

what's your diagnosis?

A 56-year-old woman with starry radiopacities

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Ann Saudi Med 2008; 28(6): 469

A 56-year-old Chinese woman with end-stage renal disease (ESRD) on continuous ambulatory peritoneal dialysis for 3 years suffered from progressive bilateral hip pain for months due to tumoral calcinosis (periarticular soft tissue calcification). She received lanthanum carbonate 1 tablet three times daily (total 2250 mg) as a non-calcium phosphate binder for hyperphosphatemia-associated tumoral calcinosis (serum phosphate concentration 9.3 mg/dL) for 6 months. To evaluate whether

the tumoral calcinosis was reduced or not, she received an x-ray examination which showed starry radiopacities scattered all over the abdomen (Figure 1).

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Figure 1. Abdominal roentgenogram shows widespread radiopaque spots in the lumen of gastro-intestinal tract and tumoral calcinosis over bilateral hip regions.

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Diagnosis: Benign bowel distribution of lanthanum carbonate

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Hyperphosphatemia in uremic patients is associated with metastatic calcification such as tumoral calcinosis and vascular calcification, and an increased cardiovascular mortality and morbidity.¹ To avoid hyperphosphatemia-related complications, the use of oral phosphate-binding agents is universal to reduce phosphate absorption in the gastrointestinal tract. "Old generation" phosphate binders with aluminum or calcium-based agents tend to cause

neurological toxicity and exacerbation of calcium overloading and soft tissue or cardiovascular calcification, respectively.² The "new generation" of aluminum or calcium-free phosphate binders has been shown to effectively control serum phosphate concentration with the attenuation of cardiovascular and soft tissue calcification.

Lanthanum carbonate ($\text{La}_2(\text{CO}_3)_3$), is a novel calcium- and aluminum-free phosphate binder for the



Figure 1. Radiopaque lanthanum carbonate tablets milled in the gastrointestinal distribution. Starry opacities also seen.

treatment of hyperphosphatemia in ESRD patients. The element, lanthanum (La, atomic number 57, atomic weight 138.9) is a rare-earth natural metal belonging to group 3B of the periodic table and causes radiopacities in the roentgenogram, as does barium (atomic number 56) (Figure 1). The half-life of lanthanum elimination from plasma is 53 hours though the plasma level is extremely low and elimination half-life from bone is 2.0 to 3.6 years.³ The affinity of lanthanum compound for phosphate is >97% and is more potent than calcium or magnesium, and similar to aluminum.⁴ Lanthanum binds phosphate optimally at pH 3~5 and retains binding activity at pH 1~7.⁵ It is virtually non-absorbed (0.00005%) and chelates dietary phosphate

into insoluble lanthanum phosphate by ionized form. Lanthanum phosphate and carbonate in the gut may form numerous radiopaque spots on the abdominal x-ray, which is not reported with other phosphate binders.^{6,7}

These unexpected starry opacities disappear completely after the withdrawal of lanthanum carbonate. The patient continued lanthanum carbonate treatment because of no abdominal symptoms and improved pain. Due to this radiopaque feature, one can evaluate the compliance to this drug. Given the increasing usage of lanthanum carbonate in patients with ESRD, every physician must understand this typical benign radiopaque finding to avoid unnecessary examination and inappropriate management.

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