

# Anesthesia in Morgagni hernia with high PIP: A case report

## PIP değeri yüksek olan Morgagni hernili hastada anestezi: Olgu sunumu

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### Abstract

Morgagni hernia, a congenital diaphragmatic hernia, is usually asymptomatic. Surgery should be planned as soon as possible after diagnosis. The observation of variable degrees of pulmonary dysplasia and increased vascular resistance, and the presence of heart or other organ disorders make anesthesia management important. We describe the anesthetic management of a 2.5-month-old patient operated due to Morgagni hernia. Following intubation, peak inspiratory pressure was high, but rapidly returned to normal levels after the abdomen was opened. No complications were observed during this process in terms of anesthesia management.

**Keywords:** Congenital diaphragmatic hernia, Morgagni hernia, Anesthesia

### Öz

Konjenital diyafragma hernilerinden biri de morgagni hernisi olup genellikle asemptomatik seyredir. Tanı konulduktan sonra cerrahi en yakın zamanda planlanmalıdır. Değişken derecelerde pulmoner displazi ve artmış vasküler direnç varlığının gözlenmesi, kalp veya başka organ bozukluklarının mevcudiyeti anestezi yönetimini önemli kılar. Biz de olgumuzda morgagni hernisi nedeniyle opere olan 2,5 aylık hastamızın anestezi yönetimini paylaşmayı amaçladık. Olgumuzun entübasyon sonrası ölçülen PIP değeri yüksek olup batin açıldıktan sonra normal düzeylere hızlı bir şekilde ulaştı. Bu süreçte anestezi yönetimi açısından herhangi bir komplikasyon gözlenmedi.

**Anahtar kelimeler:** Konjenital diyafragma hernisi, Morgagni hernisi, Anestezi

## Introduction

Congenital diaphragmatic hernias (CDH) occur when the embryological development process fails to completely close the diaphragmatic muscle. The intra-abdominal organs are thus displaced into the thorax, which adversely affect the structural development of the thoracic organs. The reported incidence of the disease is between 1:2,500 and 1:3,500 [1]. Anterior diaphragmatic hernias, known as Morgagni hernias, represent one component of this group, with an incidence of 1-6% [2]. Patients are usually asymptomatic after birth and exhibit no symptoms until later ages [3]. Symptomatic patients usually exhibit pulmonary infection, dyspepsia, dysphagia, chest pain, and upper gastrointestinal obstruction [2]. In this case report, we describe the anesthetic management of a patient operated for Morgagni hernia who had high peak inspiratory pressure (PIP).

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Informed Consent: The authors stated that the written consent was obtained from the parents of the patient presented with images in the study.

Hasta Onamı: Yazar çalışmada görüntüleri sunulan hastanın ebeveynlerinden yazılı onam alındığını ifade etmiştir.

Conflict of Interest: No conflict of interest was declared by the authors.

Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Financial Disclosure: The authors declared that this study has received no financial support.

Finansal Destek: Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

Published: 5/17/2020

Yayın Tarihi: 17.05.2020

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## Case presentation

A 2.5-month-old male weighing 6 kg was admitted to hospital with respiratory distress and inability to pass stool. The patient had been delivered at the 40<sup>th</sup> gestational week by cesarean section, weighing 3,600 g, and experienced neither respiratory distress nor cyanosis after birth. Posteroanterior and lateral lung radiography showed that the bowel loops were herniated into the thorax, and abdominal ultrasonography revealed omental fat tissues extending superiorly from an 8-mm wide area into the epigastric region, which led to the diagnosis of Morgagni hernia (Figure 1). Surgery was planned by the pediatric surgery department. Preoperative respiratory and cardiological examinations were normal. Laboratory parameters were within normal limits. The patient was taken to the operating room without premedication for 4 hours had passed since oral feeding, and monitored with electrocardiography (ECG), peripheral oxygen saturation (SPO<sub>2</sub>) and end tidal carbon dioxide (ETCO<sub>2</sub>) values. Vascular access was achieved, and fluid replacement was started with 1/3 Isodex at 160 ml/h. He was preoxygenated with 100% oxygen, and induction was performed with 0.5 mg/kg midazolam (Zolamid 5 mg / 5 ml, Vem Pharmaceutical Industry, Istanbul, Turkey), 1 mcg / kg fentanyl (Talinat 0.5 mg / 10ml, Vem Pharmaceutical Industry, Istanbul, Turkey) and 5 mg/kg pentothal (Pental sodium 1 g, I.E. Ulagay Pharmaceutical Industry Inc., Istanbul, Turkey). Rocuronium at a dose of 0.6 mg/kg (Muscuro 50 mg / 5 ml, Kocak Farma Pharmaceutical and Chemical Industry, Istanbul, Turkey) was administered for muscle relaxation, and positive pressure ventilation was avoided. After complete muscle relaxation, endotracheal intubation was performed without difficulty at the first attempt using an uncuffed tube with a 3 mm internal diameter. Anesthesia was maintained with a 50% -50% oxygen-air mixture and 2-2.5% sevoflurane (Sevorane, Abbott Laboratories, Istanbul, Turkey). Tidal volume was adjusted to 8 ml/kg/min, frequency to 22 breaths/min and ETCO<sub>2</sub> to 30-40 mmHg.



