

CASE REPORTS

Constipation Presenting as Respiratory Distress

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This case report describes a 14-year-old boy presenting with a barrel-chested appearance and a complaint of shortness of breath on exertion. The patient had a long history of severe constipation with overflow incontinence. Physical examination suggested limited diaphragmatic excursion. Initial pulmonary function studies showed a restrictive pattern. Catharsis resulted in an 11-lb weight loss and normalization of pulmonary function. We speculate that the extrinsic upward pressure imposed on the diaphragm by a full bowel resulted in increased anteroposterior diameter, decreased lung height, and a reversible restrictive pattern on pulmonary function studies.

KEY WORDS:

Constipation
Pulmonary function
Respiratory distress

There are a variety of causes for restrictive pulmonary disease in the adolescent. Interstitial fibrosis, adult respiratory distress syndrome, increased thoracic blood volume from a cardiac defect, skeletal abnormalities of the chest wall, or respiratory muscular weakness can present a restrictive pulmonary function pattern. The typical pattern of restriction includes decrease in vital capacity and total lung capacity, with flow rates remaining relatively normal.

We present a case of an unusual cause for restrictive pulmonary defect. The condition, which was rapidly reversible, resulted from extrinsic upward mechanical pressure on the diaphragm from chronic stool retention and an overdistended large

bowel. We have found no similar cases in adolescents. Similar observations have been noted during pregnancy and with patients with severe ascites (1).

Case Report

A 14-year-old male was seen for routine care. He was noted to have a barrel-chested appearance with an increased anteroposterior (AP) diameter.

There was no history of cough, sputum production, wheezing, or chest pain. The patient was not an active participant in group sports because of predictable, rapid onset of shortness of breath with exertion.

The patient's history revealed about six years of infrequent, difficult bowel movements of large caliber. Between his every 3-4-week bowel movements, he reported fecal soiling, which occurred with no prior warning.

The patient's history indicated that after the initiation of solid foods at eight months of age his stools became firmer but never warranted laxative therapy. It was not until he was eight years old that the frequency of bowel movements decreased to the current level.

On physical examination, the patient had a barrel-chested appearance, an increased AP diameter, and a distended abdomen. His breath sounds were diminished over both bases. Diaphragmatic excursion as assessed by percussion was 2 cm bilaterally (normal is approximately 5 cm). His abdomen was tense and distended with several visible and palpable dilated loops of bowel. Rectal examination disclosed a large amount of hard, Guaiac negative stool in the rectal vault. Anal wink was present, sphincter tone was fair. The patient's weight was 109 lb, height was 62 in., pulse was 84, and chest circumference was 89 cm on deep inspiration and 87 cm on deep expiration. The remainder of the physical and neurologic examination was unremarkable.

Chest x-ray (Figure 1) showed bilaterally elevated diaphragmatic domes. Cardiac silhouette and lung fields were normal. A supine abdominal film showed the large bowel to be massively dilated with stool. Pulmonary function studies showed a total lung capacity (TLC) of 3.04 liters

