BRONCHIECTASIS DUE TO CILIARY APLASIA IN TURNER'S SYNDROME*

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A seven-year-old girl with Turner's syndrome, who suffered from recurrent respiratory system infections since birth, was investigated to determine the etiology of bronchiectasis. Electron microscopy of recurrent nasal biopsy specimens revealed ciliary aplasia. Ciliary aplasia in Turner's syndrome, has not previously been reported.
Key words: bronchiectasis, ciliary aplasia, primary ciliary dyskinesia, Turner's syndrome.

Recurrent lower and upper respiratory system infections are not common findings in Turner's syndrome. In this report, we describe ciliary aplasia, a rare congenital disorder, in a girl with Turner's syndrome who suffered from recurrent respiratory system infections and bronchiectasis. To our knowledge no such association has been reported previously.

Case Report

A seven-year-old girl with Turner's syndrome was admitted to Hacettepe University Children's Hospital because of chronic cough, purulent sputum and chronic rhinitis since birth. There was a third-degree consanguinity in her parents; all four of her siblings were healthy. Previously, she had been followed with the diagnosis of bronchiectasis at another hospital, and a lobectomy of the right inferior lobe had been performed a year ago.

On physical examination, she had a height of 97 cm, and a weight of 15.5 kg, both of which were below the 3rd percentile. Her height and bone ages were

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3 years and 9/12 months, and 6 years, respectively. She was showing typical physical findings of Turner's syndrome[11]: short and webbed neck, low posterior hair line, cubitus valgus, short metacarpals, and widely spaced nipples. There was a purulent nasal and postnasal discharge. On chest examination, the breath sound was decreased on the right basal area, and rales were auscultated over both lung areas. The cardiovascular system examination was within normal limits except for bilaterally weak arterio-femoral pulses. Clubbing was present.

On laboratory examination, the peripheral chromosomal studies showed 45,XO Tuner's genotype. Coarctation of the aorta was diagnosed by echocardiographic and angiographic studies. Her chest radiograph showed chronic changes and bronchiectasis in both lung areas. The thoracal computerized tomography (CT) performed before the lobectomy demonstrated significant bronchiectasis of the right lower lobe. The follow-up thoracal CT, one yar after the operation, showed left lower lobe bronchiectasis. Histopathological examination of the lobectomy material showed bronchiectasis and reactive lymphoid hyperplasia. Sweat chloride and alpha-1-antitrypsin values were normal. The immunological tests which were performed were in normal limits: IgG: 1600, M: 205, A: 299 mg/dl; immunoglobulin G subclasses: G1: 1030, G2: 266, G3: 61, G4: 5.4 mg/dl; her blood group was A Rh positive; and anti B titer was 1/54. Polio antibody titers were T1: 1/4, T2: 1/8, T3: 1/8. Lymphocyte response to mitogens (phytohemagglutinin, concanavalin A) was normal; CH50:33 U/ml; T lymphocyte subsets: total T cell: 63%, B cell: 18%, helper/inducer: 34%. She did not cooperate with the nasal saccharin test. Nasal biopsies were done on three separate occasions over a six-month period, when the child was clinically well. The tissue was fixed immediately in two percent glutaraldehyde solution and processed for transmission electron microscopy. Cilia were rarely found in any of the three nasal biopsies. Whole areas of the sample were examined and a minimum of 250 cells were analyzed under the electron microscope. Epithelial cells were covered with numerous normal microvilli (Fig. 1); cilia and basal bodies were not found except in small number of cells having a few cilia (Fig. 2). These cilia had basal bodies and did not show any structural abnormalities (Fig. 3).

Discussion

Bronchiectasis is not one of the phenotypic changes in Turner's syndrome. Some immunological defects have been described in Turner's syndrome[2,7,8]. Abnormalities of the proportions of peripheral blood lymphocyte subpopulations and of immunoglobulin serum levels have been described in some patients affected by Turner's syndrome. However, we could not find such defects in our patient, and all the other immunological tests which were performed were in normal limits. All the other tests done to determine the cause of bronchiectasis,

Fig. 1: Electron microscopy of epithelial cells with surrounding microvilli and goblet cells. Cilia are not present (m: microvilli) (magnification: x3,000).

