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FOUR DIFFERENT HERNIAS ARE ENCOUNTERED IN THE ANTERIOR PART OF THE DIAPHRAGM*

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SUMMARY: Salman AB, Tanyel FC, Şenocak ME, Büyükpamukçu N. (Departments of Pediatric Surgery, Atatürk University Faculty of Medicine, Erzurum and Hacettepe University Faculty of Medicine, Ankara, Turkey). Four different hernias are encountered in the anterior part of the diaphragm. Turk J Pediatr 1999; 41: 483-488.

A retrospective clinical study was performed to evaluate the hernias encountered in the anterior part of the diaphragm. Twenty patients (14 males, 6 females; aged 7 days-7 years) with hernias located in the anterior part of the diaphragm who were treated surgically formed the study group. The exact locations, contents and additional malformations were evaluated. The locations were parasternal in 14 and retrosternal in six. Parasternal locations were the right side in 11, left side in two and bilateral in one patient. Three patients had trisomy 21 syndrome. A sac was presented in all cases and included the colon in 12 patients. A patient with retrosternal location also had trisomy 21 syndrome. The patients with retrosternal hernias also presented with sacs, and the colon was the most commonly included viscus. In the presented series, no intrapericardial herniations or anteromedial defects were encountered. Comparison of previously reported patients and the present series suggests that the anterior part of the diaphragm hosts various hernias of congenital origin in its different locations. According to the exact location and the presence or absence of sacs, four different types of hernias occur in this area: retrosternal hernias with a sac, intrapericardial herniation, and parasternal and anteromedial hernias with either unilateral or bilateral involvements. Since four different hernias were distinguished, the term Morgagni hernia does not include or define all the hernias of the anterior part of the diaphragm. We believe they should, therefore be designated according to the location and presence or absence of a sac. *Key words: congenital diaphragmatic hernia, Morgagni hernia.*

Material and Methods

During a 15-year period from 1980-1995, 20 patients diagnosed with hernias located in the anterior part of the diaphragm in the Departments of Pediatric Surgery of Hacettepe Children's Hospital and of Atatürk University Hospital were evaluated retrospectively.

The exact localization of the defect was determined through preoperative radiological evaluations and operative findings.

The presence or absence of a sac, included organs and additional anomalies were recorded.

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Results

Twenty patients were diagnosed with hernias in the anterior part of the diaphragm. The locations were parasternal in 14 (10 males, females) six (4 males, 2 females) and retrosternal in six two (Table I). Parasternal locations were the right side in 11 (Fig. 1), left side in two (Fig. 2), and bilateral in one patient of the 14 with parasternal hernias, eight patients were younger than one year of age. Three patients, including one with ventricular septal defect (VSD) and patent ductus arteriosus (PDA), had trisomy 21 syndrome. A sac was presented in all cases and included the colon in 12 patients. Only one patient had malrotation.

Six patients with retrosternal hernias, five patients were younger than one year of age. One had trisomy 21 syndrome. The patients with retrosternal locations also had sacs and the colon was the most commonly included viscus (Fig. 3).

Midline epigastric incisions were used in 19 patients and a right thoracotomy was performed in one patient.

Postoperative courses were uneventful.

Table I: Clinical Characteristics of Patients

Patient	Sex	Age at Presentation	Site of Hernia	Organs in Hernia	Associated Anomalies
M.K.	F	7 days	Retrosternal	Left lobe of liver, small bowel	
Ö.B.	M	3 months	Right parasternal	Left lobe of liver, small bowel	
A.K.	M	4 months	Retrosternal	Colon	
K.G.	M	7 months	Right parasternal	Left lobe of liver, colon	Malrotation
S.G.	F	7 months	Right parasternal	Colon	
F.A.	F	8 months	Retrosternal	Left lobe of liver, colon	
K.S.	M	8 months	Right parasternal	Colon	Trisomy 21
T.C.	M	8 months	Right parasternal	Colon	
R.O.	M	9 months	Retrosternal	Colon, omentum	Trisomy 21
S.S.	F	9 months	Right parasternal	Colon	
H.B.	F	9 months	Left parasternal	Colon	Trisomy 21
H.A.	M	9 months	Left parasternal	Colon	
G.A.	M	11 months	Retrosternal	Colon	
Ö.Y.	M	4 years	Bilateral parasternal	Right colon, left small bowel	
S.I.	F	5 years	Right parasternal	Omentum	VSD+PDA Trisomy 21
C.F.	M	5 years	Right parasternal	Colon	
F.G.	M	5 years	Right parasternal	Colon	
M.K.	M	6 years	Right parasternal		
B.K.	M	6 years	Retrosternal	Colon	
H.B.	M	7 years	Right parasternal	Colon	

VSD: ventricular septal defect
PDA: patent ductus arteriosus.

Fig. 1: Parasternal hernia involving the right side (left: posteroanterior view; right. lateral view).

