

Exploring the Impact of Persistent Hyperparathyroidism on Kidney Allograft Function, Survival and Bone Health in Renal Transplant Patients

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INTRODUCTION

Consensus recommendations for the management of severe persistent hyperparathyroidism for kidney allograft recipients do not exist at a national level and are largely determined by provider preference. Several studies have shown that hypercalcemia and hyperphosphatemia secondary to hyperparathyroidism increases the prevalence of acute kidney injury, post-transplant bone disease, and elevates risk of bone fracture [1]. A 2022 study shows that persistent hyperparathyroidism at one-year post-transplant is an independent predictor of graft loss, regardless of hypercalcemia [2]. Early management and tight control of elevated parathyroid hormone (PTH) levels may contribute to better outcomes after kidney transplantation and minimize worsening of bone disease.

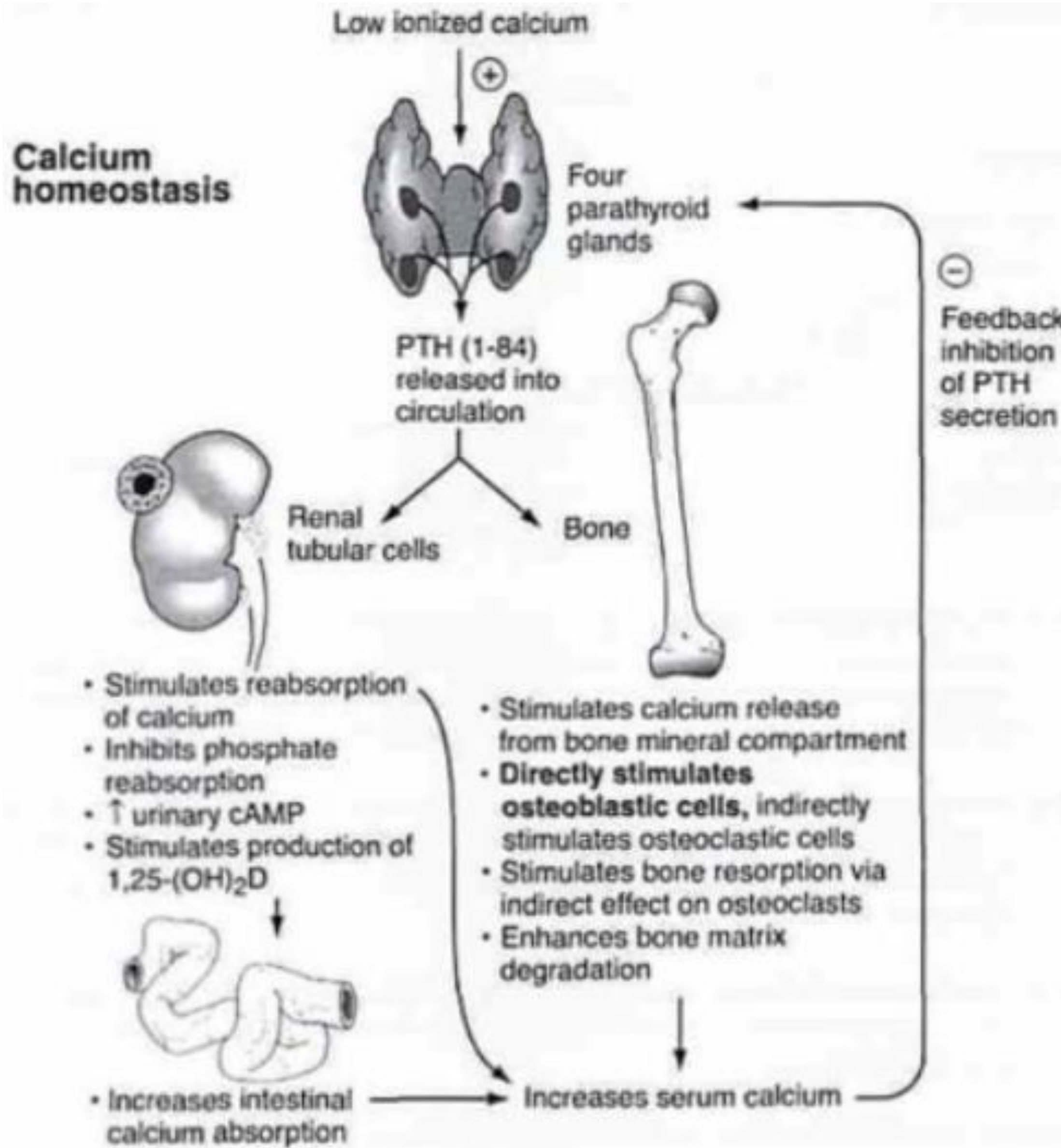


Figure 1: Depiction detailing the feedback mechanisms at play during calcium homeostasis

OBJECTIVE

The goal of this study is to gain further insight into the relationship between persistent hyperparathyroidism and potentially poorer clinical outcomes, specifically in the context of graft survival and the prevalence of osteoporosis, osteopenia, and fracture occurrence post-transplant.

