Bilateral spontaneous pneumothorax in a newborn with N1303K mutation of cystic fibrosis (CFTR) gene

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ÖZET

Kistik fibrozis (CFTR) geninde N1303K mutasyonu olan yenidoğanda bilateral spontan pnömotoraks

Kistik fibrozis, Avrupa ve Kafkas kökenli toplumları etkileyen, en sık görülen ölümcül kalıtımsal hastalıktır. Pnömotoraks, kistik fibrozisin hayatı tehdit eden pulmoner komplikasyonudur. Bilateral pnömotoraks nadir görülür ve kötü prognostik belirteçtir. CFTR geninde N1303K mutasyonu taşıyan kistik fibrozis tanısı olan, bilateral pnömotoraks ile başvuran yenidoğanı bildirdik.

Anahtar Kelimeler: *Kistik fibrozis, pnömotoraks, yenidoğan, N1303K, CFTR gen mutasyonu.*

SUMMARY

Bilateral spontaneous pneumothorax in a newborn with N1303K mutation of cystic fibrosis (CFTR) gene

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Cystic fibrosis is the most frequent and lethal inherited disease, affecting populations of European and Caucasian origin. Pneumothorax is life threatening pulmonary complication of cystic fibrosis. Bilateral pneumothorax is rarely seen and is a predictor of poor prognosis. We report a newborn presenting with bilateral pneumothorax whose diagnosis was cystic fibrosis with N1303K mutation on CFTR gene.

Key Words: *Cystic fibrosis, pneumothorax, newborn, N1303K, CFTR gene mutation.*

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Cystic fibrosis is the most frequent and lethal inherited disease affecting populations of European and Caucasian origin (1,2). This autosomal recessive disorder is formed by mutations of cystic fibrosis transmembrane regulator gene (1-4). The most common mutations are ΔF508 (66%), G542X (2.4%), G551D (1.6%), N1303K (1.3%) and W1282X (1.2%) (5). Cystic fibrosis affects exocrine glands. The basic pathology is abnormal secretion of exocrine glands containing sweat glands, tracheobronchial tree, colon and pancreas (1,2). Symptoms vary according to affected system. The most important organ is lung that affects patients' life quality and survival. Pneumothorax is one of the life threatening pulmonary complications of cystic fibrosis. Bilateral pneumothorax is rarely seen and is a predictor of poor prognosis (1,2,6).

Our patient had N1303K mutation and was managed due to rarely seen complication, bilateral spontaneous pneumothorax. We decided to present this case because of the extreme rarity of this mutation and the complication in neonatal period.

CASE REPORT

One month old female patient was admitted to hospital with respiratory distress and diarrhea. She had been operated for meconium ileus after birth and jejunostomy had been performed by pediatric surgeon. The chloride concentration in sweat test had been 69 mEq/L, was confirmed with a second test 102 mEq/L and genetic analysis had revealed homozygote N1303K mutation.

On physical examination, she was dyspneic, her appearance was pale. Her temperature was 38.2°C, pulse rate was 138 beats per minute and blood pressure was 55/35 mmHg. Her weight, height, head circumference were 2770 g (< 3P), 53 cm (< 3P) and 35 cm (< 3P), respectively. She had growth retardation. Bilateral crackles were auscultated. The remaining physical examination was normal.

On admission following laboratory tests performed. The complete blood count showed white blood cells 14.400/mm^3, hemoglobin 12.7 g/dL, platelet 364.000/mm^3. Peripheric blood smear showed 42% neutrophil, 58% lymphocytes. Arterial blood pH was 7.38; base deficit was 3.2 mEq/L and oxygen saturation was 86%. Chest radiography showed retrocardiac triangular shadow that indicates left lower lobe collapse but pneumothorax was not determined (Figure 1). Computed tomography of thorax revealed bilateral pneumothorax all through the pleura, infiltration on posterobasal and left inferior segments (Figure 2). Pneumothorax was treated without tube thoracostomy, only careful and close clinical observation was performed. Oxygen therapy was used for seven days and intravenous antibiotic regimen for pneumonia for 14 days. Pancreatic enzyme replacement, vitamin complex and zinc administration was started. After pancreatic enzyme

