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Acute renal failure in a tertiary referral hospital, a relevant cause of chronic renal failure and mortality☆

Fracaso renal agudo en un hospital de tercer nivel, causa relevante de enfermedad renal crónica y mortalidad a medio plazo

Dear Editor,

The onset of acute renal failure (ARF) in a hospitalised patient is an important independent factor of morbidity/mortality and development of chronic kidney disease (CKD), and, therefore, preventive measures are essential for reducing their frequency.[1–3]

Our aim was to analyse episodes of ARF in our department followed as referrals and their mid-term outcome.

This is a retrospective cohort study in which the referrals due to ARF requested to our department for a 10-month period (April 2013–January 2014), as well as their evolution over the following two years, were analysed.

We analysed the following variables: age, gender, comorbidity, kidney function, average duration of hospitalisation, need for haemodialysis, risk factors and mortality. To do this, we reviewed the electronic medical record (EMR) and the treatments received during hospitalisation. Continuous variables were expressed as mean and standard deviation; discrete variables, as percentages. Associations between related quantitative variables were analysed using the Student's *T*-test for related means.

Forty-eight patients were assessed for ARF, with an average of 17 visits per patient. The referrals came from Cardiology and Heart Surgery (33%), Internal Medicine (13%), Pulmonology (19%), Digestive Medicine and Neurology (19%); the rest were miscellaneous. Ten of these patients (21%) had previously been admitted to the Intensive Care Unit (ICU). Average age was 71 ± 10.5 years. 69% were male and the average hospital stay was long: 30.5 ± 21.7 days.

In 25% of cases, ARF was related to symptoms of heart failure; a septic procedure in 27%; volume depletion or a drug in 31%; and 17% were classified multi-factorial. The main comorbidities were: 52% diabetes, 56% heart disease, 43% peripheral vascular disease and up to 50% had a prior history of CKD.

Moreover, 71% presented with hypoalbuminaemia; 65% with low blood pressure in the preceding days, 54% presented with hypovolaemia; 6% with rhabdomyolysis; and 10% with third-spacing.

With regard to other factors[1–3]: 21% had received NSAIDs in previous days; 60%, ACE inhibitors/angiotensin II receptor antagonists (ARBs); 25%, other drugs (aminoglycosides or chemotherapy); 21%, metformin; 16%, iodinated contrast; and, in 40% of cases, serum creatinine monitoring was not always performed daily.

Evolution: 12% required admission to ICU, 25% required haemodialysis during hospitalisation and 10% began a definitive haemodialysis programme. Kidney function remained impaired (creatinine at discharge 1.91 ± 0.75 vs. 1.27 ± 0.50 mg/dl), at 6 months (1.54 ± 0.86 vs. 1.33 ± 0.63 mg/dl), 12 months (1.68 ± 0.84 vs. 1.33 ± 0.56 mg/dl) and 24 months (1.67 ± 0.70 vs. 1.29 ± 0.52 mg/dl), with $p = 0.001$ in all comparisons.

A 66% of patients were followed in our Nephrology Clinic. Four patients died while in hospital and 15 after discharge (total mortality at 2 years: 39.5%), mainly due to cardiovascular and infectious causes, although five patients had advanced oncological diseases.

There are a large number of known risk factors for the development of ARF[1–4]: age, CKD, diabetes, sepsis and

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nephrotoxic drugs. In our study, all of these factors were present in varying proportions. In spite of the efforts made from the publication of clinical guidelines for early diagnosis and ARF classification,[1–4] the incidence continues to increase. This is important because ARF is a significant risk factor for the development of CKD.[5] Ishani's study[6] demonstrates that the risk of terminal nephropathy is 13 times greater in hospitalised elderly people with ARF than in those without ARF, and the risk is even 42 times greater if the ARF occurs on top of CKD. In our cohort it was observed that the majority of patient maintained a reduced kidney function after the episode of ARF; and the majority were followed as out-patients and in 10% was necessary to start chronic haemodialysis. Mortality may reach 30–50% in general series, and 40–80% in ICU series.[7,8] The survival rate is comparable to that of a diabetic patient who survives a myocardial infarction with ST-elevation. In our study, considering our patients' elevated co-morbidity, overall mortality was 39.5% at 2 years.

Serum creatinine measurement is inexpensive and is widely available in hospitals. Today this parameter is included in all ARF classification tables (RIFLE, AKIN, KDIGO), and yet, many times, it is not measured. While in the Hospital, Electronic Medical Records (EMR) could help to detect patients at risk for development of ARF[9,10] based on epidemiological, clinical, analytic and pharmaceutical prescription data. It could activate automated alert systems that signal the need for daily measurement of serum creatinine in these patients. This would shorten intervention time and reduce the number and duration of ARF episodes.

The findings of this study concur with the findings reported in other studies, and make us to think on the importance of identifying patients at risk of developing ARF at hospital admission using EMR, as well as on the importance of frequent serum creatinine measurement in these patients to reduce incidence and attenuate the consequences of the ARF, especially in relation to morbidity, mortality and CKD.

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