METHODS

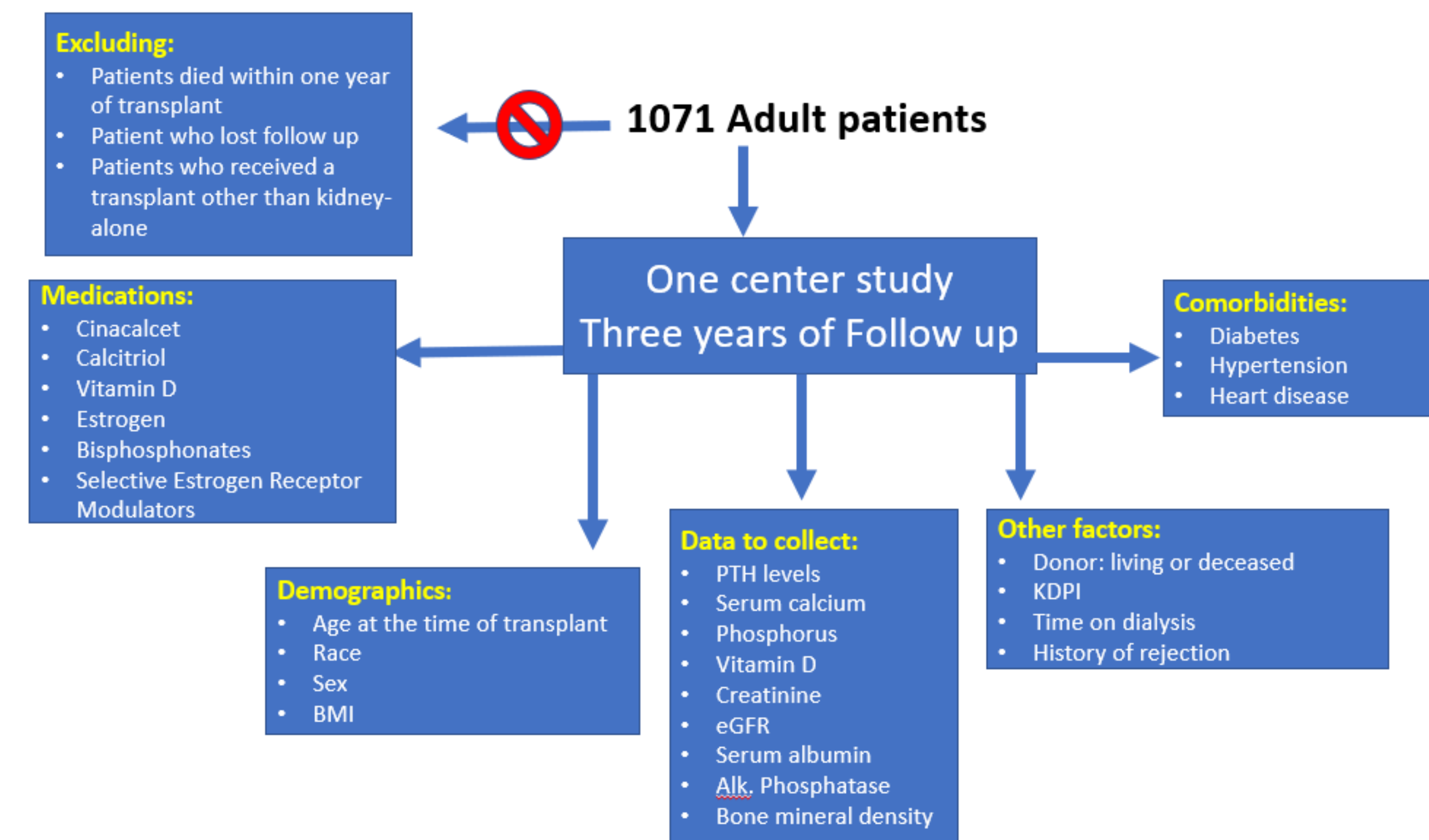


Figure 2: Flowchart demonstrating experimental biomarkers, comorbidities, and other factors considered during the chart review process utilized for this study

