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Editorial:

GLOMERULAR HYPERFILTRATION: PROPOSAL TO DEVISE A SYSTEM FOR THE DIAGNOSIS AND THERAPEUTIC MONITORING

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Version en español

According to the current physiological model, the progression of renal damage in chronic renal failure is attributed to the deterioration in renal function caused by the over activity of the remaining nephrons (compensatory glomerular hyperfiltration) due to the loss of the rest of the glomerular units[1].

The renin-angiotensin system actively takes part in this progressive damage, on inducing a sustained intraglomerular hypertension and subsequent glomerular damage[1].

It is because of this interpretation that the family of drugs, angiotensin converting enzyme inhibitors (ACEI) and/or angiotensin II antagonists (ARA) are used with the aim of reducing this renal deterioration[2].

The response of the hyperfiltration to giving these drugs (ACEI or ARA) is currently monitored by measuring whether or not there is a reduction in the baseline urine protein of the patient. However proteinuria is an indirect indicator of hyperfiltration with the limitations that this involves, as well as there being other clinical conditions that show frank glomerular hyperfiltration which is not demonstrated by the presence of a significant proteinuria. On the other hand, there are conditions where the patient proteinuria is more the product of secondary changes in the filtration barrier due to a glomerular disease (minimum changes, etc) than the result of the hyperfiltration per se[1].

The phenomenon of renal reserve was described decades ago. This is the capacity of the kidney to increase its baseline glomerular filtration by at least 20% after an intake rich in proteins (post-amino acid overload filtration rate)[2]. Furthermore, this response is susceptible to being blocked by the use of glomerular hyperfiltration inhibitors such as ACEI and/or ARA[3-10].

Therefore, due to the importance of hyperfiltration treatment to protect the nephrons in the chronic renal patient, it should be essential to objectively assess whether the hyperfiltration treatment is effective or not. For this reason, we present the following proposal to devise a system for the diagnosis and therapeutic monitoring of glomerular hyperfiltration based on physiological foundations:

1.- Given that the definition and classification of chronic renal failure requires knowing the glomerular filtration rate of the patient, and that the creatinine clearance with cimetidine is the most accurate and practical test (creatinine clearance with cimetidine/glomerular filtration ratio = 1.1) of measuring it in clinical practice, the glomerular filtration of the patient should first be measured using this technique.

2.- Once the glomerular filtration rate (GFR) of the patient is documented, it is assessed whether the GFR is within the level expected for the age, sex, body surface and plasma creatinine of the patient according to the Cockroft - Gault formula (due to this formula has been validated even in the elderly). If the GFR of the patient measured by the creatinine clearance with cimetidine is higher than expected when calculated by the Cockroft - Gault formula, we can then determine that the patient has glomerular hyperfiltration.

3.- The renal reserve (RR) of the patient is then evaluated, determining whether it is positive (greater than 20%) and to what extent.

4.- The previously mentioned parameters (GFR and RR), together with the classic measurement of urine proteins, will be the indicators used to assess the presence of hyperfiltration, and whether inhibition is adequately achieved with the medication scheme indicated.

5.- After prescribing ACEI and/or ARA and a suitable dose is reached, the GFR and the RR are repeated, and if the GFR falls within the expected range using the Cockroft - Gault formula and the RR becomes negative, the hyperfiltration is considered to be controlled, and the initially proposed medication scheme is maintained. But if on the other hand, any of the previously mentioned indicators do not reach the proposed objective, the baseline medication scheme is adjusted (the ACEI/ARA dose is increased or they are combined, taking care not to alter the serum potassium or the blood pressure of the patient). The GFR and the RR measurements are then repeated to see whether the dose readjustments have managed to reduce the GFR to a suitable level and inhibit the RR, continuing thus until the planned objective is achieved (generally, no more than one adjustment is needed).

To conclude, this editorial proposes a strategy to use a system to diagnose and monitor the treatment of glomerular hyperfiltration based on basic physiological indicators, such as the measurement of the glomerular filtration rate and the renal reserve.

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