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**Search details**

Lanthanium and its gastrointestinal effects, in particular deposition in the lamina propria / macrophages in the gut.

**Resources searched**

NICE Evidence; TRIP Database; Cochrane Library; EMBASE; MEDLINE; Google Scholar

**Database search terms:** lanthanium; lanthanum; LANTHANUM; fosnerol; “lamina propria”; GASTRIC MUCOSA; INTESTINAL MUCOSA; macrophage*; gut; intestin*; stomach; bowel*; colon; colorectal; duodenum; jejunum; ileum; MACROPHAGES; exp INTESTINES; exp LOWER GASTROINTESTINAL TRACT; exp UPPER GASTROINTESTINAL TRACT; exp COLON

**Evidence / Google Scholar search string(s):** lanthanium (gastro OR "lamina propria" OR macrophages) / lanthanium / lanthanum (stomach OR gut OR bowel OR intestines OR intestinal OR colon OR jejenum OR duodenum OR ileum OR gastrointestinal OR gastric OR "lamina propria" OR macrophages) / lanthanium ("lamina propria" OR macrophages)

**Summary**

There is some research on the effects of lanthanium particularly in terms of the gastrointestinal system. However there is limited research on its effect on the lamina propria.
1. Peculiar histiocytic lesions with massive lanthanum deposition in dialysis patients treated with lanthanum carbonate.

**Author(s)** Haratake, Joji, Yasunaga, Chikao, Ootani, Akifumi, Shimajiri, Shohei, Matsuyama, Atsuji, Hisaoka, Masanori

**Citation:** The American journal of surgical pathology, Jun 2015, vol. 39, no. 6, p. 767-771 (June 2015)

**Publication Date:** June 2015

**Abstract:** Pathologic lesions caused by lanthanum carbonate (LC), a recently developed phosphate-binding agent, have not been recorded. A peculiar gastroduodenal histiocytic lesion associated with a mucosal lanthanum overload was reported. Our routine gastrointestinal biopsy series included 6 cases with heavy lanthanum burden in the gastroduodenal mucosa. In addition to routine histopathologic examinations, a series of immunohistochemical analysis and electron microscopic examinations associated with x-ray diffraction and elemental analysis were performed. Six cases, 3 of male and 3 of female individuals with ages from 59 to 69 years, were all patients of end-stage renal diseases managed under dialysis and treated with LC for >21 months. Endoscopic examinations demonstrated gastric erosions in 3, gastric polyps in 2, and duodenal ulcer in 1. In the mucosal layer, there were numerous non-Langerhans cell histiocytes, stained with CD68 but not S100 protein, engulfing a large amount of mineral-like materials. An electron microscopic and elemental analysis revealed a similar distribution of lanthanum and phosphorus in the histiocytes. Long-standing LC administration can cause massive mucosal accumulation of lanthanum in the tissue histiocytes associated with several forms of gastroduodenal lesions. A long-standing outcome is not clear at present; hence, careful follow-up studies of these patients may be needed.

**Source:** Medline

2. Extensive lanthanum deposition in the gastric mucosa: the first histopathological report.

**Author(s)** Makino, Mutsuki, Kawaguchi, Kenji, Shimojo, Hisashi, Nakamura, Hironori, Nagasawa, Masaki, Kodama, Ryo

**Citation:** Pathology international, Jan 2015, vol. 65, no. 1, p. 33-37 (January 2015)

**Publication Date:** January 2015

**Abstract:** Lanthanum carbonate is one of the new phosphate binders used for the treatment of hyperphosphatemia in patients with chronic kidney disease. It is poorly absorbed from the gastrointestinal tract, forms insoluble complexes within the lumen, and prevents the absorption of dietary phosphate. A 63-year-old female with a 7-year history of peritoneal dialysis, who was treated with lanthanum carbonate for four years, underwent endoscopic submucosal dissection for intramucosal gastric cancer. Resected specimens showed massive accumulation of macrophages containing fine, granular, brown material in the lamina propria. This was confirmed as lanthanum deposition by scanning electron microscopy with energy dispersive x-ray spectroscopy. Although lanthanum may be poorly absorbed, increased tissue accumulation of lanthanum, particularly in the liver and bone,
has been reported in animals with chronic kidney disease. This report indicates enhanced gastrointestinal absorption of lanthanum in some patients or conditions, although its clinical significance awaits further studies. © 2014 Japanese Society of Pathology and Wiley Publishing Asia Pty Ltd.

Source: Medline

3. Biokinetic data and models for occupational intake of lanthanoids

Author(s) Leggett R., Ansoborlo E., Bailey M., Gregoratto D., Paquet F., Taylor D.

Citation: International Journal of Radiation Biology, November 2014, vol./is. 90/11(996-1010), 0955-3002:1362-3095 (01 Nov 2014)

Publication Date: November 2014

Abstract: Purpose: This paper reviews data related to the behavior of the lanthanoid elements (lanthanum through lutetium, atomic numbers 57-71) in the human body and proposes biokinetic models for internally deposited radio-lanthanoids in workers. Materials and methods: Published data on the following topics are reviewed and analyzed: Physico-chemical properties of the lanthanoids as indicators of the potential behavior of these elements in body fluids; the concentrations of the stable lanthanoids in the environment and human body; and results of biokinetic studies of radio-lanthanoids in human subjects and laboratory animals. Respiratory and systemic biokinetic models and gastrointestinal absorption fractions are developed or selected in an effort to represent the typical behavior of lanthanoids in adult humans. Results and conclusions: Generic (element-independent) absorption rates from the respiratory and alimentary tracts to blood and systemic biokinetic models are proposed. The systemic models are largely generic but include some element-specific parameter values to reflect regular changes with ionic radius in certain aspects of the behavior of the lanthanoids, particularly fractional deposition in liver and bone and early removal in urine.

Source: EMBASE


Author(s) Locatelli, Francesco, Del Vecchio, Lucia, Violo, Leano, Pontoriero, Giuseppe

Citation: Expert opinion on drug safety, May 2014, vol. 13, no. 5, p. 551-561 (May 2014)

Publication Date: May 2014

Abstract: Hyperphosphatemia is common in the late stages of chronic kidney disease (CKD) and is associated with elevated parathormone levels, abnormal bone mineralization, extraosseous calcification and increased risk of cardiovascular events and death. Several classes of oral phosphate binders are available to help control phosphorus levels. Although effective at lowering serum phosphorus, they all have safety issues that need to be considered when selecting which one to use. This paper reviews the use of phosphate binders in patients with CKD on dialysis, with a focus on safety and tolerability. In addition to the more established agents, a new resin-based phosphate binder, colestilan, is discussed. Optimal phosphate control is still an unmet need in CKD. Nonetheless, we now have an extending range of phosphate binders available. Aluminium has potentially serious toxic risks. Calcium-based binders are still very useful but can lead to hypercalcemia and/or positive calcium balance and cardiovascular calcification. No long-term data are available for the new calcium acetate/magnesium combination product. Lanthanum is an effective phosphate binder, but there is insufficient evidence about possible long-term effects of tissue deposition. The resin-based binders, colestilan and sevelamer, appear to have profiles that would lead to less vascular calcification, and the main adverse events seen with these agents are gastrointestinal effects.

