Evaluation of Bone Mineral Density in Patients with Hemophilia in a Colombian Population

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INTRODUCTION AND OBJECTIVES

There is a well established association between hemophilia and low bone mineral density (LBMD). Patients with hemophilia have risk factors for low bone mineral density (hemophilic arthropathy, inhibitors, lower levels of physical activity, HIV or HCV infection) and therefore an increased risk for fragility fractures. (1-4)
The objectives:

- Establish the association between hemophilia and LBMD in a group of patients with hemophilia, older than 5 years old, compared to an aged-matched control group.
- Evaluate other determinants for low bone LBMD in hemophilia patients

METHODS

A matched case-control study was conducted. Controls were matched by age, body mass index and socioeconomic status. All participants underwent bone densitometry (DXA), measurement of physical activity with the Global Physical Activity Questionnaire (GPAQ) and calcium consumption survey. Biochemical tests for calcium and phosphorus metabolism, markers of inflammation, hormonal and infectious profile were performed to cases. Information on sociodemographic and clinical characteristics was collected from medical records and medical visits between March of 2014 and November of 2015. Exclusions criteria included: Acquired hemophilia, chronic consumption of glucocorticoids, use of antiepileptic and antiretroviral drugs, use of calcium and Vitamin D supplements, alcohol consumption, thyroid and parathyroid disease and history of chronic disease causing osteopenia other than hemophilia.
Categorical variables were compared with chi square test and continuous variables with the MannWhitney test. The p was considered significant when ≤ 0.05. We performed multivariate logistic regression analysis with variables with a p <0.25. This protocol was reviewed and approved by the committee of ethic, investigation or its equivalents of Universidad Autónoma de Bucaramanga and FOSCAL.

RESULTS

The sample included 59 cases and 59 controls. The median age was 27 years (26 cases under 18 years and 5 over 50 years). The bone mineral density (BMD) was lower in the cases group. BMD Femoral neck cases was 0.867 gr / cm2 vs. controls 0.977gr / cm2 (p = 0.007); BMD hip cases was 0.938gr / cm2 vs. controls 1,016 gr / cm2 (p = 0.004). The level of physical activity (GPAQ) was lower in hemophiliacs with LBMD compared to controls (p = 0.008). An inverse association between the severity of hemophilia and BMD (p = 0.518) was observed. Additionally, a significant association between the presence of hemophilic arthropathy with low BMD (p = 0.004) was found. Elevated C- reactive protein levels were found in 50% of patients with low BMD and 12.8% with normal BMD (p = 0.006). 22% of cases have vitamin D3 deficiency.

REERENCES
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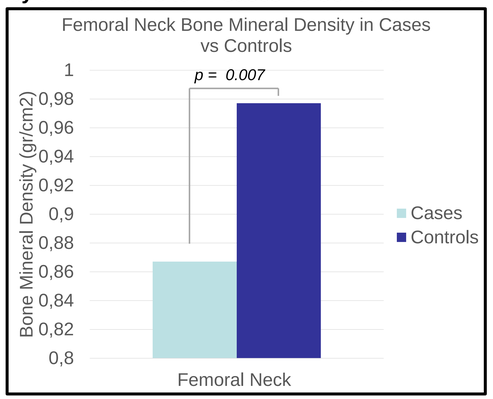
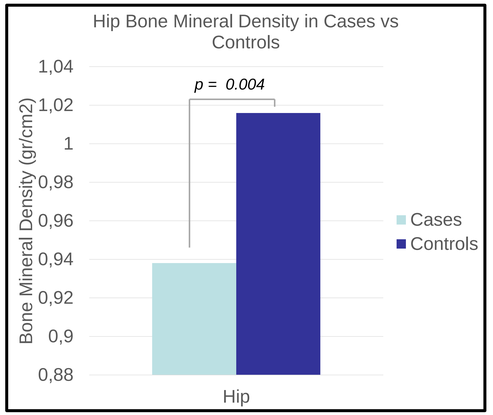
Table 1. Sociodemographic and clinical characteristics

Variables		N (%)	Cases (%)	Controls (%)
Age (years)	<19	50 (42.37)	26(44.06)	24 (44)
	20-29	28 (23.72)	13 (22.03)	15 (23.72)
	30-39	20 (16.94)	10 (16.64)	10 (16.94)
	40-49	9 (7.62)	5 (8.47)	4 (6.77)
	>50	11 (9.32)	5 (8.47)	6 (8.47)
BMI (Kg/m2)	Low	29 (24,57)	14 (23,72)	15 (25,42)
	Normal	54 (45,76)	27 (45,76)	27 (45,76)
	Overweight	27 (22,88)	14 (23,72)	13 (22,03)
	Obesity	8 (6,77)	4 (6,77)	4 (6,77)
Physical Activity Level (GPAC)	High	46 (38,98)	22 (37,29)	24 (40,68)
	Moderate	49 (41,5)	16 (27,1)	33 (55,93)
	Low	23 (19,49)	21 (35,59)	2 (3,39)
Daily Calcium Consumption mg (Mean)		277	301	253
Clinical Characteristics of Hemophilia Patients				
		N (%)	**Hemophilia A** n= 51 (86,4%)	**Hemophilia B** n= 8 (13,5%)
Severity	Mild	13 (25,5)	13 (25,5)	2 (25)
	Moderate	7 (13,8)	7 (13,8)	4 (50)
	Severe	31 (60,7)	31 (60,7)	2 (25)
Family History	Yes	49 (74,58)	41 (80,3)	7 (87,5)
	No	6 (10,17)	5 (9,8)	1 (12,5)
	Unknown	5 (8,47)	5 (9,8)	0
Age at first bleeding event (years)	1 - 5	46 (77,97)	38 (74,5)	8 (100)
	6 - 10	7 (11,86)	7 (13,7)	0
	11 - 15	3 (5,08)	3 (5,9)	0
	16 - 20	0	0	0
	21 - 25	3 (5,08)	3 (5,9)	0
FISH score		27.4	27,15	29,75
PEDHal Score		276	272,5	277,25
Current Treatment	Without	2 (3,39)	2 (3,92)	0
	Prophylaxis	42 (71,19)	37 (72,5)	5 (62,5)
	By request	12 (20,34)	9 (17,65)	3 (37,5)
	Immunotole-rance	3 (5,08)	3 (5,9)	0

Figure 1. Comparison of Bone Mineral Density by anatomical site in Cases vs Controls





CONCLUSIONS

Our results support the association between Hemophilia and Low Bone Mineral Density. Given the related morbidity and strong economic impact on health care systems, it is reasonable to implement effective diagnostic and preventive measures that reduce the presence of LBMD and osteoporosis in hemophilic population.

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