A rare bacterial and fungal peritoneal dialysis related peritonitis, a case report and review of literature

Peritoneal dialysis (PD) related peritonitis due to atypical organisms commonly occur following prolonged antibiotic exposure in an immune-compromised hosts. Fungal PD peritonitis is a rare cause of PD related peritonitis and is associated with significant morbidity and mortality with poor response to conservative management. Early PD catheter removal is contemplated in fungal PD peritonitis in view of discouraging response to prolonged medical management and high risk of complications including death.

KEYWORDS: peritoneal dialysis, peritonitis, *Micobacterium oxydans, Lecythophora mutabilis*

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Case

A 27 years old Caucasian male on continuous cyclic peritoneal dialysis (CCPD) for end stage renal disease (ESRD) secondary to obstructive uropathy presented with 10 days history of feeling generally unwell, increasing abdominal pain and nausea. His peritoneal dialysis (PD) fluid analysis was consistent with peritoneal dialysis (PD) related peritonitis, with white cell count of 2690 × 10^6/liter with 90% polymorphs. This was his first ever presentation with PD related peritonitis, after being on PD for last 5 years for his failed renal allograft. He received intraperitoneal cefazolin and gentamicin empirically as per our local protocol consistent with international society of Peritoneal dialysis (ISPD) 2010 guidelines [1]. He completed 2 weeks of intra-peritoneal (IP) cefazolin after his PD fluid grew coagulase negative Staphylococcus sensitive to penicillin with resolution of symptoms and negative PD fluid cell count.

He represented with soar abdomen after completing 2 weeks of treatment for his coagulase negative PD peritonitis with PD fluid analysis revealing a cell count of 1460 × 10^6/liter cells with 76% neutrophils. Once again he was started empirically on IP cefazolin and gentamicin. This time his PD fluid culture grew gram-positive bacillus identified as *Micobacterium oxydans* with in vitro susceptibility to penicillin and vancomycin with minimum inhibitory concentration (MIC) 1.0 µg/ml and 0.25 µg/ml for pencillin and vancomycin respectively. He was shifted over to IP vancomycin in view of slow decline in PD fluid cell count and higher MIC levels for penicillin. He also received IP urokinase and antifungal prophylaxis with oral nystatin this time. After one week of his second presentation, his PD fluid was also reported to grow a rare fungus identified as *Lecythophora mutabilis* on multiple extended cultures. Although he was not particularly symptomatic at this stage however he did persist with smoldering white cell count of 80-109 × 10^6/liter with 60-70% monomorphs.

PD catheter removal and transfer over to hemodialysis (HD) was advised, however he was reluctant to transfer to HD as it didn't suit his life style, being a musician and insisted on a trial of antifungal treatment before PD catheter removal. He was initiated on IP fluconazole which was later changed to Voriconazole after 48hours. He finished 2 weeks IP vancomycin and continued on IP voriconazole. His PD fluid white cell count persisted between 50-100 × 10^6/liter after about 2 weeks of antifungal treatment with persistent growth of the fungus *Lecythophora mutabilis*, hence a final call for PD catheter removal and transfer to HD was made. He did well on HD and completed further 4 weeks of oral voraconazole treatment without any further complications.

Discussion

This case highlights the risk of PD peritonitis with atypical microorganisms following

antibiotic exposure for common garden variety PD peritonitis and discouraging response to treatment with antifungal agents. This patient developed *Micobacterium oxydans* and atypical fungal PD peritonitis following the treatment of coagulase negative PD peritonitis; both these organisms are rare causes of the PD peritonitis.

Micobacterium oxydans is a gram positive, non-encapsulated, non-spore forming, *Coryneform bacillus*, previously known as *Brevibacterium oxydans*. 1 There are very few case reports of PD peritonitis caused by *Micobacterium* species such as *resistens* and *paraoxydans* but there are no case reports on *oxydans* species. *M. Oxydans* although ubiquitous in distribution, rarely causes invasive illness in human [1,2]. We did doubt the significance of *M. oxydans* in his PD fluid culture considering it as a commensal organism, and a very rare cause of PD peritonitis; however, this organism was present in several PD fluid cultures with resolution on treatment initially with cefazolin and later vancomycin.

Lecythophora mutabilis is a dermatiaceous fungus, which is again cosmopolitan and ubiquitous in the environment and a rare opportunistic pathogen in immunocompromised hosts. There are a few case reports of human infections including PD peritonitis, septic shock, prosthetic valve endocarditis and endophthalmitis related with this fungus [3-5].

The risk factors for opportunistic bacterial and fungal PD peritonitis in this patient could have been previous bacterial PD peritonitis requiring prolonged antibiotic exposure in addition to immune-compromised state related to his previous failed kidney transplant. PD catheter removal was strongly suggested at the first sight of the fungal Peritonitis, however due to patients'reluctance we were obliged to try a course of antifungal treatment, well aware of the risk and poor response.

Treatment of the fungal PD peritonitis with antifungal agents without PD catheter removal is associated with high risk of morbidity and mortality, hence early PD catheter removal has been contemplated in most of the case reports and case series [6-9]. The International society of peritoneal dialysis (ISPD) 2000 guidelines, recommends a trial of antifungal agents for the treatment of fungal PD peritonitis, in addition to some case reports of successful medical treatment of fungal PD peritonitis without catheter removal, encouraged us to try a course of antifungal agents, considering patient's strong reluctance against PD catheter removal [10,11].

I am not certain whether it was worth a consideration of a trial of antifungal treatment in this patient considering quite discouraging response to treatment and very high risk of morbidity and mortality in most of the published case reports. Early catheter removal is still the best option for management of fungal PD peritonitis. Current ISPD 2010 guidelines have been updated to recommend early PD catheter removal and avoidance of the prolonged antifungal treatment as the risk of death, transfer to hemodialysis and PD failure rates are very high [12].

Conclusion

Hence this case report is in support of current ISPD 2010 guidelines of early PD catheter removal to avoid the high risk of complications associated with conservative and prolonged treatment of fungal PD peritonitis.

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