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FROM THE EDITORIAL OFFICE

Dear All,

In this issue, we are delighted to have Professor David Johnson and his group, share their experience of climatic influence on peritonitis.

The ISPD Asia-Pacific Chapter meeting 2013 is coming this September. We look forward to seeing you in Taipei.

You are most welcome to distribute this newsletter electronically or in printed form to your colleagues or other people interested. If you or your colleagues want to receive this newsletter directly from our editorial office, please send your e-mail address to me.

Sincerely,
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THE ROLE OF CLIMATIC REGION IN PERITONEAL DIALYSIS-RELATED PERITONITIS

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In Australia, peritonitis is an important cause of technique failure and infectious deaths amongst peritoneal dialysis (PD) patients. The temperature and humidity differences in individual climatic regions may influence the development of PD peritonitis by changing patient behaviour and hygiene, distribution of normal skin flora, organism virulence, and the chance of contamination. Previous studies attempting to demonstrate a relationship between changes in temperature and humidity and the occurrence of PD peritonitis have had conflicting outcomes [1-5]. Those studies have been limited by small patient numbers, single-centre sourcing, retrospective design and a relatively narrow range of temperature and humidity in the studied regions, which were often within one climatic region, thereby possibly underestimating the true effect of climatic variation. Australia is in a unique position to evaluate the impact of climate on PD peritonitis because its land mass encompasses a range of different climatic regions concurrently.

We recently conducted an observational study to examine the effect of climatic regional variation on the risk, microbiology, treatment, and clinical outcomes of PD-associated peritonitis in all Australian adult PD patients, as recorded in the Australia and New Zealand Dialysis and Transplantation (ANZDATA) registry [6]. Patients were analysed according to the climatic region in which they resided, based on postal code according to the Köppen classification scheme used by the Australian Bureau of Meteorology (http://www.bom.gov.au).

The study included 6610 PD patients, in whom 6213 episodes of peritonitis occurred in 3128 patients (47%, 1-15 episodes per patient). The key findings observed in the study included:

1. **Disproportionate distribution of PD patients:** The majority of PD patients lived in Temperate regions (65%; reference group), followed by Subtropical (26%), Tropical (6%) and Other climatic regions (3%; Desert or Grassland).
2. **Differences in patient characteristics:** PD patients from Tropical regions were significantly more likely to be Aboriginal and Torres Strait Islander racial origin (adjusted odds ratio [OR]: 25.9; 95% confidence interval [CI]: 18.7 to 35.9), have lower eGFR at dialysis commencement (OR per mL/min/1.73m2: 0.89; 95% CI: 0.84 to 0.93), be current cigarette smokers (OR: 1.54; 95% CI 1.07 to 2.21), have low transporter status (OR: 2.73; 95% CI: 1.60 to 4.66) and receive dialysis at a medium-large (3rd-quartile) centre (OR: 4.32; 95% CI : 3.33 to 5.60, using largest-centre quartile as a reference).
3. **Significantly higher overall peritonitis rate and shorter time to first peritonitis amongst patients living in Tropical regions** (hazard ratio: 1.15; 95% CI 1.01 to 1.31 relative to Temperate region reference), even after adjustment for differences in demographic and clinical factors, compared to those living in Temperate, Subtropical or Other climatic regions.
4. **Dissimilar microbial profile of peritonitis:** Tropical (OR: 2.18; 95% CI 1.22 to 3.90, using Temperate as a reference) and Other climatic regions (Desert and Grassland; OR: 3.46; 95% CI: 1.73 to 6.91) were associated with higher rates of fungal peritonitis, whilst culture-negative peritonitis was significantly less likely to occur in Tropical regions (adjusted OR: 0.42; 95% CI: 0.25 to 0.73).
5. **Divergent approach in initiating empiric antibiotics:** Patients from Tropical regions were more likely to receive treatment with vancomycin in combination with an aminoglycoside or a 1st-generation cephalosporin in combination with a 3rd- or 4th-generation cephalosporin. Moreover, in spite of higher rates of fungal peritonitis, antifungal chemoprophylaxis was less commonly used in Tropical and Other climatic regions than in Subtropical regions.

Increased episodes of peritonitis in warmer climatic conditions is biologically plausible because hot and humid climates promote skin perspiration and may influence human behaviour, such that people living in Tropical regions may be more likely to participate in outdoor activities such as swimming in oceans or waterholes. Furthermore,

humid environments can enhance the growth and persistence of bacteria on dialysis tubing and other environmental reservoirs [7]. Differences in the microbial profile of organisms responsible for peritonitis may be explained by increasing virulence of Candida species, responsible for most fungal peritonitis in Australia [8], by promoting the development of tubular, branching-type hyphal cells that facilitate deep penetration into human tissues rather than the unicellular budding yeast state [9]. The risk of fungal peritonitis may be further increased by lower rates of co-prescription of antifungal prophylaxis in Tropical (11%) and Other climatic regions (8%) compared with Subtropical regions (24%). The role of divergent approaches to the choice of empiric antibiotics in different climatic regions on the subsequent risk of fungal peritonitis is unknown and warrants further exploration.

