

Chronic Silica Gel Ingestion: A Case Report

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Citation

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Abstract

A 43-year-old woman with a history of hyperthyroidism presented to the hospital with recurrent heart burn, muscular pain, difficulty in walking, giddiness and numbness in all four limbs. She had a history of hyperthyroidism and had been on carbimazole 20 mg twice daily for 6 months and ingested beads of silica gel provided as a desiccant in bottles with carbimazole tablets. She was treated with rabeprazole 20 mg daily and carbimazole 10 mg daily while she was on investigations. After completion of investigations, she was reassured and carbimazole was continued. She was followed up for six months and was symptom free. We believe this is the first reported case of chronic ingestion of silica gel.

CASE REPORT

A 43-year-old woman with a history of hyperthyroidism presented to the hospital with recurrent heart burn, muscular pain, difficulty walking, giddiness and numbness in all four limbs. She had a history of hyperthyroidism and had been on carbimazole 20 mg twice daily for 6 months. She had been issued carbimazole in bottles, which contain silica gel in small packs. As she had been instructed to take four tablets twice a day, she had started taking four tablets of carbimazole and four beads of silica gel twice a day. When the dose was reduced, she had reduced the dose of silica gel accordingly.

After about three months of use, she presented to the doctor with muscle pain, numbness of all four limbs and unsteadiness on walking. However, her symptoms were ignored and she was reassured since clinical examination was normal. After six months on a routine inspection of left over medicines, it was found that she was taking silica gel with her carbimazole. She was referred to the toxicology unit for further investigations and management.

On clinical examination, she was euthyroid. Neurological examination and all the other systems were clinically normal. Laboratory investigations revealed normal full blood count, Erythrocyte Sedimentation Rate (ESR), renal function, liver profile and normal urine analysis results. Electrocardiogram (ECG), chest X-ray and ultrasonography of abdomen were normal. Magnetic Resonance Imaging (MRI) scan of brain and posterior fossa, which was done in the view of unsteadiness on walking and nerve conduction studies of peripheral nerves, did not reveal any

abnormalities. Upper gastro-intestinal endoscopy, which was done because of recurrent heart burn, proved to be normal.

She was treated with rabeprazole 20 mg daily and carbimazole 10 mg daily while she was on investigations. Her heart burn disappeared with rabeprazole. After completion of investigations, she was reassured and carbimazole was continued. She was followed up for six months and was symptom free.

DISCUSSION

Patient's complaints were most probably related to the ingestion of silica gel because side effects of carbimazole include nausea, mild gastro-intestinal disturbances, headache, rashes, pruritis and arthralgia, [1] and because the patient was relieved when ingestion of silica gel was discontinued.

Silica gel is a partially dehydrated polymeric form of colloidal silicic acid with the formula $\text{SiO}_2 \cdot n\text{H}_2\text{O}$. This amorphous material is composed of spherical particles, 2-20 nm in size, which aggregate to form the adsorbent, with pore sizes in the range of 6-25 nm. Surface areas are in the range of 100-850 m^2/g , depending on whether the gel is low density or regular density. The surface comprises mainly SiOH and SiOSi groups and, being polar, it can be used to adsorb water, alcohols, phenols, amines etc. (i.e. polar compounds) by hydrogen bonding mechanisms [2]. Therefore, this patient's symptoms can be attributed to these properties.

Silica gel is used for drying procedures in which high capacity is required at low temperature and moderate water

vapour pressure [2]. Therefore, it is used as a desiccant and is included with medicines, which deteriorate in the presence of moisture. Silica gel packets usually bear warning in English for the user not to eat the contents. However, ordinary Sri Lankan patients would not be able to read and understand what is written in English. Even if it is written in the native language, some patients would not take time to read these small prints.

According to Bough, when pets ingest silica gel granules or packets, there is little risk for serious side effects. Gastro-intestinal upset may occur, especially in sensitive pets, but symptoms usually are easily managed at home without veterinary intervention [3].

Riordan et al. have categorized silica gel as a low toxic substance on ingestion for children [4]. However, there are no reported cases of chronic exposure to silica gel and we believe this is the first reported case of long term ingestion of silica gel.

Silica gel can cause a drying irritation of the mucous membranes and skin in cases of severe exposure due to extensive absorption of water. Another possible harmful effect is that beads can shatter inside the digestive system. consequently, they will act as tiny pieces of broken glasses inside the gut and damage the gut wall. These effects may have led to recurrent heart burn, which was successfully treated with rabeprazole.

References

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