Premature Delivery and Vitamin D Deficiency

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"High Prevalence of Hypovitaminosis D in Pregnant Japanese Women with Threatened Premature Delivery,"
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Kirk Hamilton: *Can you please share with us your educational background and current position?*

Atsushi Suzuki: I am a medical doctor (internal medicine) and a researcher in the field of endocrinology and metabolism. I graduated from Nagoya University School of Medicine in Nagoya, Japan in 1988. I started my professional career as a medical doctor in a Red Cross hospital in Nagoya. Then I studied both basic and clinical research in Nagoya University Graduate School of Medicine, and earned a PhD in biochemistry in 1996. From 1996 to 1998 I worked as a visiting fellow in Division of Clinical Pathophysiology at the University Hospital of Geneva in Switzerland. Currently I am an associate professor in Division of Endocrinology and Metabolism, Department of Internal Medicine, Fujita Health University in Japan.

KH: *What got you interested in studying the role of vitamin D and premature delivery?*

AS: We at first explored the prevalence of vitamin D deficiency in healthy Japanese (Ono et al., JBMM 23(2):147-151, 2005) and found that many Japanese people had low 25-OH vitamin D levels especially in winter. Therefore we wondered if the maternal vitamin D level could be also so low that skeletal development in utero and/or delivery itself might be affected.

KH: *What is the biochemistry of vitamin D that might alter the pathophysiology of premature delivery?*

AS: Poor muscular performance is an established symptom of vitamin D deficiency, and calcium levels play an important role in the smooth muscle function in early labor. Although serum concentrations of Ca in threatened premature delivery were within the normal range in our study, low vitamin D levels could induce transient fluctuation of serum Ca concentrations which may affect their pregnancy. Papandreou et al. reported significantly higher serum calcium levels in pregnant women at the time of vaginal delivery compared with term women not in labor or women who did not labor but delivered by scheduled cesarean. It was speculated that the higher serum calcium levels played a role in the mechanism of initiation of labor. In addition, the incidence of preeclampsia, which correlates with hypocalcaemia, has been reported to increase in the mothers with hypovitaminosis D. These findings as a whole suggest the importance of Ca homeostasis for normal pregnancy and delivery.

KH: *Was there a maternal therapeutic blood level of vitamin D that was protective against premature delivery?*

AS: There is so far no relevant data of vitamin D levels for prevention against premature delivery. Further examination should be required.

KH: *Were blood levels of other biochemical markers along with vitamin D taken during this study? If so what were their clinical significance?*

AS: Serum 25-OHD levels were not associated with either intact parathyroid hormone or corrected calcium concentrations, but were negatively associated with serum type I collagen N-terminal telopeptide and bone-specific alkaline phosphatase in our study. As the increase of the bone resorption marker NTx was also associated with threatened premature delivery independent of maternal 25-OHD level, the importance of Ca homeostasis in pregnant women is suggested further.

KH: *Can you tell us about your study and the basic results?*

AS: Vitamin D deficiency is related to not only osteoporosis in elderly but also incidence of other types of diseases such as multiple sclerosis and type 1 diabetes in youth. Maternal vitamin D status during pregnancy is known to affect bone acquisition in utero, and the incidence of neuromuscular diseases of their children in the future. We conducted an observational study about the relationship between serum 25-hydrroxyvitamin D level and clinical complications during pregnancy. Severe vitamin D deficiency (25-OHD < 10 ng/ml) was found in 10 of these 93 women. Hypovitaminosis D, defined as serum 25-OHD concentration equal to or less than 20 ng/ml, was found in 85 mothers (89.5%). Serum 25-OHD levels were negatively associated with serum type I collagen NTx and bone-specific alkaline phosphatase in these subjects. Mothers with threatened premature delivery had significantly lower 25-OHD levels (11.2 ± 3.2 ng/ml) than those in mothers with normal delivery (15.6 ± 5.1 ng/ml). Our present data suggest the high prevalence of hypovitaminosis D in Japanese perinatal pregnant women throughout year seems to affect bone metabolism and appears to be associated with threatened premature delivery.

KH: *Who is a candidate for vitamin D therapy? All pregnant females? Those at risk for premature delivery?*

AS: Personally, I recommend vitamin D therapy to pregnant women who are at risk for premature delivery. I also recommend vitamin D to pregnant women who are at high risk for vitamin D deficiency. Low fish intake could diminish vitamin D_3 intake. Those who are bedridden long-term will have reduced vitamin D_3 synthesis in their skin because of lack of sun exposure.

KH: *How can the public or health professionals use this information?*

AS: Japanese gynecologists are going to explore more widely the extent of vitamin D deficiency in Japan.

KH: *Do you have any further comments on this very interesting subject?*

AS: The exact role of Ca homeostasis in normal pregnancy and delivery seems unlikely to be fully understood. We need more research on how to optimize Ca homeostasis during pregnancy.