= Abstract =

A Central Diaphragmatic Eventration with Accessory Hepatic Lobe
Causing Cardiac Compression.

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A case of congenital diaphragmatic eventration on the right and central tendinous portion
with accessory hepatic lobe causing direct compression of the right heart is presented. We
have performed the video assisted thorascopic plication of the right hemidiaphragm and
eliminated the mass effect of the accessory hepatic lobe.

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Key words: 1. Diaphragmatic eventration
2. Cardiac compression.
3. Thoracopy

Introduction

Congenital diaphragmatic eventration may involve either the
right or left diaphragm, or it may be bilateral [1-3]. Eventration of
the diaphragm on the central tendinous portion with accessory
hepatic lobe causing external compression of the heart has not
been reported in the other literature [4-7]. Herein we describe a
first case of the combined right hemidiaphragmatic eventration,
plicated by video assisted thorascopy and eventration of the
diaphragm in the central tendinous portion, namely central
diaphragmatic eventration with accessory hepatic lobe that cause
direct compression of the heart and result in deterioration of the
hemodynamics (Fig. 1).

Case Report

A 3-day-old boy who weighed 2,885g was referred to our
department with cyanosis on crying or feeding. The patient was
a full-term baby from the second gestation of a 43-year-old
mother. On physical examination, the chest was expanded
symmetrically and the cardiac murmur was not auscultated.
Blood examination and arterial blood gas analysis on room

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Fig. 1. Schematic presentation of summarized surgical findings. The elevated right and central membranous diaphragm impacted with accessory hepatic lobe were noted.

air showed as following: hemoglobin 17.7g/dL, hematocrit 53.5%, serum calcium 6.9 mg/dL, PaO₂ 38.5 mmHg, PaCO₂ 34.2 mmHg and oxygen saturation 75.3%. The chest x-ray performed on admission showed the elevation of the right hemidiaphragm and the presence of a mass like density enlarging the right cardiac profile. Computed tomography of the thorax and transthoracic echocardiogram identified that the right atrium and ventricle were considerably reduced in diameter and compressed on its antero-lateral wall by sonographically homogenous mass(Fig. 2). These findings were considered to be consistent with diaphragmatic evagination caused by accessory hepatic lobe. The respiratory distress progressed, accompanied by progressing hypercarbia and hypoxia.

On fifth day of life, right diaphragm was plicated by video assisted thoracoscopic surgery with previous reported our sliding loop ligation method. Only a small window and one port of access were necessary to plicate the diaphragm and to apply the extracorporeally created sliding knot.

Although his respiratory status was improved gradually allowing discontinuation of mechanical ventilation after operation, cyanosis on the lip was persisted and protracted low oxygen support was required. Serial chest radiographs obtained over the next week and postoperative echocardiogram displayed the remained mass effect to the right ventricle.

On day-of-life 13, central diaphragmatic plication was performed via a laparotomy. Accessory hepatic lobe shaped as like as a head of snowman in the right side of the falciiform ligament was impacted on the membranous central
portion of the diaphragm. After the falciform ligament was divided, plication was performed using traction sutures on the both muscular margins to eliminate the mass effect of the accessory hepatic lobe to the heart.

Postoperative recovery was uneventful, and the patient was sent home on day-of-life 19. He is well 12 months after operation.

**Discussion**

Evagination of the diaphragm of the infant has been reported but congenital evrotations on right and central leaflet with accessory hepatic lobe has not reported.

It is now generally accepted that surgical treatment is indicated in symptomatic diaphragmatic evroration. Diaphragmatic plication is technically simple, easy and straightforward with a very low complication rate when carefully performed and a thoracic approach is mandatory for optimal access. Recently, some authors have reported a video-assisted thoracoscopic plication of the diaphragmatic evroatation in adult, but not in infancy. Narrow intercostal space and difficult one lung ventilation during the operation make it difficult to introduce the video assisted thoracoscopic surgery in neonate. Applying the extracorporeal created sliding knot with the small window and one port of access for thoracoscopy, we have performed right hemidiaphragmatic plication with easy by video-assisted thoracoscopic surgery and concluded that the plication of central diaphragmatic evroatation should be strategistized via abdominal approach. We believe this is the first report of thoracoscopic plication in the pediatric age group.

The dome of the right hemidiaphragmatic leaf is normally at a higher level than is that of the left. It has been generally thought that this is the result of the hepatic mass beneath the right leaf. However, this view has been brought into question by the studies of Reddy and colleagues. They insisted that the cardiac mass determined the caudad displacement and lower position of the related hemidiaphragm from the review of sixty-five cases of congenital heart disease. We thought that their analysis based on a supine posteroanterior chest roentgenograms took a little account of gravity of the liver and the development of the diaphragm. In a neutral upright position, the gravity of the liver is transmitted to the left diaphragm through the falciform ligament and convexed right lobe of the liver may affect the elevation of the right hemidiaphragm. Our case may be one of the evidence of lifting effect of the liver to the diaphragm. We thought what dictates the position of the diaphragm is the liver, not a heart.

We have described a case of combined central and right hemidiaphragmatic evroatation causing direct compression of the heart and presented with deterioration of the hemodynamics.

**References**

=국문초록=

선천성 황격막 기상증은 우측이나 좌측 또는 양측으로 발생할 수 있다고 알려져 있다. 황격막의 중앙부위와 우측 중앙 전략부위에서 간 부위에 의해 심장암막이 동반된 선천성 황격막 기상증 환자가 있어 비디오 홍강 경을 통한 황격막 주행 성형술을 시행하였던 증례를 보고하고자 한다.

중심 단어: 1. 황격막 기상증
           2. 심장암막
           3. 비디오 홍강경