

# Pica and the radiologist - beyond the radiology report ... digging deeper

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## Abstract

Pica is a psychological disorder of intentional and craving consumption of non-nutritive substances over a period of time. This is seen at an age when such a behavior is developmentally inappropriate. Substances such as wall paint, soil, hair, and feces have been reported as being consumed. Complications of this condition may range from being self-limiting to life-threatening. Radiological examinations play a crucial role in the diagnosis and management of this condition. We present a case of a 9-year-old boy who presented with chronic abdominal pain with history of persistent consumption of pencil erasers. Abdominal radiographs showed radio-opaque foreign bodies, and etiological diagnosis was made when the radiologist obtained a detailed history from the patient's mother. We also discuss the radiographic evaluation of the pencil eraser and the reason why it is densely radio-opaque.

**Key words:** Constipation; pencil eraser; pica

## Introduction

Pica is a psychological disorder and as per the Diagnostic and Statistical Manual of Mental disorder IV, it is a disorder of consumption of non-nutritive substances for at least a period of 1 month at an age where it is considered to be developmentally inappropriate.<sup>[1]</sup> Substances such as wall paint, soil, hair, and feces have been reported as being consumed.<sup>[2]</sup> The origin of the word Pica comes from the Latin name of Magpie [Figure 1 The Magpie- PICA],<sup>[3]</sup> a bird which is reputed to eat almost anything.<sup>[4]</sup>

Pica has been associated with pregnancy,<sup>[5]</sup> obsessive compulsive disorder,<sup>[6]</sup> schizophrenia,<sup>[7]</sup> emotional stressors, and autism.<sup>[8]</sup> In certain sections of the society, it may be associated with cultural practices such as consumption of clay in African American women.<sup>[9]</sup>

Substances that have been commonly consumed in Pica include soil or mud (geophagia), feces (coprophagia), hair (trichophagia), glass (hyalophagia), wall paint, wooden materials (xylophagia), and so on.

Complications of Pica depend on the substance consumed. Commonly reported are cases with lead poisoning when children have consumed wall paint, intestinal obstruction due to formation of bezoars, gastroenteritis, parasitic infestations, internal bleeding, and perforation due to sharp objects. There can be nutritional deprivation due to failure to thrive.<sup>[7]</sup>

The diagnosis and management of Pica needs a multimodality approach with active involvement of pediatrician, psychologist-psychiatrist, radiologist, and parents/family members. Detailed psychosocial history,

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**Figure 1:** The magpie- PICA

clinical evaluation, and corresponding investigations are required to arrive at the diagnosis.

### Case Report

A 9-year-old boy was brought to the pediatric outpatient clinic of our institution with complaints of intermittent pain in the abdomen of 5 days duration. The child had been attentive, coherent, and playful during this time. The abdomen was soft, but there was tenderness on deep palpation in the left lumbar region and the left iliac fossa. The bowel sounds were sluggish.

The parents informed that the child had been repeatedly constipating and had to be given regular laxatives. The boy was then referred to our department for an upright plain radiograph of the abdomen [Figure 2 Plain upright radiograph of the abdomen showing multiple rectangular radio opaque foreign bodies along the large bowel].

The radiograph showed multiple, irregular, well-defined square to rectangular radio-opaque shadows distributed along the course of the large intestine predominantly along the descending colon and the rectum. These measured about 5 mm across.

There was fecal loading of the entire large bowel. No abnormal air fluid levels were seen. There was no free peritoneal air seen and the peritoneal fat planes were preserved. On enquiry, the child's mother informed that the boy had been asking for new pencil erasers very frequently. Suspecting that the child could be eating the erasers, we wanted to confirm whether the densely radio-opaque shadows seen on the film of the abdomen could be pieces of eraser [Figure 3 Pencil erasers provided by the parents].

Therefore, we radiologically evaluated the pencil erasers provided to the child by the parents.



**Figure 2:** Lain upright radiograph of the abdomen showing multiple rectangular radio opaque foreign bodies along the large bowel

On plain radiographs [Figure 4 'R' radiograph of the pencil erasers and solitary solid rectangular density is the ct scan of the eraser.], the pencil erasers were densely radio-opaque. We then performed a computed tomography scan [Figure 4 'R' radiograph of the pencil erasers and solitary solid rectangular density is the ct scan of the eraser.] on the eraser; the erasers had an attenuation values in the range of 800–813 HU. Stool examination after laxative therapy confirmed the presence of pencil erasers.

We concluded that the child had Pica for pencil easers and the child was referred for counseling sessions with a pediatric psychiatrist and follow-up.

### Discussion

Pica can be an indicator of the underlying psychosocial stress or a psychiatric disorder. Prompt attention and specialized help would prevent complications and further deterioration of the condition. A diagnostic radiologist should be aware of these unusual conditions so as to provide timely diagnosis and aid in the management of these conditions.

A plain upright radiograph is by far the most common requested examination in a child presenting with pain in



**Figure 3:** Pencil erasers provided by the parents

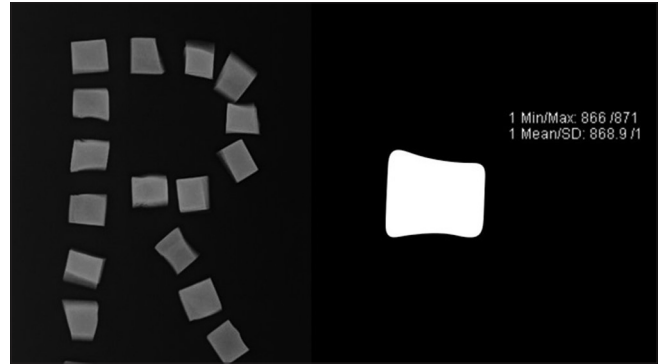
abdomen. Chronic constipation is one of the most common causes of recurrent abdominal pain.<sup>[10]</sup>

Metallic substances and glass particles are known radio-opaque substances observed in Pica. Pencil erasers have not been reported as being a cause for Pica.

Erasers are highly radio-opaque due to the sulfur content. Sulfur is added to the eraser to achieve elasticity. The human digestive mechanism is unable to breakdown the erasers into their individual ingredients. Hence, the digestive system and the metabolic pool are not exposed to the toxicity of sulfur. Nevertheless, the erasers can cause delayed transit and sluggish peristalsis in the intestine, presenting with constipation. Consumption of a large quantity may cause intestinal obstruction requiring surgical intervention. Since pencil erasers are readily available to children, it is important for pediatricians and radiologists to be aware of the symptoms, clinical, and radiological signs of pencil eraser consumption.

In our patient, evaluation of suspected substance and its confirmation helped in alleviating the symptoms and avoiding aggressive management.

Treatment of pencil eraser consumption is laxative therapy for evacuation of the substance. The material is nontoxic and indigestible. A large quantity or large size may cause intestinal obstruction requiring surgical intervention.



**Figure 4:** "R" radiograph of the pencil erasers and solitary solid rectangular density is the ct scan of the eraser

Preventive medicine and counseling for removal of the patient from the stressor environment, altering the lifestyle, education, and medical treatment of the underlying psychiatric disorder are of prime importance after providing symptomatic treatment.

We also wish to stress that the radiologist's role often does not end with writing the radiology report, but it can extend to making an etiological diagnosis by obtaining an appropriate history and making fundamental observations about the pathology seen in radiological images.

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#### Conflicts of interest

There are no conflicts of interest.

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