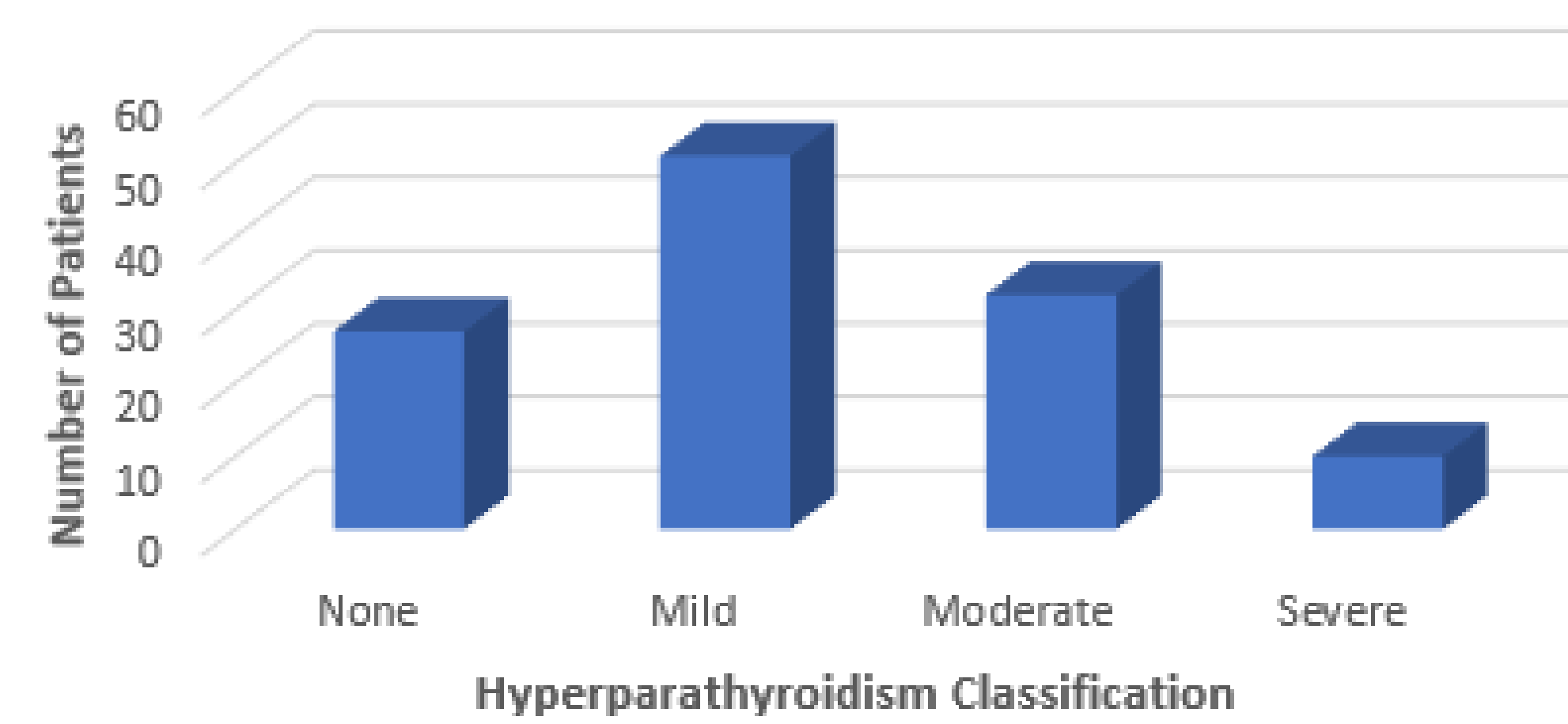
For this study, a cohort of about 1000 adult kidney-alone transplant recipients will be examined, accounting of those who received a renal transplant at a single institution and who have at least three years of follow-up. Transplant recipients who died within one year of transplant, have any other organ transplant prior to or simultaneous to the kidney transplant, and those lost to follow-up will be excluded.