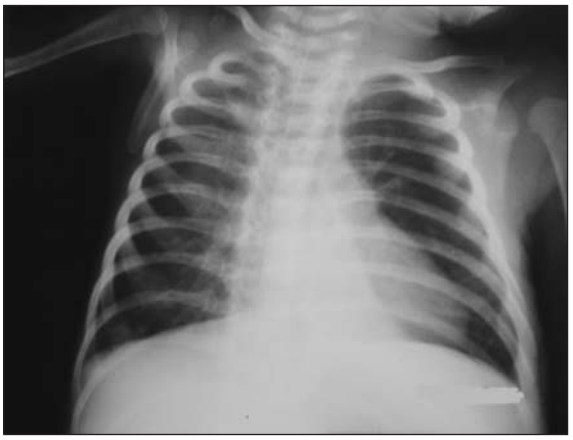

Figure 1. Chest roentgenogram at diagnosis showed retrocardiac collapse, pneumothorax was not determined.

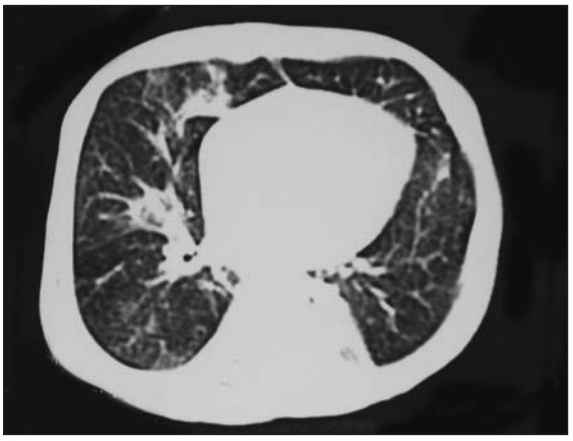

Figure 2. Chest computed tomography at diagnosis: bilateral pneumothorax all through the pleura.

replacement, diarrhea improved and patient started to put on weight. Chest X-ray showed a complete resolution of bilateral spontaneous pneumothorax. Patient discharged with clinical wellness.

DISCUSSION

The classic triad of cystic fibrosis is chronic pulmonary disease; pancreatic insufficiency and increased chloride concentration in sweat (7). Lungs are the most important organs that affect patients' life quality and survival (1,8). The pulmonary complications of cystic fibrosis are chest pain, segmental and lobar atelectasis, hemoptysis, pneumothorax, allergic aspergillosis, hypertrophic osteoarthropathy, acute and chronic respiratory insufficiency and pulmonary hypertension, which cause cor pulmonale (1,9).

Pneumothorax is defined as air in the pleural cavity and is seen less than 1% in children and teenagers with cystic fibrosis, but it is more frequent in older patients with advanced disease and may be life threatening (2). There are various protocols in management of pneumothorax according to its intensity. If pneumothorax is less than 5-10%, patient is hospitalized and observed. Clinical sign and symptoms improve with bed rest, oxygen therapy or simple thorax tube. But recurrence rates are between 50-100% (1,9,10). Our patient's clinical follow up contained only close observation and supportive care. Spontaneous bilateral pneumothorax resolved without thorax tube application.

N1303K mutation frequency in Turkish cystic fibrosis patients varies 1.5% to 3.7%, but in USA and in Brasil, it was encountered with 0.57% and 1.3% rates respectively (5,8,11,12). Genetic analysis of our patient revealed homozygote N1303K mutation in CFTR gene. Association of this mutation with pulmonary diseases was not reported in previous studies. Our patient is the first case in literature whose CFTR gene analysis is homozygote N1303K mutation with bilateral spontaneous pneumothorax in neonatal period. One of the causes of pneumothorax can be cystic fibrosis in newborns, management of pneumothorax must be included this situation.

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