Case study

Vitamin D deficiency associated with staying indoors during the COVID-19 pandemic: A report of two infants

ABSTRACT

Aims: The world is in the grip of the COVID-19 pandemic. Here, we report two infant cases of vitamin D (VD) deficiency associated with a lack of sunlight.
Presentations of case: Patients and their families stayed indoors according to orders issued by the public administration.
Conclusion: Physicians should be aware that many health problems are associated with long stays at home, including VD deficiency, which may be associated with a lack of sunlight.

Keywords: [COVID19, sunlight, vitamin D deficiency, stay home, patient education}

1. INTRODUCTION

The world is in the grip of the COVID-19 pandemic. Here, we report two infant cases of vitamin D (VD) deficiency associated with a lack of sunlight. Patients and their families stayed indoors according to orders issued by the public administration. Physicians should be aware that many health problems are associated with long stays at home, including VD deficiency, which may be associated with a lack of sunlight.

2. PRESENTATION OF CASE

Case 1. A 6-month-old exclusively breast-fed Japanese male was admitted to our hospital with a 2-day history of fever in winter season. His family and previous clinical history were not significant and his mother did not take VD supplement. A screening blood test incidentally revealed hyperphosphatasemia (2391 U/; normal value, <1200IU/l) and hypocalcaemia (7.4 mg/dl; normal value, >8mg/dl). An X-ray showed fraying of the metaphysis in the left radius (Figure 1).

[Figure 1. Fraying of the metaphysis and widening of the epiphyseal plate in the left radius]

A laboratory examination revealed 25-hydroxy-VD deficiency (8.2 ng/ml; normal value, >20ng/ml) and an excess of parathyroid hormone (339 pg/ml; normal value, 10~65pg//ml) with normal phosphorus. No clinical symptoms or physical signs of VD deficiency were detected.

Case 2. A 9-month-old Japanese female was admitted to our hospital with a 3-day history of fever and respiratory tract symptoms in fall season. She has already stopped breastfeeding two months ago. Her family and clinical history were not remarkable and his mother did not take VD supplement. A screening test incidentally revealed hyperphosphatasemia (3121 U/l; normal value, <1200IU/l) with normal phosphorus and calcium. A laboratory examination revealed 25-hydroxy-VD deficiency (17.7 ng/ml; normal value, >20ng/ml) with normal parathyroid hormone. An X-ray showed minimal widening of the epiphyseal plate in the left wrist. No clinical symptoms or physical signs of VD deficiency were detected.

3. DISCUSSION

We revealed two important clinical issues. First, VD deficiency is a health risk during prolonged stays at home. Many countries have implemented restrictive measures based on social distancing. Prolonged stays at home may have side

effects, including insufficient sunlight exposure. [1] Exposure to sunlight is the major limiting step in endogenous generation of VD. [2] It has been suggested that sunlight exposure for approximately 15~30 min twice or three times a week is sufficient to produce the required amount of vitamin D in adults. The optimal amount of sunlight is different in regions, for race and ages. [3] We have no standard protocol about sufficient amount of sunlight especially for children in Japan. VD is not only essential for bone health, but also has a vast array of beneficial effects, including reducing the risk of COVID-19 infection. [1] According to a Japanese survey concerning symptomatic VD deficiency in children, 21.3% of patients (n=19) were insufficiently exposed to sunlight due to infrequent outdoor activity. [2] Diagnosis and treatment of osteoporosis in adults during the COVID-19 pandemic have been previously discussed. [4] In adults, VD intake can be increased by administering VD as a dietary supplement or by enriching the diet with VD-containing foods. Both approaches are difficult to implement in children; therefore, parents should ensure their children are exposed to a sufficient amount of sunlight. VD supplementation for breastfeeding infants (400IU/day) was encoureged by American Academy of Pediatrics,[5] but in Japane, it was reported by few pregnant women (5.1%) and most consumed only 100 to 200 IU/day of vitamin D, administration to infant was more infrequent.[6] In fact, VD deficiency is a worldwide problem that far antedated the beginning of the COVID-19 pandemic [7], though it is possible that it has become more pronounced following the COVID-19 epidemic.[8] Adequate VD supplementation for infants is an effective preventative strategy and should recomment to reduce the risk of VD deficiency.[9] Second, a laboratory examination efficiently diagnoses asymptomatic VD deficiency. The incidence of VD deficiency in children varies from 2.2 to 24.1 per 100,000 children among studies. [2] Infants and children with a serum 25-hydroxy-VD level lower than 20 ng/ml but without clinical evidence of rickets required VD replacement therapy. [10] Physicians examining patients who have stayed at home for a long time should check bone metabolic markers.

4. CONCLUSION

VD deficiency is a potential side effect of long lockdowns, and haematological tests are useful to diagnose VD deficiency in patients without clinical symptoms. Physicians should be aware that many health problems are associated with long stays at home, including VD deficiency, which may be associated with a lack of sunlight.

8.ETHICAL APPROVAL (WHERE EVER APPLICABLE)

The study protocol was approved by the Institutional Review Board of the Japanese Red Cross Wakayama Medical Center (no. 756).

9.REFERENCES

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