Figure 1: Lateral lung radiography showing herniated bowel loops into the thorax

## Discussion

Morgagni hernia, a common entity in the pediatric age group, was first described by Morgagni in 1761. The hernia is usually located on the right and is more common in men [3,4]. Although the disease is not hereditary, comorbidity with hereditary heart diseases and other genetic diseases is present in 34-50% of cases [5]. The disease usually progresses asymptotically until it is diagnosed incidentally in the emergency department [3]. Diagnosis is based on posteroanterior and lateral lung radiography, while thorax computed tomography (CT) and ultrasonography (USG) are also helpful [2]. Our patient was asymptomatic until presentation to the emergency department with respiratory distress and bowel disorder. Diagnosis of Morgagni hernia was based on the presence of intestinal loops in the thorax at X-ray, supported by USG.

Since patients with CDH have a high likelihood of strangulation and incarceration, which can lead to life-threatening conditions, they should be operated immediately after diagnosis [4]. According to the CDH EURO consortium consensus published in 2010 and updated in 2015, surgical repair of these patients should be performed after physiological stabilization [6].

Surgical treatment methods vary in different centers depending on the patient's clinical status, and repair is usually performed using laparotomy [7]. Although laparoscopic surgery has some advantages over open surgery, laparoscopic intervention is complicated by low mean age and body weight, the presence of varying degrees of pulmonary dysplasia, increased vascular resistance, and the presence of heart or other organ disorders [8,9]. In our case, open surgery was adopted as the surgical method because of the patient's low body weight.

The main purpose of anesthesia management in these patients is to prevent an increase in intra-abdominal pressure. Otherwise, such pressure increase will cause diaphragmatic tearing, and displaced organs to the thorax may exert pressure on the heart as a result [10]. Inhalation agents should be administered to these patients because they do not irritate the airways, prevent bronchoconstriction, and are easy to control [11]. However, the use of nitrogen protoxide should be avoided as it may cause enlargement of the intra-abdominal organs [12]. Careful adjustment of the mechanical ventilator is essential as hypoxemia and carbon dioxide retention may occur because of positive pressure ventilation [13]. At the same time, high PIP values (>35-40 cmH<sub>2</sub>O) should be avoided to protect the patient from pressure-related complications [14]. In addition, preoperative acid-base balance and electrolyte values should be brought to normal limits to prevent pulmonary hypertension, pulmonary vasoconstriction, hypoxemia, and hypercapnia [15]. In our case, preoperative laboratory values were normal. Consistent with the previous literature, we used inhaler general anesthetics in our case and observed PIP elevation after intubation. However, PIP values regressed to normal levels following opening of the abdomen. Vital signs were stable during surgery, and no additional problems occurred.

As in other patients undergoing thoracic surgery, postoperative pain management is important in these cases due to its restrictive effect on respiration. Otherwise, the risk of atelectasis, hypoxia and infection may increase [11]. Analgesic

control in our case was established with rectal paracetamol. No complications were encountered in the recovery room or follow-up on the ward.

### Conclusions

Patients with Morgagni hernia are usually diagnosed incidentally, and the surgical procedure after diagnosis is important for anesthesia. Although there is no specific anesthetic management, selection should be made depending the clinical status of the patient and the surgery to be performed.

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