

# Nonbacterial osteitis: Is there any mismatch in the pathophysiology of osteoblasts or osteoclasts?

D. Singh<sup>1</sup>, S. Bechtold - Dalla Pozza<sup>1</sup>, I. S. Gesell<sup>2</sup>, H. Schmidt<sup>1</sup>, A. F. Jansson<sup>1</sup>

<sup>1</sup> Dr. von Hauner Childrens Hospital, Ludwig-Maximilians-University, Munich, Germany

<sup>2</sup> Department of Orthopedic Surgery, Physical Medicine and Rehabilitation, University Hospital of Munich, Germany

## Introduction

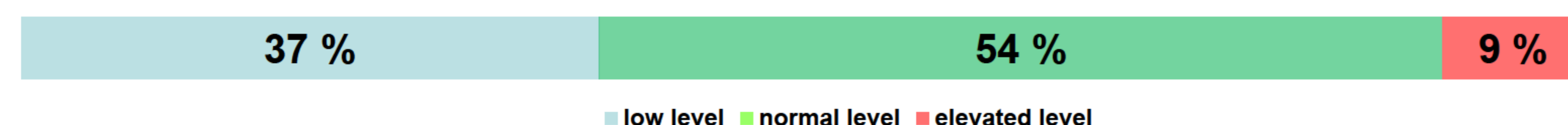
The aim of the study was to determine whether there is an imbalance between bone formation and bone resorption in nonbacterial osteitis. The osteoclast inhibitor pamidronate has been successfully used in nonbacterial osteitis. It is assumed, that there is a mismatch in the pathophysiology of osteoblasts or osteoclasts. We investigated osteoprotegerin (OPG) as a marker of bone formation and dickkopf-1 (DKK-1) as a marker of bone resorption.

## Methods

The serum levels of Osteoprotegerin and dickkopf-1 were measured in 55 patients, (7 - 25 y, average age 13 y), using enzyme link immunoassay test. We compared the serum levels of OPG and DKK-1 with averages values of healthy control groups from the literature.

## Results

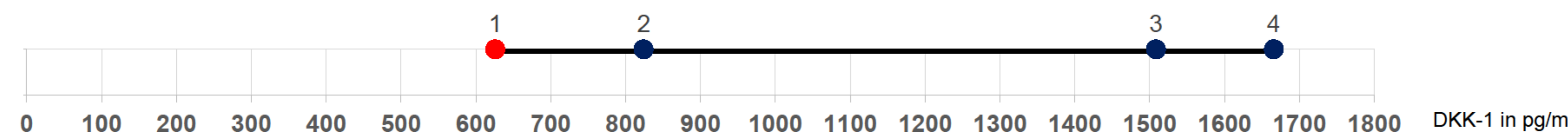
### • OPG in comparison to standard values (1)



57 % of patients showed normal levels, 37 % low levels (< 2 SD) and 9 % elevated levels (> 2 SD) of OPG.

(1) Gajewska, J., J. Ambroszkiewicz, and T. Laskowska-Klita, Osteoprotegerin and C-telopeptide of type I collagen in Polish healthy children and adolescents. Adv Med Sci, 2006. 51: p. 269-72.

### • DKK-1 in comparison to standard values (2-4)



1) Average value of our patients – 626,16 pg/ml

2) Average value of the publication – 824,26 pg/ml: Brabnikova-Maresova, K., et al., Serum sclerostin in high-activity adult patients with juvenile idiopathic arthritis. Arthritis Res Ther, 2014. 16(5): p. 460.

3) Average value of the publication – 1508,57 pg/ml: user manual DKK-1, Biomedica Medizinprodukte GmbH & Co KG, Wien, BI-20412

4) Average value of the publication – 1666,00 pg/ml: Brunetti, G., et al., High dickkopf-1 levels in sera and leukocytes from children with 21-hydroxylase deficiency on chronic glucocorticoid treatment. Am J Physiol Endocrinol Metab, 2013. 304(5): p. E546-54.

2) and 4) They used the same enzyme link immunoassay test from Biomedica Medizinprodukte GmbH & Co KG like in our study.

All patients showed lower levels of DKK-1 in comparison to standard values from the literature.

### • Comparison of bone markers:

- Patients, without therapy escalation (pamidronate or etanercept) versus patients with therapy escalation in the further period of observation → significant



1) Average value of patients, without therapy escalation (pamidronate or etanercept): 589,17 pg/ml (range: 516 – 663)

2) Average value of patients, with therapy escalation in the further period of observation: 745,68 pg/ml (range: 581 – 910) → p = 0,023 → significant

10 of the 55 patients received in the course of disease pamidronate, 2 etanercept and in one patient etanercept was recommended.

No significant difference was found by OPG (p = 0,592).

- patients with vs. without hyperostosis (OPG p = 0,863, DKK-1 p = 0,544) → not significant

- patients with elevated vs. normal serum levels of TNF-alpha (OPG p = 0,768, DKK-1 p = 0,547) → not significant

- patients with axial vs. no axial involvement (OPG p = 0,993, DKK-1 p = 0,186) → not significant

- patients with vertebral body involvement vs. no vertebral body involvement (OPG p = 0,241, DKK-1 p = 0,505) → not significant

## Conclusions

In summary, the results of this study indicate a mismatch in bone metabolism in nonbacterial osteitis. All patients showed a reduced osteoclast activity. About half of the patients showed a normal level of OPG. 37 % of all patients showed a low turnover in bone remodeling, indicated by decreased OPG and DKK-1 levels. 9 % of all patients showed an increased osteoblast activity. Patients with a high disease activity may show more osteoclast activity with elevated DKK-1 levels. DKK-1 could be a predictive parameter for a severe course of disease.

In Zusammenarbeit mit:



Novartis Pharma GmbH