RESULTS

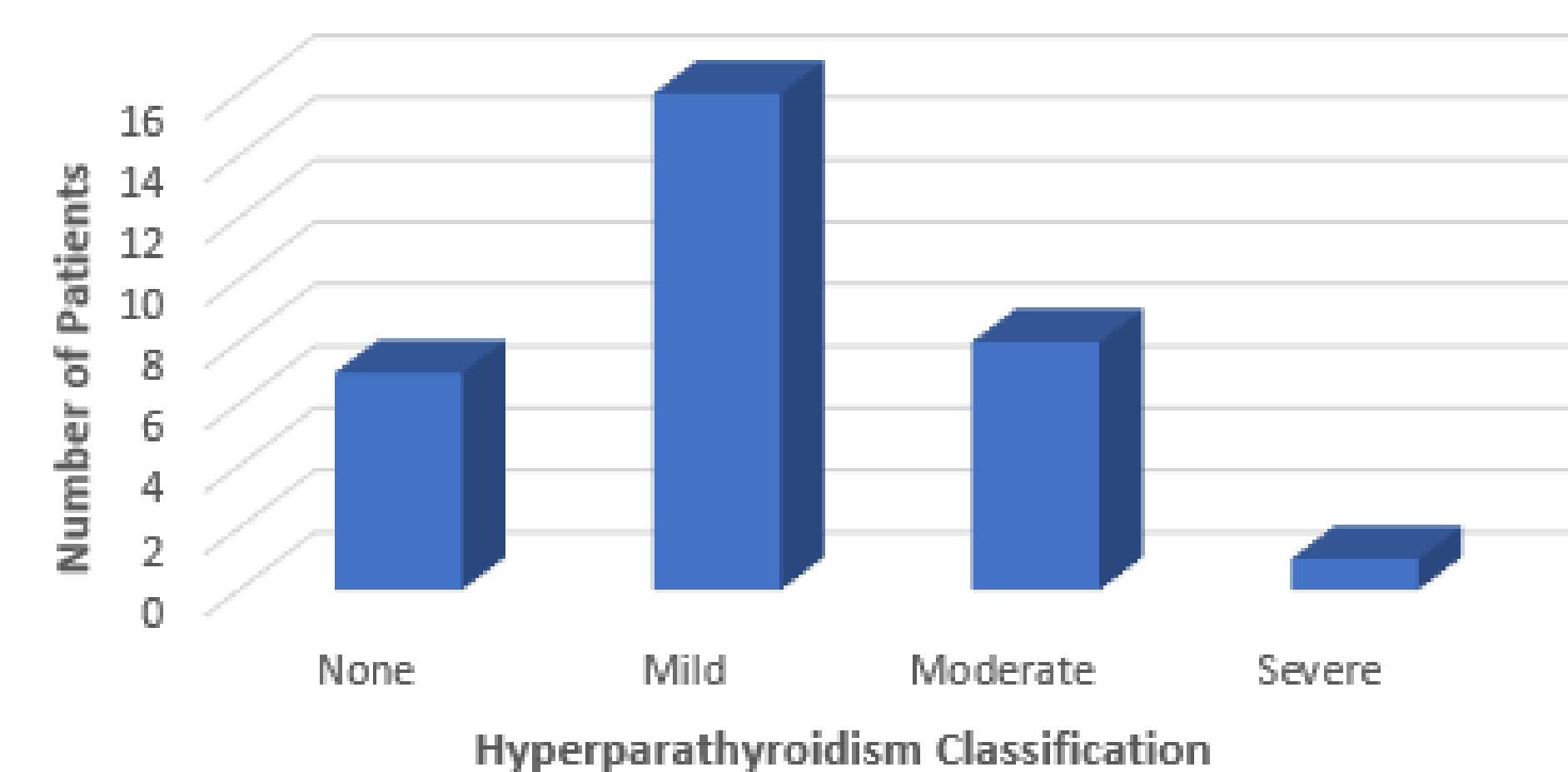
To date, approximately 200 patients of the cohort have been analyzed. For the purpose of cohort categorization, different levels of hyperparathyroidism were defined as the following:

Hyperparathyroidism Classification	Intact PTH level measured at 1-year Post Transplant
None	<65 pg/mL
Mild Hyperparathyroidism	65-130 pg/mL
Moderate Hyperparathyroidism	130-300 pg/mL
Severe Hyperparathyroidism	>300 pg/mL

