Sol Akciğer ve Safra Kesesi Agenezisi ile Birlikte Bilateral Diyafragma Agenezisi

Leyla Karadeniz[1], Şirin Güven[1], Enver Atay[1], Fahri Ovalı[1], Osman Pektaş[2], Ayşenur Celayir[2]

[1]Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi, Yenidoğan Yoğun Bakım Ünitesi, İstanbul, Türkiye

[2]Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi, Çocuk Cerrahisi Kliniği, İstanbul, Türkiye

Yazışma Adresi : Zeynep Kamil Hastanesi İstanbul – Türkiye

Tel: 0 532 445 20 74 **e-mail:** leylakaradeniz@yahoo.com

ÖZET :

Giriş: *Konjenital diyafragma hernisi sık görülen doğumsal anomalilerden biri olmasına rağmen, bilateral total diyafragma agenezisi oldukça nadirdir ve sıklıkla diğer major anomaliler ile birliktelik göstermektedir. Makalemizde major konjenital anomaliler ile birlikte bilateral diayafragma agenezisi olan bir vakayı sunduk.*

Vaka: *2240 gram ağırlığında, 35 gestasyon haftasındaki erkek bebek 34 yaşındaki anneden acil sezaryanla doğurtuldu. Prenatal takip yetersizdi ve 1. düzey USG'da polihidramniyos saptanmıştı. Doğum odasında solunum sıkıntısı olan bebek entübe edildi. 1, 5, ve 20. dakika Apgarları sırasıyla 2/1/1 olan hasta, ressusitasyona cevap vermedi ve postnatal 2. saatinde kaybedildi. Otopside bilateral diyafragma agenezisi ile birlikte sağ pulmoner hipoplazi, sol pulmoner agenezi, multiple kardiyak anomali ve safra kesesi agenezisi tespit edildi. Sitogenetik çalışmalarda normal erkek karyotip saptandı.*

Sonuç: *Bilateral diyafragma agenezisi mortalitesi yüksek olan bir konjenital anomalidir ve prognoz hastaların kardiyopulmoner fonksiyonlarına bağlıdır. Ayrıca safra kesesi agenezisi ve pulmoner agenezi ile birlikteliği oldukça nadirdir. Klinik açıdan bu durum daha ileri araştırma gerektirebilir.*

Anahtar Kelimeler: *Bilateral diyafragma agenezisi, Konjenital diyafragma hernisi, Pulmoner hipoplazi,*

SUMMARY :

Bilateral agenesis of diaphragm with agenesis of left lung and gall bladder

Background: *Although congenital diaphragmatic hernia is one of the most common congenital anomalies, complete bilateral agenesis of the diaphragm is a very rare congenital malformation and associated frequently with other major anomalies. We report a case of bilateral diaphragmatic agenesis associated with major congenital anomalies.*

Case: *A 2240g male infant was born at 35 weeks' gestation to a 34-year-old mother with a history of minimal prenatal care. Polyhydramnios was reported on prenatal level 1 scan. He experienced early respiratory distress requiring intubation. Apgar scores were 2/1/1 at 1, 5 and 20 minutes, respectively and efforts to resuscitate him were unsuccessful. He died at 2 hours of age. Autopsy revealed bilateral diaphragmatic agenesis associated with right pulmonary hypoplasia, left pulmonary agenesis, multiple cardiac abnormalities and gall bladder agenesis. Cytogenetic studies showed normal male karyotype.*

Conclusions: *Bilateral agenesis of the diaphragm is a life-threatening malformation. Survival of these infants often depends on cardiopulmonary function. Also, bilateral agenesis of the diaphragm associated with gall bladder and unilateral pulmonary agenesis is a rare entity and its clinical significance needs further investigation.*

Key Words: *Bilateral diaphragmatic agenesis, Congenital diaphragmatic hernia, Pulmonary hypoplasia*

INTRODUCTION

The development of the diaphragm occurs early in gestation via a fusion of the embryonic pleuroperitoneal membrane and the transverse septum. During the third week of gestation,

the fusion of the transverse septum with the dorsal mesentery of the foregut creates two openings whereby the thoracic and abdominal contents meet. During the ninth week of gestation, these openings close. Thus any process inhibiting the closure of these channels may lead to defects in the diaphragm, including congenital diaphragmatic hernia (CDH) and diaphragmatic agenesis (1).

