ScienceFrontier
Case Report

Clinical Case Studies and Review Reports
ISSN Online: 3064-7843 | OPEN ACCESS

Incidental Detection of Profound Vitamin D Deficiency During Evaluation of a Patient with Ovarian Cyst, Renal Calculi and Ovarian Cyst: A Case Report

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Received Date: **May 27, 2026**; **Accepted Date:** **June 02, 2026**; **Published Date:** **June 11, 2026**

Citation: Sinha S. (2026). Incidental Detection of Profound Vitamin D Deficiency During Evaluation of a Patient with Ovarian Cyst, Renal Calculi and Ovarian Cyst: A Case Report, J *Clinical Case Studies and Review Reports.* 3(3) 49, **DOI:** *https://doi.org/10.5281/zenodo.20637300*

Abstract:

A 29 years old female reported with previously documented renal calculi and ovarian cyst in USG abdomen and Pelvis scan report. Comprehensive evaluation incidentally detected profound Vitamin D deficiency (25-OH vitamin D: 4.1ng/mL), and other contributing factors like Urinary tract infection, border line Vitamin B12 deficiency. Vitamin D supplementation along with personalized diet, life style modification, addressing dehydration and supportive treatment for other concerned issue, her vitamin D level improved to 30ng/mL and follow up imaging reportedly showed resolution in other abnormalities. After 3 months of treatment, patient could improve health status and natural conception was possible. She could deliver a healthy infant. This case study significantly highlights the importance of Vitamin D in metabolic and reproductive health. However, so many contributing factors are there we cannot say that profound Vitamin D was the root cause. Moreover, this issue is based on single case study; we need to induce more trials to confirm the statement.

Key words: vitamin d deficiency; kidney stone; ovarian cyst; urinary tract infection (UTI)

Introduction:

Vitamin D plays vital role in our overall health. It is crucial fat soluble nutrient. It is primary regulator of calcium and absorbs phosphorous to strengthen bones. It influences our whole immune system, metabolic function, and endocrine systems, reduces inflammation, neutralizes mood swings, regulates brain function, and works on reproductive system-almost all body functions are modulated by Vitamin D.

Ovarian cyst and renal calculi are familiar clinical condition with multiple etiologies. Emerging studies on Vitamin D explored the association between profound Vitamin D deficiency and development of renal calculi, ovarian cyst, infertility, hormonal disturbance, inflammation. There could be strong relationship between kidney stone formation and severe vitamin D deficiency. However, it depends upon many factors. Vitamin D regulates Calcium and helps in phosphorus absorption for building strong bones. So, severe vitamin deficiency may influence the kidney stone formation function. Few nutritionist and researchers feel that severe vitamin D deficiency may lead to systematic inflammation and hinder parathyroid function. However; we need more trails to support the statement. There may be relationship between vitamin D deficiency and kidney stone formation. Proper diagnosis is needed to rule out the exact issue. Since, kidney stone formation has multifaceted factors.

Vitamin D is not only vitamin; rather it is a hormone- which stimulates reproductive organs also. Severe vitamin D deficiency may cause hormonal imbalance. It may secrete more male hormone (androgen). It is not confirmed or scientifically proven that low vitamin D causes ovarian cyst. However, female with low vitamin D- are mostly seen with high grade inflammation, insulin resistance, thyroid issue, PCOD or PCOS like symptoms.

Several studies have reported an association between vitamin D deficiency elevated AMH in woman (Anti –Mullerian Hormone. It is produced by small ovarian follicles and female with PCOS have higher level of AMH. It is because of accumulation of many immature cells in the ovaries. Few scientists believe that we can manage AMH level just making little adjustment in Vitamin D serum level. However, we cannot ensure the statement with one case study. It depends upon the case and the situation to support the evidence and more trials need to be induced.

Vitamin D stimulates gonadotropic or sex hormone. It has huge contribution in reproductive organ and severe deficiency of vitamin D may lead to infertility issue in both male and female. Vitamin D helps in ovarian follicle development in female and improves sperm quality in male. It has been observed that female with severe Vitamin D, face difficulty in vitro fertilization (IVF). On the other hand, optimal Vitamin D increases the chances of natural conception and reduces complexities in child birth. However, more research evidence is needed to support this statement.

29 years old female was reported with USG abdomen and Pelvis scan report prior to the consultation, demonstrating 3mm right kidney stone and 1.9 cm left ovarian cyst. Upon performing comprehensive assessment, profound Vitamin D was detected incidentally along with other contributing factors such as Urinary tract infection, border line Vitamin B12 deficiency. Addressing her all contributing factor with lifestyle modification, proper hydration, improving Vitamin D serum level, she could conceive naturally and follow up USG imaging also showed no abnormalities.

Case Report Presentation:

We report 29 years old female with the complaint about 3mm kidney stone and 1.9cm ovarian cyst. She has performed USG abdomen and Pelvis scan prior to the consultation. Additionally she also reported about infertility. A comprehensive assessment was performed to rule out the underlying issues. While evaluating underlying issues associated with renal calculi and ovarian cyst, profound Vitamin D deficiency (25-OH vitamin D: 4.1ng/mL) was detected along with other contributing factors such as border line Vitamin B12 deficiency and Urinary tract infection. The patient also reported about menstrual irregularities and expressed concern about conception in future.

Her medical history was unremarkable, except for mild elevations in a few laboratory parameters. She also described about her sedentary life style, predominance of sitting job along with less water intake approximately less than one litter per day. She also informed about burning micturition, which suggests indication of urinary tract infection. Moreover, urine microscopy report also supported it. However, no significant family history of same issue was reported.

