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Case Report

A rare case of strontium induced dermatitis in an osteoporotic patient taking an over-the-counter supplement: a case study

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ABSTRACT

Strontium ranelate, a strontium salt, is used in osteoporosis treatment due to its dual mechanism of promoting bone formation and inhibiting resorption. Although it is effective, strict monitoring is recommended because of it adverse reactions particularly related to cardiovascular and cutaneous adverse reactions. We report the case of a 71-year-old woman with a 20-year history of osteoporosis who developed progressive dermatitis and generalized pruritus over 1.5 years. Extensive dermatologic and rheumatologic evaluations, including skin biopsies, were inconclusive. Upon detailed history, the patient disclosed long-term use of an over-the-counter (OTC) vitamin supplement containing strontium citrate. Performed laboratory testing revealed significantly elevated serum strontium levels (124.2 ng/ml; reference: 8.3-34.3). After discontinuation of the supplement, her symptoms gradually resolved without specific treatment. This case highlights strontium toxicity manifesting as cutaneous symptoms, potentially caused by chronic ingestion of OTC strontium. While adverse effects of prescription strontium ranelate are documented, reports of toxicity from non-prescription strontium citrate are rare. The patient's clinical improvement and declining strontium levels after supplement cessation strongly support the diagnosis. This is a rare and possibly novel case of cutaneous strontium toxicity linked to an OTC supplement. Clinicians should consider strontium toxicity in patients presenting with unexplained dermatitis and a history of osteoporosis, particularly when supplement use is identified. Greater awareness and regulation of strontium-containing OTC products are warranted.

Keywords: Strontim toxicity, Osteoporosis, Osteoporosis management, Strontium citrate

INTRODUCTION

Osteoporosis is a systemic skeletal disorder characterized by reduced bone mass and architectural deterioration of bone, leading to increased risk of fracture.[1]

Strontium ranelate, a strontium salt, has been used for the management of osteoporosis due to its unique dual mode of action as it promotes bone formation and simultaneously reduces bone resorption.[2] Randomized controlled trials, including the SOTI, Cochrane and TROPOS studies, have demonstrated that strontium ranelate improved bone mineral density and decreased fracture incidence and significantly reduced the risk of vertebral and non-vertebral fractures in postmenopausal women.[3,4]

However, the safety profile of strontium ranelate has raised concerns, particularly regarding cardiovascular risks and severe cutaneous adverse reactions such as drug reaction with eosinophilia and systemic symptoms (DRESS) syndrome. Also reported adverse events include hypersensitivity skin reactions (e.g. Stevens Johnson syndrome), vomiting, bronchial hypersensitivity, dermatitis, eczema etc.[5]

We present the case of a 71-year-old woman with a long-standing history of osteoporosis who developed dermatitis linked to the use of an OTC vitamin supplement containing strontium.

CASE REPORT

A 71-year-old-woman with known history of osteoporosis for the last 20 years presented with complaints of rash and long-standing generalized pruritus for 1.5 years. On questioning, she mentioned that rash initially developed around the sides of neck a year ago. It was progressive in nature, starting from the sides of the neck extending up to the shoulders and eventually encompassing the arms and legs. Rash was initially pinkish and macular in nature but over the course of the year it developed in to a nodular form as well. It was associated with itching and redness on her scalp and face without any pain, discharge, burning sensation, tingling or numbness.

Over the next 4 months the rash spread throughout the body and she gradually had itching over her underarms, arms and legs which further progressed to neck which were of same characteristics. It fluctuated in size and she has some raspiness of her voice. There were no exacerbating or relieving factors.

She also had episodes of hair fall during the last 1.5 years prominent over the center and rear of the head. Hair fall was associated with thinning of hair and flaky rashes over the scalp. Dermatology and rheumatology consults were done to find out the underlying cause of the symptoms. She underwent multiple skin biopsies that were inconclusive.

