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Effects of Artificial Intelligence Clinical Decision Support Tools (Terumo Health, ePRISM) on Contrast Induced Acute Kidney Injury in Patients Undergoing Percutaneous Coronary Intervention

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Objective

The aim of this study is to determine the reduction in rates of CI-AKI in those patients undergoing percutaneous coronary intervention (PCI) with use of ePRISM (Terumo Health Outcomes AI Clinical Decision Support Tool).

Background

Contrast induced acute kidney injury (CI-AKI) is the leading cause of iatrogenic acute nephropathy, occurring in 7% of patients undergoing percutaneous coronary intervention (PCI). CI-AKI results in increased adverse outcomes, length of stay and healthcare costs. Advanced artificial intelligence (AI) models have been created which incorporate unique patient characteristics, in order to provide patient specific CI-AKI risk and contrast recommendations.

Methods

A retrospective review of patients undergoing PCI at our institution (Kettering Health) from May to December of 2023 was performed. All patients had an ePRISM (Terumo Health Outcomes AI Clinical Decision Support Tool) generated risk assessment and maximum contrast volume recommendation reported during procedure timeout. Statistical analysis was performed to determine incidence of post PCI CI-AKI and to track variance with the implementation.

Results

A total of N=405 patients (inpatient and outpatient) were analyzed using ePRISM. 36.6% of patients were classified as low risk, 36.4% moderate risk and 27% high risk for post PCI CI-AKI (Figure 1). The incidence of CI-AKI significantly declined from a baseline of 10% to an average of 1.5% (Figure 2). There was an 85% reduction in PCI associated CI-AKI with implementation of ePRISM recommendations. All of the CI-AKI reported were in hospitalized patients, with 88.9% of cases exceeding the ePRISM recommended contrast maximum. In the final two months of analysis, 0 CI-AKI were reported.

Figure 1: ePRISM Risk Assessment for CI-AKI

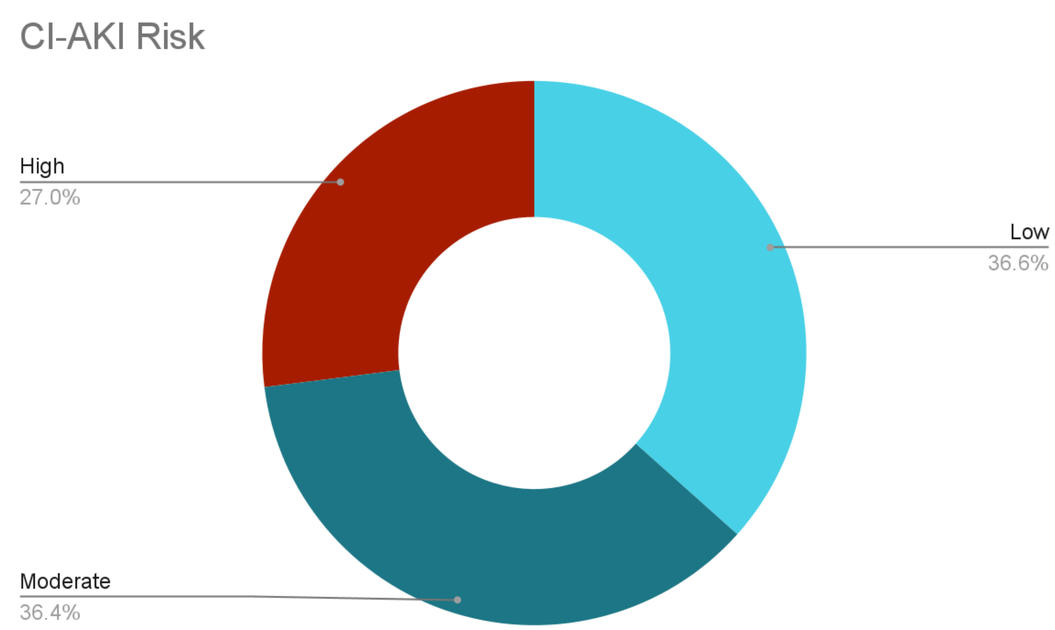
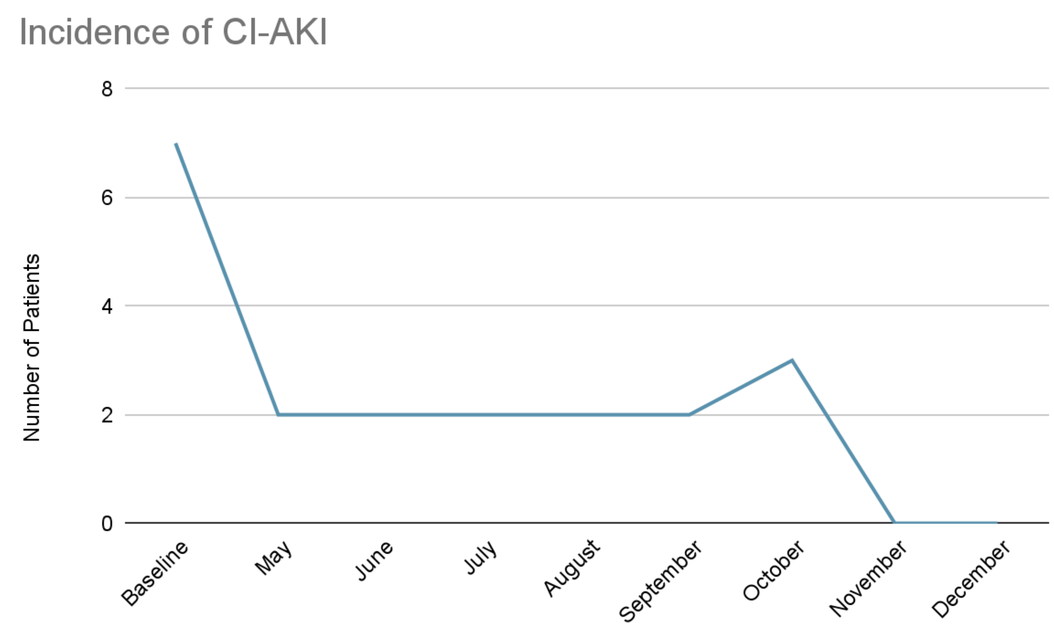


Figure 2: Trend of CI-AKI with Use of ePRISM



Conclusion

Artificial intelligence clinical decision support tools can effectively be incorporated into clinical practice. ePRISM (Terumo Health Outcomes) was successfully able to risk stratify patients undergoing PCI for CI-AKI and give meaningful recommendations in terms of maximum contrast volume which resulted in a drastic reduction in patient adverse events.

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