

II. PEDIATRICS

THE CORELATION OF THE RICKETS INCIDENCE WITH THE RISK FACTORS

The risk factors- individual study

Liana Berinde¹, I Popa¹, Daniela Boangiu², A Berinde³, R Georgescu⁴

¹Pediatrics Clinic II UMF *Victor Babes*, Timisoara,

²MGP Dr. Daniela Boangiu,

³County Clinical Hospital nr.1 Timisoara,

⁴University of Medicine and Pharmacy “Victor Babeş” Timișoara

Summary

The vitamin D-deficiency rickets, a well defined clinical entity, still represents an important risk factor for the infantile morbidity and mortality. As it is known for more than 10 years, the vitamin D-deficiency rickets has multiple causes. Until now, there was no prospective study undertaken in order to establish the real incidence of the disease.

The analysis performed through this study sustains that the whole process of the primary medical practice consists in the knowledge of the rickets epidemiology with the purpose to improve the efficiency of the general and individual prevention measures of this disease.

Key words: vitamin D-deficiency rickets, child, incidence, risk factors, study.

Introduction

The vitamin D-deficiency rickets is a well defined clinical entity and remains the most frequent vitamin deficiency during the childhood and especially in the infant period.

The frequency of the disease continues to remain high in our country, this representing an important risk factor for the infantile morbidity and mortality (4). In other parts of the world (Canada, USA, Scandinavian countries,

some countries from Asia) the high incidence of the disease led to settled measures of public health, a great importance was given to the nutritional factors (6, 7, 8, 9, 12, 14).

Rickets etiology studies performed for more than 10 years in other countries showed that the disease has multiple causes. (13)

So far, no prospective study was undertaken in order to establish the real incidence of the disease. The evaluation is complicated due to the fact that many rickets cases are diagnosed and treated in the out patient departments without being reported. That is why it is necessary once more a prospective follow-up study of the rickets cases.

Material and method

In order to achieve our goal, we followed a group of children aged from 0 to 16 years recorded in the G.P. Children Consulting Room – Dr. Boangiu from Timisoara, during the period 1.01.1997- 31.12.2003. During each year we divided the patients group in 2 subgroups: subgroup 1 - children aged 0-2 years - and subgroup 2 - children aged 3-16 years. The subjects repartition during the study was the following:

The study period	Total analyzed subjects	Subjects repartition on age groups
1. 1.01.1997-31.12.1997	1464	subgroup1: 153 subgroup 2: 1311
1.01.1998-31.12.1998	1448	subgroup1: 149 subgroup2: 1299
1.01.1999-31.12.1999	1493	subgroup1: 143 subgroup2: 1350
1.01.2000-31.12.2000	1490	subgroup1: 128 subgroup2: 1362
1.01.2001- 31.12.2001	1156	subgroup1: 136 subgroup2: 1331
1.01.2002-31.12.2002	1481	subgroup1: 155 subgroup2: 1326
1.01.2003-31.12.2003	1453	subgroup1: 138

subgroup2: 1315

To these patients we followed the appearance of the clinical signs and the laboratory findings in correlation with the physiological antecedent history (the pregnancy evolution, the gestational age, the physiological jaundice duration, dairy nourishment during infancy), the somatic and the health state evolution, the child feeding and the caring environment, the moment of the rickets prevention initiation, the manner of its applying, the types of the used vitamin D preparations. The rickets diagnosed cases were

treated through the Specialty Out-Patient Department of the Pediatrics Clinic II Timisoara.

2.Results and discussions

Depending on the disease form, the diagnosed cases were divided in:

- the classical form of the infant and toddler (the common vitamin D-deficiency rickets);
- the delayed onset form.

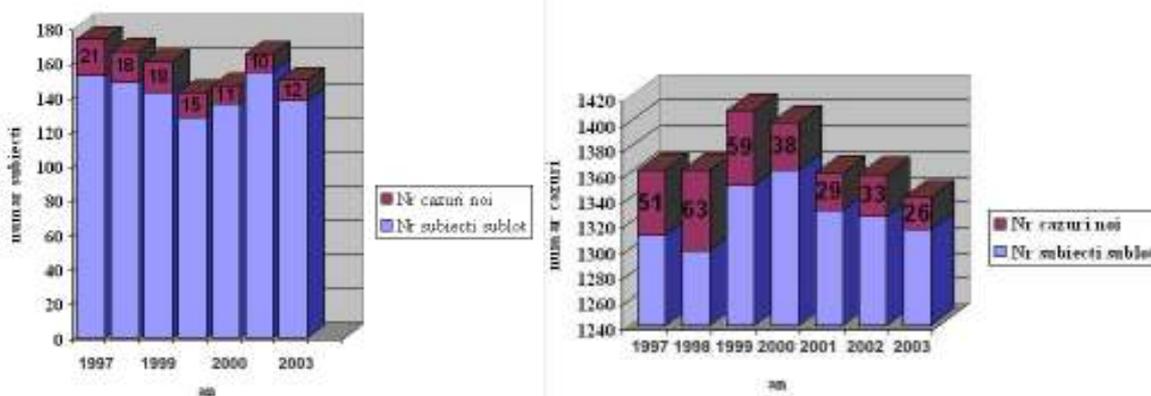


Fig 1 The specific morbidity at the analyzed group

At the analyzed group we followed the rickets incidence in relation with the risk factors, starting from the premise that the decisive factors in this disease are the nutritional vitamin D-deficiency (exogenous deficiency) and the lack of exposure to sunrays (endogenous deficiency). The risk factors taken into the study were: the season, dairy nourishment during infancy, maternal vitamin D-deficiency, prematurity, the prolonged jaundice evolution in the newborn period.

