New research shows clear association between ACE inhibitors and acute kidney injury

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Cambridge scientists have found an association between ACE inhibitors (and similar drugs) and acute kidney injury - a sudden deterioration in kidney function. The research is published today, 06 November, in the journal *PLOS ONE*.

ACE inhibitors and related drugs known as angiotensin receptor antagonists (ARAs or 'sartans') are the second most frequently prescribed medicines in UK clinical practice, and are used to treat common conditions such as high blood pressure, heart disease and kidney problems, especially in people with diabetes. Although concerns about a link between these drugs and kidney function have been raised in the past, the size of the problem had previously been unknown.

The researchers therefore examined the issue using data from the whole of England. They compared the admission rates for acute kidney injury to English hospitals with the prescribing rates of ACE inhibitors and ARAs. From 2007/8 to 2010/11, there was a 52 per cent increase in acute kidney injury admissions. During this same period of time, there was an increase in the number of prescriptions for ACE inhibitors and ARAs issued by GP surgeries by 16 per cent.

The results show a clear association between the increase in prescriptions and the increase in hospital admissions. The researchers estimate that 1636 hospital admissions with acute kidney injury – which has a

mortality rate in the UK of around 25-30 per cent of patients - could potentially have been avoided if the prescribing rate had remained at the 2007/8 levels. They estimate that one in seven cases of acute kidney injury could be due to increased prescriptions for these drugs.

This is the first time that a study has been able to assess the extent to which these medications are linked to acute kidney injury. However, the researchers emphasise that we cannot assume that the medication was a direct cause of the acute kidney injury in this study, and no one should stop taking these medications unless advised by their doctor to do so.

Dr Rupert Payne, senior author of the study from the University of Cambridge's Institute of Public Health, said: "There has been lots of anecdotal evidence suggesting these drugs may be a contributory factor in patients developing acute kidney injury, and this work gives us an opportunity to estimate the size of the problem, as well as making clinicians and patients more aware of the importance of using these drugs in accordance with current clinical guidelines.

"As both a GP and clinical pharmacologist, it also highlights to me the importance of improving our understanding of the risks and benefits of drugs more generally in the real world of clinical practice, away from the artificial setting of clinical trials."

Dr Laurie Tomlinson, co-author of the study, added: "As a kidney doctor I have looked after many patients with acute kidney injury who were taking these medications prior to becoming unwell and have often worried that the drugs were doing more harm than good. These results are the first to estimate to what extent these drugs may be contributing to the growing incidence of acute kidney injury. Therefore, they represent the first step of research needed to better define when they can be prescribed safely, which should reduce the growing burden of acute kidney injury and save NHS costs and ultimately lives."

The researchers will next use large primary care databases to examine the association between the drugs and acute kidney injury for individual patients and, in particular, the role of other medication, patient factors (such as the existence of chronic kidney disease) and infections in causing acute kidney injury.

More information: The paper 'ACE Inhibitor and Angiotensin Receptor-II Antagonist prescribing and hospital admissions with acute kidney injury: A longitudinal ecological study' will be published in the 06 November edition of *PLOS ONE*: dx.plos.org/10.1371/journal.pone.0078465

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