Source: Medline
5. An unusual abdominal film in a hemodialysis patient

Author(s) Kam J., Doraiswamy V., Palant C., Nathan R.

Citation: American Journal of Kidney Diseases, May 2014, vol./is. 63/5(A62), 0272-6386 (May 2014)

Publication Date: May 2014

Abstract: A 47-year-old man on hemodialysis for 3 years and on Coumadin for a hypercoagulable disorder presented with repeated episodes of gross hematuria. Urological workup included imaging of the abdomen which revealed an incidental finding of multiple rounded hyperdense structures accumulating in the intestinal tract (Figure 1, 2). The patient denied any gastrointestinal complaints, intake of any foreign bodies, history of suicidal ideation or prior abdominal surgery. On review of his medications, lanthanum carbonate (Fosrenol 1000 mg tablet chew) 1000 mg twice daily was used as a phosphate binder to control his hyperphosphatemia. The patient's presentation was attributed to a reported swallowing of his lanthanum tablet as opposed to chewing them. During hospitalization, the patient did not show any signs of bowel obstruction and was consequently discharged with instructions to properly chew his medication before ingestion. Two weeks later, repeated abdominal x-rays and CT scans showed no further appearance of any hyperdense structures in the intestinal tract. Lanthanum is a third-generation, non-calcium, non-aluminium-based phosphate binder used in the treatment of hyperphosphatemia in patients with end-stage renal disease who require dialysis (1,2). Precipitation of insoluble complexes takes place in the intestinal lumen. With an increase in the usage of lanthanum carbonate, many patients on hemodialysis and peritoneal dialysis will have the compound appear on radiography. Due to the very low degree of absorption by the gastrointestinal tract (<0.0013%), an abdominal radiography will show radiopaque images appearing as opacifications of lanthanum carbonate in the gastrointestinal tract (6). We report a case where hyperdense structures were incidently found on abdominal imaging after improper ingestion of lanthanum carbonate. In addition to radiologist education regarding the radiopaque effects of lanthanum carbonate, patient and nursing education regarding the correct administration of the medication needs to be encouraged in order to prevent any diagnostic confusion on abdominal radiography.

Source: EMBASE

6. Diffuse colon opacifications due to lanthanum carbonate

Author(s) Jimeno-Almazan A., Vilaplana-Garcia R., Contreras-Padilla M.

Citation: Revista espanola de enfermedades digestivas : organo oficial de la Sociedad Espanola de Patologia Digestiva, February 2014, vol./is. 106/2(133-134), 1130-0108 (01 Feb 2014)

Publication Date: February 2014

Source: EMBASE

Available in fulltext from Revista Espanola de Enfermedades Digestivas at Directory of Open Access Journals

7. Bioequivalence for drug products acting locally within gastrointestinal tract

Author(s) Jiang X., Yang Y., Stier E.

Citation: AAPS Advances in the Pharmaceutical Sciences Series, 2014, vol./is. 13/(297-334), 2210-7371;2210-738X (2014)

Publication Date: 2014

Source: EMBASE

Abstract: Serum phosphorus control is critical for chronic kidney disease (CKD) 5D patients. Currently, clinical profile for an oral phosphorus binder in the mainland Chinese population is not available. To establish the efficacy, safety, and tolerability of lanthanum carbonate in CKD 5D patients. Multicenter, randomized, double blind, placebo-controlled study. A central randomization center used computer generated tables to allocate treatments. Twelve tertiary teaching hospitals and medical university affiliated hospitals in mainland China. Overall, 258 hemodialysis or continuous ambulatory peritoneal dialysis (CAPD) adult patients were enrolled. After a 0-3-week washout period and a 4-week lanthanum carbonate dose-titration period, 230 patients were randomized 1:1 to receive lanthanum carbonate (1500 mg-3000 mg) or placebo for a further 4-week maintenance phase. Efficacy and safety of lanthanum carbonate to achieve and maintain target serum phosphorus concentrations were assessed. In the titration phase, serum phosphorus concentrations of all patients decreased significantly. About three-fifths achieved target levels without significantly disturbing serum calcium levels. At the end of the maintenance period, the mean difference in serum phosphorus was significantly different between the lanthanum carbonate and placebo-treated groups (0.63±0.62 mmol/L vs. 0.15±0.52 mmol/L, P < 0.001). The drug-related adverse effects were mild and mostly gastrointestinal in nature. Lanthanum carbonate is an efficacious and well-tolerated oral phosphate binder with a mild AE profile in hemodialysis and CAPD patients. This agent may provide an alternative for the treatment of hyperphosphatemia in CKD 5D patients in mainland China.
from 6.31 +/- 1.13 to 4.74 +/- 0.78 mg/dl, respectively. The calcium x phosphate product level was reduced in the lanthanum carbonate and calcium carbonate groups from 60.23 +/- 10.23 to 46.97 +/- 16.42 and from 57.92 +/- 11.05 to 44.50 +/- 7.74 mg<sup>2</sup>/dl<sup>2</sup>, respectively. The serum parathyroid hormone (PTH) level in the lanthanum carbonate group did not change significantly compared to baseline during the study, but in the calcium carbonate group, the serum PTH level decreased significantly. Gastrointestinal complications were the main adverse effects of lanthanum carbonate and 11 out of 35 patients dropped out of the study due to this complication.

Conclusions: Lanthanum carbonate was as effective as calcium carbonate in reducing serum phosphate level, and serum PTH level tended to be steadier in the lanthanum carbonate group compared to the calcium carbonate group. Though the difference was not significant, lanthanum carbonate tended not to elevate serum calcium level in CAPD patients compared to calcium carbonate. The high incidence of gastrointestinal adverse effect in the lanthanum carbonate group will need further evaluation. © 2013 Dustri-Verlag Dr. K. Feistle.

Source: EMBASE

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10. Lanthanum, constipation, baffling X-rays and a perforated colonic diverticulum

Author(s) Korzets A., Tsitman I., Lev N., Zingerman B., Herman M., Ben Dor N., Gafter U., Ori Y.

Citation: CKJ: Clinical Kidney Journal, August 2012, vol./is. 5/4(331-333), 2048-8505;2048-8513 (August 2012)

Publication Date: August 2012

Abstract: Lanthanum carbonate (LC) is used as a phosphate binder in dialysed patients. Abdominal pain and constipation are known side effects of its use. Furthermore, in radiological studies, LC tablets are seen as intense radio-opaque deposits within the entire gastrointestinal tracts which can lead to diagnostic misinterpretations. An elderly patient on peritoneal dialysis and taking LC presented with peritonitis, secondary to a perforated colonic diverticulum. The possible association between the use of LC, worsening constipation and complications arising from colonic diverticular disease, are discussed. © 2012 The Author.