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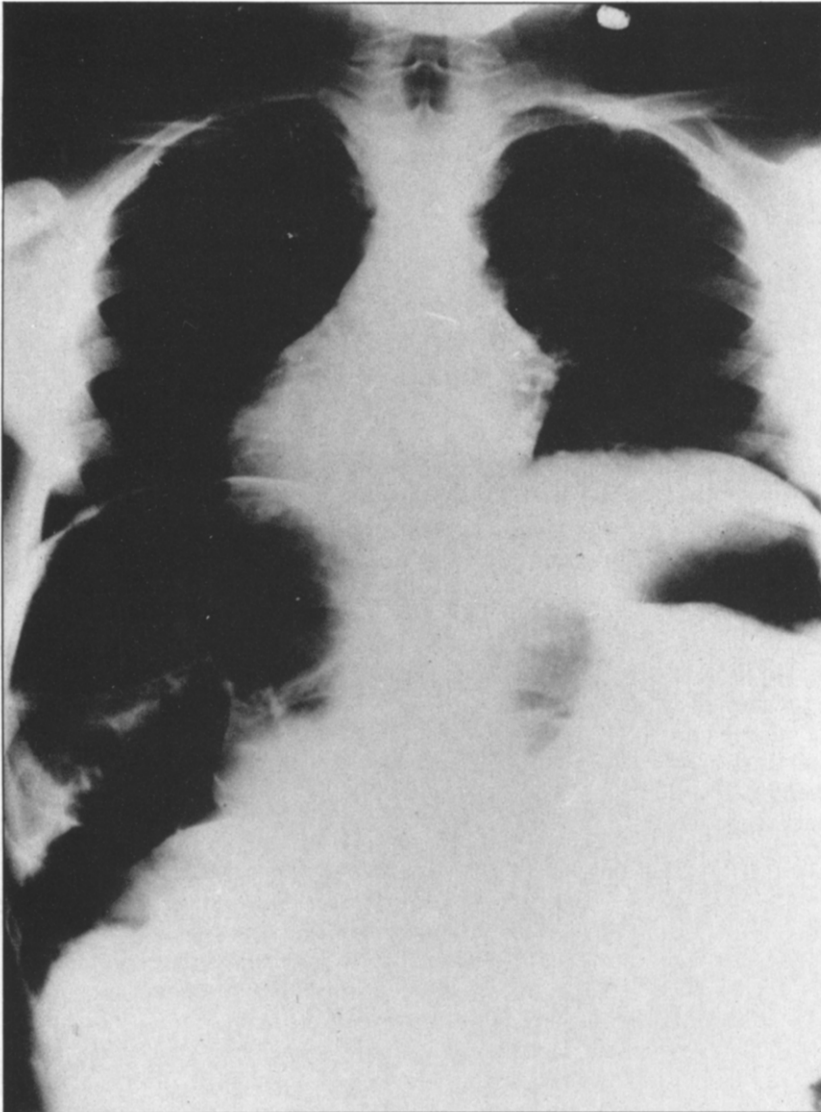


Figure 1. Chest posteroanterior prior to catharsis.

(79% predicted), vital capacity (VC) of 2.95 liters (87% predicted), functional residual capacity (FRC) of 1.42 liters (71% predicted), residual volume (RV) of 0.45 liters (49% predicted), FEV 1 of 2.56 (81% predicted), FEV 1/FVC (percent of FVC in 1 sec) of 86% (95% predicted), and FEF 25-75 of 219 (109% predicted). These values are compatible with a restrictive pulmonary defect without obstruction.

Based on the historical data, physical examination, and the x-ray studies, this young man's barrel-chested appearance and pulmonary function abnormalities were attributed to the secondary effects of chronic stool retention and encopresis. Encopresis has been defined as the passage of formed or semiformal stools in a child's underwear, occurring regularly, after four years of age.

After an explanation to the boy of the problem of encopresis and its management, he was admitted for an ini-

tial catharsis, as described by Levine and Bakow (2). After four days, evacuation was felt to be complete, with a weight loss of 11 lb. The patient's abdomen was soft and scaphoid with no fecal masses palpable. Rectal examination was negative for stool. Diaphragmatic excursion by percussion increased to 5 cm bilaterally. Chest circumference was 88 cm on deep inspiration and 81 cm on deep expiration. A repeat chest x-ray (Figure 2) showed appropriately positioned diaphragmatic domes. Repeat pulmonary function studies showed marked improvement with a TLC of 4.2 liters (99%), VC of 3.25 liters (95%), FRC of 2.25 liters (109%), RV of 1.18 liters (125%), FEV 1 of 2.81 liters (98%), FEV 1/FVC of 86%, and FEF 25-75 of 283 (119% predicted).

At discharge the patient was placed on maintenance mineral oil, a high-fiber diet, multivitamin supplements,

