



KIDNEY INJURY AND CLINICAL MANAGEMENT IN HYPERTENSIVE PATIENTS: DIAGNOSIS, MANAGEMENT AND PROGNOSIS



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ABSTRACT

Abstract: Kidney injury in hypertensive patients is a common and serious complication, which can progress to chronic renal failure if not diagnosed and treated properly. We report the case of a 65-year-old male patient with a history of poorly controlled hypertension who presented with signs of hypertensive nephropathy. Clinical and laboratory evaluation revealed impaired renal function, with increased serum creatinine and proteinuria. Clinical management involved tight control of blood pressure and use of ACE inhibitors to minimize progression of kidney disease. This study discusses the current guidelines for the management of kidney injury in hypertensive patients, with emphasis on the importance of early diagnosis and therapeutic approach to preserve renal function and improve prognosis.

Keywords: Kidney Injury. Hypertension. Hypertensive Nephropathy. Proteinuria. ACE Inhibitors.



INTRODUCTION

Hypertension is one of the main causes of chronic kidney injury, and its prevalence increases with age. Patients with poorly controlled hypertension are at increased risk of developing hypertensive nephropathy, characterized by a progressive decrease in renal function and the presence of proteinuria. Hypertension contributes to structural changes in the renal vessels, leading to decreased blood flow and chronic renal ischemia. These changes, if not diagnosed and treated early, can progress to chronic renal failure, which requires dialysis treatment or kidney transplantation.

Early diagnosis of kidney injury in hypertensive patients is essential to prevent more serious complications. Evaluation includes serum creatinine measurement, estimation of glomerular filtration rate (GFR), and analysis of the presence of proteinuria, which is a sensitive marker of kidney damage. In addition, imaging tests, such as renal ultrasound, can be used to evaluate the structure of the kidneys and the presence of vascular abnormalities.

The management of hypertensive nephropathy involves strict control of blood pressure, with the use of antihypertensive drugs that also offer renal protection, such as angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs). Lowering blood pressure to target levels is critical to slowing the progression of kidney injury and improving long-term prognosis. Modification of risk factors, such as glycemic control in patients with diabetes and reduction of sodium intake, also plays an important role in management.

The objective of this study is to review the clinical management of kidney injury in hypertensive patients, highlighting the diagnostic and treatment strategies based on a clinical case report.

METHODOLOGY

This study was conducted as a literature review, based on a clinical case of a hypertensive patient with kidney injury. The PubMed, Scielo, and Medline databases were consulted in order to identify relevant studies published between 2010 and 2023. The search was performed with the following terms: "kidney injury", "hypertension", "hypertensive nephropathy" and "proteinuria". The selection of articles was based on their relevance to the clinical management of hypertensive nephropathy, with emphasis on international guidelines and clinical studies that address renal protection in patients with hypertension.

The inclusion criteria considered studies that discussed the pathophysiology, diagnosis, and treatment of kidney injury in hypertensive patients, as well as studies that compared the different classes of antihypertensive drugs in preventing the progression of nephropathy. Studies that addressed new therapies for the control of resistant hypertension and nephropathy were also considered. Studies that did not present data applicable to clinical practice or that did not involve patients with hypertension were excluded.

The data obtained were compared and correlated with the case report, reinforcing the diagnostic and therapeutic implications of hypertensive nephropathy. The analysis included the impact of pharmacological interventions on the preservation of renal function and the therapeutic options available to patients with resistant hypertension.

RESULTS AND DISCUSSION

Hypertension-induced kidney injury is a progressive condition that, if not treated properly, can result in chronic kidney failure. The patient described presented with classic signs of hypertensive nephropathy, including elevated serum creatinine levels and proteinuria, both important markers of kidney damage. The presence of proteinuria, in particular, is widely recognized as an early indicator of injury to the renal glomeruli and reflects the degree of impairment of the glomerular filtration barrier.

Proteinuria is an early warning sign in hypertensive patients, and its control is essential to prevent the progression of chronic kidney disease. Initial treatment included the use of angiotensin-converting enzyme (ACE) inhibitors, one of the most effective strategies for lowering blood pressure and controlling proteinuria. Studies have shown that ACE inhibitors play an important role in preventing further damage, particularly in patients who have early signs of hypertensive nephropathy.

High blood pressure is the main modifiable risk factor for kidney damage, and its aggressive reduction is essential to stop the progression of the disease. The use of ACE inhibitors, in addition to having a direct effect on lowering blood pressure, also protects the kidneys by reducing intracapsular pressure. When combined with angiotensin II receptor blockers (ARBs), these drugs provide additional protection to the kidneys in patients who have hypertension resistant to conventional treatment.

