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## Case report

## Hereditary mucoepithelial dysplasia and severe respiratory distress

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## A B S T R A C T

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Hereditary mucoepithelial dysplasia (HMD) is a rare autosomal dominant disorder characterized by mucoepithelial disruption of the skin, hair and mucous membranes. It results from defective gap junction formation and leads to non-scarring alopecia, mucosal erythema, perineal erythematous intertrigo, involvement of the conjunctival mucosa, and pulmonary disease. We present a case of severe respiratory distress in an initially healthy full term infant born to a mother with HMD. This infant later developed signs and symptoms of HMD. A high index of suspicion for pulmonary infection with atypical organism is essential in infants with a family history of HMD who present with respiratory distress.

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## Introduction

Hereditary mucoepithelial dysplasia (HMD) is a rare autosomal dominant disorder characterized by mucoepithelial disruption involving the skin, hair and mucous membranes [1]. HMD results from structural abnormalities of the desmosomes and gap junctions and histologically manifests as a dyshesive, dyskeratotic epithelial disease of skin, hair and mucous membranes. Clinically, it presents with non-scarring alopecia, well-demarcated mucosal erythema, perineal erythematous intertrigo, and involvement of the conjunctival mucosa [2]. Involvement of the lung mucosa typically occurs later in life with recurrent pneumonia, pulmonary fibrosis [3], and spontaneous pneumothorax [2]. The original description of HMD reported recurrent pulmonary infections, fibrocystic changes and cor pulmonale as the cause of death in many adult patients with HMD [2].

Early in life, infants with HMD typically present with severe photophobia, tearing, and nystagmus [2]. As they age, children with HMD develop the triad of non-scarring alopecia, well-demarcated fiery red mucosa and psoriasiform perineal involvement [4]. To our knowledge, a primary manifestation of pulmonary involvement has never been described. Here, we report an unusual presentation of HMD manifesting as severe respiratory distress in a full term 5-day old infant born to a mother with known HMD.

## Case report

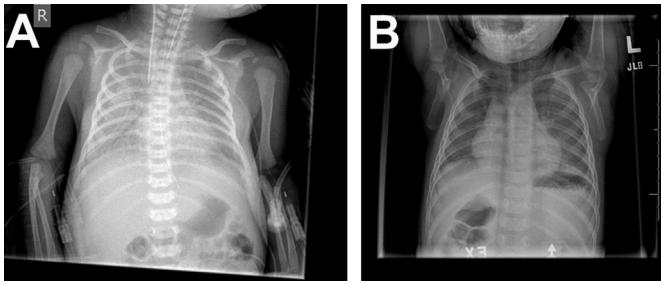
Our patient is a 5-day old female born full term via spontaneous vaginal delivery to a mother with known HMD. The mother had an MRSA skin infection while pregnant and was treated. After an uneventful birth, the patient went home with her mother. However, at 5 days of life, she presented to a local emergency room with a sudden onset of tachypnea and increased work of breathing. She appeared cyanotic, tachypneic and had increased retractions. Oxygen saturations were 67% on room air. There was no history of fever or cough.

The patient was intubated and admitted to the pediatric intensive care unit. A chest X-ray demonstrated bilateral haziness with air bronchograms. Blood and urine cultures were positive for *Staphylococcus haemolyticus* and *Pseudomonas aeruginosa*, respectively. Nasal swab culture was positive for MRSA. Surfactant therapy was given and vancomycin and ceftazidime were started but the patient's respiratory status deteriorated.

Flexible bronchoscopy with bronchoalveolar lavage (BAL) was performed and showed normal airway anatomy but inflamed and friable mucosa. BAL fluid was described as "milky", had a positive PAS stain and increased inflammatory cells. The diagnosis of Pulmonary Alveolar Proteinosis (PAP) was suspected. However, BAL cultures were later positive for *Pseudomonas aeruginosa*, *Acinetobacter*, *Enterobacter*, and *Staphylococcus*. Piperacillin/Tazobactam was started. At that point, the patient's respiratory status deteriorated despite increasing ventilatory support, so on her 7th day of admission, she was transferred to our center for consideration of ECMO. A chest X-ray upon arrival showed diffuse patchy airspace

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**Fig. 1.** Panel A: Chest radiograph upon transfer to our institution at day 7 of hospitalization shows diffuse patchy airspace infiltrates. Panel B: Chest radiograph at 6 months of life shows resolution of pathology.

infiltrates (Fig. 1A). A bedside flexible bronchoscopy with BAL was repeated and revealed diffuse inflammation with mild bronchomalacia, but the BAL fluid was no longer “milky”. BAL cell count showed 51% polymorphonuclear cells, 1% lymphocytes and 48% monocytes. She was continued on Piperacillin/Tazobactam, and re-started on Vancomycin. In addition Tobramycin nebulizer therapy, Fluconazole and IV corticosteroids were initiated. She gradually improved and 5 days after her transfer to our institution, she was extubated to CPAP for a day, then to nasal cannula for a few days, then to room air. She completed 21 days of IV antibiotics, and was discharged home on room air. During her outpatient follow up visits at 3 months and 6 months, she had no cough or respiratory symptoms and her oxygen saturations were 100% on room air with a negative respiratory examination, and normal CXR (Fig. 1B). However, she developed severe photophobia and was diagnosed with corneal keratitis. She currently sees genetics, ophthalmology and dermatology for a suspected diagnosis of HMD.