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11. Assessment of pharmacodynamic equivalence and tolerability of lanthanum carbonate oral powder and tablet formulations: a single-center, randomized, open-label, 2-period crossover study in healthy subjects.

Author(s) Pierce, David, Hossack, Stuart, Robinson, Antoine, Zhang, Pinggao, Martin, Patrick

Citation: Clinical therapeutics, Jun 2012, vol. 34, no. 6, p. 1290 (June 2012)

Publication Date: June 2012

Abstract: Phosphate binders are commonly used in tablet form to help patients with hyperphosphatemia limit their absorption of dietary phosphate. These patients frequently have a heavy tablet burden so alternative formulations provide choice and may support adherence. Lanthanum carbonate (LC) is a phosphate binder currently available as a chewable tablet. This study was conducted to support an application for marketing authorization for the oral powder formulation within the European Union. The goal of this study was to examine the pharmacodynamics, pharmacokinetics, and tolerability of an oral
powder formulation of LC compared with the reference chewable tablet formulation. A Phase I, single-center, randomized, open-label, 2-period, crossover study to assess pharmacodynamic equivalence of the 2 formulations was conducted in healthy adults aged 18 to 55 years receiving a diet standardized for phosphate content. Individuals were randomized to receive a different formulation in each period, taking 10 doses of 1000-mg LC at 3000 mg/d per period with an intervening washout of ≥14 days. The primary pharmacodynamic variable was mean daily excretion of urinary phosphorus over 3 days while receiving LC. Pharmacodynamic equivalence was confirmed if the 90% CI for the difference between formulations in least squares (LS) mean excreted urinary phosphorus was within ±20% of the LS mean value for the tablet formulation. Secondary end points included determination of pharmacokinetic parameters and assessment of tolerability by recording of adverse events. In total, 72 individuals entered the study. They were predominantly men (72.2%), with a mean (SD) age of 31.4 (8.26) years and a BMI of 25.8 (2.45) kg/m². The LS mean (SE) excreted urinary phosphorus was 16.8 (0.48) mmol/d during administration of LC tablets (±20% = ±3.35 mmol/d). The corresponding value during administration of LC oral powder was 15.2 (0.48) mmol/d; 90% CI for the difference between formulations was -2.38 to -0.82 mmol/d, confirming pharmacodynamic equivalence. The most common adverse events were gastrointestinal, and no serious adverse events were recorded. In this multiple-dose study, the oral powder and tablet formulations of LC were well tolerated and met the regulatory criteria for pharmacodynamic equivalence in these healthy volunteers. ClinicalTrials.gov identifier: NCT00880750.

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Source: Medline
Available in fulltext from Clinical Therapeutics at ProQuest

12. Lanthanum chloride bidirectionally influences calcification in bovine vascular smooth muscle cells.
Author(s) Zhao, Wen-Hua, Gou, Bao-Di, Zhang, Tian-Lan, Wang, Kui
Citation: Journal of cellular biochemistry, May 2012, vol. 113, no. 5, p. 1776-1786 (May 2012)
Publication Date: May 2012
Abstract: Vascular calcification (VC) is frequent prevalence in patients with chronic kidney disease (CKD) and atherosclerosis. Lanthanum carbonate is used as an orally administered phosphate-binding agent to reduce the gastrointestinal absorption of phosphate and ameliorate VC in advanced CKD. In this study, we used bovine vascular smooth muscle cells as a model VC in vitro and studied the effects of lanthanum chloride on calcium deposition. Exposure of cells to LaCl(3) at the concentration of 0.1 μM suppressed the β-glycerophosphate-induced alkaline phosphatase activity and calcium deposition. Furthermore, LaCl(3) upregulated the β-glycerophosphate-suppressed expression of calcium-sensing receptor. In contrast to the inhibitory effect of LaCl(3) on calcium deposition, higher level lanthanum (50 μM) was found to promote immediately precipitation of calcium phosphate in cell culture medium. At this concentration, LaCl(3) was found to induce cell apoptosis which involves caspases-9 and -3. These data indicate that the promotory effect of LaCl(3) on calcium deposition is likely mediated by induction of apoptosis. Our in vitro findings do suggest that, in the context of raised lanthanum, greater attention should be paid to potential toxic effects associated to the use of lanthanide-based drugs. Copyright © 2011 Wiley Periodicals, Inc.

Source: Medline

13. Lower serum phosphorus can be attained by increasing the dose of lanthanum carbonate
Author(s) Wilson R., Copley J.B., Poole L.
Citation: Nephrology Dialysis Transplantation, May 2012, vol./is. 27/(ii496), 0931-0509 (May 2012)
Abstract: Introduction and Aims: Patients with chronic kidney disease experiencing hyperphosphataemia should be treated with a dose of phosphate binder that is titrated to achieve recommended target levels of serum phosphorus. However controlling serum phosphorus to these levels is challenging. The objective of this analysis was to investigate whether patients had better control of serum phosphorus on a dose of 3000 mg/day of lanthanum carbonate compared with lower doses. Methods: Data were analysed, post hoc, from a European, randomized, controlled study of haemodialysis patients receiving lanthanum carbonate or calcium carbonate. Patients entered a 5-week dose titration period during which doses were adjusted to achieve serum phosphorus control (≤ 5.6 mg/dL). After the titration period, patients with controlled serum phosphorus entered a 20-week maintenance period. Patients randomized to lanthanum carbonate, who entered the maintenance period on a dose of < 3000 mg/day lanthanum carbonate, and subsequently increased their dose to 3000 mg/day, were analysed to evaluate whether increasing the dose had any positive effect on serum phosphorus levels. New or worsening adverse events reported by these patients during the maintenance period were also examined.

Results: During the maintenance period, 35 patients who entered on 1500 or 2250 mg/day lanthanum carbonate had their dose increased to 3000 mg/day. On average these patients had serum phosphorus levels approximately 0.6 mg/dL lower on 3000 mg/day of lanthanum carbonate compared with doses ≤ 2250 mg/day. Sixty-six percent of patients (23/35) had better serum phosphorus control on 3000 mg/day than on lower doses. Eighty-six percent (30/35) of patients experienced AEs on any dose of lanthanum carbonate, and new or worsening adverse events (AEs) were experienced by 74% (26/35) whilst on or following a dose of 3000mg. The majority were mild (12) or moderate (13). Consistent with previous studies evaluating lanthanum carbonate, the most common AEs observed were gastrointestinal in nature: 17 (49%) patients experienced gastrointestinal AEs of mild (9) or moderate (8) intensity. Conclusions: Serum phosphorus control may be improved by increasing the dose of phosphate binders. This exploratory analysis suggests that increasing lanthanum carbonate to 3000 mg/day may help to reduce serum phosphorus levels and may improve the percentage of patients achieving target levels. In addition the new or worsening adverse events observed were similar in nature and frequency to previous studies. Lanthanum carbonate has been shown to be well tolerated when given at doses up to 4500 mg/day in patients with chronic kidney disease receiving haemodialysis.