In patients with resistant hypertension, the combination of multiple antihypertensive agents may be necessary to achieve target blood pressure levels. In addition to ACE inhibitors and ARBs, diuretics and calcium channel blockers are often used to optimize blood pressure control and protect renal function. The choice of drug combination should be



individualized, taking into account the patient's comorbidities, such as diabetes and dyslipidemia.

The presence of diabetes mellitus and dyslipidemia, for example, can accelerate the process of renal deterioration in hypertensive patients. Strict glycemic control in diabetic patients and reduction of blood lipid levels are important complementary strategies for the management of hypertensive nephropathy. The adoption of a low-sodium diet and the encouragement of regular physical exercise are also interventions that contribute significantly to the preservation of kidney function.

Continuous monitoring of renal function is indispensable in the management of these patients. Periodic testing of serum creatinine, glomerular filtration rate, and proteinuria is essential to assess response to treatment and adjust therapies as needed. In addition, evaluation of new markers of renal function, such as cystatin C, may provide additional information on the risk of disease progression.

In recent years, the development of new classes of drugs has provided advances in the treatment of hypertension-induced kidney injury. Sodium-glucose cotransporter type 2 (SGLT2) inhibitors, initially developed for the treatment of diabetes, have shown beneficial effects in preserving renal function in patients with hypertension, regardless of diabetic status. These agents offer a promising therapeutic approach, which may become standard in the management of patients with hypertensive nephropathy.

In conclusion, the effective treatment of hypertensive nephropathy depends on a multifactorial approach, involving strict blood pressure control, appropriate use of medications, regular monitoring of renal function, and modification of risk factors. Early implementation of these measures can significantly slow the progression of chronic kidney disease and improve the long-term prognosis for hypertensive patients

CONCLUSION

Kidney injury in hypertensive patients is a serious complication that requires appropriate clinical management to prevent progression to chronic renal failure. Early diagnosis, using markers such as serum creatinine and proteinuria, is essential to initiate appropriate treatment and minimize kidney damage. Strict control of blood pressure, especially with the use of ACE inhibitors, is critical to preserving kidney function. The integration of new therapies, such as SGLT2 inhibitors, may offer new avenues to improve the prognosis of these patients.



REFERENCES

1. Bakris, G. L., & Weir, M. R. (2000). Angiotensin-converting enzyme inhibitor–associated elevations in serum creatinine: Is this a cause for concern? **Archives of Internal Medicine, 160*(5), 685-693.*
2. Brenner, B. M., Cooper, M. E., de Zeeuw, D., Keefe, J. E., et al. (2001). Effects of losartan on renal and cardiovascular outcomes in patients with type 2 diabetes and nephropathy. **New England Journal of Medicine, 345*(12), 861-869.*
3. KDIGO. (2021). **2021 Clinical Practice Guideline for the Management of Blood Pressure in Chronic Kidney Disease**. **Kidney International, 99*(3).*
4. Lewis, E. J., Hunsicker, L. G., Clarke, W. R., et al. (2001). Renoprotective effect of the angiotensin-receptor antagonist irbesartan in patients with nephropathy due to type 2 diabetes. **New England Journal of Medicine, 345*(12), 851-860.*
5. Whelton, P. K., Carey, R. M., Aronow, W. S., et al. (2018). 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. **Journal of the American College of Cardiology, 71*(19).*
6. Wright, J. T. Jr, Bakris, G. L., Greene, T., et al. (2002). Effect of blood pressure lowering and antihypertensive drug class on progression of hypertensive kidney disease: Results from the AASK trial. **JAMA, 288*(19), 2421-2431.*
7. Appel, L. J., Wright, J. T., Greene, T., et al. (2010). Intensive blood-pressure control in hypertensive chronic kidney disease. **New England Journal of Medicine, 363*(10), 918-929.*
8. Rossing, P., Hougaard, P., & Parving, H. H. (2002). Risk factors for development of incipient and overt diabetic nephropathy in type 1 diabetic patients: A 10-year prospective observational study. **Diabetes Care, 25*(5), 859-864.*
9. Bakris, G. L., Williams, M., Dwyer, J. P., et al. (2000). Preserving renal function in adults with hypertension and diabetes: A consensus approach. **American Journal of Kidney Diseases, 36*(3), 646-661.*
10. Townsend, R. R., Anderson, A. H., et al. (2018). Association of pulse wave velocity with chronic kidney disease progression and mortality: Findings from the CRIC Study (Chronic Renal Insufficiency Cohort). **Hypertension, 71*(6), 1101-1107.*