

CASE REPORT

Fatal colorectal injury by compressed air through anal insufflation

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Abstract

Compressed air is a concentrated stream of air at high pressure and it is released through a narrow pipe with high speed that can cause fatal injuries if it is not handled appropriately. Rectal perforation by foreign bodies and iatrogenic injuries during colonoscopy is known, however barotrauma by compressed air is less often encountered. The case herein reported is that of a victim who presented with the history of insertion of a compressed air tube into the anus by his friends. The patient had severe abdominal pain and on examination, there was a distension involving the lower abdomen with the diffuse tenderness.

Keywords

Barotrauma; Transanal; Compressed air; Colonic injury

Introduction

Compressed air is the air which is kept under a pressure that is greater than the atmospheric pressure and is widely used for industrial as well as domestic purposes. As it stores a large amount of gas at high pressure, its injudicious use may lead to fatal incidents in the workplace. Transanal insufflation of compressed air may cause perforation, especially in the rectum and sigmoid colon or any part of the colon. It is being suggested that it takes only 1-2 seconds to deliver enough compressed air to cause major damage.¹ Injuries may vary from cat scratch colon to colorectal perforation or blowout.² A misdirected jet of compressed air to the head can cause serious eye injuries or rupture of the eardrum. If it is applied in the mouth, it can damage the lungs as well as esophagus. Even its careless use to blow away dirt or dust from the body could allow the air to enter the body damaging the internal organs. The air jets that are being utilized in the industries usually have 50-100 lbs pressure or even more which enters the anus more promptly as compared to a proctoscope or a finger leading to barotrauma.³ Here we are reporting a case of 14 years old male with the history of insertion of a compressed air tube into the anus by his friends, causing barotraumas to the intestines.

Case Report

A male aged 14 years was a worker in an industry. He was approached from behind by his colleagues and the compressed air was insufflated through the anal route using the compressed

air cleaner. The victim started complaining of severe abdominal pain and distension and hence was taken to a hospital. On examination the patient was restless and had unstable vitals i.e. pulse rate- 105 per minute, blood pressure- 94/58 mm Hg and respiratory rate- 24 per minute. Per abdominal examination showed abdominal distension with a diffuse tenderness and reduced bowel sounds. The erect Chest X-ray showed presence of air under the diaphragm which suggested gastrointestinal perforation. His condition worsened with time and subsequently succumbed to the injuries. An autopsy was done in the mortuary of District Hospital, Aligarh, Uttar Pradesh. In postmortem examination, externally there was an abraded wound at the anal margins. A huge gush of air was noted on opening the abdomen. The entire peritoneal cavity was soiled with faecal matter and blood, and the peritoneum showed the features of ulceration and peritonitis. Multiple seromuscular tears were present in the rectum and colon. The cause of death was opined as shock and haemorrhage as a result of colorectal injuries suffered due to transanal insufflation of the compressed air.

Discussion

Rectal perforation by foreign bodies along with iatrogenic injuries during colonoscopy is known, however barotrauma by compressed air is less often encountered. Few cases of transanal barotraumas due to compressed air leading to colonic injury have been reported from time to time. It was first reported in the literature in 1904.⁴ Similar case has been reported by Pahwa et al.⁵, in which high-pressure compressed air jet was playfully insufflated through the anal orifice of the victim resulting in sigmoid colon perforation. Colorectal injury can occur when the nozzle is merely placed near the anus, even when the clothes are worn.^{6,7}

Clothes do not protect the force of compressed air as the funnel shaped anatomy of the buttock facilitates the air to concentrate around the anus and allows the easy delivery of air through the anus. The most susceptible site for iatrogenic barotrauma is the

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caecum which have the largest diameter in colon. It is explained by the law of Laplace where the tension in the wall is proportional to the radius of the lumen.⁸ The various experimental studies have shown that the human colon bursts with only about 120–200 mmHg of pressure while seromuscular rupture occurs at lower levels.⁹ The cause of death can be acute air embolism, acute fat embolism, acute respiratory insufficiency due to increased intra-abdominal pressure, acute heart failure due to insufficient preload and peritoneal shock.¹⁰

A study done by Ali et al. showed 10 construction workers with an isolated perforation particularly in the left half of the colon.¹¹ Barotraumas can also be caused by a pneumatic pressure cleaner or during water sports when a crash on the water surface can lead to bowel perforation or rectal injury as a result of the water enema.^{12,13} The normal intestine of a dog required a pressure of 0.49-0.88 kg/cm² to get ruptured when Andrews used compressed air is used to distend the intestine.¹⁴ The average pressure needed to cause a full thickness tear in human gastrointestinal tracts is 0.29 kg/cm² which is shown by the study done by Burt.¹⁵ The highly compressed air which is used widely in industrial fields exerts a pressure higher than 10 kg/cm² and which is far greater than the pressure needed for intestinal perforation.

Conclusion

Barotrauma related colorectal injuries by compressed air are rare conditions which are encountered at the emergency departments. Trans-anal insufflations of compressed air often result in serious colonic injury. The decision to operate and its management must be taken in short span of time as its morbidity and mortality rates are high. Though negligent or intention injuries attract punishment under various laws of the country but it fails to address the social embarrassment and psychological traumas. It is a high time to implement strict safety guidelines at the workplace to discourage these types of incidents.

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