Source: EMBASE
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Available in fulltext from Nephrology Dialysis Transplantation at Highwire Press

14. Mucosal barrier defects in gastric intestinal metaplasia: In vivo evaluation by confocal endomicroscopy
Author(s) Ji R., Zuo X.-L., Yu T., Gu X.-M., Li Z., Zhou C.-J., Li Y.-Q.
Citation: Gastrointestinal Endoscopy, May 2012, vol./is. 75/5(980-987), 0016-5107;1097-6779 (May 2012)
Publication Date: May 2012
Abstract: Background: Helicobacter pylori infection and intestinal metaplasia (IM) are associated with gastric cancer. An impaired gastric mucosal barrier could be involved in this carcinogenesis. Objective: To evaluate laser confocal laser endomicroscopy (CLE) for in vivo functional imaging of mucosal barrier defects in patients with IM. Design: Prospective, controlled study. Setting: A tertiary-care academic center. Patients: This study involved patients with IM of the gastric mucosa who underwent CLE for surveillance. Interventions: Specific IM mucosa and non-IM mucosa in patients were identified by CLE, and targeted biopsy samples were taken for histopathology and electron microscopy. Main Outcome Measurements: Post-CLE assessment of paracellular fluorescein leakage was devised and validated by electron microscopy. We also evaluated the effect of H pylori eradication on the mucosal barrier. Results: Forty-two patients were included. Of non-IM samples, the paracellular permeability was significantly increased in H pylori-positive samples compared with H pylori-negative controls (54 +/- 31% vs 3 +/- 6%, P <.05). Of IM
samples, the permeability was significantly increased in both H pylori-negative and H pylori-positive samples (67 +/- 34% and 72 +/- 28% vs 3 +/- 6%, both P <.05). The results of post-CLE assessment correlated well with the electron microscopy findings (R<sup>2</sup> = 0.834, P <.0001). After the eradication of H pylori, the paracellular barrier dysfunction of non-IM mucosa was significantly improved as shown by electron microscopy and CLE (both P <.001). However, there was no significant change in IM mucosa. Limitations: Single-center study. Conclusions: CLE allows functional imaging of mucosal barrier defects. Gastric IM is associated with an impaired paracellular barrier irrespective of H pylori eradication. © 2012 American Society for Gastrointestinal Endoscopy.

Source: EMBASE

15. Intestinal pseudo-obstruction secondary to persistent constipation due to lanthanum carbonate

Author(s) Camarero-Temino V., Mercado-Valdivia V., Hijazi-Prieto B., Aibaig-Luquin P.

Citation: Nefrologia : publicacion oficial de la Sociedad Espanola Nefrologia, 2012, vol./is. 32/1(129), 1989-2284 (2012)

Publication Date: 2012

Source: EMBASE

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16. Effectiveness of lanthanum carbonate treatment used in combination with other phosphate binders in peritoneal dialysis patients.

Author(s) Yamada, Shunsuke, Yoshida, Hisako, Taniguchi, Masatomo, Tanaka, Shigeru, Eriguchi, Masahiro, Nakano, Toshiaki, Tsuruya, Kazuhioko, Kitazono, Takanari

Citation: Internal medicine (Tokyo, Japan), Jan 2012, vol. 51, no. 16, p. 2097-2104 (2012)

Publication Date: January 2012

Abstract: Phosphate binders are used in the treatment of hyperphosphatemia in peritoneal dialysis (PD) patients. An ideal phosphate binder for long-term use must be effective with little or no side effects. We evaluated the long-term efficacy and side effects of lanthanum carbonate (LaC) used in combination with other phosphate binders in PD patients. The subjects of this retrospective study were 30 PD patients who received LaC at Kyushu University. The effect of LaC on various biochemical parameters (serum phosphate, calcium and parathyroid hormone), daily dose of other phosphate binders, gastrointestinal side effects, and nutritional status were determined during the 24-week treatment. We also evaluated the rate of achievement of the Japanese Society of Dialysis Treatment guidelines for secondary hyperparathyroidism and used multivariate analysis to determine the factors associated with the efficacy of LaC. LaC (960 ± 412 mg/day) reduced serum phosphate from 6.2 to 5.3 mg/dL. The rate of achievement of the guideline target improved after 24 weeks of LaC treatment. The dose of other phosphate binders and dialysis volume remained unchanged during the treatment. Although 53% of patients experienced at least one gastrointestinal side effect, LaC treatment did not affect the nutritional status, and none of the patients discontinued LaC. Multivariate analysis identified low stature, old age and high baseline total creatinine clearance as significant factors that determine the effectiveness of LaC in PD patients. Low dose LaC treatment used in combination with other phosphate binders improved serum phosphate control with tolerable gastrointestinal symptoms in PD patients.

Source: Medline

17. Efficacy and safety of lanthanum carbonate (fosrenol) for hyperphospataemia in
patients on dialysis - Results of a post-marketing surveillance study

Author(s): Dellanna F., Reichel H., Seibt F.

Citation: NDT Plus, June 2010, vol./is. 3/(iii228), 1753-0784 (June 2010)

Publication Date: June 2010

Abstract: Introduction and Aims: As a consequence of CKD-Mineral and Bone Disorder (CKD-MBD) more than 80% of patients on dialysis suffer from osteopathy and cardiovascular calcifications. Disorders of mineral metabolism, in particular an elevated serum phosphate [SP], and increased serum calcium [SC] are major risk factors for these diseases. Both are associated with an increased mortality. Lanthanum carbonate [LC], a non-calcium, non resin, and non aluminium phosphate binder, has been licensed for the treatment of hyperphosphataemia in Germany since the end of 2006. In this post-marketing surveillance study, efficacy and tolerability of LC were examined during daily clinical practice. Methods: Patients on dialysis received LC to reduce their elevated SP. Serum phosphorous and calcium levels were measured. Previous therapy with phosphate binder, co-medication and adverse events were documented. Results: 698 patients on dialysis from 116 German dialysis centres were included. 89.0% of the patients had received other phosphate binders previously. Lack of efficacy of the previous therapy was the reason for change in 78.5% of these patients. Under the previous therapy, mean SP had been 2.33 (SD 0.59) mmol/l. Under LC therapy, a significant reduction of mean SP to 2.04 (SD 0.59) mmol/l was reached within 2 weeks. After 6 months the mean SP decreased to 1.93 (SD 0.57) mmol/l (p<0.0001). The average daily dose of LC reached 2509 (SD 936) mg/day, distributed over 3.22 (SD 1.05) chewable tablets. Patients had taken 6.1 tablets (SD 3.4) per day under the respective previous therapy. During the observation period, 113 adverse events were reported in 53 patients (7.6% of all subjects). Fourteen patients experienced 23 drug-related events, mainly of gastrointestinal origin (n=20), as well as restlessness, malaise and pruritus (each n=1). Conclusions: In this study, a significant reduction of SP was observed after change of therapy to LC, a non-calcium, non-resin phosphate binder, devoid of aluminium. As previously demonstrated in clinical trials, the efficacy and tolerability of LC was confirmed in this observational study.

