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Pneumocystis Carinii Pneumonia: A Rare Cause of Granulomatous Hypercalcemia

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Abstract

- Pneumocystis Carinii Pneumonia (PCP) is a well-known complication of immunosuppression.
- Few case reports have linked PCP and its ability to induce a granulomatous response to hypercalcemia.
- PCP related hypercalcemia appears to be resistant to standard therapy.
- We report a case of hypercalcemia that preceded PCP and continued to worsen during the course of infection.

Case Report

- A 63y man with renal transplant for polycystic kidney disease one year prior, presented with three week history of fatigue, cough and chills.
- Patient was hypoxic and CT of the thorax revealed diffuse ground glass opacities.
- He was started on empiric therapy for PCP with intravenous methylprednisolone, clindamycin, and primaquine.
- The patient's bronchoalveolar lavage confirmed PCP.

Laboratory Values

- Serum Calcium - 12 mg/dl (baseline 9.2mg/dl, reference range 8.6-10.4 mg/dl)
- Creatinine - 3.23 mg/dl, which rose from a baseline value of 1.6 mg /dl.
- PTH of 15 pg/ml from a baseline of 97 pg/ml (reference range 15-65pg/ml) post-transplant
- 25-hydroxyvitamin D level of 30 ng/ml (reference range >20 ng/ml)
- **1,25-dihydroxyvitamin D(1,25D) level was elevated (>156 pg/ml; reference range 20-79 pg/ml)**
- 1,25 D mediated hypercalcemia – started on intravenous fluids and high-dose steroids

Laboratory Values

	Creatinine	Total Calcium	Ionized calcium
8/29/2018 1807	3.23*	12.0*	1.53*
8/30/2018 2117	2.81*	11.6*	
8/31/2018 0452	2.85*	11.1*	
8/31/2018 2046	2.53*	11.4*	
9/1/2018 2031	2.56*	11.2*	
9/2/2018 2017	2.12*	10.7*	1.45*
9/3/2018 0652	2.23*	10.8*	1.39*
9/3/2018 2045	2.04*	10.7*	
9/4/2018 2032	1.91*	11.4*	
9/5/2018 0449	1.95*	12.0*	
9/5/2018 2132	2.19*	12.6*	
9/6/2018 2100	2.56*	13.5*	
9/7/2018 2100	2.67*	12.9*	
9/8/2018 0555	2.96*	12.4*	
9/8/2018 2100	2.92*	11.9*	1.46*
9/9/2018 2102	3.16*	11.4*	1.36*
9/10/2018 1336			1.38*
9/10/2018 2100	3.19*	10.9*	1.35*
9/11/2018 2037	3.14*	11.2*	1.44*
9/12/2018 2216	3.01*	11.6*	1.44*
9/13/2018 0752	2.98*	11.4*	1.47*
9/13/2018 2226	2.94*	11.3*	1.49*
9/14/2018 2157	2.89*	10.6*	1.39*
9/16/2018 0850	2.77*	10.3*	
9/16/2018 2100	2.52*	10.0*	1.34*
9/18/2018 0810	2.49*	9.8*	1.32*
9/26/2018 1423	2.14*	8.9*	

- Serum calcium levels improved transiently but subsequently rose to a peak level of 13.5 mg/dl.
- Ketoconazole 200 mg every 8hrs was started to reduce 1,25D production.
- Serum calcium remained high despite a reduction in 1,25D level (33 pg/ml).
- Bisphosphonates therapy was considered unsafe because of decreased GFR. Therefore, Denosumab 30mg was administered, which resulted in decrease in serum calcium level to 10.3 mg/dl by day 19.
- Overall, improvement of hypercalcemia correlated with improvement of PCP and renal function.
- Patient was discharged home after completing the 21 day course of treatment for PCP.
- Five weeks later, serum calcium stayed normal with an elevated PTH of 153 pg/ml and 1,25D level of 20 pg/ml.

Discussion

- Hypercalcemia heralding PCP infection has been reported in the literature.
- **Elevated calcium of 10.6 mg/dl was present one month prior to our patient's hospitalization around the time of onset of his symptoms.**
- Of the 19 cases of hypercalcemia due to PCP infection, 5 had hypercalcemia that preceded PCP infection by few weeks. (1-3)
- The gold standard for diagnosis of PCP involves identification of the organism in induced sputum or bronchoalveolar lavage specimen.
- Measurement of serum 1,3-β-d-Glucan, which has high sensitivity, may be used as a screening tool in the right clinical setting such as our patient with immunosuppression and hypercalcemia to diagnose PCP at an earlier stage.
- We believe that hypercalcemia in a patient with immunosuppression should alert the possibility of PCP infection.

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