On detailed questioning regarding her OTCs medicine intake, she mentioned that she started taking vitamin supplement for her osteoporosis since last 3 years which was containing of strontium citrate. She wasn't on any other medications apart from vitamin supplement. She stopped taking supplement containing Strontium and after stopping the rash initially got worse however after one week of stoppage the rashes began to subside and itching decreased without any other interventions.

Routine investigations were performed which tuned out to be inconclusive and DEXA scan revealed diffuse osteoporosis.

Based on history of long term use of vitamin supplements containing strontium, laboratory investigation for Strontium levels were ordered and it turned out to be elevated 124.2 ng/ml (Reference range of 8.3-34.3). Patient's symptoms and the supporting lab investigation, a diagnosis of strontium toxicity was made and advised for not taking any supplements and symptomatic treatment of rash as per dermatology continued. On the follow-up visit post discontinuation of strontium around 6 months later, her clinical presentation of rash improved and her strontium level was 76.4 ng/ml. She advised continuing her treatment and regular follow-up.

DISCUSSION

Strontium is a naturally occurring alkaline metal. Strontium ranelate, a strontium salt has been used for management of osteoporosis specially for elderly and postmenopausal women with a decreased bone mineral density.[6,7] Its mechanism of action in promoting bone growth involves reducing bone resorption and increasing bone formation. Strontium ranelate works primarily by activating the calcium-sensing receptor (CaSR) in bone. Similar to calcium, activation of CaSR induces differentiation, survival, and replication of primary osteoblasts. It also promotes apoptosis of osteoclasts through the same signaling pathway as calcium via CaSR.[8-12]

In the SOTI trial, three years of treatment with strontium ranelate led to a 41% reduction in vertebral fracture risk (relative risk [RR]=0.59; 95% CI: 0.48-0.73; $p<0.001$), while in the TROPOS study, there was a 16% reduction in nonvertebral fractures in postmenopausal women. Compared to other osteoporosis therapies, studies have shown that patients treated with strontium ranelate exhibit significant increases in bone mineral density. The agent's anti-fracture efficacy in the spine is not dependent on the patient's age, baseline BMD values, or the concentration of bone metabolism markers.[13,14]

The recommended oral dose for its anabolic effect is 2 gm once daily. However, this usual dosing has raised many concerns regarding adverse reactions. Reported side effects range from mild symptoms such as nausea and vomiting to severe hypersensitivity reactions, including Stevens-Johnson syndrome and DRESS. Cardiovascular risks and cutaneous reactions are also well documented, with cutaneous effects occurring in approximately 26% of patients on long-term strontium therapy, despite strict monitoring.[5-7]

In our patient, long-term use of a strontium-containing supplement led to cutaneous manifestations such as dermatitis and eczema, which were presumed to be due to elevated strontium levels-124.2 ng/ml (reference range: 8.3-34.3). After discontinuing the supplement, her symptoms resolved without any specific treatment for strontium toxicity. Although a skin biopsy was performed, it was inconclusive. However, there are reported cases where strontium has been associated with granulomatous dermatitis and even systemic granulomatous inflammation associated with DRESS.[15,16] Therefore, both granulomatous and non-granulomatous forms of dermatitis should be considered when managing patients with suspected strontium toxicity.

CONCLUSION

In conclusion, this case represents a rare and possibly novel presentation of cutaneous strontium toxicity secondary to prolonged intake of an OTC supplement containing strontium citrate. Unlike previously reported

cases involving prescription strontium ranelate, this patient developed significant dermatologic symptoms-including diffuse dermatitis and pruritus-linked to an unregulated OTC supplement. The resolution of symptoms following discontinuation, along with elevated serum strontium levels, strongly supports the diagnosis. In patients with chronic, unexplained skin manifestations and a history of osteoporosis, clinicians should consider strontium toxicity in the differential diagnosis-particularly when OTC supplement use is identified. This case underscores the clinical importance of taking a detailed supplement history and raises awareness about the potential systemic effects of non-prescription strontium. Further reporting of such cases is needed to better characterize the spectrum of strontium-induced toxicity and guide safer use of bone health supplements.