Source: EMBASE

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Available in fulltext from Clinical Kidney Journal at Oxford University Press

18. One year efficacy and safety of lanthanum carbonate for hyperphosphatemia in Japanese chronic kidney disease patients undergoing hemodialysis

Author(s): Shigematsu T.

Citation: Therapeutic Apheresis and Dialysis, February 2010, vol./is. 14/1(12-19), 1744-9979;1744-9987 (February 2010)

Publication Date: February 2010

Abstract: Lanthanum carbonate is a non-calcium-based phosphate binder for hyperphosphatemia in patients with chronic kidney disease (CKD). The efficacy and safety of lanthanum carbonate (LaC) on hyperphosphatemia in patients has been well documented in clinical trials in Western countries and recent relatively short-term clinical trials in Japan. Evidence supporting its safety and efficacy in Japanese patients for longer-term treatment is now desired for clinical practice. A non-controlled, open-label, multicenter, one year study of LaC to assess safety and its effect on the levels of serum phosphate, serum calcium and parathyroid hormone was performed with Japanese dialysis patients. Lanthanum carbonate was administered to patients at variable doses for a period of 46-52 weeks. Evaluation of the safety and efficacy of LaC in reducing serum phosphate was performed, in addition to extensive and systematic monitoring of the laboratory parameters related to bone turnover and cardiac health. A significant reduction in the serum phosphate level was demonstrated throughout the treatment period (P < 0.05), without any increase in the frequency or severity of drug-related adverse events such as vomiting, nausea, and stomach discomfort. There was no clinically relevant change in vital signs, or electrocardiograms for a period. The profiles for parathyroid hormone, bone alkaline phosphates, and osteocalcin were stable in the patients concomitantly treated with vitamin
D. This study provides further evidence that the administration of LaC over a period of one year is safe and effective for the reduction of serum phosphate levels in CKD patients undergoing hemodialysis. © 2009 International Society for Apheresis.

**Source:** EMBASE

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19. Lanthanum carbonate: A review of its use in lowering serum phosphate in patients with end-stage renal disease

**Author(s)** Curran M.P., Robinson D.M.

**Citation:** Drugs, 2009, vol./is. 69/16(2329-2349), 0012-6667;1179-1950 (2009)

**Publication Date:** 2009

**Abstract:** Orally administered lanthanum carbonate (Fosrenol) dissociates in the acid environment of the upper gastrointestinal tract to release the cation lanthanum, which then binds dietary phosphate. Lanthanum carbonate was effective in reducing levels of serum phosphate and serum calcium × phosphate product and then maintaining these levels within target ranges for up to 6 years in adult patients with end-stage renal disease (ESRD) on haemodialysis or peritoneal dialysis. The reduction in serum phosphate levels with lanthanum carbonate was generally similar to that with calcium carbonate or sevelamer hydrochloride. This agent was generally well tolerated, with the most frequently reported adverse events being gastrointestinal in nature and occurring at a similar rate to that with calcium carbonate. However, lanthanum carbonate was associated with fewer episodes of hypercalcaemia than calcium carbonate. Overall, lanthanum carbonate is a valuable option for the reduction of serum phosphate levels in patients with ESRD on haemodialysis or peritoneal dialysis. © 2009 Adis Data Information BV. All rights reserved.

**Source:** EMBASE

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20. Lanthanum carbonate for hyperphosphatemia in patients with advanced CKD and patients receiving dialysis

**Author(s)** Szeki I., Hutchison A.

**Citation:** Expert Review of Endocrinology and Metabolism, 2009, vol./is. 4/4(307-316), 1744-6651 (2009)

**Publication Date:** 2009

**Abstract:** Reduced renal excretion of phosphate leads to hyperphosphatemia, which is prevalent in patients with end-stage renal disease, and is associated with increased morbidity and mortality. Dialysis alone is unable to adequately remove the ingested phosphate contained in food. It is therefore usually necessary to supplement food with drugs that reduce the intestinal absorption of dietary phosphate in order to control serum phosphate. Lanthanum carbonate is a recently introduced nonaluminum, noncalcium phosphate binder licensed for the management of serum phosphate in end-stage renal failure. It appears safe and effective, with data demonstrating no toxic effects in man after continuous exposure for up to 6 years. It is well tolerated and has a positive effect on bone histology in the context of renal osteodystrophy. Lanthanum carbonate’s high affinity for phosphate rapid binding, palatability, low pill burden and absence of evident toxicity compare favorably with what are considered to be the ideal characteristics of an oral phosphate binder. © 2009 Expert Reviews Ltd.

**Source:** EMBASE
21. Clinical pharmacokinetics of the phosphate binder lanthanum carbonate

Author(s) Damment S.J.P., Pennick M.

Citation: Clinical Pharmacokinetics, 2008, vol./is. 47/9 (553-563), 0312-5963:0312-5963 (2008)

Publication Date: 2008

Abstract: Lanthanum carbonate is considered to be the most potent of a new generation of noncalcium phosphate binders used to treat hyperphosphataemia in chronic kidney disease (CKD), a condition associated with progressive bone and cardiovascular pathology and a markedly elevated risk of death. Its phosphate-binding action involves ionic binding and precipitation of insoluble complexes within the lumen of the intestine, thereby preventing absorption of dietary phosphate. While pharmacokinetics have little relevance to the efficacy of lanthanum carbonate, they are of fundamental importance when it comes to evaluating safety. When administered as lanthanum carbonate, the oral bioavailability of lanthanum is low (~0.001%). The small absorbed fraction is excreted predominantly in bile, with less than 2% being eliminated by the kidneys. Predictably, therefore, plasma exposure and pharmacokinetics have been shown to be similar in healthy human volunteers and CKD stage 5 patients. With almost complete plasma protein binding, free lanthanum concentrations in patients at steady state are <3 pg/mL. These properties greatly reduce systemic exposure, tissue deposition and the potential for adverse effects. While lanthanum has a variety of calcium-like actions in vitro, there is little or no evidence that these occur in vivo. This paradox is explained by the very low concentrations of circulating free lanthanum ions, which are many orders of magnitude lower than reported effect concentrations in vitro. Safety pharmacology and toxicology evaluations have failed to reveal any significant calcium-like actions in vivo, despite inclusion of high intravenous doses in some cases. Lanthanum carbonate has a low propensity to cause systemic drug interactions due to its poor absorption. However, the higher concentrations present in the gastrointestinal tract can form chelates with some drugs, such as fluoroquinolones, and reduce their absorption. The improved understanding of the pharmacokinetics of lanthanum that has emerged in recent years has helped to explain why the myriad of calcium-like effects described in vitro for lanthanum have little if any relevance in vivo. The pharmacokinetic investigations of lanthanum carbonate formed an important part of the stringent premarketing safety assessment process and have been influential in reassuring both regulators and physicians that the agent can be used safely and effectively in this vulnerable dialysis population.