The rickets incidence during the 7 years study in the presented group was of 4.02%. The percentage analysis deducted on the study-years led to the conclusion that the peak incidence occurred in 1998 and was followed by a progressive decrease until the end of the year 2003. We consider that this favorable evolution of the rickets incidence curve during the 7 years study is due to the up to date prevention scheme of the disease beginning with 1998.

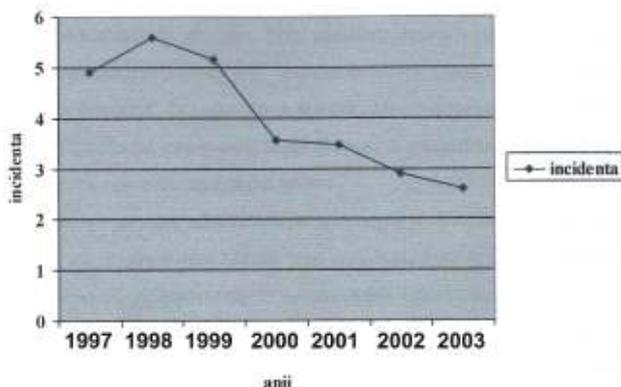


Fig. 2. The rickets incidence during the years of study.

Another factor that might have contributed to this favorable evolution was the large scale accessibility of the commercially available formulas that are supplemented with the adequate vitamins, including the vitamin D necessary.

Comparing with this favorable evolution, the rickets incidence at the studied group was high, this situation sustaining the multiple etiology of the disease.

The rickets incidence depending on the clinical form was of 1.04% for the classical form of the infant and

toddler and of 2,97% for the delayed onset form. The appearance risk of the delayed onset form is much higher because the development rhythm at this age is more accelerated.

The season incidence of the rickets in the followed group was of 3% in the non-sunny months, comparing with 1,01% during the sunny months, this aspect confirming the importance of the environment factor which should be taken into account for the adjustment of the prevention vitamin D doses (2,5).

We chose for this study the risk factors that we were able to demonstrate through experimental, clinical and statistical studies and that could cause, promote or aggravate the disease. We used the statistical method after Ancusa et al. from the bibliographical studied material (1).

The infant diary nourishment evaluation as a risk factor for the rickets, through the obtained results, confirms the data sustained by other authors from abroad. (7,11)

The vitamin D-deficient human milk represents a risk factor for the rickets. Despite this result, the breastfeeding's value remains absolute and indisputable even in the rickets prevention (3).

The data used for the evaluation of the gestational age as a risk factor showed in all the 7 years of the study that the prematurity represents a very important risk factor, which should be considered in adjusting the vitamin D prevention dose for this infant category(10).

The vitamin D maternal deficiency showed that ignoring the antenatal prevention might represent a risk factor for the disease.

Conclusions

1. The rickets incidence found in the study-group sustains the importance that should be given to this public health problem.
2. The simultaneous action of all etiological factors requires a detailed knowledge, the aim being the improvement of the general and individual prevention measures.
3. Fighting this disease as a necessary premise for the whole primary medical process is correlated with the competent medical surveillance of the pregnant woman and of her child from the first days of life until the end of the growth process.

Bibliography

1. Ancusa M., Ciobanu V. *Problems of public health*, Mirton ed.Timisoara 1996
2. Bishop N., *Rickets today- children still need milk and sunshine*, N Engl.J.Med., august 1999, 341,602-03
3. Ciofu E. Pascal, Ciofu C, *Handbook of Pediatrics*, Med.ed. Bucharest 2001
4. ****Protocols in child care*, vol.I, The Institute for the mother and child care "Alfred Rusescu" Bucharest 1998
5. ****The mother and child assistance, Studies-Research- Guidance*, Med ed. Bucharest 1974
6. ****Augmentation des cas de rachitisme aux Etates-Unis*, Chapel Hill, USA 10/08/2000
7. ****Recommended Nutrient Intakes for Canadians* Dep. Of National Health and Welfare, Ottawa, 1983
8. Binet A., Kooh SW, *Persistence of vitamin D deficiency rickets in Toronto in the 1990s*. Can J. Public Health 1996
9. Block BH, Grant CC, McNeil AR, *Characteristics of children with florid vitamin D deficient rickets in the Auckland region in 1998*. NZ Med, J 2000
10. Devlin E.E.,Glorieux FH *Control of vitamin D metabolism in preterm infants* Arch Dis Child 1982
11. Glorieux FH *Rickets* vol.21 of Nestle nutrition workshop series. New York, Raven Press 1991
12. Rowe PM *Why is rickets resurgent in the USA!* Lancet 2001
13. Walker ARP *Etiology of nutritional rickets: geographic variations*. J Pediatrics 1997
14. Zhou H. *Rickets in China* Rickets Vol 21 of New York Raven Press 1991.

Correspondence to:

Liana Berinde
 Timisoara/Romania
 Spitalul Clinic Judetean Nr. 1 Timisoara
 Clinica II Pediatrie – Bega
 Str. Paltinis, Nr. 2
 Tel. +4-0256-491742