Acute Kidney Injury days or time to recovery a novel sensitive metric for AKI improvement

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Introduction

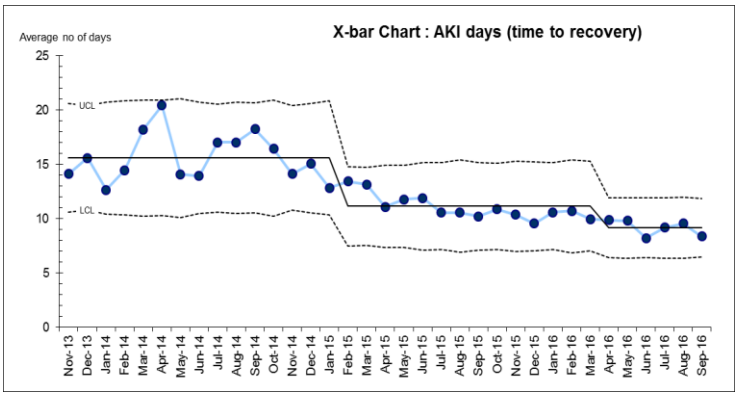
Acute Kidney Injury (AKI) occurs in 1 in 5 hospital admissions in the UK, associated with worse outcomes. There has been a national drive to improve AKI management, and every trust is measuring the improvements in AKI care. The commonly used outcome measures include AKI incidence, hospital length of stay and mortality. However these measures are influenced by several other factors and as such may not necessarily be true reflection of the AKI improvement activities. We tested the hypothesis that the time to recovery from AKI (AKI days) will constitute a new sensitive marker for the impact of the intervention to AKI care.

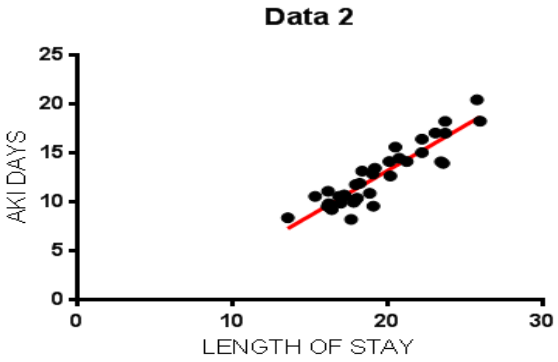
Method

As a part of the multifaceted quality improvement programme we recorded attainments in process (4 process) and outcome measures (5 measures).The key improvement quality improvement were AKI alerts, check list, tailored AKI education, AKI nurses to help with implementation and to support team in managing AKI. Data for all process and outcome measure was continuously monitored on statistically process charts on month to month basis and relevant improvement was calculated quarterly and achieved improvements were compared. In addition a 3 month factorial design experiment the impact of the various interventions such as nurse intervention, check list, education and pharmacist intervention and was conducted using AKI days as the hypothetical marker of AKI improvement. We also analysed the co-relations between AKI days and other conventional outcome measure such as LoS. The AKI days was defined as the difference between the first date of a blood test which triggered an AKI alert, to the date that the patient recovered or creatinine was less than 50% from the baseline or no more AKI alert is triggered. The patients who did not have a baseline were excluded from the analysis.

Results

We had 9622 cases of AKI recorded since November 2013 to September 2016 of which 7172 patients had baseline and had AKI days measured. From the date of full implementation of the improvement programme (March 2015) the AKI days have consistently shortened from baseline of 15.6 days prior to intervention to 9.2 days in the current two quarter i.e. April to September 2016 (41% reduction). This compares to a 22% reduction in average LoS (22.2 to 17.6 days), 27% reduction in AKI incidence and 11% reduction in AKI mortality. During this period the key process measures such as detection of AKI within 24 hours had improved from 52% to 100% and appropriate drug review has been carried out in 95% of cases from baseline of 48%. AKI days correlated quite strongly with LoS (r=0.91) and p-value <0.0001. Interestingly the absolute reduction in LoS (6 days) is very similar to reduction in AKI days (6 days) suggesting early discharge is attributable to early recovery from AKI. In the factorial design experiment AKI days came out as the clear most sensitive marker for measuring the impact of the improvement programme. The AKI days was significantly shorter on wards where the intervention consisted of combination of nurse intervention +checklist +education (5.9 days) compared to 14.4 days where different interventions implemented.





Conclusion

Our study clearly shows AKI days have a very sensitive measure of improvement in AKI outcome care. Whilst traditional marker such as LoS and mortality may still see an improvement but may be significantly influenced by other factors such as social needs and other competing improvement programmes. We propose AKI days to a new outcome marker to measure AKI improvement programmes.