

Rickets: A re-emerging public health problem in Canada?

A 15-month-old Inuit girl presents to the nursing station in February after a generalized convulsion lasting less than 2 min. She is now alert, but her physical examination reveals a child with short stature (66 cm in height [less than the 5th percentile] and 8.7 kg in weight [5th percentile]), flaring of the wrists, bowing of the legs and refusal to bear weight on her left knee. The child was exclusively breastfed for 12 months without vitamin supplementation. The mother also confirms that she did not drink any milk during her pregnancy, and rarely took multivitamins. Outdoor activities have been minimal over the present winter due to the frequent blizzards.

Laboratory investigations show decreased total and ionized calcium, normal phosphate and parathyroid hormone levels, slightly increased alkaline phosphatase and decreased 25-hydroxy vitamin D levels. Radiographs of the wrists reveal widening and cupping of the metaphyseal regions, consistent with the diagnosis of rickets. With daily oral supplementation of 400 U of vitamin D and adequate milk intake, she steadily improves without further convulsions and masters independent walking.

LEARNING POINTS

- Vitamin D deficiency rickets remains a global health problem among children, despite the availability of numerous simple and cost-effective prevention measures.
- Canada is not exempt from vitamin D deficiency rickets. Between July 2002 and June 2004, the CPSP rickets study confirmed 104 cases in children up to seven years of age, with an estimated incidence of 2.9/100,000 children.
- Although occurring more frequently in winter months, secondary to reduced intensity and duration of sunlight, recent reports have noted cases in continents or countries enjoying much sunnier climates than Canada, such as Africa, Australia and Saudi Arabia.
- Identified risk factors in the CPSP and other studies include, among others:
 - Living in the northern part of Canada;
 - Having intermediate or darker skin colour;
 - Wearing protective clothing and/or using sunscreen frequently;
 - Being born to a mother with inadequate vitamin D intake or supplementation;
 - Being exclusively breastfed, without vitamin D supplementation; and
 - Having a milk intolerance, without adequate calcium and vitamin D supplementation.
- Human breast milk is the ideal food for infants; however, breast milk has too low a vitamin D concentration (12 U/L to 60 U/L) to prevent rickets and, thus, vitamin D needs to be supplemented.
- The Canadian Paediatric Society recommends:
 - Vitamin D supplements (400 U/day) for all breastfed full-term infants;
 - If living north of the 55° latitude and at even higher risk of vitamin D deficiency from October to April, supplementation of vitamin D may be increased to 400 U/day for bottle-fed infants and to 800 U/day for breastfed infants; and
 - Consideration should be given to administering 2000 U of vitamin D daily to pregnant and lactating women, especially during the winter months, to maintain vitamin D sufficiency.
- Heightened awareness among health care providers and the general public with targeted public health interventions are needed to prevent vitamin D deficiency rickets and the accompanying serious complications.

The Canadian Paediatric Surveillance Program (CPSP) is a joint project of the Canadian Paediatric Society and the Public Health Agency of Canada, which undertakes the surveillance of rare diseases and conditions in children and youth. For more information, visit our Web site at <www.cps.ca/cpsp>.