

Cystic Fibrosis and Down's Syndrome: Not Always a Poor Prognosis

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Summary. A child developed a bronchiolitis-like illness and was found to have mosaic Down's syndrome (diagnosed on karyotype) and also cystic fibrosis, diagnosed on the basis of a high sweat osmolality (247 mosmoles/kg sweat; normal, 62–137) and a homozygous delta F508 genotype. Despite two potentially life-threatening conditions, the child is doing well at the age of 7 years, despite pancreatic insufficiency. **Pediatr Pulmonol.** 2001; 31:321–322.

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Key words: cystic fibrosis; Down's syndrome; mosaicism; sweat osmolality.

INTRODUCTION

Cystic fibrosis and Down's syndrome are common diseases, but reports of their coexistence are rare.^{1–3} It has been proposed that prognosis of the combined disease is poor.¹ We report on a contrasting case, which also highlights a potential diagnostic pitfall.

CASE REPORT

A.M. was born at term after an uneventful pregnancy, weighing 2.9 kg. There was no relevant family history. Initial presentation at 2 months of age was with an acute respiratory illness, diagnosed as bronchiolitis. However, symptoms persisted, with development of an oxygen requirement and cough productive of green sputum. Further investigation revealed an abnormal sweat test (osmolality, 247 mosmoles/kg), and a karyotype showing 8% mosaicism for trisomy 21. DNA analysis confirmed homozygosity for the delta F508 mutation on chromosome 7. Although dysmorphic features consistent with Down's syndrome were noted after the karyotype was known, these had escaped prior detection.

She was pancreatic-sufficient at diagnosis, and was treated with intravenous antibiotics. Within a month of diagnosis, *Staphylococcus aureus* was isolated from nasopharyngeal secretions, and prophylactic oral flucloxacillin was started. Since then, she has continued to be managed as an outpatient and has been clinically well.

Pancreatic insufficiency developed at 3 years of age, confirmed by 3-day fecal fat collection (fecal fat, 26.7 g/day). Pancreatic replacement therapy has resulted in entirely satisfactory growth and nutrition, with weight progressing just below the 50th centile and height along the 3rd centile. She has no respiratory symptoms and has made normal neurodevelopmental progress. Now aged 7 years, she is doing well in mainstream school.

DISCUSSION

We report on this case for three reasons: 1) *Mosaic trisomy 21* has never been reported before in association with cystic fibrosis, but unlike Down's syndrome, does not seem to worsen the clinical manifestations of cystic fibrosis. 2) Elevated sweat osmolality is a known feature of patients with trisomy 21.⁴ The median osmolality in Down's syndrome is 176 mosmoles/kg of sweat compared to 117 mosmoles/kg in controls.⁴ Sweat electrolytes are usually measured rather than osmolality, which is the sum of total sweat anions and cations, mainly chloride and sodium. An osmolality greater than 200 mosmoles/kg of sweat is considered diagnostic of cystic fibrosis; therefore, false positives are likely to be higher in Down's syndrome, and it is wise to confirm the diagnosis of cystic fibrosis by other means, in this case a genotype. In view of a positive genotype being obtained, we did not proceed to measure A.M.'s sweat electrolytes. 3) Mild clinical features compatible with Down's syndrome may carry a good prognosis in the presence of mosaicism. Specifically, intellectual development may be normal.^{5,6}

In summary, despite clinical features and a confirmed diagnosis of two potentially severe conditions, this child is doing well and is making developmental normal progress through childhood.

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