In conclusion, our study represents the largest investigation to date and the first comprehensive multicentre examination of the effects of climatic region on the risk, microbiology, treatment, and clinical outcomes of PD-associated peritonitis. The findings clearly demonstrate that PD patients living in Tropical areas experienced higher overall peritonitis rates (particularly fungal peritonitis) and shorter times to a first peritonitis episode. Augmented peritonitis prophylactic measures should be considered in PD patients residing in Tropical climates.

References

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2. Chan MK, Chan CY, Cheng IK, Ng WS. Climatic factors and peritonitis in CAPD patients. *Int J Artif Organs*.12(6):366-368, Jun 1989.
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6. Cho Y, Badve SV, Hawley CM, McDonald SP, Brown FG, Boudville N, Wiggins KJ, Bannister KM, Clayton P, Johnson DW. Effects of Climatic Region on Peritonitis Risk, Microbiology, Treatment, and Outcomes: A Multicenter Registry Study. *Perit Dial Int*. Sep 1 2012.
7. Stinghen AE, Barretti P, Pecoits-Filho R. Factors contributing to the differences in peritonitis rates between centers and regions. *Perit Dial Int*.27 Suppl 2:S281-285, Jun 2007.
8. Miles R, Hawley CM, McDonald SP, Brown FG, Rosman JB, Wiggins KJ, Bannister KM, Johnson DW. Predictors and outcomes of fungal peritonitis in peritoneal dialysis patients. *Kidney Int*.76(6):622-628, Sep 2009.
9. Gow NA, Brown AJ, Odds FC. Fungal morphogenesis and host invasion. *Curr Opin Microbiol*.5(4):366-371, Aug 2002.

LITERATURE UPDATES ON PERITONEAL DIALYSIS

Economic considerations of PD

Although there is a strong economic rationale in favour of peritoneal dialysis (PD) over hemodialysis (HD), the potential cost of PD technique failure remains a concern to many dialysis program directors. A recent study reviewed all incident dialysis patients from Alberta, Canada, between 1999 and 2003. Total cumulative health care costs in 3 years, including inpatient and outpatient costs, physician claims, and medication costs were determined using patient-level resource utilization data. In essence, the analysis showed that, as compared to patients who receive only HD, those who received PD only and those who transitioned from HD to PD therapy had significantly lower total health care costs at both 1 and 3 years. Patients experiencing PD technique failure had costs similar and not in excess of HD-only patients at 3 years. Cost drivers in PD technique failure arose primarily from costs of dialysis provision, hospitalization, medications, and physician fees. The findings of this study support the economic rationale for a PD-first policy in all eligible patients. However, it is important to note that, as the authors pointed out, this analysis is taken from the perspective of the health payer, and costs that are outside the health care system are not measured.

Comments

The result is encouraging and strongly argues for a wider use of PD. Nonetheless, it is important to note that the healthcare costs vary widely between countries, and the cost estimation used in this study may not be easily extrapolated to other healthcare systems.

1. Chui BK, et al. Health care costs of peritoneal dialysis technique failure and dialysis modality switching. Am J Kidney Dis 2013; 61: 104-111.

Internal milieu matters

Previous studies suggest that hemodialysis (HD) patients are more likely to die on a Monday or Tuesday, presumably because of the extra day without dialysis over the weekend, resulting in a higher risk of hyperkalemia. However, there has been little study of daily variation in cardiac death in PD patients until the recent observational cohort study using ANZDATA Registry data. In this study, all 14,636 adult dialysis patients (HD 10,338; PD 4,298) in Australia and New Zealand who died between 1999 and 2008 were analysed. Consistent with the findings of previous studies, the authors noted that daily variation in the pattern of cardiac deaths was observed in HD patients receiving 3 or fewer dialysis sessions per week. However, this variation was not found in PD, home HD, and HD patients receiving more than 3 sessions per week. Their result strongly supports the hypothesis that fluctuation of the internal milieu leads to adverse outcome in dialysis patients.

Comments

This study confirms the long-believed advantage of PD. Unfortunately, detail of serum potassium levels is not available.

1. Krishnasamy R, et al. Daily variation in death in patients treated by long-term dialysis: comparison of in-center hemodialysis to peritoneal and home hemodialysis. Am J Kidney Dis 2013; 61: 96-103.

