Not Passing Flatus On A Non-stop Flight Familial Cecal Volvulus And Review Of Surgical In-flight Emergencies

P Adusumilli

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Abstract

Dilatation of the cecum can precipitate its rotation, resulting in a volvulus in individuals who have a mobile cecum. Conditions associated with increased intestinal gas can put predisposed patients at increased risk for cecal volvulus. Drop in the cabin pressure during air travel may cause up to a 30% gas expansion, which might result in cecal dilatation. We report an exceptionally rare occurrence of cecal volvulus in mother and daughter during air travel.

CASE REPORT

A 41-year old woman experienced abdominal distention, obstipation and abdominal pain during a flight from California to New York. She was brought to the emergency room from the airport with worsening of symptoms. In the emergency room, she was found to have an asymmetrically distended, tympanitic abdomen with fullness in left upper quadrant. Plain radiograph of the abdomen demonstrated a large dilated, displaced loop of bowel in the left upper quadrant and typical ‘bird's beak image' pointing to right lower quadrant consistent with cecal volvulus. She underwent an uneventful cecectomy for non-ishemic cecal volvulus and was discharged home on the third post-operative day. Pathology confirmed dilated, distorted cecum with focal mucosal hemorrhages. Interestingly, the patient's mother has had cecal volvulus during air travel from United States to Germany and was operated upon for cecal volvulus few years earlier.

DISCUSSION

The human is omnivorous and so has a relatively well developed cecum. During midgut rotation in embryological development, the cecum is the last segment to reach its final position in the abdominal cavity. Although complete gut malrotation leaves the cecum totally free in the peritoneal cavity, there are also varying degrees of malrotation in which the cecum does not become fully attached to the retroperitoneum. Like other nonruminant mammals, the cecum is the first site of fermentation in the intestine. Because the byproducts of fermentation include gases such as hydrogen and methane, the cecum is subject to periodic distention as a result of changes in intraluminal pressure. Dilatation of the cecum can precipitate the rotation of the cecum in individuals who have a mobile cecum. Conditions associated with increased gas production, such as malabsorption and pseudo-obstruction, are additional risk factors for cecal volvulus. Cecal volvulus is less common than sigmoid volvulus, more difficult to diagnose, and tends to affect younger individuals, especially females.

Air travel can precipitate or contribute to many medical problems, which are underreported. Many of the in-flight emergencies in air travel are directly related to the commercial aircraft's hypobaric environment. At cruising altitude, cabin oxygenation and humidification decrease and gases typically expand up to 30%[1]. Gases expand in direct proportion to decreases in pressure, thus creating the potential for pathological disturbances in the gas containing cavities. Cabin pressurization minimizes gas expansion, though there will be an approximate 10-30% increase in gas volume. This poses a potential risk for patients with intestinal obstruction. Wearing loose-fitting clothing and avoiding gas-producing foods before travel can minimize the increase in abdominal pressures. Patients with recent abdominal surgery, intestinal obstruction are at greater risk of gut distension and should not fly for at least 10 days after surgery. In cases where abdominal distress is severe, descent to 22,500 feet (where cabin pressure is equivalent to atmospheric pressure) may result in enough gas decompression to alleviate the patient's symptoms.

In-flight medical emergencies are likely to increase as air travel continues to expand and life expectancy lengthens[2].

Elderly population with multiple medical problems is traveling more and is prone for in-flight emergencies. Approximately more than 3000 in-flight medical emergencies are reported to Federal Aviation Administration (FAA) each year3. Medical emergencies most commonly reported in commercial air travel include hyperventilation, syncope, allergic reactions, sinusitis, earache, bronchospasm, angina/myocardial infarction, seizures, trauma, food poisoning, gastroenteritis and drug overdose3. Surgical in-flight emergencies are listed in table 1.

TABLE 1: SURGICAL IN-FLIGHT EMERGENCIES

- Abdominal pain
- Pneumothorax
- Economy class syndrome (DVT)
- Scalds
- Head injuries
- Uncontrollable bleeding from injuries

Abdominal pain from gastroenteritis or food poisoning in passengers returning from tropical destinations is common. Pneumothorax during air travel was well publicized when, on a flight from Hong Kong to London, Professor Angus Wallace relieved a tension pneumothorax with the aid of a catheter, coat hanger and brandy bottle[4]. Scalds are quite frequent from hot drinks in crowded area. Head injuries are caused by items falling from overhead storage bins are quite common (6.3% of incidents reported by British airways)1. The "Economy class syndrome" refers to the development of vascular thrombosis during a flight attributed to the position of economy class seating, which compresses the popliteal and femoral veins promoting stasis. Passengers who develop deep vein thrombosis in flight are often found to have risk factors in addition to those of prolonged flight. One half of the economy class syndrome patients had pulmonary embolism[3]. World health organization research initiative on global hazards of travel project (WRIGHT) recently announced launching a major study with 12 million dollars in an attempt to identify the frequency and cause of deep vein thrombosis among air travelers and steps needed to be taken to protect passengers from deep vein thrombosis[5].

We have reported the first case report of familial cecal volvulus in mother and daughter. Gas expansion due to commercial air travel probably precipitated cecal volvulus in both cases.

CORRESPONDENCE TO

Prasad S Adusumilli MD Chief Resident in Surgery Department of Surgery Lenox Hill Hospital 100 East 77th street New York, NY 10021-1883. Telephone #: 212 434 2150 Fax #: 212 434 2083 E-mail: prasad30@aol.com

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Author Information

Prasad S Adusumilli, MD
Chief Resident , Department of Surgery, Surgery, Lenox Hill Hospital