

SPECIAL COMMUNICATION

**HYPERURICEMIA AND ITS ASSOCIATION WITH HYPERTENSION:
RISK FACTORS AND MANAGEMENT****Kanwal Ashiq^{1,2}, Sana Ashiq³, Naureen Shehzadi¹**¹Punjab University College of Pharmacy (PUCP), University of the Punjab Lahore, Pakistan, ²Department of Pharmaceutical Sciences, Superior University Lahore, Pakistan, ³Centre for Applied Molecular Biology, University of the Punjab Lahore, Pakistan.

Hyperuricemia is a medical condition that arises due to the increased concentration of uric acid in the body. Worldwide, a surge in the number of hyperuricemia cases has been seen over the last ten years. Hyperuricemia develops when the concentration of uric acid persistently crossed its normal threshold value (6 mg/dL). Uric acid is a metabolic product of purine catabolism. During the metabolism of purine, hypoxanthine is formed which is later on converted to xanthine and uric acid by the action of the xanthine oxidase enzyme. A continual increase in levels of uric acid is a major biomarker of developing gouty arthritis. Clinically, gouty arthritis is characterized by inflammation and pain in joints due to the accumulation of urate crystals in and around the affected area.¹

Recently, hyperuricemia-induced renal and cardiovascular diseases have gained more consideration. Hyperuricemia is not only associated with gout but also linked with other comorbidities, including diabetes type II, heart diseases, and hypertension. A cohort study has demonstrated a threefold rise in the incidence of diabetes, hypertension, and kidney diseases in patients suffering from hyperuricemia. Epidemiological reports have revealed that factors leading to hypertension, hyperlipidemia, and obesity are commonly existed side-by-side and may considerably increase the threat of organ damage.^{2,3}

According to estimation, 1.13 billion people around the globe are suffering from hypertension. Also, the World Health Organization has indicated that 13% of deaths happen worldwide due to hypertension and they have also set a goal of decreasing its frequency by 25% from the baseline year 2010 by the year 2025. The concept of association between blood pressure and uric acid is perhaps quite old and has been identified years ago. Multiple studies have established an independent association between uric acid and blood pressure. However, the impact of this association on direct causality is yet to be determined.^{4,5}

In the 1870s, first time Mahomed et al had presented a hypothesis on hypertension and uric acid association. Later, Cannon et al. had conducted a study, and their research results have verified that 47% of patients were hypertensive and had elevated levels of uric

acids. Previous findings have suggested that hyperuricemia participates in the pathological process of cardiovascular disorder. However, there is still no credible information is available that reveals decreasing uric acid levels will control blood pressure in adults. So far, it is not known that the use of uric acid-lowering agents will improve the condition of hypertensive patients. Xanthine oxidase inhibitors are quite effective in decreasing the serum uric acid concentration and helpful in impeding the production of reactive oxygen species (ROS). However, their potential benefit in controlling blood pressure has not been appraised and more studies are required in this regard. Hyperuricemia is linked with metabolic, renal, and cardiovascular diseases, and it is suggested that monitoring of serum uric acid is essential in hypertensive patients (blood pressure: >140/90 mmHg) and in patients who have a family history of prehypertension (blood pressure: 120–139/80–89 mmHg) with other comorbidities like obesity and diabetes. Uricosuric antihypertensive drugs (for example losartan) with diet management can be proved useful. However, diuretics should be avoided in these patients. At present, we haven't enough evidence based on well-made clinical trials that advocate the use of xanthine oxidase inhibitors for the treatment of hypertension and above all mention their potentially harmful effects. Febuxostat can become a better alternative because it is more effective, better tolerated, and more specific than allopurinol. In this regard, long-term interventional studies are required.⁶

Conversely, as hypertension and hyperuricemia are linked together, a drug having antihypertensive effects might have the potential to reduce serum uric acid concentration. Traditional medicine systems can be a better option for the management and treatment of several ailments, particularly in developing countries. Currently, scientists showed more interest in natural remedies as these are safe, effective, and economical. Medicinal plants are enriched sources of various active metabolites such as flavonoids, tannins, saponins, and alkaloids that demonstrated many therapeutic activities in different studies. In the future, more experimental studies are needed to validate their usefulness and explore their possible pharmacological and toxicological effects.^{7,8}

REFERENCES

1. Ashiq K, Bajwa MA, Tanveer S, Qayyum M, Ashiq S, Khokhar R, et al. A comprehensive review on gout: The epidemiological trends, pathophysiology, clinical presentation, diagnosis and treatment. *J Pak Med Assoc.* 2021;71(4):1234-8.
2. Gaubert M, Bardin T, Cohen-Solal A, Diévert F, Fauvel J-P, Guieu R, et al. Hyperuricemia and hypertension, coronary artery disease, kidney disease: from concept to practice. *Int J Mol Sci.* 2020;21(11):4066.
3. Zhang Y, Zhang M, Yu X, Wei F, Chen C, Zhang K, et al. Association of hypertension and hypertriglyceridemia on incident hyperuricemia: an 8-year prospective cohort study. *J Trans Med.* 2020;18(1):1-8.
4. Stewart DJ, Langlois V, Noone D. Hyperuricemia and hypertension: links and risks. *Integr Blood Press Control.* 2019;12:43.
5. Ashiq K, Ashiq S. COVID-19 pandemic and management of hypertension. *Pak Heart J.* 2021;54(3):275-6.
6. De Becker B, Borghi C, Burnier M, Van De Borne P. Uric acid and hypertension: a focused review and practical recommendations. *J Hypertension.* 2019;37(5):878-83.
7. Ashiq K, Hussain K, Islam M, Shehzadi N, Ali E, Ashiq S. Medicinal plants of Pakistan and their xanthine oxidase inhibition activity to treat gout: a systematic review. *Turkish J Botany.* 2021;45(SI-2):723-38.
8. Tâmaş M, Vostinaru O, Soran L, Lung I, Opris O, Toiu A, et al. Antihyperuricemic, Anti-Inflammatory and Antihypertensive Effect of a Dry Extract from *Solidago virgaurea* L.(Asteraceae). *Sci Pharm.* 2021;89(2):27.

Address for Correspondence:

Kanwal Ashiq, Punjab University College of Pharmacy (PUCP), University of the Punjab Lahore, Pakistan

Email: pharmacist.kanwal6@gmail.com

Citation: Ashiq K, Ashiq S, Shehzadi N. Hyperuricemia and Its Association with Hypertension: Risk Factors and Management. *Pak Heart J.* 2022;55(02):200-201. <https://doi.org/10.47144/phj.v55i2.2251>