On physical examination, her height was 149 cm and weight was 68 Kg, indicating excess body fat. Clinical assessment suggested increased central adiposity.

Investigations:

Following findings are revealed through comprehensive laboratory evaluation:

Hemoglobin	13.7g/dL	
Fasting Glucose	81mg/dL	
HbA1C	5.3%	
Thyroid Profile	Within Normal Limits	
Liver Function Tests	Within Normal Limits	
Kidney Function Tests	Within Normal Limits	
Calcium	9.0 mg/dL	
HDL Cholesterol	36 mg/dL	
LDL Cholesterol	105 mg/dL	
Vitamin B12	198pg/mL	
Homocysteine	17 µmol/L	
hs-CRP	1.95 mg/L	
ESR	30mm/hr	
25-Hdroxyvitamin D	4.1ng/mL	
Urinalysis Findings		
Slightly hazy appearance		
Leukocyte esterase:1+		
Pus cells:8-10/HPF		
USG abdomen and Pelvis Scan Report	1)3mm renal Calculus	2)1.9 ovarian cyst

Table 1: *USG abdomen and Pelvis report was not available while drafting the manuscript and so it was not included in the case report.*

Management and Intervention:

A comprehensive treatment plan was implemented based on data findings and USG imaging report. It was focused on correction of nutritional deficiency, lifestyle modification, hydration, and supportive management.

- The patient was advised to increase daily intake of water 2-3 liters.
- To follow nutrition-rich balanced diet.
- She was asked to initiate physical activity.
- To join a structured exercise training
- Nutritional supplements were included:
- Vitamin D3 with vitamin K2
- Magnesium glycinate
- Vitamin B12 supplementation

Follow-Up and Outcome:

The patient was reviewed every month. During follow –up she reported about improvement of overall health. Her energy level was increased, regularization of monthly menstrual cycle, even her urinary symptoms also subsided and gradual weight loss as well.
After 3 months of treatment, repeat investigations demonstrated significant clinical and laboratory improvement. Serum 25-hydroxyvitamin D levels increased from 4.1 ng /mL to 30ng/mL after 3 months of treatment. Improvement was also observed in other clinical and laboratory parameters as well.
Repeat ultrasonography shows no sign of previously documented renal calculus or ovarian cyst.
Subsequently the patient conceived naturally. The pregnancy progressed without any major complications and after nine months of gestation, the patient delivered a healthy infant.

Pre-Treatment investigation		**Post-Treatment investigation**
Hemoglobin	13.7g/dL	13.9g/dL
Fasting Glucose	81mg/dL	80 mg/dL
HbA1C	5.3%	5.2%
Thyroid Profile	Within Normal Limits	Within Normal Limits
Kidney Function Tests	Within Normal Limits	Within Normal Limits
Calcium	9.0 mg/dL	9.3 mg/dL
HDL Cholesterol	36 mg/dL	36 mg/dL
LDL Cholesterol	105 mg/dL	105 mg/dL
Vitamin B12	198pg/mL	220 pg/mL
Homocysteine	17 µmol/L	15 µmol/L
hs-CRP	1.95 mg/L	1mg/L
ESR	30mm/hr	29mm/hr
25-Hdroxyvitamin D	4.1ng/mL	30.1ng/mL
Urinalysis Findings		
Slightly hazy appearance	Normal appearance	
Leukocyte esterase:1+	Nill	
Pus cells:8-10/HPF	Pus cells:6-8/HPF	
USG abdomen and Pelvis Scan Report	1)3mm renal Calculus 2)1.9 ovarian cyst	1)No evidence of renal calculus was identified 2)No ovarian cyst was visualized

Table 2: *A comparative data of pre-treatment and post-treatment investigations are summarized in Table 2.*

Discussion:

The case highlights the co-occurrence of profound Vitamin D deficiency, renal calculus, ovarian cyst, infertility and urinary tract infection in a young woman. Experimental and clinical studies suggest that Vitamin D deficiency can be associated with ovarian follicular development, endocrine regulation, inflammatory pathway and reproductive outcomes. More similar cases have been investigated in patients with nephrolithiasis, though the relationship remains complex and incompletely understood.
In this present case report, the patient exhibited multiple etiologies including dehydration, sedentary lifestyle, increased body weight, urinary tract infection, borderline Vitamin B12 deficiency, and elevated homocysteine levels. Therefore, it is not possible to differentiate her clinical findings solely the causal effect of Vitamin D deficiency.
However, correction of profound Vitamin D deficiency, as part of the comprehensive treatment plan, associated with subsequent clinical improvement such as no abnormalities seen in post imaging scan and successful conception was possible.
As a single case report, this observation cannot be established as causal effect of profound Vitamin D deficiency. Multiple etiologies have been attributed in single case and we cannot particularly emphasize the profound Vitamin D deficiency as the major factor. More trials need to be induced to support this causal effect of Vitamin D deficiency and association of multiple factors.

Conclusion:

Profound Vitamin D deficiency was incidentally identified to a 29 years old female reported with renal calculus and ovarian cyst and additionally reported with infertility. Correction of Vitamin D deficiency and implementation of lifestyle change, nutritional interventions, personalized diet, and the patient demonstrated significant clinical improvement in overall health. Her imaging report was clear and no sign of abnormalities. Moreover, she conceived naturally and after successful completion of nine months gestation, she delivered a healthy infant.
Though a causal relationship cannot be substantiated from a single case study, this report emphasized the importance of value of nutritional assessment and highlights the need for further studies exploring the role of Vitamin D in metabolic and reproductive health.

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