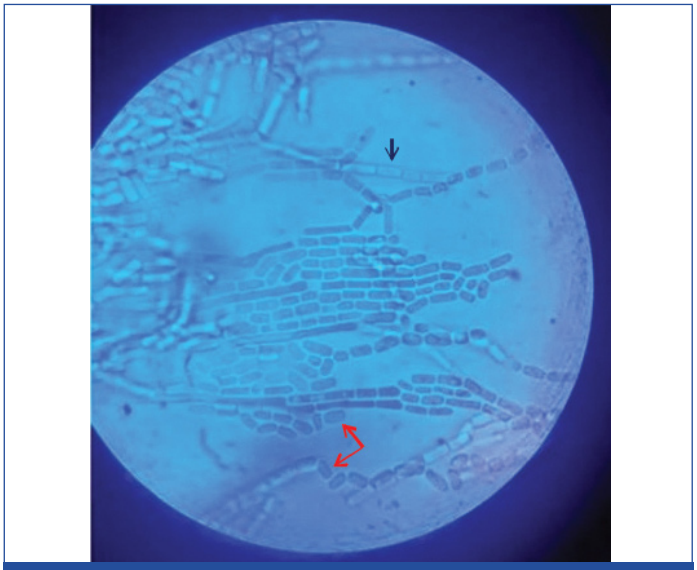
A second sample collected post operatively also yielded pure growth of *Geotrichum* species. Identification was further confirmed by amplification and sequencing of the D1/D2 domain of 26S rDNA at National Culture Collection of Pathogenic Fungi (NCCPF), Postgraduate Institute of Medical Education and Research, Chandigarh, India.



[Table/Fig-1]: Direct gram stain showing gram positive fungal hyphae (black arrow) arthrospores (blue arrow) (100X).



[Table/Fig-2]: Blood agar showing dry, white and spidery colonies of *Geotrichum spp*.



[Table/Fig-3]: LPCB mount showing septate hyphae (black arrow) and arthroconidia (red arrow) (40X).

Briefly, Genomic DNA was extracted from pure culture obtained from peritoneal fluid by phenol chloroform method [3]. D1/D2 region of 26S rDNA was amplified using the primers pairs NL-1 (5'-GCATATCAATAAGCGGAGGAAAAG-3') and NL-4 (5'-GGTCCGTGTTTCAAGACGG-3') (Sigma, Bengaluru, India). Amplified gene products were purified by a gel extraction kit (QIAquick; Qiagen, Bengaluru, India). Purified PCR products were sequenced using the big dye terminator cycle sequencing kit, version 3.1 (Applied Biosystems, Foster City, CA) and analysed on an ABI 3130 Genetic Analyzer (Applied Biosystems). The sequences were compared in the Gene Bank DNA database (http://www.ncbi.nlm.nih.gov/Genbank/index.html). The 26S rDNA sequence of our isolate had 99% (526/529) homology to type strain of *Galactomyces geotrichum* (ATCC® 34614™) (GenBank accession number GQ458034.1)

The patient was started on oral Itraconazole 100 mg OD. She became afebrile and started to improve. The remainder of her post operative stay was uneventful. She was discharged after one week with the advice to continue oral itraconazole for five weeks. On follow up visits, the patient had recovered completely.

DISCUSSION

Geotrichum candidum and *G. capitatum* are reported in literature as rare pathogens of low virulence in humans. They are recognised to cause superficial skin infections, respiratory tract infections, oral infections or disseminated infections in patients with underlying predisposing factors such as diabetes, haematological malignancies or in patients undergoing chemotherapy for cancer [4,5]. Peritonitis due to *Geotrichum* species has occasionally been reported in patients with continuous ambulatory peritoneal dialysis [6]. However, peritonitis in the absence of underlying co-morbidities is uncommon.

In the present case report, *Geotrichum* species was considered as the causative agent of peritonitis as repeated culture yielded pure growth of the same organism [1] and the patient's symptoms resolved only after treatment with itraconazole. It is probable that prior antibacterial therapy could have led to suppression of normal bacterial flora which subsequently led to overgrowth of the fungus, *Galactomyces geotrichum* which is found in the human gut [7,8]. Following perforation, the fungus could have entered peritoneal cavity and led to the development of peritonitis.

Earlier, the anamorph *Geotrichum candidum* was included in *Galactomyces geotrichum*. In 2004, Hoog GS and Smith MT introduced *Galactomyces candidus* to accommodate *Geotrichum candidum* complex and *Galactomyces geotrichum* became a complex of several unnamed *Geotrichum* species [9,10]. It is conceivable that the cases of *G. candidum* in literature are over estimated because of possible misidentification due to the difficulties in speciation and confusion over the recent changes in taxonomy [6,10].

This case puts emphasis on emergence of *Geotrichum* species as a significant pathogen and the best of our knowledge this is the first case report of peritonitis due to *Galactomyces geotrichum* in an immunocompetent patient. This case also stresses that fungal aetiology should be considered early in the course of disease, especially in patients with history of taking broad spectrum antibacterial therapy or in those who do not respond to empirical antibacterial therapy. Early identification and appropriate therapy are essential for a successful outcome.

CONCLUSION

This report on *Galactomyces geotrichum* aids in increasing awareness of its ubiquity, to highlight the change in its taxonomy and to emphasize that high index of suspicion for fungal peritonitis along with early therapy will lead to successful outcomes.

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