

# Morgagni Hernia in Infants and Children

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*The cumulative data regarding five cases of Morgagni hernias in infants and children over the last six years have been reviewed. All five patients were clinically normal upon presentation; however, the most common symptoms and signs were respiratory. Chest x-ray was the most common diagnostic test. The diagnoses were also later confirmed with preoperative barium meal studies. All of the patients had additional congenital anomalies, of which malrotation of the gut was the most commonly encountered. Upon operation, all of the cases contained a hollow viscus, and had a sac. The defects were repaired through abdominal approaches. There was no mortality and postoperative complication in these series.*

**Key Words:** Morgagni hernia, Infants, children

Congenital subcostosternal diaphragmatic hernia, described by Morgagni in 1761, is the least common congenital diaphragmatic hernia and usually arises late in life with minimal symptoms (Pokorny *et al.* 1984). These hernias are uncommon in infants and children (Berman *et al.* 1989). However, this paper reports such a type of hernia in five patients.

## MATERIAL AND METHODS

Within the last eight years, five infants and children with Morgagni hernia have undergone surgery at the Pediatric Surgery Department of Karadeniz Technical University and of Trakya University. The case notes of them were reviewed according to the following parameters: Age, sex, any preeminent symptoms and signs, operative approach, operative findings, and com-

plications and the associated anomalies.

## RESULTS

There were four females and one male between the ages of 7 days and 10 years. The main symptoms presented were related to the respiratory system (Table). No specific physical signs were observed on presentation in all patients. Chest x-rays revealed air-filled intestinal loops in four patients and displayed a solid mass in right side of the chest in the other patient (Fig. 1). Five preoperative barium studies were performed and all were diagnostic (Fig. 2). All of the cases had extra anomalies (Table). All the operations were performed through the abdomen. A hernia sac was present in each case. Their contents included the colon and the omentum in three patients, the stomach in one patient, and the small bowel and the liver in the last patient. Malrotation of the gut was seen in every case. The anterior diaphragmatic defects were repaired by suturing the diaphragmatic edge to the underside of the posterior rectus sheath at the costal margin after reduction of the hernia and resectioning of the sac.

In every case, the postoperative course was

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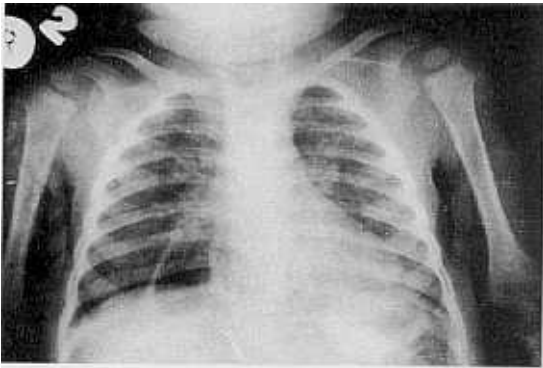
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**Table 1. Clinical features and operative findings of infants and children with morgagni hernia**

Patient	1	2	3	4	5
	1 week	10 mo.	10 mo.	10 yr.	9 mo.
	M	F	F	F	F
	Cyanose, tachypnea	Respiratory infection	Respiratory infection	Respiratory infection	Respiratory infection
Operative approach	Laparotomy	Laparotomy	Laparotomy	Laparotomy	Laparotomy
Site of hernia	Right	Right	Right	Right	Right
Organ in hernia	Small bowel, Liver	Colon Omentum	Colon, Omentum	Stomach	Colon
Associated anomalies	Grynfeld hernia, Meningomyelocele, Vertebra anomalies,  Malrotation of the gut	Malrotation of the gut	Malrotation of the gut	Congenital heart isease. Malrotation of the gut	Malrotation of the gut

M: Male, F: Female

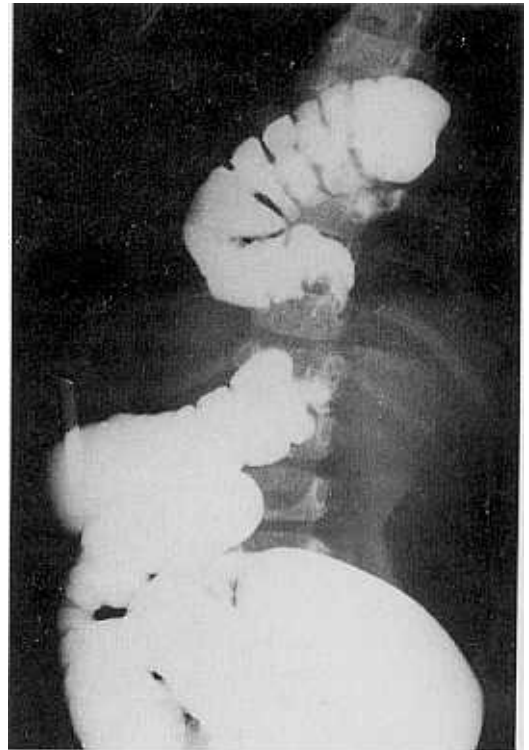


**Fig. 1.** Upright chest x-ray film showing single air-filled intestinal loop on the right side of the diaphragm in a ten month old infant.

uneventful. They were discharged within seven days after their operations. There were no hernia recurrences during the follow up period.

