A NOVEL MARKER IN PD-RELATED PERITONITIS: DIAGNOSTIC AND PROGNOSTIC SIGNIFICANCE OF CALPROTECTIN LEVELS IN PERITONEAL DIALYSIS EFFLUENT

Francesco Iannuzzella[1], Mattia Corradini[1], Lucia Belloni[2], Alfredo Stefani[1], Maria Parmeggiani[2] and Sonia Pasquali[1]

[1], Nephrology and Dialysis Unit, IRCCS Arcispedale Santa Maria Nuova, Reggio Emilia, Italy and [2], Laboratory and Molecular Biology Unit, IRCCS Arcispedale Santa Maria Nuova, Reggio Emilia, Italy.

OBJECTIVES

In patients on peritoneal dialysis (PD), peritonitis remains a common complication and still represents the main cause of technique failure. The diagnosis is relatively easy, but clinicians have limited tools to determine which patients will progress to more severe forms of infection at the time of peritonitis onset. Calprotectin is a novel inflammatory biomarker now commonly used in the diagnosis of inflammatory bowel disease. The aim of this study was to assess the utility of peritoneal fluid calprotectin as a novel diagnostic and prognostic marker in PD-related peritonitis.

METHODS

We performed a longitudinal study of all 48 patients who were on PD in our Center since January 2012 to June 2012. A total of 44 consecutive peritoneal fluid samples from 11 patients (4 samples per patient) were collected during the first day of an acute episode of peritonitis and then on days 3, 7 and 30 (i.e. at least one week after antibiotic therapy suspension). All peritoneal effluent samples were examined for cell count, bedside culture and calprotectin concentration. In presence of fever or abdominal pain, a PD fluid total white cells count greater than 100/mm3 with or without a positive culture was used for diagnosis of peritonitis. Moreover we evaluated C reactive protein and blood leucocytes on the same days of PD effluent collection. Calprotectin levels were determined by means of a modified ELISA test with a threshold value of 15.6 ng/mL. Continuous factors were presented as the mean values +/- standard deviation. The Wilcoxon test was used for peritoneal white cells count and calprotectin levels.

RESULTS

We investigated 48 patients (28 men, 61+/-18 yrs), of whom 24.3% were diabetic and 86.7% had hypertension. Mean PD vintage was 30+/-16 months. During the 6 months follow-up period, peritonitis was diagnosed in 11 patients (8 men, 59+/-16 yrs). The PD effluent culture was positive in 9 patients (**TABLE 1**). The mean calprotectin concentration in PD fluid was 263.7+/-81.4 on day 0 and 35.7+/-66.8 on day 3. Calprotectin was undetectable in PD samples in 6 patients on day 3 and in 9 patients on day 7, and in all patients on day 30 (**FIGURE 1**). Notably the only 2 patients with persistence of calprotectin on day 7 were those who presented with a worse clinical course, a long in-hospital stay and who underwent peritonitis recurrence after treatment suspension. In all patients, both PD white cells count and calprotectin levels decreased significantly after the start of treatment ($p<0.001$). At the time of peritonitis onset, calprotectin concentration correlated well with both the neuthrophil count in the PD effluent (r=0.68, **FIGURE 2**) and in the circulation (r=0.62, **FIGURE 3**).

	Number of patients
Gram positive isolates	
Staphylococcus species	3
Corynebacterium species	1
Gram negative isolates	
Pseudomonas species	1
Klebsiella pneumoniae	2
Acinetobacter	1
O. anthropi	1
Culture negative (no growth)	2

TABLE 1. Organisms isolated in 11 patients with PD-related peritonitis.

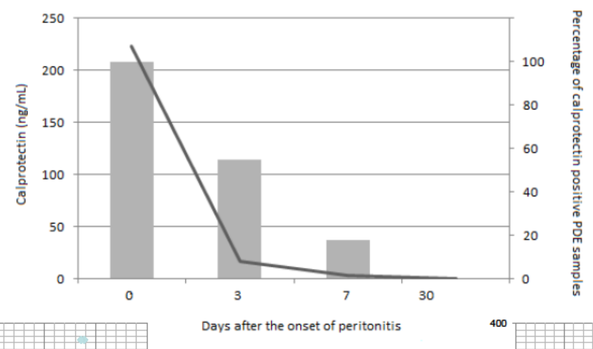

FIGURE 1. Calprotectin levels in PD effluent (PDE) after peritonitis.

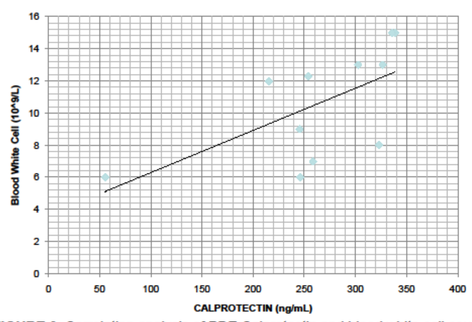

FIGURE 3. Correlation analysis of PDE Calprotectin and blood white cell count.

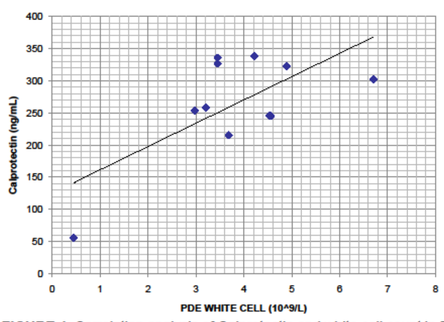

FIGURE 4. Correlation analysis of Calprotectin and white cell count in PDE.

CONCLUSIONS

Calprotectin was undetectable in PD fluid samples of healthy PD patients and after a complete recovery from PD related peritonitis, by contrast its levels increased significantly in patients who developed peritonitis. Persistence of calprotectin after 7 days of therapy or its reappearance after a previous disappearance should be regarded as a risk factor for a worse clinical course.