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Nutritional Rickets in Three Years Old Boy: A Case Report

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Abstract:
Rickets is a severe vitamin D deficient disorder mostly of developing countries due to the least exposure to sunlight and poor nutrition. Rickets causes inappropriate absorption of phosphorus and calcium. It retards growth; alters phosphorus, calcium, and vitamin D metabolism, and causes the bony manifestation of the patient. We describe the clinical course severe vitamin D deficiency in a boy of three years with cold and dry cough sweats on the forehead at night and can't walk and stand. Multi-disciplinary physical, laboratory, and clinical analysis; the child was diagnosed as nutritional rickets with fever and respiratory infection. Treatment with proper exposure to sunlight vitamin supplements and adequate nutrition is directed. Rickets is a worldwide public health problem that arises due to vitamin D and calcium deficiency found more in children than adults. Early diagnosis of rickets in humans provides the optimal and proper treatment for saving a patient's life.

Keywords: Nutrition, rickets, vitamin D, public health.

INTRODUCTION

Rickets is a major global public health issue caused by vitamin D deficiency. This disorder has a wide geographic distribution affecting more than one billion population of the world and is the main problem of developing countries (Holick *et al.,* 2007). Obesity and many fatal diseases such as cancer, tuberculosis, osteoporosis, neurological aching, diabetes, and heart disease are related to low vitamin D levels (Coussens *et al.,* 2014; Heany, 2008). Rickets reduces performance, retards growth, and disturbs the calcium and phosphorus homeostasis linked with osteomalacia, multiple sclerosis, and sever's disease. Rickets affects lifestyle with complain of muscle fatigue, hyperparathyroidism deformities, and bone demineralization (Farrar *et al.,* 2013). Medical care providers are also affected by vitamin D deficiency (Jadoon *et al.,* 2019). This area (Darora) located in the north of district Dir (Lower) is a scientifically least explored area of Pakistan. Linked with Afghanistan on its west at Northwest, bounding with district Chitral - join on its south with district Malakand, while in the east it joins district Swat. This case describes the unusual case of rickets recently hospitalized in district headquarter hospital Timergara Dir (Lower) Khyber Pakhtunkhwa, Pakistan, who was recommended for rickets treatment.

Case report

In April 2019 a three years old boy who used to live an agriculture raising area with moderate weather in the north of district Dir (Lower) Pakistan admitted to district headquarter hospital Timergara with a complaint of difficulty in standing, walking, with weakness, pain, and fatigue of muscles. His history of disorder shows sweats on the forehead at night, temperature, chest pain with cold and dry cough. Post history presents that the child since his birth can't walk, stand, and in all limb weakness is present. In the past have no history of bodily injury and accident. On physical check-up there was proliberent abdomen, knock knee, and pectus carinatum. On the laboratory analysis, leucocyte count was 15500/mm^2, hemoglobin level was 9.8 g/dl, calcium 6.5 mg/dl, phosphorous 4.7mmol/L, and vitamin D 12mg/ml. The anthropometry examination showed height 80 cm, abdominal circumference 42 cm, and 7 kg weight. According to this investigation the child was diagnosed as rickets. The patient's socio-economic position is poor; the father occupation is labor, no knowledge about rickets and vitamin D deficiency, illiterate, living in joint family economic status is not satisfied. The physician recommended the patient through calcium, multivitamin, and vitamin D supplements with calcium and vitamin D rich foods like (dairy butter, milk, eggs, etc.) with daily exposure to sunlight.

DISCUSSION

Rickets is one of the common challenging problems of the globe. For the action of normal body function, the intake of vitamin D associated with calcium in an adequate amount is very necessary. Approximately 50% of the world population is calcium and vitamin D deficient which arises as a challenging issue (Holick *et al.,* 2007). Lack of adequate foods, limited sunlight, many public duties, dresses, financial problems, indoor jobs, closed and high building awareness, and illiteracy is the common barrier to intake vitamin D. Pregnant women require an adequate amount of sunlight and vitamin D rich foods. The Rickets in children are due to the mother's poor nutrition and keeping away from sunlight. Outdoor people which work outside like outdoor labors, farmers working in fields, outdoor professions (working in roads, buildings construction, etc.) living in open houses are exposed to sunlight and receive sufficient amount of vitamin D. In the present case the patient is diagnosed as rickets due to poor nutrition, limited exposure to sunlight at daytime, drinking un-boiled upstream water, vegetarian, absence of health education, health

care, and poor economic status. In rickets delayed fontanelle closure, frontal bossing, hypocalcemia, craniotabes, bowing of forearm, lower ribs flaring, poor tooth eruption followed by delay enamel growth, cardiac failure and seizure are present in kids (Sperling, 2014). The sun is the main large natural source of vitamin D but the people with an indoor job at the day time, black skin, sunscreen, dresses, high and close buildings lack sunlight (Lips, 2010; Mithal *et al.,* 2009). It was reported that like other health challenges, vitamin D and associated nutrients deficiency is also a challenging health issue in Pakistan (National Nutrition Survey, 2011). The major cause of rickets is limited exposure to sunlight; the sun is the main natural source for human-associated with vitamin D rich foods but in the inadequate amount it does not justify the patient requirements (Holick, 2007). Rickets is widely prevalent in Pakistan with variable prevalence in different localities. Random surveys on the Pakistan population show 53.3% complaint with vitamin D deficiency (Riaz *et al.,* 2016). Another study reported the prevalence as Lahore 73% (Junaid *et al.,* 2015), Islamabad 56% (Chaudhary *et al.,* 2017), Karachi 57.7% (Shiekh *et al.,* 2012), Abbottabad 63% (Jadoon *et al.,* 2017). Hassan et al. (2015) assessed the vitamin D deficiency problem in the population of Pakistan from different regions of the country with 66.1% prevalence. Khan et al. 2013 reported in 305 community-dwelling females with 90.5% having a low level of vitamin D. Naqvi et al. (2012) recorded (69.6%) prevalence of vitamin D deficiency among 360 pregnant women of Karachi. Jadoon et al. (2019) conducted a study on medical caregivers and reported 47% vitamin D deficiency. No correct and statistical data present in other cities of Pakistan. Rickets may cure with regular use of vitamin D for few months with 600,000 U (15,000 mcg) intake of vitamin D supplements with milk, calcium supplements, and rich nutrition. Food monitoring, health care, health education, and knowledge about rickets with calcium and vitamin D rich nutrition can stop rickets. The present study is a case report regarding rickets in a boy of three years with retarded growth, problem in walking standing and muscle pain is a rare and minor case. Awareness in people is necessary to prevent rickets.

CONCLUSION

We concluded that rickets is a serious disease caused by vitamin D deficiency. Awareness in public about vitamin D, its sources, and disorder related to vitamin D deficiency is necessary for the prevention of rickets.

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CONFLICT OF INTEREST

There is no conflict of interest.

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