## DISCUSSION

Morgagni hernias occur infrequently in in-



**Fig. 2.** Barium meal studies of the gastrointestinal tract showing the intestine on the right side of the sternum in the thoracic cavity.

infants and children, representing only 1% to 6% of all congenital diaphragmatic defects (Cullen *et al.* 1990). The vast majority of Morgagni hernias arise after the neonatal period. One of our five patients was the newborn. Berman *et al.* in 1989 reported 15 cases at the Hospital for Sick Children in Toronto, during a 20 year period. In Gross' (1953) series of 91 children with diaphragmatic hernias, four had Morgagni hernias. In Bonham-Carter *et al.*'s series, 3 out of 66 children requiring operation possessed anterior defect, and Colling (1982) documented three Morgagni hernias. They occur more often on the right side (%90) and bilaterally (%7) (Baran *et al.* 1967; Thomass and Clitherow 1977), and our case is no exception since all of our patients had the hernia on the right side. There is a slight predominance in males and in older people (Baran *et al.* 1967; Cullen *et al.* 1985; Thomass and Clitherow 1977). The male to female ratio was 1/4 in our series. Gastrointestinal symptoms such as constipation, diarrhea, failure to thrive, vomiting and postprandial fullness, and respiratory symptoms such as infections and acute distress are the primary symptoms of Morgagni hernias (Berman *et al.* 1989). However, it may also be symptomless (Pokorny *et al.* 1984). Respiratory symptoms have been commonly observed in all our cases.

Except for the evidence of respiratory compromise, the physical examination contributes little to the diagnosis of Morgagni hernias (Pokorny *et al.* 1984). Most Morgagni hernias are discovered incidentally by observing air-fluid levels or solid masses in the retrosternal area, or by the discovery of suspicious radiologic findings which may be confirmed with barium meal studies, ultrasonography, radionuclide scan, and computerized tomography (Groff 1990; Thomass and Clitherow 1977). Diagnoses of our subjects were made by chest x-rays and barium meal studies.

The reported incidences of associated congenital defects are extremely variable (Berman *et al.* 1989). Congenital heart disease, mental retardation, abnormalities of the central nervous system, omphalocele, anomalies of the genitourinary system, pectus carinatum, trisomy 21, Turner syndrome, Prader-Willi syndrome, Down syndrome and Noonan's syndrome were reported

in association with Morgagni hernias (Berman *et al.* 1989; Pokorny *et al.* 1984; Lopez *et al.* 1993). Congenital heart diseases were the most commonly reported defect in the literature, however, in our research, abnormalities of the gastrointestinal system were common (Berman *et al.* 1989; Cakmak *et al.* 1990; Pokorny *et al.* 1984). Therefore, screening tests of patients may assist in determining the true incidence of associated anomalies.

In 50% to 100% of reported cases, the presence of the hernia sac was observed (Bingham 1959). These figures were supported by our research, which found the presence of hernia sacs in all cases. In our series, as well as others, the presence of a hollow viscus in Morgagni hernias was detected (Kimmelstiel *et al.* 1987; Pokorny *et al.* 1984). Acute intestinal obstruction and incarceration, and intestinal perforation due to Morgagni hernias have been rarely reported (Bingham *et al.* 1959; Cakmak *et al.* 1990; Kimmelstiel *et al.* 1987). These symptoms were not observed in our study. Based on the research of Randolph *et al.* (1981) and Harris *et al.* (1993); which noted the familial nature of diaphragmatic Morgagni hernias, family members of those patients with Morgagni hernias should be examined, whether they have Morgagni hernia or not. We have not encountered familial cases in our series. Surgical repair is recommended for all hernias of Morgagni in infants and children (Pokorny *et al.* 1984). Both transabdominal and thoracic approaches have been recommended (Wollock *et al.* 1974).

However, there were no such unexplained pneumopericardium, a rare but fatal postoperative complication which has appeared in the literature was not observed in any of our cases.

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