SHORT REPORT

Renal disease is not associated with delays in hyperacute stroke management in South Australia

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Abstract

Objective: The aims of the present study were to determine how renal disease is associated with the time to receive hyperacute stroke care. Methods: The present study involved a 5-year cohort of all patients admitted to stroke units in South Australia. Results: In those with pre-existing renal disease there were no significant differences in the time taken to receive a scan, thrombolysis or endovascular thrombectomy. Conclusions: The present study shows that in protocolised settings there were no significant delays in hyperacute stroke management for patients with renal disease.

Key words: chronic kidney disease, contrast-associated acute kidney injury, ischaemic stroke.

Introduction

Delays in hyperacute stroke management are associated with worse outcomes. Typically, hyperacute stroke management involves the administration of i.v. iodinated contrast agents. Historically, there has been a concern that iodinated contrast agents may cause contrast induced nephropathy (CIN), particularly in patients with chronic kidney disease, which may result in reluctance to perform imaging and unnecessary delays in management. However, current guidelines describe that stable elevated creatinine levels are not an absolute contraindication to i.v. contrast. Recent studies have suggested that the use of additional contrast medium to facilitate imaging such as CT perfusion is not associated with increased rates of acute kidney injury (AKI). These recommendations are reflected in departmental protocols. Figure 1 presents the component of the institutional code stroke protocol pertaining to renal function and performing scans. The impact of such findings and protocols on the timeliness of hyperacute stroke management is uncertain. The aims of the present study were to determine how pre-existing renal disease, in particular reduced estimated glomerular filtration rate (eGFR) or dialysis, are associated with the time to receive hyperacute stroke care. The primary outcome was door-to-scan time. Secondary outcomes included symptom-onset-to-door time, door-to-needle time and door-to groin-puncture time.

Methods

The present study involved a cohort of patients admitted with stroke, who presented by ambulance as a code stroke, during a 5-year period (from 2017 to 2021) to any of the stroke units in South Australia (the Royal Adelaide Hospital, Flinders Medical Centre and the Lyell McEwin Hospital – see Supplementary information 1 in Appendix S1 for details). The presence of pre-existing renal disease was determined on the basis of an individual having either

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(i) the result of the first blood test of the admission and the most recent blood test prior to admission both demonstrating eGFR <30 mL/min/1.73 m², or (ii) a history of dialysis. Shapiro–Wilk tests were used to evaluate for normality. Descriptive statistics, χ² tests, unpaired t tests and Wilcoxon rank-sum tests were used, including to evaluate for associations between a history of renal disease and delays in hyperacute stroke management. The present study received institutional review board approval at each of the participating centres with a waiver of individual consent.

Results

Patient characteristics

The number of patients included in the study was 2960. Of the included individuals, 2499 had an ischaemic stroke (84.4%) (see Supplementary Information 2 in Appendix S1). The number of patients that received thrombolysis was 530 (21.2% of those, presenting with code stroke, who had an ischaemic stroke). The number of patients that underwent endovascular thrombectomy was 436 (17.5% of those, presenting with code stroke, who had ischaemic stroke). The median age was 77 (interquartile range [IQR] 68–85, range 18–103) and there were 1303 females (44.0%). Of all of those presenting with code stroke, with a diagnosis of stroke, there were 81 (2.7%) who fulfilled the criteria for renal disease, of whom 15 (0.5%) were on dialysis. In the subset with ischaemic stroke, there were 78 individuals with renal disease, including 12 individuals on dialysis. In the renal group, the median pre-admission eGFR was 21 mL/min/1.73 m² (IQR 14.5–25). The pre-admission creatinine result in the renal group preceded the admission date by a median of 82 days (IQR 4–292 days).

Hyperacute stroke management times

The median time from symptom onset to hospital arrival was 96 min (IQR 65–197 min). The median time from door-to-scan was 26 min (IQR 18–41 min). In the patients that received thrombolysis, the median door-to-needle time was 64.5 min (IQR 51–82.75 min). The proportion of patients that received thrombolysis in <60 min was 213 (40.3%). For individuals that underwent endovascular thrombectomy, the median door-to-groin-puncture time was 102 min (IQR 82–125.75 min). For none of the primary and secondary outcomes was there a statistically significant difference between those with pre-existing renal disease and those without pre-existing renal disease (see Table 1).

Discussion

The present study has demonstrated that in the participating centres there are no significant delays in hyperacute stroke management for patients with renal disease. This finding is important, as, historically, there may have been delays in obtaining contrast imaging for patients with renal disease due to concerns for contrast-associated AKI (see Supplementary Information 3 in Appendix S1). Patients with a stable elevated creatinine or who receive dialysis do not inherently have an absolute contraindication to receiving iodinated contrast. The participating centres utilise protocols for acute code stroke management. These protocols may be hypothesised to contribute to the lack of an association between renal disease and delays in hyperacute stroke management.

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Competing interests

None declared.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References


Supporting information

Additional supporting information may be found in the online version of this article at the publisher’s web site:

Appendix S1. Supporting Information.