Managing the Complexities of CKD Mineral and Bone Disorders: A Unique Tool

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INTRODUCTION

Managing Mineral and Bone Disorder (MBD) is a challenge, but successfully doing so is essential to optimizing patient clinical outcomes. Traditionally the clinical team has tried to manage each of the 4 MBD parameters defined by KDOQI ™ (Phosphorus, Calcium, Product, and PTH) individually. The result has led to frustration by the physicians and care team, undesirable clinical outcomes, and even confusion for patients and clinicians because the recommended interventions for elevated Phosphorus, Calcium and PTH at times contradict each other.

There is a need for a comprehensive tool that will enable the care team to view the management of MBD in a more holistic way. The optimal tool would assist physicians in evaluating the 4 key biochemical markers of MBD simultaneously and provide guidance for recommending adjustments in phosphate binders, vitamin D sterols, calcimimetics, and diet counseling.

METHODOLOGY

- In June 2006, a large dialysis organization with >1200 facilities, caring for >80,000 patients initiated a program to assist physicians in increasing the percent of patients with outcomes within KDOQI guidelines for MBD targets. A key component of the initiative, "Choosing Health to the Power of P," was a new and unique MBD tool called the "Zen Tool."
- The Zen Tool includes 3 MBD management grids based on the level of PTH: <150, 150-300, and>300. In addition, 4 ranges of calcium are plotted horizontally and 4 ranges of phosphorus are plotted vertically on each PTH grid (Figures 1-3).
- These 3-dimensional grids allow the clinician to plot individual patient outcomes simultaneously to determine zone position, therapy changes, and progress towards a goal. The Zen Tool helps to identify 3 areas of focus: Diet, Medication Therapy, and Education.

Figure 1: iPTH < 150

	Ca < 8.4	Ca 8.-9.4	Ca 9.5-10.2	Ca > 10.2	Treatment Key
P > 7	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Primary focus on therapy changes to improve PTH since Ca and P within goal
P 5.6-7	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Primary focus on therapy changes to improve PTH, additional interventions to improve Ca and P levels
P 3.5-5.5	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Primary focus on therapy changes to improve PTH, intensive intervention to improve Ca and P levels
P < 3.5	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Primary focus on therapy changes to improve PTH, additional interventions to improve nutritional status, Ca and P levels

Figure 2: iPTH 150-300
(All patients on this grid have PTH within goal. Focus on Ca and P.)

	Ca < 8.4	Ca 8.-9.4	Ca 9.5-10.2	Ca > 10.2	Treatment Key
P > 7	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Focus on interventions to improve nutritional status, Ca and P levels
P 5.6-7	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	PTH within goal, focus on Ca, P
P 3.5-5.5	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Ca and P slightly out of range, Dietitian to focus on diet & binder therapy
P < 3.5	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Optimal goal- provide positive reinforcement and maintain levels

Figure 3: iPTH >300

	Ca < 8.4	Ca 8.-9.4	Ca 9.5-10.2	Ca > 10.2	Treatment Key
P > 7	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Intensive intervention to address Ca and P
P 5.6-7	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Focus on addressing Ca or P issues as first priority
P 3.5-5.5	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Focus on addressing iPTH, P and Ca issues
P < 3.5	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Interventions Specific to patients in this zone	Ca and P within goal; Focus on intervention to lower iPTH

*Note: these grids provide a general example of the Zen Tool without the specific interventions found in the actual tool.

Figure 4: % Patients Meeting all 4 KDOQI Targets

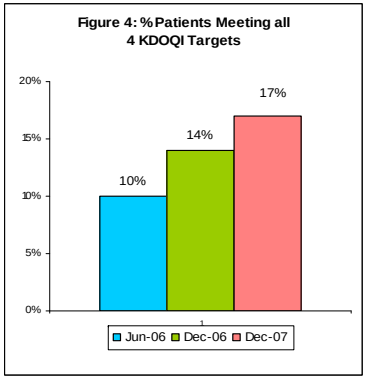
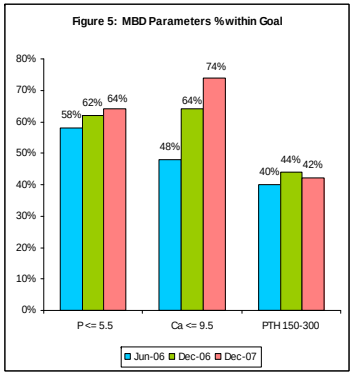


Figure 5: MBD Parameters %within Goal



RESULTS

By December 2006, over 850 physicians had approved use of the Zen Tool. In February 2008 over 70% of the dialysis facilities reported that the physician was using the Zen Tool or a facility-specific protocol based on the Zen Tool. Industry standards reflect only 7-10% of patients are able to achieve all 4 KDOQI targets at once. During this initiative, the percent of patients meeting all 4 KDOQI targets steadily increased from 10% in June 06 to 14% in December 06 to 17% in December 07 (Figures 4 and 5).

CONCLUSION

- The Zen Tool was initially developed as a manual tool. A computer generated application was later developed. The tool creates the ability to graph individual patient trends, response to therapy, and movement toward goal.
- This unique approach streamlines and prioritizes intervention recommendations for diet, binder, Vitamin D, calcimimetics and consideration of dialysate bath treatment changes concurrently.
- The tool supports the clinician's ability to consider all 3 parameters in relation to each other as they co-exist within the patient rather than as single entity or linear process.
- Zen Tool management includes evaluation of the trend of each parameter. Actions are not based solely on the most recent result but the trend and consecutive occurrence of outlier.
- The Zen Tool was a key component in the successful clinical campaign to improve MBD outcomes. It integrates the complex components of MBD into a comprehensive approach and provides focused recommendations that take into account all 3 parameters.

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