

PERITONITIS/INFECTIONS

Peritoneal Dialysis (PD)-Related Peritonitis: Changes in Causative Organisms and Their *In Vitro* Susceptibility over Eleven Years in a Single Brazilian Center

Objective: To examine the changes of PD peritonitis causative organisms and their susceptibilities to antimicrobial agents over 11 years. **Methods:** Retrospective review of the medical records of 402 episodes (ep) of peritonitis in PD patients (pts) who were followed up from January 1998 through December 2008, divided in 3 consecutive periods. **Results:** In January 1998 to August 2001 period (P1), 143 pts (1871 pt-months) were followed with 153 ep of peritonitis (0.98 ep/pt/yr); in September 2001 to May 2005 period (P2) there were 113 pts (2281 pt-months) with 155 ep (0.81 ep/pt/yr), and in the May 2005 to December 2008 period (P3), 165 (1760 pt-months) pts were followed, with 94 ep (0.64 ep/pt/yr). The peritonitis rate was significantly lower in P3 compared to P1 ($p=0.028$). The incidence of peritonitis due to *Staphylococcus aureus* (SA) decreased significantly over time ($P1=0.24$ vs $P3=0.04$ ep/pt/yr, $p=0.018$), whereas there was no significant change for coagulase-negative staphylococcus (CoNS) ($P1=0.25$ vs $P3=0.27$ ep/pt/yr). Gram-negative bacilli (GNB) peritonitis incidence did not vary ($P1=0.2$ vs $P3=0.16$); in contrast the proportion of cases due to a single GNB increased from 20.9% (P1) to 27.1% (P2) and 26.3% (P3) ($p=0.029$, P1 vs P2 and P1 vs P3). The CoNS oxacillin-resistant rate increased from 50% in P1 to 73% in P2 and decreased to 53.8% through P3 ($p>0.05$). In contrast, the rate of oxacillin-resistant SA decreased from 22.6% (P1) to 15.8% (P2) and was absent in P3 ($p>0.05$). Among GNB the resistance rate to ceftazidime increased from 9.6% (P1) to 19% (P2) and 37.5% (P3) ($p=0.045$, P1 vs P3), while there was a trend to increase of resistance rate to gentamicin from 9.6% (P1) to 23.8% (P2) and 28% (P3) ($p=0.09$, P1 vs P3). **Conclusions:** The incidence of peritonitis decreased significantly over time, due mainly to a significant decrease in SA-induced peritonitis, whereas the proportions of peritonitis due to a single GNB and ceftazidime-resistant GNB increased. These findings reinforce that it is necessary microbiological profile monitoring in each center to improve the initial empirical treatment of PD peritonitis.

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Pet-Related Peritonitis in Peritoneal Dialysis (PD): Companion Animals or Trojan Horses?

Objective: Infectious peritonitis is still a major concern in PD, associated with high morbidity and mortality rates. The usual organisms involved in peritonitis are gram-positives, *Staphylococcus aureus* and *S. epidermidis*, gram-negatives *Pseudomonas* spp and bacteria from the bowel. When infection does not respond to standard treatment, unusual infective agents are to be considered, including zoonoses, infections with an animal source. Pets are very popular in our modern urban societies, with close contacts between owners and animals, creating potential health risks. The incidence of PD peritonitis caused by zoonotic micro-organisms is still unknown. **Methods:** To precise the pet-related peritonitis incidence, we made a MedLine search with pet-related and zoonotic peritonitis as key words, then analyzed statistics from both the French-speaking PD registry (RDPLF) and our own PD unit. **Results:** 124 published cases of PD peritonitis caused by 12 different zoonotic agents were found, 30 (24%) of them following a documented contact with an animal. *Campylobacter* spp, *Pasteurella* spp, *Zygomycetes*, *Rhodococcus* spp, *Listeria monocytogenes*, *Mycobacterium avium* complex, *Neisseria* spp, *Brucella* spp, *Bordetella bronchiseptica*, *Salmonella* spp, *Capnocytophaga* spp, and *Giardia* spp were the various organisms involved. Contact animals were cats, dogs, hamsters, birds, and farm animals; transmission ways being direct contact, bite, scratch, tubing bite or puncture. PD catheter removal was necessary in 27% of the cases and overall mortality was 13.5%. Data from RDPLF and our own unit showed an incidence of 0.54% (51 of 9433 peritonitis over a 117-month period) and 0.03% (4 of 128 peritonitis during a 119-month period) of PD peritonitis related to zoonotic agents, respectively. **Conclusions:** Despite a very low incidence, zoonotic PD peritonitis represents a serious infectious problem with high Tenckhoff catheter removal and mortality rates. Strict hygiene is still the main measure to prevent zoonotic peritonitis in PD patients owning a pet or having occupations involving contacts with animals.