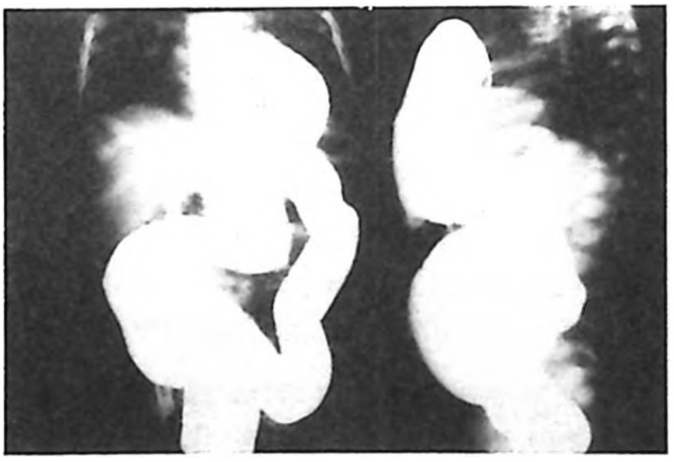

Fig. 2: Parasternal hernia involving the left side. (left: posteroanterior view; right: lateral view).

Fig. 3. Retrosternal hernia (left: posteroanterior view; right: lateral view)

Discussion

Although hernias are also encountered in the anterior part of the diaphragm, the term congenital diaphragmatic hernia describes the posterolateral form[1]. In contrast to the abundant studies and large chapters in textbooks, limited information is available for hernias encountered in the anterior part of the diaphragm.

Since the description of an anterior diaphragmatic hernia in an adult by Morgagni in 1761[14], all hernias encountered in this region are traditionally named as hernia of Morgagni. The hernia originally described by Morgagni had a parasternal location. The congenital origin has been questioned, and a direct herniation through the foramen of Larrey has also been suggested[2,15]. Therefore, the traditional nomenclature of Morgagni hernia may not satisfactorily explain the hernias seen in the anterior part of the diaphragm during the neonatal period and infancy. Additionally, these hernias have been evaluated under different titles, which suggests different anatomical locations. However, most of the cases were evaluated under the title of Morgagni hernia, and thorough evaluation of those reports fails to clarify the exact location and characteristics of the pathologies[8,16,17]. In any case, although evaluated under the title of Morgagni hernia, some reports suggest locations other than those described by Morgagni[11,12,18].

The evaluation of our clinical material revealed two different locations, parasternal and retrosternal, for hernias encountered in the anterior part of the diaphragm, with a parasternal location occurring more frequently.

The parasternal hernia was more frequent among males, and among those under one year of age in the present series. It frequently occurred in the right side. The 94 cases in the literature which were clearly defined with a parasternal location, also revealed a male predominance. Thirty were children and 64 were elderly. While the side in three patients was not clarified, right side, bilateral and left side locations were reported in 11, 9 and 5 patients, respectively[8,9,11,12,14,16,19,20]. All patients except one had sacs. One patient had an intrapericardial herniation. This suggests the case was suspect for a parasternal hernia. Although manuscripts do suggest the possibility of absence of sac, the two reports always referred to in this regard are subject to question on this point[16,17]. Hernias with parasternal location have right side predilection, but there is a tendency towards bilateral occurrence. The age distribution of those with parasternal locations resembles that of inguinal hernia, appearing more commonly among the elderly and infants.

Retrosternal hernia was more frequent among males and infants in the present series. All the patients also had sacs. Among six cases in the literature with hernias located retrosternally, four were children and two were adults and a had sacs[2,18,21,22]. A newborn patient with a retrosternal hernia also had bilateral posterolateral hernias.

Review of the literature also reveals patients with anteromedial defects and intrapericardial herniations. Anteromedial defects are also referred to as ventral diaphragmatic or septum transversum defects. They are described as semilunar defects of the ventral diaphragm extending dorsally almost to the vena caval opening and anterolaterally to the rib cage in the mid-clavicular line[8]. All 14 patients reported in the literature with anteromedial hernias were children. The frequency among males and females was equal. Three patients, including one with Cantrell's pentalogy and two others with omphalocele, had intrapericardial herniations[13,23,24].

Results of our clinical series and literature findings of location and age distribution suggest the parasternal hernia to be different from others. Retrosternal hernia, anteromedial hernia, and intrapericardial herniation might be the components of a spectrum. However, in Cantrell's pentalogy, retrosternal hernia with sac has not been reported[25]. Contrary to male predominance among patients with retrosternal hernia, equal sex distribution is encountered in anteromedial hernia, which may also occur without the other components of Cantrell's pentalogy. Isolated intrapericardial herniation however, has not been clearly documented. Therefore, it seems possible to suggest that four different hernias are encountered in the anterior part of the diaphragm: parasternal and anteromedial hernias with either unilateral or bilateral locations, and retrosternal and intrapericardial hernias. Since the normal embryologic development of the diaphragm remains controversial[26], proposing an embryologic basis for the hernias of the anterior part of the diaphragm is speculative.

The features of hernias encountered in the anterior part of the diaphragm are different from the features encountered in Bochdalek's hernia. Bochdalek's hernia is more frequent and follows a grave course. It is known that Bochdalek's hernia is usually without a sac and involves the left side, with a minimal tendency towards bilateral occurrence. Additionally, Bochdalek's hernia has an increased incidence among patients with trisomy 13 and 18[6], while the hernias of anterior diaphragmatic portion are more frequent in trisomy 21[14,12,20,27,28].

Since four different types of congenital hernias are encountered in the anterior part of the diaphragm, the traditional nomenclature of Morgagni's hernia is unsatisfactory. The anatomical location and presence or absence of a sac should be defined to clarify the exact type of the hernia in this region.

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