



CASE REPORT - ANAESTHETIC MANAGEMENT OF LATE ONSET OF CONGENITAL DIAPHRAGMATIC HERNIA REPAIR OF AN ELDERLY FEMALE.

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ABSTRACT Adult onset congenital diaphragmatic hernia (CDH) is uncommon but not rare. The defect tends to be small and patients may remain asymptomatic and diagnosed incidentally. When these patients become symptomatic, they usually present with gastrointestinal and cardiorespiratory symptoms or sometimes as an emergency due to obstruction or strangulation of herniated viscera. Chest radiograph, computed tomography scan, and magnetic resonance imaging are the imaging modalities used for diagnosis of CDH. Cardiopulmonary compromise due to mass effect of hernial contents on lungs, heart and great vessels, and obstruction or strangulation of herniated viscera poses the special challenge before anesthesiologists. Our patient was diagnosed to have diaphragmatic hernia, at the age of 50 years and underwent laparotomy for the same. This case highlights the key feature of the successful anesthetic management of adult onset CDH.

KEYWORDS : Anesthetic management, congenital diaphragmatic hernia.

INTRODUCTION:

Late-onset congenital diaphragmatic hernia (CDH) accounts for only 5–30% of all CDH. Herniation of abdominal viscera in the thoracic cavity through foramen of Morgagni may produce severe cardiopulmonary or gastrointestinal complications. Our patient became symptomatic for the 1st time at the age of 50 years, which is quite rare. She had a history of acid peptic disease and presented with worsening of cardiorespiratory symptoms. Diagnosis of diaphragmatic hernia was made on the basis of clinical and radiological findings. In this case report, we present the successful anesthetic management of a late onset diaphragmatic hernia repair in the 50-year-old female patient.

CASE REPORT:

A 50-year-old female patient; weighing 56 kg was presented with complaints of worsening of dyspnea and frequent chest infection for last 6 months. One and a half year back patient sought medical advice for recurrent abdominal pain, nausea and vomiting. She was diagnosed as APD moderate esophagitis at that time. Since then she had on and off epigastric discomfort. Patient had no past history of surgery or trauma. Patient was examined and on auscultation there were decreased breath sounds on the lower part of left side of the chest. Chest X-ray was advised, and it showed gas-filled bowel loops in left hemithorax with blunting of left costophrenic angle. For further evaluation, computed tomography (CT) scan of the thorax was done, and it showed large defect in left posterolateral hemidiaphragm with stomach, spleen, tail of pancreas and hepatic flexure of colon herniating as contents, suggesting of diaphragmatic hernia. Diagnosis of late onset symptomatic left-sided CDH was made, and the patient was scheduled for laparotomy.

During preanesthetic check-up, patient was tachypneic but maintaining oxygen saturation (SpO₂) 98% on air. Airway Mallampati grade II and systemic examination was normal except decreased breath sounds over the lower part of left hemithorax. Laboratory investigations, electrocardiogram (ECG), and echocardiography were normal. Surgery was performed by team approach of Cardiothoracic & General Surgeon. Combined balanced general and epidural anesthesia was planned.

At arrival in operation theater, patient's pulse rate was 92 beat/min, her blood pressure was 116/74 mmHg and SpO₂ on room air was 97–98%. Large gauge intravenous access was secured. Thoracic epidural catheter (T10-T11) was placed before the induction of anesthesia. The patient received aspiration prophylaxis and premedicated with intravenous glycopyrrolate 0.2 mg and midazolam 1 mg. Nasogastric

tube was inserted, and stomach was deflated. After preoxygenation, rapid sequence induction was performed using fentanyl 100 µg, Inj propofol 100 mg and inj scholine 75 mg. Trachea was intubated with 7.5 No. portex endotracheal tube. Anesthesia was maintained with vecuronium, isoflurane, 50% O₂ in the air and controlled mode ventilation. Lungs are kept down on and off in the initial phase of surgery as per surgeon demand and once diaphragmatic defect was repaired both the lungs were ventilated properly. After repair of diaphragmatic defect 100% O₂ and positive end expiratory pressure (PEEP) was used. Intraoperative monitoring was instituted with ECG, SpO₂, EtCO₂, temperature, urine output, invasive blood pressure, and central venous pressure (CVP) with double lumen catheter in right internal jugular vein. CVP measured at starting of surgery was found 16 cmH₂O. Laparotomy was done with midline incision and a defect was found in posterolateral part of diaphragm (approximately 5 cm × 3 cm) through which transverse colon, small intestine, omentum, spleen & tail of pancreas were herniating in the left hemithorax. Left hemithorax was decompressed by returning the viscera into the abdominal cavity, and the defect was closed with primary suturing. As the thorax was decompressed, CVP came down to 10 cmH₂O.