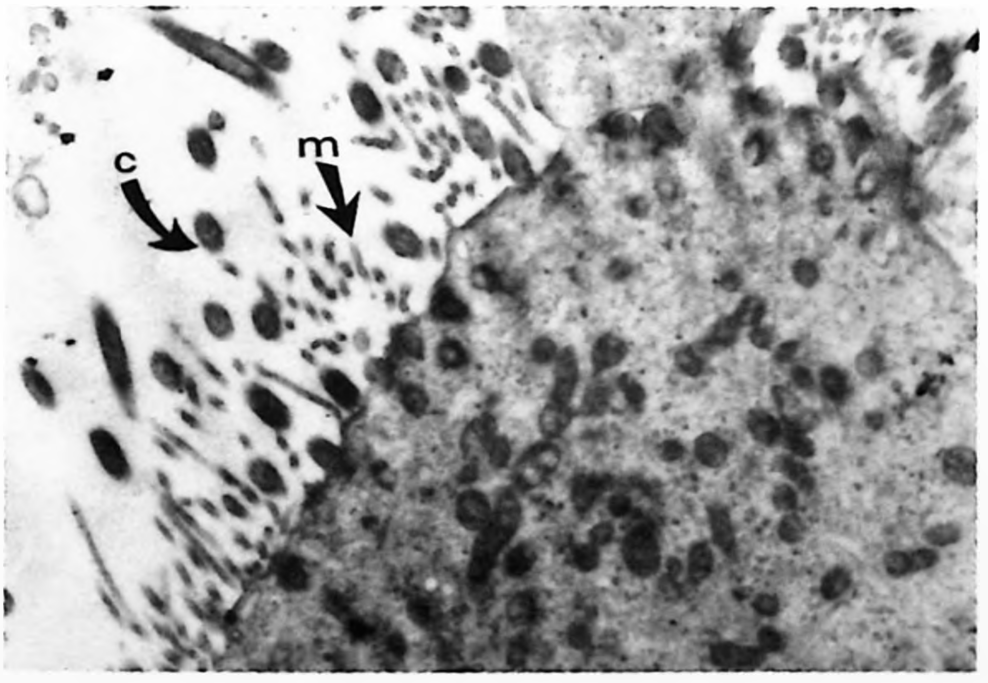

Fig. 2: Electron microscopy of epithelial cells shows absence of cilia and basal bodies in most of the cells (m: microvilli, c: cilia) (magnification: x10,000).

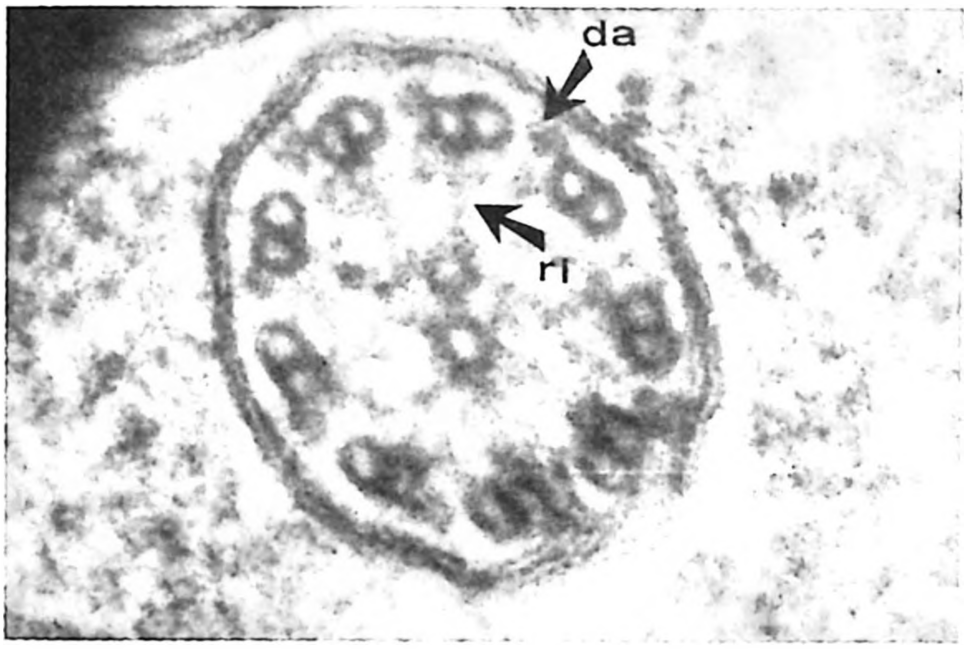

Fig. 3: Normal cross-section of cilium (d: dynein arms, r: radial spoke) (magnification: x100,000).

except for the nasal biopsies, including sweat chloride and alpha-1-antitrypsin, were in normal limits.

Repeated nasal mucosa biopsies showed lack of cilia and basal bodies in almost all cells examined. It is known that viral and bacterial infections appear to be the most frequent cause of secondary ciliary aplasia[3,10]. However, although we could not perform an in vitro cell culture for ciliogenesis, ciliary aplasia was documented three times over a six-month period, when the patient was well. In addition, ciliary basal bodies, which are expected to be present in secondary ciliary dysplasias[4], were not seen in these biopsies.

Ciliary aplasia is a very rare condition. Some authors consider ciliary aplasia as type 4 dyskinetic cilia (abnormal ciliated cells lacking axonal structure within the ciliary shafts)[1]. As is similar in other primary ciliary dyskinesias, association of ciliary aplasia with abnormalities such as dextrocardia, azoospermia, and hydrocephalus has been noted in the literature[1,4-6,9]. Bronchiectasis is a very common finding of primary ciliary dysplasia. In the series of Barlocco et al.[1], the incidence of bronchiectasis was reported to be 85 percent. Ciliary aplasia is considered an autosomal recessively inherited disease, as are the other forms of primary ciliary dyskinesia. Although the parents of our patient were consanguineous, her siblings were healthy. In this report, ciliary aplasia was described in a girl with Turner's syndrome who showed typical clinical findings of primary ciliary dyskinesia syndrome. To our knowledge, association of these two different genetic diseases has not been reported previously.

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