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Review Article

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The Importance of Residual Renal Function in Peritoneal Dialysis

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Introduction

Renal residual function (RRF) is defined like the glomerular filtration rate (GFR) maintained by patients with end-stage renal disease (ESRD) after being included in some dialysis technique [1]. It is difficult to discern which is the best way to calculate it, but it is probably the average of the sum of the urea and creatinine clearance [1].

Throughout this review the most relevant aspects of RRF in peritoneal dialysis (PD) its benefits, its relationship with dialysis adequacy, survival in the technique will be analyzed, concluding with a summary of the most important keys for the preservation of it.

General Benefits Derived from RRF

Classically, RRF has been linked to some benefits, which are ultimately related to a decrease in morbidity and mortality of cardiovascular origin, which translates into an increase in quality of life.

These benefits are the following [1,2].

I. Increase survival.

II. Easy elimination of water and salt.

III. It helps the clearance of solutes of small and medium molecular weight.

IV. Reduces systemic inflammation.

V. Improves the nutritional status.

VI. Reduces the risk of cardiovascular disease.

VII. Keep endocrine functions.

Additive Effect of RRF on the Dialysis Dose

RRF contributes to the dialysis dose. One ml/min of renal clearance of creatinine is equivalent to approximately 10 L/week of peritoneal clearance. In this way, it contributes decisively to the elimination of sodium and water, since it helps the clearance of solutes of small and medium molecular weight. Therefore, those patients with RRF require less dose of dialysis. However, RRF is lost over time, so a periodic monitoring is essential, which will force us to progressively increase the dose of prescribed dialysis as it is lost [1].

RRF and Survival in Peritoneal Dialysis

RRF has been related to an increase in survival in the technique, mainly motivated by the elimination of small molecules, but also by medium and large sized toxins. In addition, it obtains greater effectiveness to clarify the uremic toxins linked to proteins such as phosphates. Preservation of RRF is also associated with lower plasma levels of AGE in PD patients [1]. Some studies, like the CANUSA study, show that survival is higher in patients who start in technique with a higher RRF [3].

Modality of PD and its Relationship with RRF

It is a controversial aspect and not entirely clear. In the Cochrane Database of Systematic Reviews 2007, no differences were found between automated peritoneal dialysis (APD) and continuous ambulatory peritoneal dialysis (CAPD) in relation to RRF [4]. However, other studies such as NECOSAD or the Spanish multicenter study show that there is a higher rate of GFR loss in APD [4,5].

Peritoneal Dialysis Solutions and RRF

Different articles [6,7] show that the use of solutions with neutral pH and low glucose degradation product (GDP) are related to a higher RRF.

The Renin-Angiotensin-Aldosterone System (RAAS) Blockade and RRF

The use of ramipril is associated with less loss of RRF in patients treated with PD for one year [8]. Something similar occurs with valsartan, which is related to greater diuresis and less loss of RRF after 24 months of treatment [9].

Diuretics and its Relationship with RRF

The use of diuretics, such as furosemide, does not increase RRF, but urine volume does [10].

Conclusions Key Points to Preserve RRF

These key points could be [1]:

a) PD as a dialysis start modality.

b) Use of solutions with neutral pH and low in GDP.

c) Start of treatment with CAPD. It continues being a controversial issue, although it is the usual clinical practice.

d) Avoid nephrotoxic drugs.

e) Avoid situations of volume depletion.

f) Prevent the appearance of peritonitis.

g) Use of RAASS blockade drugs.

Conflict of Interest

The authors of this manuscript declare not to have any conflict of interest.

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