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Source: EMBASE

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22. Long-term efficacy and safety profile of lanthanum carbonate: results for up to 6 years of treatment.

Author(s) Hutchison, Alastair J, Barnett, M Edwina, Krause, Rolfdieter, Kwan, Jonathan T C, Siami, Ghodrat A, SPD405-309 Lanthanum Study Group


Publication Date: January 2008

Abstract: Lanthanum carbonate (LC, FOSRENOL) is an effective phosphate binder for which tolerability and a safety profile have been reported in haemodialysis patients. Patients from previous studies entered a 2-year extension, enabling assessment of efficacy and safety for up to 6 years of LC monotherapy. Patients from four previous trials entered this study. Ninety-three patients started the extension, with 22 entering a sixth year of LC treatment. Two-thirds of all patients received LC doses of 2,250 or 3,000 mg/day. Reductions in serum phosphate and calcium x phosphate product were maintained for up
to 6 years. There were no new or unexpected adverse events (AEs), and no increase in the incidence of events with increasing treatment exposure. Over the complete duration of therapy, treatment-related AEs occurred in 25.8% of patients and were primarily gastrointestinal in nature. No clinically relevant changes in liver function tests were observed and there was no evidence of adverse effects on the liver, bone or the central nervous system. LC monotherapy was effective and well tolerated for up to 6 years with no evidence of safety concerns or increased frequency of AEs. Copyright 2008 S. Karger AG, Basel.

Source: Medline
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23. Lanthanum carbonate as a first-line phosphate binder: The "Cons"

Author(s): Druke T.B.

Citation: Seminars in Dialysis, July 2007, vol./is. 20/4(329-332), 0894-0959;1525-139X (July/August 2007)

Publication Date: July 2007

Abstract: Controlling serum phosphorus levels in patients with renal failure is critical. The use of oral phosphate-binding agents is universal for patients with end-stage kidney disease to reduce phosphate absorption. The therapeutic goal is to reduce serum phosphorus levels without disturbing calcium homeostasis or promoting accumulation of potentially toxic elements from the medication. Aluminum hydroxide effectively reduces serum phosphorus, but has largely been abandoned as a first-line phosphate binder because of hazards associated with metal absorption and tissue accumulation. Traditional calcium-based phosphate binders tend to promote hypercalcemia and calcium overloading, and are linked to accelerated cardiovascular calcification. Interest in aluminum-free, calcium-free phosphate-binding agents continues to grow. Sevelamer hydrochloride, a metal-free, calcium-free hydrogel, is not absorbed, has been proven safe and efficacious in controlling serum phosphorus, and is associated with attenuated progression of cardiovascular calcification. Lanthanum carbonate is a newer aluminum-free, calcium-free phosphate-binding agent. Lanthanum is a rare-earth trace metal with industrial and agricultural applications. As a therapeutic, this metal-based binder appears effective in reducing serum phosphorus, yet concerns remain about lanthanum accumulation in tissues during long-term oral administration. Similar to the metal aluminum, lanthanum is absorbed in the intestine and accumulates in body tissues, especially in the liver, bone, muscle, kidney, and brain. Moreover, the rate of intestinal absorption of lanthanum is enhanced in chronic renal failure. Our experience with aluminum hydroxide suggests caution regarding the long-term use of another metal-based agent that displays enhanced absorption in the uremic state and progressive tissue accumulation. © Journal compilation 2007 Blackwell Publishing.

Source: EMBASE
Available in fulltext from Seminars in Dialysis at EBSCOhost
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24. Lanthanum. Hyperphosphataemia in dialysis patients: More potential problems than benefits

Author(s)

Citation: Prescrire International, April 2007, vol./is. 16/88(47-50), 1167-7422 (April 2007)
Abstract: * In dialysis patients with chronic renal failure, hyperphosphataemia can cause osteorenal dystrophy, leading to bone pain, fractures and excess cardiovascular mortality. In addition to a low-phosphorus diet and dialysis, phosphorus chelators are usually needed to control blood phosphorus levels. The first choice is calcium carbonate, and sevelamer is an alternative. * Lanthanum carbonate, a phosphorus chelator, is now also licensed for the treatment of hyperphosphataemia in dialysis patients with chronic renal failure. * In addition to three dose-finding placebo-controlled studies, clinical evaluation includes 2 comparative randomised unblinded trials: one 6-month trial versus calcium carbonate and a 2-year trial versus other phosphorus chelators. During these trials, lanthanum was no more effective than the comparators in terms of effects on the mortality rate, incidence of fractures, or blood phosphorus level. * During these trials, adverse events attributed to treatment were more frequent with lanthanum than with the other phosphorus chelators. The main problems were gastrointestinal disorders (nausea, vomiting, diarrhoea, constipation and abdominal pain), headaches, seizures, and encephalopathy. * The accumulation of lanthanum in the bones and brain is troubling. The known long-term adverse effects of aluminium, another trivalent cation with weak gastrointestinal absorption, suggest that caution is also required with lanthanum. * In practice, when a phosphorus chelator is needed to treat hyperphosphataemia in dialysis patients with chronic renal failure, calcium carbonate is the first choice and sevelamer remains the best alternative. © Review prepared and translated by the Prescrire Editorial Staff.

Source: EMBASE
**Publication Date:** February 2006

**Abstract:** OBJECTIVE: To review the pharmacology, pharmacokinetics, clinical efficacy, and safety profile of lanthanum carbonate, a phosphate binder for chronic kidney disease (CKD). DATA SOURCES: Information was selected from PubMed (1965-October 2005). All studies presented as scientific posters and abstracts from nephrology meetings from 1999 to 2005 were also included. STUDY SELECTION AND DATA EXTRACTION: All published articles regarding lanthanum carbonate were included. In addition, abstracts and presentations from scientific meeting symposia were also considered for inclusion. DATA SYNTHESIS: Lanthanum carbonate has been recently approved as non-calcium-based therapy for phosphate reduction in patients with stage 5 CKD requiring dialysis. The recommended dose is 250-500 mg with meals, for a maximum of 1500 mg daily. Clinical studies have shown short- and long-term safety with lanthanum carbonate administration. Adverse effects were primarily gastrointestinal in nature. Clinical trials have also shown reductions in serum phosphorus to target concentrations, reductions in associated calcium-phosphorus product, and minimal effects on serum calcium and parathyroid hormone concentrations. CONCLUSIONS: Lanthanum carbonate is an effective phosphate-binding agent without significant risk of hypercalcemia or worsening metabolic acidosis. Lanthanum carbonate is a safe and effective drug for reduction of elevated serum phosphorus levels associated with stage 5 CKD. The role of lanthanum carbonate relative to other phosphate-binding drugs, such as calcium salts and sevelamer, remains to be determined.

