Correcting Magnesium Levels to Improve Cardiac Health in an Inpatient Psychiatry Population

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BACKGROUND

- Magnesium deficiency and psychotropic medications are linked to QT interval prolongation and increased risk of cardiac arrhythmias impacting cardiac health.
- Evidence supports oral magnesium supplementation as an effective treatment for hypomagnesemia in patients taking antipsychotic medications.
- Correcting magnesium deficiency with supplementation allows continuation of psychotropic medications without dose reduction or discontinuation when addressing QT prolongation.

LOCAL PROBLEM

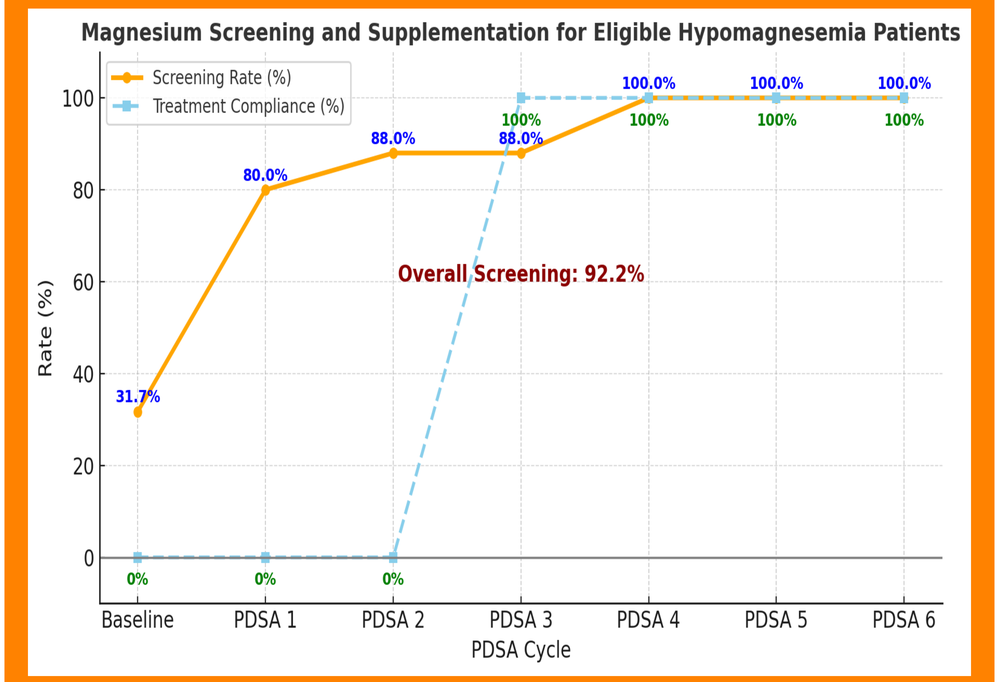
- The site for this improvement project is the Senior Behavioral Unit (SBU) at an acute care hospital in Knoxville, TN.
- Prior to this project, there was not routine magnesium screening on admission.
- The purpose of this evidence-based practice project was to improve cardiac safety and support psychotropic medication administration.
- The aim of the project was to screen magnesium levels in patients admitted to the unit and to treat eligible hypomagnesemia patients with supplementation.

METHODS

- The John Hopkins Evidence-Based Practice Model was used to guide this project.
- This model focuses on a population in need, a literature search for evidence, and implementing best practices to create improvements.
- The process measures evaluated screening and supplementation treatment compliance; outcome measures included QT interval (improvement) and cardiac-related rapid response events.
- Plan-Do-Study-Act (PDSA) Cycles were completed biweekly.

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Psychiatry patients were significantly more likely to be screened for a magnesium level on admission and eligible patients treated with supplementation after the implementation of magnesium screening orders and supplementation protocol.



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INTERVENTIONS

- Based on the evidence, we screened for hypomagnesemia upon admission to the SBU and treated eligible patients.
- Magnesium levels were ordered by manual order entry when the standard SBU admission unit order set was entered.
- Eligible hypomagnesemia patients received supplementation per protocol and provider's orders.
- Both the screening and the interventions are cost effective interventions for the patient and the hospital: 7 cents for each magnesium lab and 6 cents per oral magnesium treatment.

RESULTS

- 31.7% of patients during baseline data collection were screened for magnesium and 0/3 were treated for hypomagnesemia. 92.2% of patients during project implementation were screened for magnesium and 3/3 were treated for hypomagnesemia.
  - All three patients showed elongated QT intervals pre-treatment, and QT intervals were within normal limits post-supplementation.
- 20/90 admitted patients were identified hypomagnesemia and treated prior to SBU by the consult team which ensures patients are screened to begin the process sooner and correct the deficiency.
- 100% of identified hypomagnesemia patients received magnesium supplementation.

CONCLUSIONS

- The project demonstrated a marked increase in screening compliance, complete treatment of identified hypomagnesemia, and correction of QT interval abnormalities with minimal cost.
- Implementing routine magnesium screening and treatment in the inpatient psychiatric setting significantly improved patient safety and cardiac outcomes associated with not only overall cardiac health but also antipsychotic medication administration.
- The outcomes support the permanent integration of magnesium screening into the electronic admission order set to sustain improved cardiac health and safer antipsychotic administration practices.