Data Article

Measurement bone mineral density (BMD) of patients with beta thalassemia

Sakineh Abbasi a, Jafar Fatahi Asl b, Leila Moein Zadeh c, Mohammad Mirdoraghi d,*

a Department of Laboratory Science, Tehran University of Medical Sciences, Tehran, Iran
b School of Para medicine, Department of Radiologic Technology, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
c Thalassemia ward of Shafa hospital in Ahvaz, M.Sc in Hematology, Ahvaz, Iran
d Committee of Student Researches, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

A R T I C L E   I N F O

Article history:
Received 9 April 2018
Received in revised form
17 May 2018
Accepted 21 May 2018
Available online 24 May 2018

Keywords:
Beta thalassemia
Osteoporosis
Bone mineral density
Z-Score
Ahvaz

A B S T R A C T

The aim of the study is determining bone mineral density (BMD) of Patients with beta thalassemia in order to find the prevalence and related factors on the conditions. Z-Score of femoral neck and lumbar vertebrae were reported comparing normal matched subjects. Age and bone mineral density were significantly correlated. Moreover, the disease had significantly higher severity in men than in women. A negative significant correlation was detected between BMD and the mean of hematocrit in the last 5 years. There was significant differences between sex hormone and bone density. A significant correlation between hydroxy urea and BMD were found. A significant relationship between the use of bisphosphonates and bone density were found. Osteopenia and osteoporosis were highly prevalent in our participants. Therefore, regular tests are required to examine bone mineral density in these patients. Furthermore, the exact effect of age on bone mineral density need to be clarified.

© 2018 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

* Corresponding author.
E-mail addresses: sakineh46i2004@yahoo.com (S. Abbasi), jafarfatahi@yahoo.com (J.F. Asl), Moinzadeh61@gmail.com (L.M. Zadeh), Mirdoraghimohammad@yahoo.com (M. Mirdoraghi).

https://doi.org/10.1016/j.dib.2018.05.120
2352-2409 © 2018 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).
**Specifications Table**

| Subject area               | Medical Physics                                                                 |
|---------------------------|---------------------------------------------------------------------------------|
| More specific subject area| Describe the bone mineral density (BMD) of patients with beta thalassemia      |
| Type of data              | Tables                                                                          |
| How data was acquired     | To calculate the bone mineral density, All medical records of patients older than 15 years were reviewed. Patients demography were extracted, the results of the BMD and Z-Score of femoral neck and lumbar vertebrae were reported comparing normal matched subjects. Z-Scores \(-2 < Z \leq -1\) and \(-1 < Z \leq 2\) were considered as normal, and \(Z > 2\) were considered as osteoporosis respectively. |
| Data format               | Raw, Analyzed                                                                   |
| Experimental factors      | The mentioned parameters above, in abstract section, were analyzed according to the standards for Z-Score. |
| Experimental features     | The Z-Scores were determined.                                                   |
| Data source location      | Ahvaz province, Iran.                                                           |
| Data accessibility        | The data are available with this article.                                       |

**Value of the data**

- This study showed bone mineral density reduced with increasing age (\(p < 0.03\)).
- Measured BMD had a better status in the femoral region than in the lumbar region.
- Since the patients were in puberty, there was a significant correlation between the use of sex hormones and BMD.
- The bone mineral density increased in patients who taking bisphosphonates.

1. **Data**

The participants included 81 male and 103 female patients with transfusion-dependent thalassemia (β-thalassemia). As seen in Table 1, the mean age of the participants was 23.4 ± 8.0 years (range: 15–31 years). Based on the Z-scores at the lumbar spine, 198 patients (82%) had low BMD (\(Z \leq -2\)) and 40 (18%) had normal BMD (\(Z > -1\)). Meanwhile, low BMD in the neck of the femur was only seen in 18% of the participants. A significant correlation between age and bone mineral density were found (\(P < 0.03\)). Per year to 2.8 percent of bone mineral density scores are low. The severity of the disease was higher in men than in women (\(P < 00.02\)). A negative significant correlation was detected between BMD and the mean of hematocrit in the last 5 years (\(P < 0.005\)). There was significant differences between Sex hormone and bone density (\(P < 0.02\)). The significant relationship between Hydroxyl urea consumption and bone mineral density was seen (\(P < 00.01\)). A significant relationship between the use of bisphosphonates and bone density exists so that the bone mineral density in patients taking bisphosphonates have been increased (\(P < 0.02\)). The patients who used calcium+vitamin D had no significant difference with the others in terms of BMD. Moreover, no significant correlation was found between the use of calcitriol and BMD.

2. **Experimental design, materials and methods**

A total of 216 patients (age > 15 years) with transfusion-dependent thalassemia who visited Shafa Hospital (Ahwaz, Iran) participated in this prospective study. Their BMD had been annually monitored from age 10. The bone density in 216 patients (81 males and 103 females) who are suffering from thalassemia major, by Dual-Energy X-ray Absorptiometry.
Manufactured by Lunar company of USA) to be measured [1,2]. The patients’ demographic characteristics, average five-year hematocrit level (2008–2013), and history of medications were extracted from their records. DEXA was then performed twice to measure BMD in the femur and lumbar region [3,4]. To reduce measurement errors in each region measured three times mineral density and an average is taken (Table 2).

To view the impact of drugs on patients before and after drug consumption Z and T score were measured before and after drug consumption. In measuring the density by Dual-Energy X-ray Absorptiometry each person has three criteria: first index (Z): actually indicates Compare between patient’s bone density and bone density persons are same age and gender. The second index (T): the comparison between the patient’s bone density and bone density persons are same age [5–7].

Z-scores were obtained from BMD measurements and used to decide whether the patients had osteopenia or osteoporosis. Data analysis was performed with software SPSS 20 and the effect of drugs was studied by Wilcoxon test.

Acknowledgment

This research project was supported by Ahwaz University of Medical Sciences.
References

[1] E. Voskaridou, M. Dimopoulou, E. Terpos, Osteoporosis in thalassaemia, Thalass. Rep. 8 (1) (2018).
[2] W.J. Anderst, T. West, W.F. Donaldson, J.Y. Lee, Cervical spine bone density in young healthy adults as a function of sex, vertebral level and anatomic location, Eur. Spine J. (2017) 1–9.
[3] J. Hwang, E.-K. Lee, J. Ahn, H.-S. Cha, E.-M. Koh, J. Lee, Bone-density testing interval and transition to osteoporosis in patients with rheumatoid arthritis, Osteoporos. Int. 28 (1) (2017) 231–237.
[4] M. Atteritano, S. Sorbara, G. Bagnato, G. Miceli, D. Sangari, S. Morgante, et al., Bone mineral density, bone turnover markers and fractures in patients with systemic sclerosis: a case control study, PLoS One 8 (6) (2013) e66991.
[5] M. Karimi, A.F. Ghian, A. Hashemi, S. Alinejad, M. Soweid, S. Kashef, Bone mineral density in beta-thalassemia major and intermedia, Indian Pediatr. 44 (1) (2007) 29.
[6] P. Sharma, Summary and review of the abstracts on disorders of red cells and erythropoiesis presented at haematoco 2016–2017, Indian J. Hematol. Blood Transfus. 34 (1) (2018) 8–12.
[7] P. Nakavachara, J. Petchkul, K. Jeerawongpanich, P. Kiattisakthavee, T. Manpayak, P. Netsakulnee, et al., Prevalence of low bone mass among adolescents with nontransfusion-dependent hemoglobin E/β-thalassemia and its relationship with anemia severity, Pediatr. Blood Cancer 65 (1) (2018).