Of note, HMD is prevalent in the family of the patient’s mother, affecting at least 3 generations. The patient’s mother was diagnosed with HMD when she was 17 months old after presenting with recurrent lung infections. She also had a history of recurrent sinusitis, skin infections and visual impairment. Three young adults have died in the extended family from pulmonary complications and pneumonia (Fig. 2).

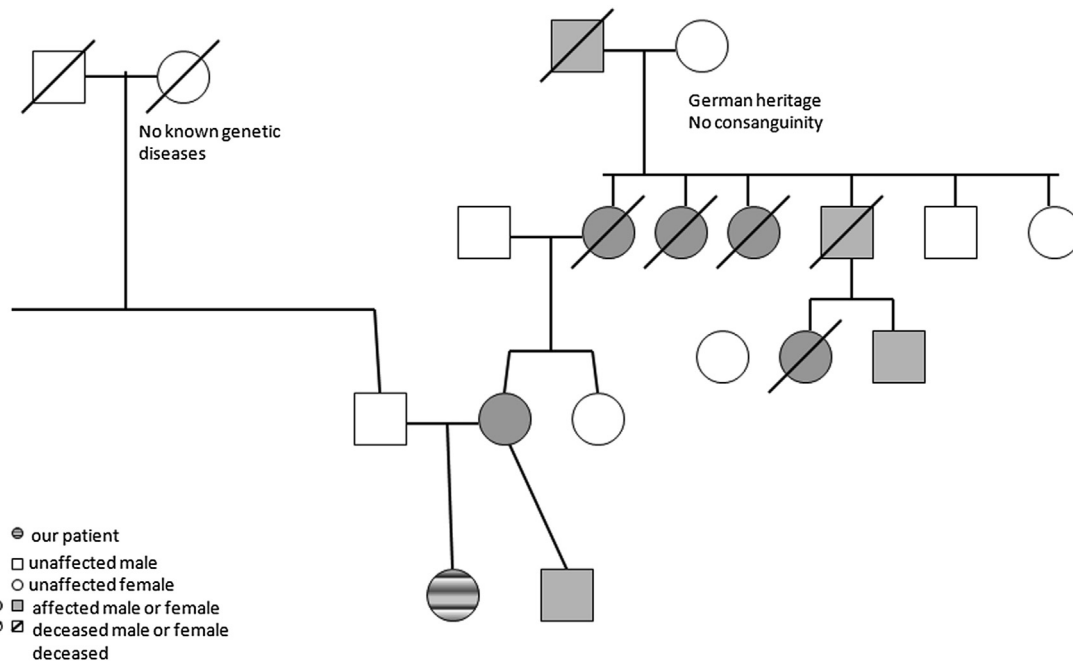
**Discussion**

To our knowledge, this is the first report of severe respiratory distress due to bacterial pneumonia in an infant born to a mother with HMD. Although there are no specific genetic tests for HMD, the HMD is suspected in this infant given the development of photophobia and corneal keratitis and the strong family history of HMD. HMD is a rare, possibly under diagnosed [3,4], autosomal dominant disease [5]. Pathology results from defective gap junction formation, and thus a paucity of these gap junctions. This compromise in the gap junctions affects many epithelial surfaces including the skin, eyes, mouth, and respiratory airways [2–4].

Pulmonary involvement normally occurs later in life and can be fatal. In fact, pulmonary fibrosis and pulmonary failure have been recently reported in a family with HMD [3]. Moreover, affected individuals with HMD have spontaneous pneumothoraces and “fibrocystic changes” [2]. No reports of chest imaging using computerized tomography (CT) scan have been reported to date. Although, the pathophysiology of pulmonary disease in HMD needs to be more specifically defined and examined, we speculate that disruption of the integrity of the airway epithelium increases the susceptibility to recurrent and/or chronic bacterial infections thereby affecting airway repair mechanism which potentially leads to structural damage and fibrotic changes.

The infectious organisms reported in both pulmonary and systemic infections in patients with HMD include *P. aeruginosa*, coagulase positive *Staphylococci*, *Neisseria*, *alpha Streptococci*, *Pneumococci*, *Hemophilis influenzae*, and *Candida albicans* [2]. Our patient presented with overwhelming respiratory and systemic infections with *P. aeruginosa*, *MRSA*, *Staphylococcus*, *Acinetobacter* and *Enterobacter*. At five days of age, these organisms are more likely to be acquired during vaginal delivery and less likely to be community acquired. Since the patient’s mother was diagnosed with HMD which typically has mucosal compromise and a higher rate of bacterial colonization in the perineal region, this infant was at an increased risk of infection.

In conclusion, our case illustrates the need to better characterize pulmonary involvement in HMD. In addition, there needs to be a



**Fig. 2.** Family Pedigree illustrates the autosomal dominant inheritance pattern of this disease. All deceased patients died of pneumonia and pulmonary complications.

high index of suspicion when presented with an infant with respiratory symptoms with a known family history of HMD, or family members with the triad of non-scarring alopecia, well-demarcated mucosal erythema and erythematous intertriginous plaques [2–4].

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