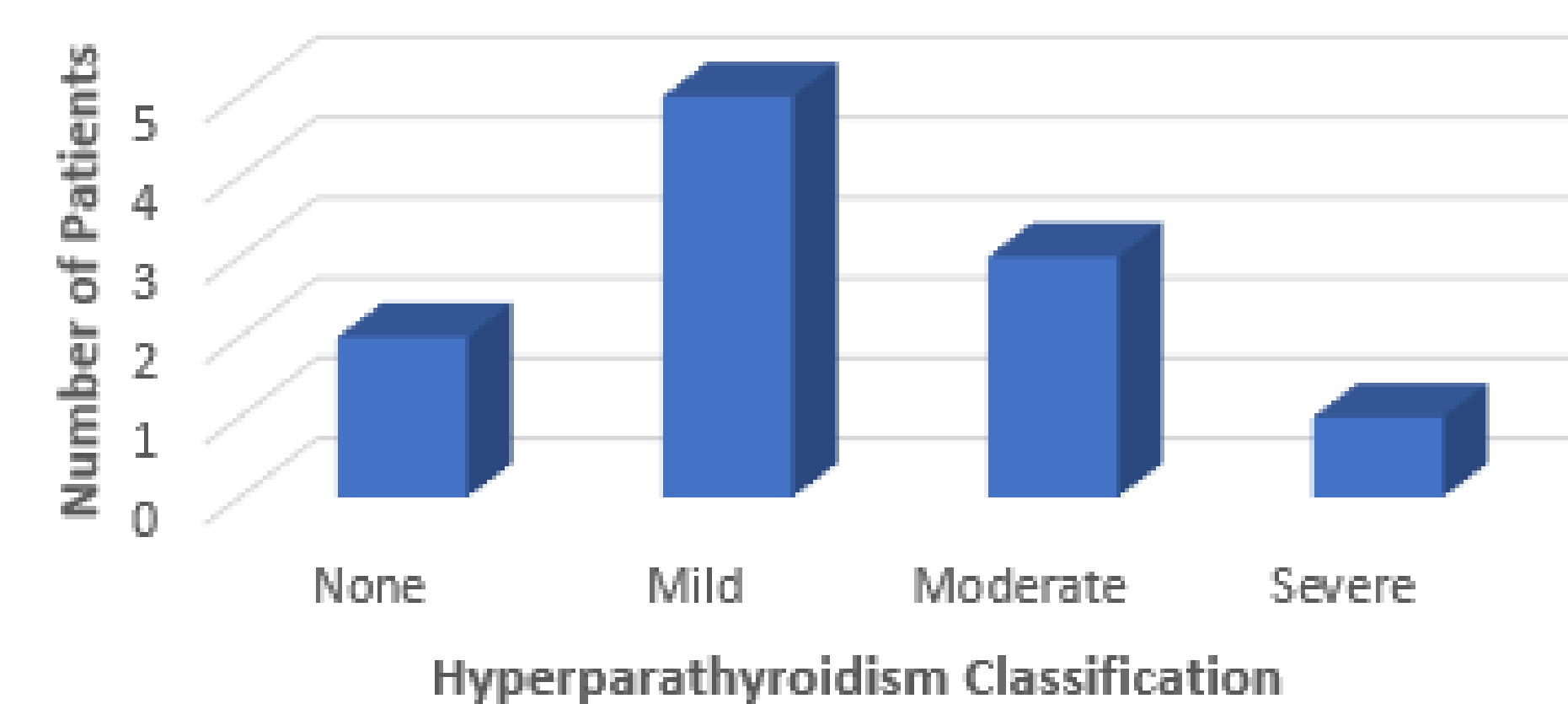
Cohort Distribution of Hyperparathyroidism Classification at 1-Year Post-Transplant



Cohort Distribution of Fracture Incidence Post-Transplant



Cohort Distribution of Patient Deaths Post-Transplant



CONCLUSIONS

No conclusions can be drawn at this time since a majority of the patient population has not been analyzed yet, but preliminary results seem to show that there are poorer patient outcomes associated with having either mild or moderate hyperparathyroidism.

FUTURE DIRECTIONS

In terms of future directions, this study will continue to analyze the remaining cohort patients and adding their data to our spreadsheet. As more patient data is added, further statistical analyses will be done, including analyzing the DXA data that is pulled. As this study was being conducted, it was observed that most patients only have one intact PTH value recorded, and it is usually only a few days post-op. Even though these values are almost always elevated, there are no following data points to compare to. Future studies should investigate taking more data points for intact PTH in order to more accurately depict the trends that we are showing here.

In addition, most of these patients only have DXA bone mineral density scans from the post-transplant period. Future studies should aim to have patients receive DXA scans before the transplant so that we can more accurately look at the potential change in bone health as a result of the transplant.

ACKNOWLEDGEMENTS

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References:

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- Okada, M., Tominaga, Y., Sato, T. et al. Elevated parathyroid hormone one year after kidney transplantation is an independent risk factor for graft loss even without hypercalcemia. *BMC Nephrol* 23, 212 (2022). <https://doi.org/10.1186/s12882-022-02840-5>