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REFERENCES

1. NIH Consensus Development Panel on Osteoporosis Prevention, Diagnosis, and Therapy. Osteoporosis Prevention, Diagnosis, and Therapy. JAMA. 2001;285(6):785-95.
2. Marie PJ. Strontium ranelate: a novel mode of action optimizing bone formation and resorption. Osteoporosis Int. 2005;16(1):S7-10.
3. O'Donnell S, Cranney A, Wells G, Adachi J, Reginster J. Strontium ranelate for preventing and treating postmenopausal osteoporosis. in Cochrane Database of Systematic Reviews (ed. O'Donnell, S.) (John Wiley and Sons, Ltd, Chichester, UK. 2006.
4. Reginster JY, Seeman E, De Vernejoul MC, Adami S, Compston J, Phenekos C, et al. Strontium Ranelate Reduces the Risk of Nonvertebral Fractures in Postmenopausal Women with Osteoporosis: Treatment of Peripheral Osteoporosis (TROPOS) Study. J Clin Endocrinol Metab. 2005;90(5):2816-22.
5. Deeks ED, Dhillon S. Strontium Ranelate. Drugs. 2010;70:733-59.
6. Jonville-Bera AP, Autret-Leca E. Ranélate de strontium (Protelos®): effets indésirables rapportés en France. Presse Med. 2011;40:e453-62.
7. di Meo N, Gubertini N, Crocè L, Tiribelli C, Trevisan G. DRESS syndrome with autoimmune hepatitis from strontium ranelate. Cutis. 2016;97:E22-6.
8. Brennan T, Rybchyn MS, Green W, Atwa S, Conigrave AD, Mason RS. Osteoblasts play key roles in the mechanisms of action of strontium ranelate. Br J Pharmacol. 2009;157(7):1291-300.
9. Coulombe J, Faure H, Robin B, Ruat M. *In vitro* effects of strontium ranelate on the extracellular calcium-sensing receptor. Biochem Biophys Res Commun. 2004;323(4):1184-90.
10. Chattopadhyay N, Quinn SJ, Kifor O, Ye C, Brown EM. The calcium-sensing receptor (CaR) is involved in strontium ranelate-induced osteoblast proliferation. Biochem Pharmacol. 2007;74(3):438-47.
11. Zhu LL, Samir Z, Yuanzhen P, Hang Z, Moonga BS, Blesius A, et al. Induction of a program gene expression during osteoblast differentiation with strontium ranelate. Biochem Biophys Res Commun. 2007;355(2):307-11.
12. Hurtel-Lemaire AS, Mentaverri R, Caudrillier A, Cournarie F, Wattel A, Kamel S, et al. The Calcium-sensing Receptor Is Involved in Strontium Ranelate-induced Osteoclast Apoptosis. J Biological Chem. 2009;284(1):575-84.
13. Edvinsson L, Ikomi-Kumm J, Monti M. Effects of calcium entry blockers on human platelet metabolism measured by microcalorimetry. Hum Toxicol. 1989;8:131-3.
14. Przedlacki J. Strontium ranelate in post-menopausal osteoporosis. Endokrynol Pol. 2011;62(2):23-31.
15. Kolitz E, McKesey J, Kwan E, Gill JG, Mauskar M. Strontium citrate associated drug reaction with eosinophilia and systemic symptoms syndrome with granulomatous dermatitis. JAAD Case Rep. 2021;10:85-8.
16. Fernando SL, Henderson CJ, O'Connor KS. Drug-Induced Hypersensitivity Syndrome with Superficial Granulomatous Dermatitis-A Novel Finding. Am J Dermatopathol. 2009;31(6):611-13.

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