

Clinical observation between chronic sustained cough with asthma and childhood inguinal hernia

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Inguinal hernias are common and cause problems for the health services. Several factors are thought to influence their development. Patients under 16 years old who had received hernioplasty at National Taiwan University Hospital were enrolled in a study to analyze the correlation between preceding recurrent cough with asthma and later hernia development. Patients aged 5 and 6 years old (when admitted for hernioplasty in 2000) were particularly focused. This entailed further analysis of their birth history, family atopic history, specific allergic diseases (allergic rhinitis, atopic dermatitis, asthma), hernia type (direct or indirect), the onset of chronic cough and asthma. One hundred and sixty three patients (2.66%) from a total hernioplasty population of 6130 were found to have had preceding asthma with recurrent cough before having the hernioplasty intervention. One hundred twenty-five patients were aged 5 to 6 years old, among whom 8 (6.4%) patients were found to have asthma, and 20 (16%) patients were noted to have recurrent sustained cough. All the hernia types were indirect and were received with high suture ligation. In conclusion, the incidence of asthma was not significantly higher in the group of individuals receiving hernioplasty. However, a higher incidence of recurrent sustained cough was noted, which could be a relatively important factor for the hernia development. Further reliable cough measurements would be needed to evaluate the severity of recurrent sustained cough as the potential risk for the hernia development.

Key words: Asthma, child, inguinal hernia

Inguinal hernia is a common finding in infants and children and represents the condition most frequently requiring surgical repair in the pediatric age group [1]. A child with an inguinal hernia generally presents with an obvious intermittent bulge at the internal or external ring or within the scrotum. The great risk in inguinal hernia is the development of intestinal incarceration and possible strangulation that may increase the associated morbidity [2,3]. The cause of inguinal hernia in children can be congenital or acquired. In predominantly male populations, the risk factors that have been found to have associations are muscle defect (previous appendectomy or other abdominal operations), physical stress, intraabdominal pressure (constipation, ventriculo-peritoneal [VP] shunt, continuous ambulatory peritoneal dialysis [CAPD][4]), smoking [5], aging, pelvic fractures and trauma, connective tissue disease and systemic illnesses [6]. However, to our knowledge, all of these risk factors have never been quantified. Therefore, we performed a hospital-based

case study to investigate the association of asthma with recurrent chronic cough and the risk of inguinal hernia at National Taiwan University Hospital (NTUH).

Material and Methods

Patient collection

From January 1990 through December 2000, a total of 6130 patients (under 16 years old) underwent inguinal hernia repair in the pediatric surgical department at the NTUH. We reviewed their medical charts and interviewed them by telephone and collected further data from them with questionnaires. Patients with unilateral or bilateral inguinal hernias were included in this study, but those with umbilical, diaphragmatic, intraabdominal, femoral hernias and multiple congenital defects were excluded. The method of repair in all cases was high-sutured ligation at the level of the internal ring. We particularly focused on the patients who suffered from asthma and recurrent cough before the hernia repair. The incidence of asthma episodes in the hernioplasty group was recorded.

Patients aged 5 to 6 years old who underwent hernioplasty at the pediatric surgical department of

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NTUH in the year 2000 were further analyzed using the following parameters: birth history (prematurity), family atopic history, specific allergic diseases (allergic rhinitis [AR], atopic dermatitis [AD], asthma [AS]), frequency of recurrent cough, hernia type (direct and indirect), and time lag between asthma onset and hernia episodes. Specific allergic diseases including AR, AD, AS, and airway hyperresponsiveness were approved by at least 2 immunologists by clinical signs, symptoms and personal histories. A chronic cough was defined as having a cough lasting three weeks or more during each cough episode.

Results

Among the total number of 6130 patients who underwent hernioplasty, 409 patients were diagnosed as having asthma with chronic cough before or after the episodes of hernioplasty. Among those 409 patients, 163 patients were noted to have asthma, recurrent wheezing and cough before the episode of hernioplasty, and the incidence was 2.66%.

The records of 670 patients were analyzed to determine the age of onset of hernia (Fig. 1). More than 50% of the patients were found to have hernioplasty before the age of three. However, older patients were still found to have inguinal hernia but with fewer incidences than the younger patients. Selected patients of 5 and 6 years old ($n = 125$) were further analyzed, looking at their birth history, atopic histories, hernia types, and the lag period between the hernia and asthma episode (Table 1). All of the patients had indirect type hernias. A total of 18.4% of the patients were recorded to have atopic diseases among which AR accounted for 9.6%, AD accounted for 2.4%, and AS accounted for 6.4%. Almost all atopic patients (except 3 AD patients) were recorded to have a recurrent sustained cough and were diagnosed to have a hyperresponsive airway