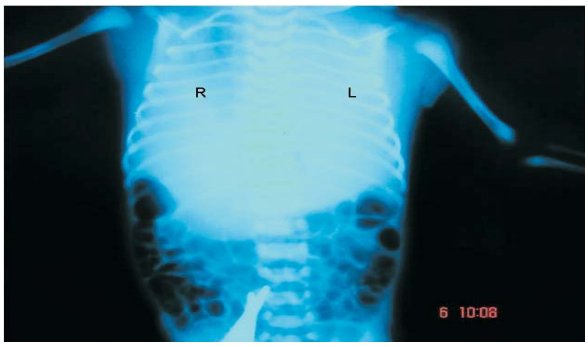
Among the causes of severe respiratory failure in the newborn, congenital diaphragmatic defects remain the most life threatening. Despite recent advances in prenatal diagnosis, neonatal intensive care and surgery congenital diaphragmatic defects continue to have high mortality of up to 38 - 62% (1,2). Although congenital diaphragmatic hernia is one of the most common congenital anomalies, complete bilateral agenesis of the diaphragm is a very rare variant (3). Survival of these infants often depends on cardiopulmonary function and the presence of other major congenital anomalies and chromosomal defects (4-6).

Here, we present a case of bilateral diaphragmatic agenesis associated with major congenital anomalies. Findings at autopsy are presented and related literatures are reviewed.

CASE REPORT

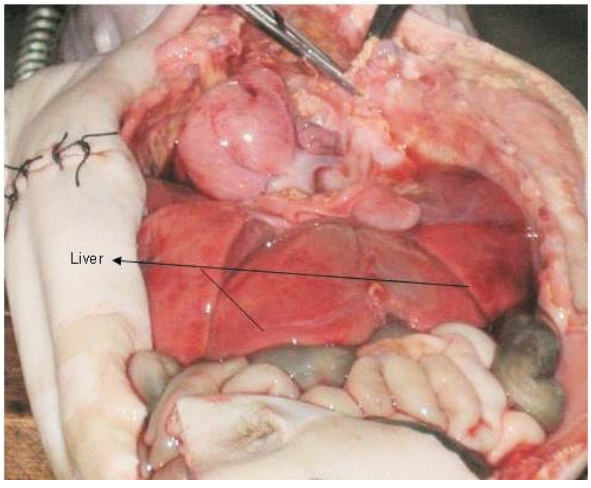
A 2240g male baby was born at 35 weeks' gestation to a 34-year-old gravida 1 para 0 woman by emergency c-section because of fetal distress. The mother had minimal perinatal care and no mid-trimester anomaly screen. The emergency prenatal ultrasound that was performed before the c-section demonstrated polyhydramnios. Family history was negative for consanguinity and genetic disorders. Weight, height and head circumference were within normal percentiles for age. Apgar scores were 2/1/1 at 1, 5 and 20 minutes, respectively. Baby experienced early respiratory distress was entubated at delivery room and transferred to the NICU. He was placed on a pressure- limited, time-cycled ventilator at PIP 30 cmH_2O, PEEP 5 cmH_2O, rate 50 breaths/min, F_{IO2} 1.0, inspiratory time 0.35 seconds, flow 8 L/min. The following arterial blood gas values were obtained from an umbilical artery catheter: pH 6.77, $Paco_2$ 102.9 torr, Pao_2 34.4 torr, base excess – 22.2, bicarbonate 12 mEq/L, and saturation 65%. Dopamine infusion was started because of hypotension.Physical examination showed cyanosis, bradycardia and absent bilateral breath sounds.Chest x-ray demonstrated minimal air in the right lung and no air in the left lung **(Figure 1)**. Despite aggressive resuscitative efforts, he died at 2 hours of age. When performing postmortem diagnostic laparotomy, liver and hypoplasic right lung were seen in the right side of the chest cavity.