**Source:** EMBASE

27. Long-term efficacy and tolerability of lanthanum carbonate: results from a 3-year study.

Author(s) Hutchison, Alastair J, Maes, Bart, Vanwalleghem, Johan, Asmus, Gernot, Mohamed, Elfatih, Schmieder, Roland, Backs, Wolfgang, Jamar, Rene, Vosskühler, Andre

Citation: Nephron. Clinical practice, Jan 2006, vol. 102, no. 2, p. c61. (2006)

**Publication Date:** January 2006

**Abstract:** Control of serum phosphate over the long term is essential in patients with end-stage renal disease. Six-month and 2-year extensions to a 6-month study evaluated the long-term safety, tolerability and efficacy of the new phosphate binder lanthanum carbonate. Patients who participated in a 6-month, randomized trial comparing lanthanum carbonate with calcium carbonate were eligible for a 24-week, open-label extension. Lanthanum carbonate-treated patients continued taking their established maintenance dose ('continued-lanthanum group') and calcium carbonate-treated patients switched to lanthanum carbonate, 375-3,000 mg/day ('switch group'). Patients could also enter a further 2-year extension. Efficacy parameters, including serum phosphate, were monitored. Mean serum phosphate was approximately 1.80 mmol/l throughout the trial. The percentage of patients with controlled serum phosphate (< or =1.80 mmol/l) after the 6-month extension was 63.3 and 58.4% in the continued-lanthanum and switch groups, respectively; after the 2-year extension, 54.4% of patients had controlled serum phosphate. After discontinuation of calcium carbonate and initiation of lanthanum carbonate, the hypercalcemia incidence was 2.7%, compared with 20.2% during the double-blind phase. Calcium x phosphate product was maintained at an acceptable level. Lanthanum carbonate was well tolerated; adverse events were mild/moderate and mainly gastrointestinal. Lanthanum carbonate maintains effectiveness with continued tolerability for up to 3 years. 2006 S. Karger AG, Basel.

**Source:** Medline

Available in fulltext from Nephron Clinical Practice at EBSCOhost

28. Lanthanum carbonate

Author(s) Finn W.F.

Citation: Therapy, July 2005, vol./is. 2/4(545-557), 1475-0708 (July 2005)
Publication Date: July 2005

Abstract: Hyperphosphatemia is associated with increased mortality in patients with end-stage renal disease. Unfortunately, precise, effective control of serum phosphate levels cannot be achieved by dialysis and regulation of dietary phosphate alone. For most patients, effective, safe and convenient phosphate binders are needed. Preclinical studies demonstrate that the new phosphate binder, lanthanum carbonate, has potent phosphate-binding properties at clinically relevant pH levels, and indicate that almost all the lanthanum phosphate formed passes unchanged through the gut. Plasma levels of lanthanum are limited and noncumulative, and the minimal systemic fraction has nonrenal elimination. Clinical trials show that lanthanum carbonate, taken with food, can effectively control hyperphosphatemia in dialysis patients, and has a well-tolerated safety profile. Side effects are largely gastrointestinal and are generally mild to moderate. Lanthanum carbonate treatment may prove instrumental in achieving the increasingly stringent target serum phosphate levels in patients with end-stage renal disease. © 2005 Future Drugs Ltd.

Source: EMBASE

29. Blast from the past: The Aluminum’s ghost on the Lanthanum salts

Author(s) Canavese C., Mereu C., Nordio M., Sabbioni E., Aime S.

Citation: Current Medicinal Chemistry, 2005, vol./is. 12/14(1631-1636), 0929-8673 (2005)

Publication Date: 2005

Abstract: Hyperphosphatemia is a common serious complication of chronic renal diseases, which needs appropriate continuous treatment in order to avoid ominous side effects. Therefore, oral chelating agents able to avoid phosphate absorption by the gut are mandatory. In the past, Aluminium salts, and more recently Calcium and Magnesium salts, and a synthetic resin polyallylamine hydrochloride have been employed, but Aluminium was later abandoned, because it has been a silent killer of many uremic patients, due to subtle absorption eventually leading to toxicity on Central Nervous System and bone, with hallucinations, seizures, dementia, and osteomalacia, bone pain, fracturing osteodystrophy, and death. Recently, a new chelating agent able to bind dietary phosphate, namely Lanthanum carbonate has been introduced, with a proven efficacy profile for short-term treatment. However, after careful examination of the very few scientific papers available to date, we strongly advise caution before adopting, at present, lanthanum carbonate as a phosphate binder in uremic patients. In fact, notwithstanding minimized, some data are worrying: first, Lanthanum ions are absorbed, though at a minimal extent, by human gut; 2) pharmacokinetic evaluations show a greater exposure to Lanthanum in uremic patients; 3) Lanthanum concentration is increased tenfold in blood and fivefold in bone after short-term supplementation in uremic patients; 4) there is no proofs that Lanthanum cannot cross the blood brain barrier in uremic patients; 5)Lanthanum has many biological effects and is potentially highly toxic. The Aluminum story should serve as cautionary tale when considering the use of new metal ions. © 2005 Bentham Science Publishers Ltd.

Source: EMBASE

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Author(s) Finn, W F, Joy, M S, Hladik, G, Lanthanum Study Group

Citation: Clinical nephrology, Sep 2004, vol. 62, no. 3, p. 193-201, 0301-0430 (September 2004)

Publication Date: September 2004
Abstract: Lanthanum carbonate is a highly effective phosphate binder with significant potential as a treatment for hyperphosphatemia in patients with end-stage renal disease (ESRD). Here, the results of a placebo-controlled, dose-ranging study are presented. 196 patients (> or = 18 years) receiving hemodialysis for at least 6 months entered a 1- to 3-week, single-blind, placebo run-in phase. Of these, 145 patients were randomized to a double-blind phase in which they received placebo or lanthanum carbonate in daily lanthanum doses of 225, 675, 1,350 or 2,250 mg for 6 weeks. Serum levels of phosphorus, calcium and parathyroid hormone, and adverse events were monitored throughout the study. The intent-to-treat analysis (n = 144) showed significant dose-related reductions in serum phosphorus at lanthanum doses of 675, 1,350 and 2,250 mg. After 6 weeks of treatment, phosphorus levels were significantly lower in the lanthanum groups receiving 1,350 mg/day and 2,250 mg/day, compared with the placebo group (respective changes from randomization: -0.95 +/- 1.39 mg/dl (-0.31 +/- 0.45 mmol/l), -1.13 +/- 2.01 mg/dl (-0.36 +/- 0.65 mmol/l), 0.75 +/- 1.47 mg/dl (0.24 +/- 0.47 mmol/l), p < 0.001). Significant reductions in serum phosphorus, compared with placebo, occurred in the lanthanum 1,350 mg/day group from the second week of treatment and in the 2,250 mg/day group from the first week of treatment. Adverse events were mainly gastrointestinal (e.g. nausea and vomiting). Treatment-related adverse events occurred in 39% of patients treated with lanthanum carbonate and 44% of the placebo group. Lanthanum carbonate is an effective and well-tolerated agent for the short-term treatment of hyperphosphatemia in patients with ESRD.