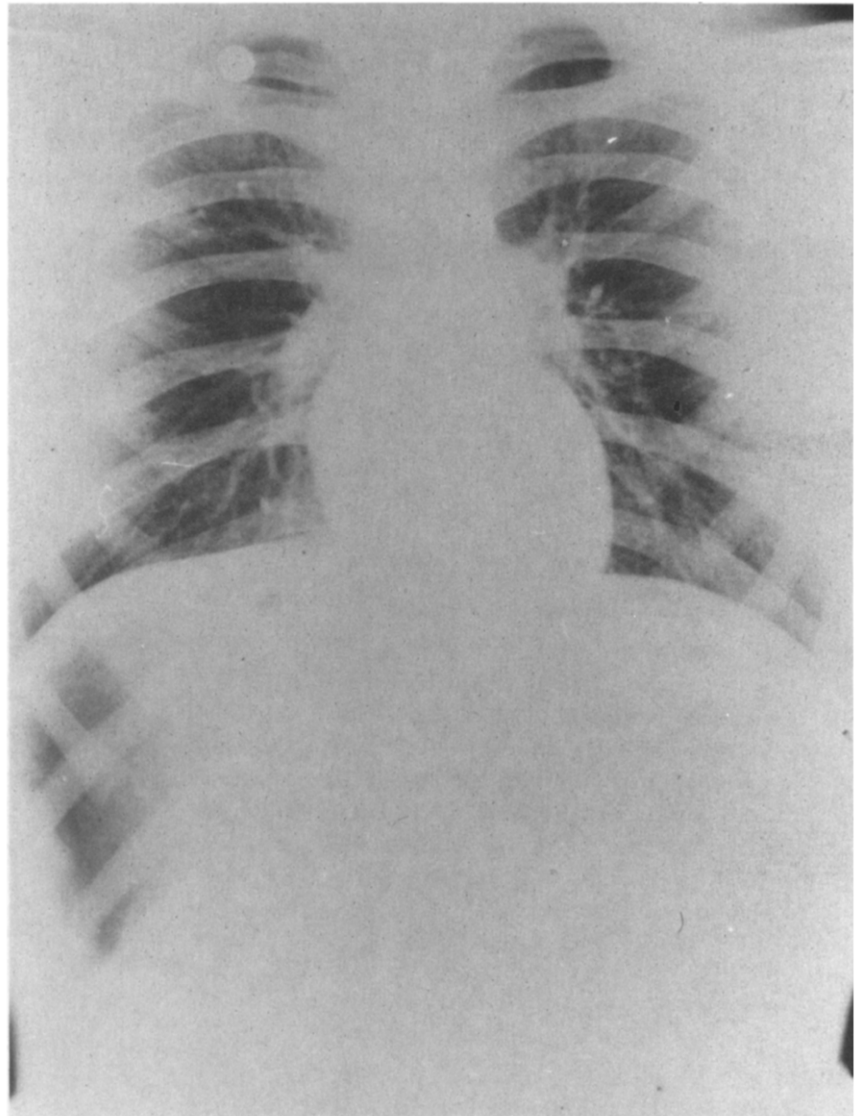


Figure 2. Chest posteroanterior after catharsis.

senna laxative, and a charting system for medication compliance and fecal soiling-free days. At one year follow-up, he reported a normal daily bowel and activity pattern.

Discussion

This patient's initial physical presentation suggested an obstructive pulmonary disease associated with a barrel-shaped chest with limited capabilities of lung and chest wall expansion. However, there were no symptoms suggestive of intrinsic chronic obstructive pulmonary disease. The chest x-ray demonstrated elevated diaphragms with flattening of the lung shadow and an increased AP lung shadow. We postulated that an over-distended colon was pushing up on the diaphragm, forcing the lungs to expand anteroposteriorly. Pulmonary function studies supported

our clinical impression of a restrictive defect without obstruction.

Scheidt et al. (3) have described the effect of abdominal compression on lung mechanics in healthy male subjects. They found abdominal compression to decrease lung height and increase the AP diameter. This finding is consistent with our assumption as to the cause of this patient's barrel-chested appearance and pulmonary function abnormalities. The immediate normalization of pulmonary function after catharsis confirms that his abnormal pulmonary function studies were secondary to his chronic stool retention.

The conceptual framework regarding encopresis has changed in recent years. In the past encopresis was primarily viewed as a psychogenic disorder warranting psychiatric intervention (4). Recent in-

investigators have described it as a relatively common (1.5% of second graders), multifactorial disorder that is primarily nonpsychiatric (5). Secondly, the experience of loss of bowel control might well trigger anxiety, social withdrawal, and low self-esteem. Levine (5) describes no social class preference and no relation to family size, birth order, or parental education. Levine lists risk factors for encopresis that may accumulate and potentiate the process in certain vulnerable individuals. In younger children, these risk factors include "early colonic inertia" or the endogenous tendency toward slow transit time, coercive toilet training, and uncomfortable evacuation following an acute illness. Specific medical risk factors include congenital anomalies such as imperforate anus. Examples of "potentiators" in the school-aged child include avoidance of school bathrooms, poor task persistence, and low dietary fiber.

The medical treatment regimen outlined by

Levine and Bakow (2) and used successfully with this patient has an overall success rate of 80% in patients presenting with encopresis (5). Encopresis imposes many disabilities, both physical and psychosocial. We have described another incapacitating condition to be added to the list of these effects.

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