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Changes in Causative Organisms and Antimicrobial Susceptibilities in Exit-Site Infection in Peritoneal Dialysis

Objective: Infection remains the Achilles heel of peritoneal dialysis (PD). Exit-site infection (ESI) and tunnel infections are serious complications of PD since they may lead to peritonitis and catheter loss. The objective was to evaluate the clinical practice, the changes of causative organisms and their susceptibilities to antimicrobial agents in ESI over the past 6 years. **Methods:** Retrospective review of the medical records of 114 PD patients (pts) from 1 center university in Brazil (176 episodes of ESI) who were followed up from 01/2004 through 12/2009. To evaluate the progressive use of prescription antibiotics in the ES, the study period was divided, the first comprising 2004–2006 and second 2007–2009. In the first period to half pts were prescribed antibiotic cream (mupirocin), in 2007 other antibiotic came to be used, gentamicin. Actually all the pts were prescribed the prophylactic antibiotic. The 2 periods were analyzed (Fisher's exact test and chi-square, $p<0.05$). **Results:** Incidence of ESI decrease was 1.4 for 0.62 episodes/pt-year. Proportion of ESI caused by a single gram-negative (GN) organism were significantly higher in 2004–2006 (52.4%), compared with those in the rest of the years (32%), $p=0.03$. Proportion of ESI due to gram-positive (GP) bacillus increased significantly over time, 3.6% for 20%, $p=0.001$; whereas there was no significant change in the incidence of GP cocci. Observing the profile resistance of GP cocci, there is no increase. In contrast when analyzing a GN, trend of increasing resistance *in vitro* has been noted for both ciprofloxacin and to gentamicin, increased from 38% in 2004–2006 to 59.5% in 2007–2009 ($p=0.09$) and increased from 40% in 2004–2006 to 68% in 2007–2009 ($p=0.08$). **Conclusions:** The incidence of ESI for 2009 decreased to less than half over the past 6 years. With the widespread usage of prophylactic antimicrobial applications at the ES, there has been a change in the organisms leading to ESI. Our study identified several cases of ESI caused by atypical GP bacillus possibly non-diphtheria corynebacteria. The findings suggest that periodic evaluation of the microbiological pattern and resistance of the agents is necessary.

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Impact of Climatic Factors in the Clinical and Microbiological Characteristics of Peritonitis in Peritoneal Dialysis

Objective: To evaluate the influence of climatic conditions on the clinical features and microbiological characteristics of peritonitis. **Methods:** A retrospective study of 480 peritonitis in 77 patients of university center in Brazil, from 1995 to 2007. We included patients with 4 or more peritonitis. Evaluated the absence of growth in culture and the distribution of the agents on the median temperature (°C) and precipitation (mm), was applied Mann-Whitney and Kruskal-Wallis, respectively. Logistic regression was applied to the variation in temperature and precipitation in the 5 days that followed the infection, evaluated the impact of variation in clinical presentation, microbiological diagnosis, and the evolution of peritonitis. The climate information was provided by the National Institute of Meteorology-Brazil. **Results:** There was influence of higher temperatures in the occurrence of negative culture ($n=49$), $p<0.05$. It was also the influence of temperature on Enterobacteriaceae and Streptococcus that occurred at high temperatures ($p=0.01$), while fungi occurred during lower temperatures. Another effect was that the temperature variation influenced the emergence of gram-negative bacilli, particularly in nonfermenters, with an odds ratio of 1.1 with confidence interval (CI) 1.0–1.29 ($p<0.004$) and with less impact for Enterobacteriaceae, odds ratio 0.93, CI 0.86–1.00 ($p<0.08$). The variation in temperature and precipitation did not influence the main symptoms; however, there was increased chance of diarrhea ($p=0.07$) in the peritonitis which occurred at high temperatures. There was no climatic influence on outcomes of peritonitis. **Conclusions:** The lack of growth in cultures may reflect the lower survival of bacteria *in vitro* as a consequence of high temperatures. The importance of climatic variations on the etiologies, revealed high temperatures in the emergence of gram-negative bacilli significantly from nonfermenting gram-negative ($p<0.004$). There are hypotheses for the increase of these bacteria in the heat, in the case of *Pseudomonas*, the excessive water contaminate the skin in baths. Currently, the influence of climate on human health, particularly in infections consists considerable gap in the literature.

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