Source: Medline

31. Lanthanum carbonate.

Author(s) Swainston Harrison, Tracy, Scott, Lesley J

Citation: Drugs, Jan 2004, vol. 64, no. 9, p. 985, 0012-6667 (2004)

Publication Date: January 2004

Abstract: Lanthanum carbonate is a novel, non-aluminium, non-calcium phosphate binding agent that forms a water-insoluble compound, lanthanum phosphate, in the gut. Lanthanum carbonate (elemental lanthanum 375-3000 mg/day) reduced serum phosphorus levels compared with placebo in two randomised, double-blind, multicentre 4-week trials in patients with chronic renal failure receiving regular haemodialysis. In two large, randomised trials in patients with chronic renal failure requiring haemodialysis, lanthanum carbonate (elemental lanthanum 375-3000 mg/day) was as effective as calcium carbonate and/or other conventional phosphate binders in reducing and maintaining serum phosphorus levels (< or =5.6 mg/dL over 6 months and < or =5.9 mg/dL over 2 years). Lanthanum carbonate was generally well tolerated. Most adverse events were mild-to-moderate in severity, with gastrointestinal events being the most common. The tolerability profile of lanthanum carbonate was similar to those of conventional phosphate binders; however, hypercalcaemic episodes occurred significantly less frequently over 6 months with lanthanum carbonate than with calcium carbonate. In a randomised 1-year trial, numerically fewer lanthanum carbonate (elemental lanthanum < or =3750 mg/day) recipients had renal bone disease at study end than at baseline; however, in the calcium carbonate < or =9000 mg/day group, numerically more patients had renal bone disease at study end compared with baseline.

Source: Medline

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32. Lanthanum carbonate

Author(s) Swainston Harrison T., Scott L.J.

Citation: Drugs, 2004, vol./is. 64/9(985-996), 0012-6667 (2004)
Abstract: Lanthanum carbonate is a novel, non-aluminium, non-calcium phosphate binding agent that forms a water-insoluble compound, lanthanum phosphate, in the gut. Lanthanum carbonate (elemental lanthanum 375-3000 mg/day) reduced serum phosphorus levels compared with placebo in two randomised, double-blind, multicentre 4-week trials in patients with chronic renal failure receiving regular haemodialysis. In two large, randomised trials in patients with chronic renal failure requiring haemodialysis, lanthanum carbonate (elemental lanthanum 375-3000 mg/day) was as effective as calcium carbonate and/or other conventional phosphate binders in reducing and maintaining serum phosphorus levels (<5.6 mg/dL over 6 months and <5.9 mg/dL over 2 years). Lanthanum carbonate was generally well tolerated. Most adverse events were mild-to-moderate in severity, with gastrointestinal events being the most common. The tolerability profile of lanthanum carbonate was similar to those of conventional phosphate binders; however, hypercalcaemic episodes occurred significantly less frequently over 6 months with lanthanum carbonate than with calcium carbonate. In a randomised 1-year trial, numerically fewer lanthanum carbonate (elemental lanthanum <3750 mg/day) recipients had renal bone disease at study end than at baseline; however, in the calcium carbonate 59000 mg/day group, numerically more patients had renal bone disease at study end compared with baseline.

Source: EMBASE
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Citation: Anti-cancer drug design, Dec 2000, vol. 15, no. 6, p. 405-411, 0266-9536
(December 2000)
Publication Date: December 2000

Abstract: Eight lanthanum(III) complexes with novel 1,10-phenanthroline-2,9-bis-alpha-amino acid conjugates were synthesized and characterized by elemental analyses, IR, MS, 1H-NMR, thermal analysis and conductance measurement. All lanthanum(III) complexes and the corresponding soluble ligand in water have been assayed for antitumor activity in vitro against HL-60 (human leukocytoma) cells, HCT-8 (human coloadenocarcinoma) cells, BGC-823 (human stomach carcinoma) cells, Bel-7402 (human liver carcinoma) cells and KB (human nasopharyngeal carcinoma) cells. The results show that several complexes have relative activity against different cell lines. In particular, the complexes La(L2) and La(L5) show relatively high activity against the Bel-7402 cell line. Moreover, they are slightly more effective than cisplatin. DNA binding studies indicate that the complex La(L2) possibly interacts with calf thymus DNA by both intercalative and covalent binding.

Source: Medline

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From the 1st fifty results:

Actin-based endosome and phagosome rocketing in macrophages: Activation by the secretagogue antagonists lanthanum and zinc
FS Southwick, W Li, F Zhang, WL Zeile… - Cell motility and the …, 2003 - Wiley Online Library
Abstract Although motile endocytic vesicles form actin-rich rocket tails [Merrifield et al., 1999: Nature Cell Biol 1: 72–74], the mechanism of intracellular organelle locomotion
remains poorly understood. We now demonstrate that bone marrow macrophages treated with ...
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... This effect was also observed in other studies, where an exposition of macrophages to lanthanum/zinc for more than 60 min induced progressive loss of membrane integrity, measured by trypan blue exclusion assay.25 Lanthanum in the used concentrations has an impact on ...
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**Lanthanum deposition in a dialysis patient**
RL Davis, JL Abraham - Nephrology dialysis transplantation, 2009 - ERA-EDTA
... Lanthanum carbonate (Fosrenol®) (LaCO₃) is used as an orally administered phosphate-binding agent to reduce the gastrointestinal ... previously reported [3]. Light microscopy of the mesenteric lymph node showed marked accumulation of pale, foamy macrophages. ...
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**Lanthanum-Induced Gastrointestinal Histiocytosis**
... Figure 3 Figure 3. Small intestine following discontinuation of lanthanum showing (A) fewer histiocytes in the lamina propria and (B) markedly decreased intracellular aggregates of foreign material. ... Oral ingestion of lanthanum leads to infiltration of macrophages containing the ...
Cite Save

**Some additional research**

Differences in gastrointestinal calcium absorption after the ingestion of calcium-free phosphate binders.
Behets GJ , Dams G , Damment SJ , Martin P , DeBroe ME and D'Haese PC
Publication Year: 2014

Comparison of dietary phosphate absorption after single doses of lanthanum carbonate and sevelamer carbonate in healthy volunteers: a balance study.
American journal of kidney diseases, 2011, 57(5), 700
Publication Year: 2011

**Published Research – Database Search Strategy**

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<td>EMBASE</td>
<td>exp INTESTINES/</td>
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<td>EMBASE</td>
<td>exp LOWER GASTROINTESTINAL TRACT/ OR exp UPPER GASTROINTESTINAL TRACT/</td>
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<tr>
<td>EMBASE</td>
<td>(gastro* OR gut OR intestin* OR stomach OR bowel* OR colon OR colorectal OR duodenum OR jejunum OR ileum).ti,ab</td>
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<td>EMBASE</td>
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<tr>
<td>EMBASE</td>
<td>exp LOWER GASTROINTESTINAL TRACT/ OR exp UPPER GASTROINTESTINAL TRACT/</td>
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