

Background

Vitamin D deficiency has been shown to contribute to the onset of musculoskeletal pain, headaches, and fatigue (1, 2).

Deficient levels of calcium phosphate have been linked to musculoskeletal pain associated with vitamin D deficiency (3). Low levels of calcium phosphate may result in an inadequately mineralized bone matrix, and normalization of vitamin D levels should help to diminish symptoms of pain by correcting suboptimal mineralization of bone matrix (3).

One prior study of patients who underwent orthopedic procedures (including treatment of vertebral compression fractures, Colle's fractures, hip & knee arthroplasty, ligament repair, and meniscal repair), showed that 44% (n = 272) had evidence of vitamin D insufficiency (20-32 ng/mL) or deficiency (< 20 ng/mL) (4).

Objective

The objective of our retrospective study was to establish a possible relationship between vitamin D deficiency and perceived pain in hospitalized patients admitted for acute orthopedic fractures.

Conclusions

- Vitamin D deficient patients with an acute orthopedic fracture had higher admission pain scores, on average, of 1.2 units (scale 0-10) as compared to patients with normal levels of vitamin D.
- There was no statistically significant difference between discharge pain scores and length of stay between patients with sufficient and deficient levels of vitamin D.
- There is a need for vitamin D screening in the setting of acute orthopedic fractures.

Methods

The HCA Healthcare database was utilized to screen for adults age 18 through 75 with an admitting diagnosis of acute orthopedic fracture between January 2018 and January 2019.

Patients with altered mental status were excluded from the study. Patients were also excluded if they presented with cognitive impairments that would not allow them to give accurate rating of their pain. The included patients had a 25-OH vitamin D test obtained within the first 24 hours of admission. Nursing pain assessments would also have to be documented in the patient's chart. Perceived pain levels were measured by nursing assessment on a scale of 0 – 10 in patients who had been admitted to an HCA hospital for an orthopedic fracture (0-no pain, 10-severe pain). A nursing assessment of pain at hospital admission and at the time of discharge was required for study inclusion.

We compared the levels of pain between patients with and without 25-OH vitamin D deficiency, and we also measured the hospital length of stay to determine if there was a relationship between vitamin D deficiency and prolonged hospitalization.

For the purpose of this study, we assigned a 25-OH vitamin D level of less than 30 ng/mL as being deficient in vitamin D.

Results

Admission Pain Score						
Gender	Frequency	Percent	Race	Frequency	Percent	Perceived Pain 1.2 units higher with vitamin D deficiency (p-value: 0.005)
Female	150	68.4	African American	13	5.9	
Male	69	31.5	Other Race	24	10.9	
			Caucasian	182	83.1	

Discharge Pain Score						
Gender	Frequency	Percent	Race	Frequency	Percent	Perceived Pain 0.41 units higher with vitamin D deficiency (p-value: 0.6)
Female	31	51.6	African American	5	8.3	
Male	29	48.3	Other Race	7	11.6	
			Caucasian	48	80.0	

Length of Stay						
Gender	Days	P-Value	Race	Days	P-Value	Days Hospitalized 0.03 days shorter hospitalization with vitamin D deficiency (p-value: 0.96)
Female	-1.95	0.008	African American	+1.67	0.24	
Male	comparison group		Other Race	+0.55	0.64	
			Caucasian	comparison group		

References

- McCabe P.S., Pye S.R., Mc Beth J., Lee D.M., Tajar A., Bartfai G., Boonen S., Bouillon R., Casanueva F., Finn J.D., et al. Low vitamin D and the risk of developing chronic widespread pain: Results from the European male ageing study. BMC Musculoskelet Disord. 2016 Jan 16;17:32.
- Knutsen K.V., Brekke M., Gjelstad S., Lagerlov P. Vitamin D status in patients with musculoskeletal pain, fatigue and headache: A cross-sectional descriptive study in a multi-ethnic general practice in Norway. Scand J Prim Health. 2010;28:166–171.
- Mascarenhas C, Mobarhan S. Hypovitaminosis D-induced pain. Nutr Rev. 2004;62:354-359.
- Bogunovic L, Shindle L, Virbalas J, et al. Prevalence of vitamin D deficiency among surgical orthopedic patients: a single center analysis. JBMR. 2008;23(S1):S291.