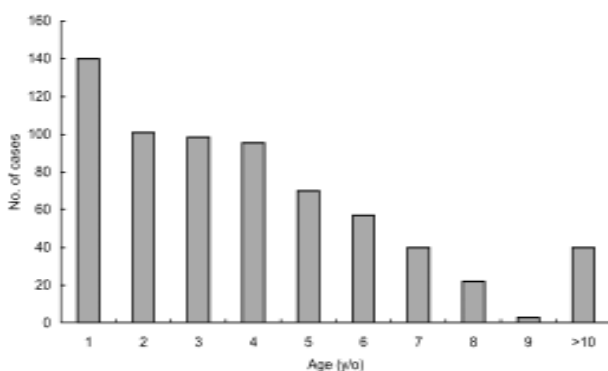


Fig. 1. Age distribution of hernioplasty patients at NTUH in 2000 ($n = 670$).

disorder by the immunologist.

Discussion

An inguinal hernia is the most commonly found problem in infants and children and represents the condition most frequently requiring surgical repair in the pediatric age group [1]. The incidence of inguinal hernias in children is estimated to be between 10 and 20/1000 live births. Approximately 50% will present before one year of age; most are seen in the first 6 months of life. Premature infants have a higher incidence of inguinal hernia, approaching 30% [4]. In our study, almost 50% of the hernia repair was done before the age of 3 years. However, later onset of hernia repair episodes was still found in the older age group. A number of factors and conditions are associated with an increased incidence of inguinal hernia [7] and the predisposing anatomical weaknesses are well known. The risk factors that have been found to be related with inguinal hernia are muscle deficiency (previous appendectomy or other abdominal operations), physical stress, increase of intraabdominal pressure (constipation, VP shunt, or CAPD) [4], smoking [5], aging, pelvic fractures and trauma, connective disease and systemic illnesses [3,6]. How the factors interact has not been clarified.

Asthma is a chronic inflammatory disorder of the airway. The chronic inflammation causes an associated increase in airway hyperresponsiveness that leads to recurrent episodes of wheezing, coughing, breathlessness, and chest tightness [8]. The relationship between airway hyperresponsiveness with chronic cough, asthma severity, and the development of inguinal hernia remains complex since a vigorous cough produces very high intrathoracic pressure and velocities [9].

In our study group (5 to 6 year-age group), among the total 125 hernioplasty patients, there were 12 patients (9.6%) born with GA <34 weeks, but none were noted to have respiratory complications. Patients (16%) who were facing problems of repeated chronic cough and under frequent medications were evaluated and were confirmed to have postnasal dripping with specific allergic diseases by the clinical immunologist. The incidence of asthma in the hernioplasty population (6.4%) was not significantly high, if compared with the current prevalence of asthma (about 14.8%) in the age matched pediatric population [10]. Of the patients with chronic cough (lasting 3 weeks or more for each cough episode), the mean age onset of cough was recorded to be 1.4 ± 0.86 years old with a range between 0.3 and 3.5 years old. Although cough is the most common symptom of respiratory disease, measurements for

Table 1. Characteristics of study patients (n = 125) who underwent hernioplasty at the age of 5 and 6 years old in 2000

	No. of cases	(%)
Age (boy/girl)	85/40	68/32
Birth history		
GA <34 weeks	12	9.6
GA >34 weeks	113	90.4
Onset of hernia		
5 y/o	70	56.0
6 y/o	55	44.0
Hernia type		
Direct	0	0
Indirect	125	100.0
Family history of atopy	34	27.2
Patient history of atopy	23	18.4
AR	12	9.6
AD	3	2.4
AS	8	6.4
Chronic cough	20	16.0
Onset of cough (y/o), mean \pm SD (range)	1.4 \pm 0.86 (0.3-3.5)	
Diagnosed age of asthma (y/o), mean \pm SD (range)	3.4 \pm 0.96 (2.0-4.1)	

Abbreviations: GA = gestational age; AR = allergic rhinitis; AD = atopic dermatitis; AS = asthma

cough severity are not well established. During vigorous coughing, intrathoracic pressures of up to 300 mm Hg and expiratory velocities of up to 28 000 cm/sec or 500 miles/h (85% of the speed of sound) may be generated. Although pressures and velocities allow coughing to be an effective means of clearing the airways of excessive secretions and providing cardiopulmonary resuscitation [10], they also can cause a variety of complications, of which a decrease in quality of life is the most common, and inguinal hernia is one of the complications. The severity of chronic cough was not determined in this study, though the potential risk of chronic cough could be one of the relative important factors in the increase of intrathoracic as well as intraabdominal pressure that may contribute to hernia development. Further reliable cough measurements as well as detecting increased intrathoracic and intraabdominal pressures would be needed to evaluate the correlation of the preceding chronic cough and hernia development.

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