

Pediatric Gastrointestinal Disorders Related to High Altitude: Two Case Reports and A Review of the Literature

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ABSTRACT

Upon ascending above 2,500 meters above sea level, the human body undergoes a series of physiological changes, which have been studied during recent years. These changes affect various systems, including the gastrointestinal tract, with diverse clinical manifestations, most mild and therefore little reported and underdiagnosed. We present two pediatric patients who attended the Pediatric Gastroenterology, Hepatology, and Nutrition Unit (Gastronutriped) in Bogota, for whom we documented symptoms associated with high altitude that affected the gastrointestinal tract. With respect to these cases, a review of the available literature focusing on the physiology, clinical manifestations, and feasible treatment was carried out. The ultimate aim of this article is to alert health care professionals working in cities located at high altitudes to the possibility of considering this entity as a differential diagnosis in children from places with a lower altitude. Pediatrics Abbreviations: Masl: Meters above sea level Introduction More than 50 years ago, the physiological changes related to altitude were begun to be described . Herefore a branch of medicine was born that was dedicated to investigating, studying, and describing some alterations that occur upon ascending above 2,500 masl, among them, serious manifestations in the nervous system (cerebral edema) and in the respiratory system (pulmonary edema) . A great part of the work has been done in aeronautics and extreme sports In the same vein, in the decade of the 80's, gastrointestinal manifestations above 2,000 masl were observed and were added to the list. He aim of this article is to present two pediatric patients from cities with a lower altitude (320 masl), who came for a consultation to the pediatric gastroenterology and nutrition unit (Gastronutriped) in Bogota (2,500 masl) with gastrointestinal symptoms associated with the ascent, as evidence of this subject. Case 1: Female patient, aged 3 years and 4 months, from Cucuta (320 masl), who came for a consultation to Gastronutriped in Bogota (2,600

masl) due to a history of 18 months of evolution with chronic abdominal pain and daily Bristol 3 depositions with anal pain. In her native city, she required hospitalization for faecal impaction. At the initial physical exam, the abdomen was found to be globular and tympanic, with presence of colonic stools, that is correlated with the marked distension of the loops and abundant faecal material that was seen in the simple X-ray of the abdomen. Her nutritional state was normal. Hypothyroidism was discounted through the laboratory exam results she brought with her. A diagnosis of chronic functional constipation was confirmed which required faecal desimpaction via the rectum with a phosphate enema, followed by maintenance with polyethylene glycol without electrolytes and nutritional guidance by the clinical nutritionist. In the follow-ups, therapeutic adherence was observed, with an improvement of depositions, and the abdominal pain disappeared, although the marked distension and decrease in height age percentiles was notable, so that tests of pancreatic faecal elastase, anti-transglutaminase antibodies, and faecal calprotectin were ordered, which returned normal results. He parents declared that the abdominal distension only occurred on arriving in Bogota (“in Cucuta her abdomen is fIDt His began suddenly and progressively 20 minutes Dier landing until it became very noticeable, was not accompanied by nausea nor vomiting, and persisted during her stay in Boota. Upon returning to Cucuta, around 40 minutes Dier landing, the child began to experience a large degree of fIDtulence and with this the abdominal distension completely ceased. Independent of the control of the constipation, on each trip to Bogota the abdominal distension reappeared. Presently, the child is under control, with a good evolution and normal nutritional state. Case 2: Male patient, 1 year and 9 months of age, from Cucuta, with a history of 9 months of consistent evolution of diarrhea alternating with normal depositions, colicky abdominal pain, and perianal erythema. He required two hospitalizations for diarrhea

and dehydration, previous treatments with oral antibiotics, zinc sulfate, multi-strain probiotics, complete nutritional supplement, and lactose-free infant formula. He continued to experience symptoms and decreased growth rate in weight and height, for which reason they came for a consultation at Gastronutriped. At the physical examination, the patient was in good general condition, with a soft abdomen, without pain. Because of anthropometrics, secondary compensated chronic malnutrition was diagnosed. Important aspects of the clinical history are: colic, recurrent croup, and treatment with oxcarbazepine due to suspicion of convulsive episodes. Chronic diarrhea was diagnosed,

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