At the completion of surgery, residual neuromuscular effect was antagonized with standard doses of glycopyrrolate and neostigmine and the trachea was extubated, then the patient was shifted to postanesthesia care unit. Patient tolerated the procedure well and remained hemodynamically stable. Epidural morphine was given for pain relief. Postoperative chest X-ray was done, and it was normal.

DISCUSSION :

The incidence of CDH is 1:2000–1:5000 with equal gender preferences. The defect arises during early embryological development (around 10 weeks) due to incomplete closure of the diaphragm or early migration of the mid gut from umbilical coelom in to the abdominal cavity before the diaphragm is fully developed. Three common sites of herniation are: (A) Posterolaterally through foramen of Bochdalek (78–90%) (B) esophageal hiatus (14–24%) (C) retrosternally through foramen of Morgagni (1.5–6%). Beyond infancy, CDH is an unusual finding. CDH study group conducted a 10-year study across 30 centers revealed that of total 3098 cases only 79 (2.6%) presented with late onset. This emphasizes the rarity of our case as our patient was 50-year-old at the time of presentation.

Late onset CDH are more difficult to diagnose as sign and symptoms become chronic, vague, and inconsistent. Symptoms can be either cardiorespiratory or gastrointestinal, with the latter becoming more

common as the age of onset of symptom increases. Suspicion of CDH should be aroused when patient presents with both cardiorespiratory and gastrointestinal symptoms and on examination when there is decreased breath sounds in either hemithorax. To confirm the diagnosis, chest radiographs are the most commonly performed and initial imaging modality to evaluate the diaphragm. Sometimes, CDH may be misdiagnosed as pleural effusion or hydro-pneumothorax on chest X-ray. When chest radiographs are indeterminate, spiral CT and magnetic imaging must be considered for evaluating diaphragm.

In cases of adult-type disorder, the acute herniation of viscera through congenital diaphragmatic defect is considered to be induced by an elevation of intraperitoneal pressure, once in the thoracic cavity the viscera usually remain there due to abdomino-thoracic pressure gradient. Although there was no history of trauma, but our patient had a history of the acid peptic disease, reflux esophagitis, nausea, and vomiting. These could be the initial symptoms of herniation of abdominal viscera, but that were missed and the patient was treated as an acid peptic disease, later on she developed severe cardiorespiratory insufficiency. Herniated viscera in the thorax may produce mass effect and can lead to cardiovascular impairment by compression of heart and mediastinal shift which can kink vena cavae, pulmonary veins, impair venous return to heart and cause cardiac output to decrease.

Anesthetic management of a patient diaphragmatic hernia remains challenging for anesthesiologists. Patient with CDH should be considered as full stomach because of possible gastrointestinal obstruction, and, therefore, these patients required aspiration prophylaxis. Nasogastric tube should be inserted and aspirated before induction. Large gauge intravenous access is necessary to manage any hemodynamic instability. Invasive blood pressure and CVP monitoring should be the standard practice considering combined mass effect of herniated viscera, and inflated lung may lead to cardiorespiratory impairment.

Whenever possible or when the difficult airway is anticipated, awake fiberoptic intubation is the gold standard otherwise rapid sequence induction with cricoid pressure must be considered. We opted for rapid sequence induction with cricoid pressure. Surgical approach either laparotomy or thoracotomy collapsed lung should not be inflated to avoid the combined mass effect of herniated viscera and inflated lung, in this way, Double Lumen Tube is helpful. However, due to unavailability of DLT, we used single lumen portex endotracheal tube with low tidal volume & low airway pressure strategy. Anesthetic agents which are cardiac depressant should not be used; in our case we used low dose propofol and fentanyl.

Any event which increases intraabdominal pressure especially during induction, intubation, and extubation is detrimental. Positive pressure ventilation with potential gastric insufflation and expansion of compressed lung may decrease venous return and cardiac output. For the same reason we used recommend low tidal volume and low airway pressure strategy. Nitrous oxide may also worsen mass effect should, therefore, be avoided.

Early diagnosis and management of symptomatic CDH is advisable otherwise patients having CDH may present as acute bowel obstruction or cardiorespiratory distress and taken for emergency surgery.

Laparoscopic repair of CDH hernia has also been described and is considered to be safe and effective procedure, but it provide different challenges for anesthesiologists as there are more chances of pneumothorax and very high airway pressures during procedure. Basic principles of anesthetic management remain the same, and to avoid pneumothorax, intraabdominal pressure should be kept low, and one must avoid nitrous oxide. If there is a decrease in SpO₂ during the procedure, ask for lowering the intra abdominal pressure or stop surgery and ventilate the lung with 100% oxygen and PEEP. Post procedure chest radiograph should be advised to look for pneumothorax.

CONCLUSION:

Anesthetic management of CDH repair in adult patients is challenging for anesthesiologists and requires special care. Aspiration prophylaxis, awake fiberoptic intubation or rapid sequence induction, lung isolation technique, meticulous monitoring, adequate plane of anesthesia and avoidance of nitrous oxide is the key of successful anesthetic

management.

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