Biocompatible PD regimen

Biocompatible PD solutions are a hot topic. However, previous clinical trials showed conflicting results with regard to their clinical benefits. More recently, utilization of PD regimen that consists of different biocompatible PD solutions have been advocated. In a prospective, multi-center randomized control study, a group of investigators from Hong Kong recruited 150 new PD patients, who were randomized to either a regimen with 3 biocompatible PD solutions (a neutral-pH, low glucose degradation product, 1.5% glucose solution; a solution with 1.1% amino acid; and a fluid with 7.5% icodextrin) or conventional PD regimen of all glucose-based solutions. These patients were followed for 12 months. The authors found that, as compared to the conventional regimen, the use of a biocompatible regimen for 12 months did not affect residual glomerular filtration rate, but was associated with better preservation of daily urine volume. The biocompatible regimen also leads to changes in small-solute transport and other inflammatory markers in dialysis effluent, but has no effect on systemic inflammatory response. The clinical significance of these changes remains to be defined.

Comments

By and large, this is a negative study. Similar studies in this area (for example, the IMPENDIA) are yet to be published.

1. Lui SL, et al. A combination of biocompatible peritoneal dialysis solutions and residual renal function, peritoneal transport, and inflammation markers: a randomized clinical trial. Am J Kidney Dis 2012; 60: 966-975.

TOP 10 PERITONEAL DIALYSIS PAPERS PUBLISHED IN 2012

1. **Effects of Biocompatible versus Standard Fluid on Peritoneal Dialysis Outcomes** *Johnson, David W.; Brown, Fiona G.; Clarke, Margaret; et al. (balANZ Trial Investigators)* JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY: Volume 23, Issue 6, Pages 1097-1107.

2. **Continuous ambulatory peritoneal dialysis as a therapeutic alternative in patients with advanced congestive heart failure** *Nunez, Julio; Gonzalez, Miguel; Minana, Gema; et al.* EUROPEAN JOURNAL OF HEART FAILURE: Volume 14, Issue 5, Pages 540-548.

3. **Differences Between Dialysis Modality Selection and Initiation** *Liebman, Scott E.; Bushinsky, David A.; Dolan, James G.; et al.* AMERICAN JOURNAL OF KIDNEY DISEASES: Volume 59, Issue 4, Pages 550-557.

4. **Global Trends in Rates of Peritoneal Dialysis** *Jain, Arsh K.; Blake, Peter; Cordy, Peter; et al.* JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY: Volume 23, Issue 3, Pages 533-544.

5. **Optimizing renal replacement therapy in older adults: a framework for making individualized decisions** *Tamura, Manjula Kurella; Tan, Jane C.; O'Hare, Ann M.* KIDNEY INTERNATIONAL: Volume 82, Issue 3, Pages 261-269.

6. **Is N-terminal probrain-type natriuretic peptide a clinically useful biomarker of volume overload in peritoneal dialysis patients?** *Papakrivopoulou, Eugenia; Lillywhite, Samuel; Davenport, Andrew* NEPHROLOGY DIALYSIS TRANSPLANTATION: Volume 27, Issue 1, pages 396-401.

7. **Hemodialysis and peritoneal dialysis are associated with similar outcomes for end-stage renal disease treatment in Canada** *Yeates, Karen; Zhu, Naisu; Vonesh, Edward; et al.* NEPHROLOGY DIALYSIS TRANSPLANTATION: Volume 27, Issue 9, Pages 3568-3575.

8. **The relationship between the soluble Klotho protein and the residual renal function among peritoneal dialysis patients** *Akimoto, Tetsu; Shiizaki, Kazuhiro; Sugase, Taro; et al.* CLINICAL AND EXPERIMENTAL NEPHROLOGY: Volume 16, Issue 3, Pages 442-447.

9. **Peritoneal dialysis relieves clinical symptoms and is well tolerated in patients with refractory heart failure and chronic kidney disease** *Koch, Michael; Haastert, Burkhard; Kohnle, Matthias; et al.* EUROPEAN JOURNAL OF HEART FAILURE: Volume 14, Issue 5, Pages 530-539.

10. **Reimbursement of Dialysis: A Comparison of Seven Countries** *Vanholder, Raymond; Davenport, Andrew; Hannedouche, Thierry; et al. (Am Soc Nephrology)* JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY: Volume 23, Issue 8, Pages: 1291-1298.

NEWS FROM THE ISPD

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Asian Chapter Scholarship

This is a scholarship to support up to 3 months of training in clinical PD for doctors and nurses from Asia. Application deadlines for each round are twice each year (June 30th or December 31st). The next deadline is **March 31st, 2013**. Details and application procedures can be found on the ISPD website (www.ispd.org) under the Regional Chapters: Asia-Pacific Chapter.

Upcoming Meetings

ISN World Congress of Nephrology 2013
May 31st- June 4th, 2013
Hong Kong
Website: www.wcn2013.org

6th ISPD Asia-Pacific Chapter Meeting
September 27th-29th, 2013
Taipei City, Taiwan
Website: www.2013ispd-apcm.org
Important dates:
Registration Open: April 1st, 2013
Abstract Submissions Deadline: July 15th, 2013
Early Registration Deadline: August 30th, 2013
Regular Registration Deadline: September 20th, 2013