Figure 1 : Chest x-ray shows minimal air in the right lung.



Autopsy revealed bilateral diaphragmatic agenesis associated with right pulmonary hypoplasia, left pulmonary agenesis, left atrial and ventricular hypoplasia, large atrial septal defect, aortic over-ride of the septum, pulmonary artery aplasia and gall bladder agenesis **(Figure 2)**. Cytogenetic studies showed a normal 46 XY male karyotype. Genetic counseling and detailed ultrasonographic examinations during subsequent pregnancies were offered to mother.

Figure 2 : Autopsy reveals bilateral diaphragmatic agenesis and hepatic herniation.



DISCUSSION

Bilateral congenital diaphragmatic hernia, previously identified through a limited number of case reports, is extremely rare and has been reported to occur in just under 1% of neonates with congenital diaphragmatic hernia. It is associated with a much higher incidence of associated anomalies and a higher mortality rate when compared with unilateral CDH (7).

Although no much statistical studies exist in the literature on the survival of the patients with bilateral diaphragmatic agenesis, survival rates of these patients have been reported to be depended more on cardiopulmonary function and associated anomalies than the size of the diaphragmatic defect (8). Greenwood et al. (9) found that cardiovascular abnormalities were present in 11 of 48 (23%) patients with congenital diaphragmatic hernia. Cardiac abnormalities included congenital heart disease, compression of a major vascular structure, cardiac malposition and abnormalities in pulmonary circulation. Fauza et al. (5) assessed that hypoplastic heart syndrome was the most common defect. In our case we found left atrial and ventricular hypoplasia, large atrial septal defect, aortic over-ride of the septum, pulmonary artery aplasia. Association of multiples cardiac anomalies with left pulmonary agenesis and right pulmonary hypoplasia influenced the survival of our patient. It is possible to detect CDH prenatally by performing ultrasound examinations early in the second trimester. A much lower survival rate was found in fetuses with polyhydramnios compared with those without (10). In our case, as detailed ultrasonographic examination was not performed during pregnancy, CDH and associated anomalies were not described on prenatal ultrasound. Although likely helpful in preparing the family, prenatal diagnosis would not improve prognosis in this case.Tonks et al. (6) found that 47% of the cases with congenital malformations of the diaphragm had additional structural or chromosomal anomalies; in their study the infant mortality rate for these complex cases was higher. Our case had a normal male karyotype. CDH is usually a sporadic, non-genetic malformation with very little risk of recurrence in subsequent pregnancies, but there have been some reports of familial recurrence in subsequent pregnancies (11,12). Cases of familial CDH tend to be isolated defects with a low incidence (3.6%) of additional malformations, whereas associated karyotypic or multiple anomalies have been reported in nearly 50% of sporadic cases of CDH (13). Because of this and negative family history of CDH, we suggest that interrupted normal embryogenesis in the early developmental stages of this infant might have caused this complex anomalies. However, according to study by Sripathi et al. (14), it is likely that parents of children with complete agenesis of the diaphragm have a significantly increased recurrence risk for future offspring. Therefore, genetic counseling and detailed ultrasonographic examinations during subsequent pregnancies were offered to our case's family. Furthermore, In this case, we present the first description of an infant with bilateral agenesis of the diaphragm associated with gall bladder and unilateral pulmonary agenesis. Whether there is any clinical significance or causal relationship between these anomalies needs further investigation.

In conclusion, bilateral diaphragmatic agenesis is a severe form of congenital diaphragmatic hernia with a worse prognosis especially when is in association with other anomalies. Although bilateral CDH is extremely rare congenital malformation, the clinician should be mindful of this possibility.

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