Umbilical Diphtheria: Resurgence of a Forgotten Entity

Diphtheria has had a resurgence in India over the past decade. We present a case of umbilical diphtheria in a neonate, who had a good outcome with administration of anti-toxin and antibiotics.

Keywords: *Anti-toxin, Corynebacterium, Neonate*.

Diphtheria, a vaccine preventable highly contagious disease is making a resurgence in India [1,2]. Diphtheria of the umbilicus is a rare clinical presentation of diphtheria, with the last report published nearly 80 years back [3]. In this case report, we present a successfully treated case of umbilical diphtheria in a neonate.

A 17-day-old, otherwise well neonate on exclusive breast feeds, presented with a 4-day history of swelling and redness around the umbilicus with pus discharge. He had no fever, poor feeding or lethargy. His mother had an uneventful antenatal period. He was born normally at a hospital at term by normal vaginal delivery with a birthweight of 3.5 kg. The umbilical cord was clamped using a sterile plastic clamp. Umbilical cord fell on day 7 of life. He had no bleeding or pus discharge from the umbilicus when the umbilical cord fell. On examination, he was alert, active, and pink with normal cry and tone, and was growing well. His temperature was 98.7 ^{o}F at presentation, and throat was normal. Local examination revealed an inflamed umbilicus that was greyish white with pus discharge. The surrounding area had warmth, erythema and tenderness extending about 3 cm all around the inflamed umbilicus (***Web Fig*. 1**).

Gram stain performed on the pus swab neither showed pus cells nor bacteria. However, sample cultured on blood agar and serum tellurite agar grew *C. diphtheriae,* which was identified by multiplex real time PCR. Elek's gel precipitation test was positive for diphtheria toxin. Abdominal ultrasound was normal. He was treated as umbilical diphtheria with 40,000 units of anti-diphtheritic anti-toxin and crystalline penicillin 1 lakh units intravenously every 6 hours for 10 days. He was on contact isolation for 4 days following start of antibiotics. Azithromycin prophylaxis was administered to close household contacts and medical personnel exposed to the child. The redness, swelling and induration around the umbilicus gradually reduced. At review after 3 weeks, he was well, with a healthy umbilicus and weight of 4.55 kg. Mother's immunization was reportedly complete up to 10 years of age. The mother's anti-diphtheria toxoid IgG level (EUROIMMUN, Lubeck, Germany) was tested by ELISA and found to be below the protective level at 0.08 IU/mL.

The largest epidemic of umbilical diphtheria was reported in 1919 [3]. It occurs in the newborn and infants up to three weeks of age [3]. Umbilical diphtheria has not been described since long, likely due to widespread vaccination for diphtheria. In our patient, umbilical diphtheria was not considered clinically and the clinical picture was akin to usual bacterial causes of umbilical infection such as *Staphylococcus aureus, Streptococcus pyogenes, Pseudomonas spp., Aeromonas spp.,* and *Klebsiella spp.* [4]. However, a positive culture provided the diagnosis. In retrospect, the pointers towards umbilical diphtheria in our child were a well-appearing child and absence of fever in spite of widespread inflammation around the umbilicus. A false membrane was; however, not obvious in our child [3]. We could not ascertain how our patient contracted the infection. However, given that the organism is an exclusive inhabitant of human mucus membrane and skin, it is likely that one of the caregivers of the baby was colonized with *C. diphtheriae* [5]. Diphtheria anti-toxin was administered to our patient even though there was no evidence of the effect of the toxin. Many cases of umbilical diphtheria cases reported in the early 20th century who did not receive anti-toxin died, and the ones who received anti-toxin survived [3].

Our patient likely had a good outcome due to the prompt administration of anti-toxin and antibiotics. Our patient was at risk for diphtheria before his first dose of pentavalent vaccine in view of the waning maternal immunity as confirmed by the mother's low antibody titre to diphtheria. Implementation of maternal Tdap vaccination during pregnancy, as recommended in some countries, possibly could have prevented umbilical diphtheria in our child [6].

In conclusion, umbilical diphtheria may be under reported as many cases of the umbilical infection are treated without any microbiological evidence and maternal Tdap vaccination should be considered to prevent diphtheria in very young infants.

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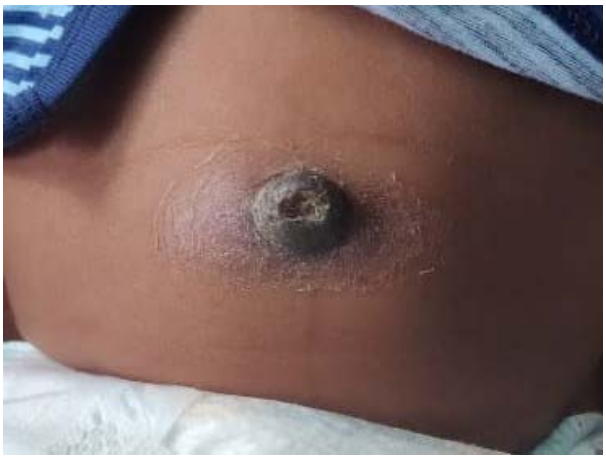
Recurrent Peumonia in an Infant With an Esophageal Lung

Esophageal lung is a rare variety of communicating bronchopulmonary foregut malformation with anomaolous communication between an isolated portion of respiratory tissue and esophagus. Children present in early life with recurrent cough and pneumonia. Majority of the reported cases are associated with other anomalies like tracheoesophageal fistula. We report a case of a 7-month-old girl with right sided esophageal lung who was misdiagnosed as dextrocardia with right sided pneumonitis.

Keywords: *Bronchopulmonary, Dextrocardia, Lung malformation, Recurrent cough*.

Esophageal lung is a rare communicating bronchopulmonary foregut malformation with anomalous origin of the main bronchus from the esophagus usually on the right side, which leads to recurrent aspiration pneumonitis. Other associated congenital anomalies of the upper gastro-intestinal tract, ribs and vertebrae may be present. It is diagnosed radiologically and confirmed by broncho-scopy. Few cases have so far been reported in literature [1]. A high index of suscpicion should be kept in young children with recurrent chest infection.

A 7-month-old girl presented with recurrent lower respiratory tract infection and episodes of choking following breast feeding since one month of age. She was symptomatic in the present episode for last 7 days for which she received oral amoxycillin for 5 days without improvement. The baby was born full term by normal delivery and was developmentally normal. At admission, child had low weight and length as per age, tachypnea (respiratory rate 72/minute), tachycardia (heart rate 130/minute) with subcostal and intercostal retractions. On auscultation, breath sounds were decreased on right side with apex beat on the right side suggestive of dextrocardia. Hemoglobin was (10g/dL), total leucocyte count was 27700/µL (neutrophils 74%), C-reactive protein was positive, with normal renal and liver functions. Blood culture was sterile. Chest *X*-ray showed hazy right hemithorax with mediastinal shift to the right side. Contrast enhanced computed tomographic (CT) scan thorax demonstrated right lung hypoplasia with cystic bronchiectatic changes with nonvisualization of right main bronchus, hypoplastic right main pulmonary artery and abnormal bronchesophageal communication (***Fig*. 1*a*, 1*b***). Barium swallow study showed filling of right main bronchus directly from the esophagus. Rigid bronchoscopy revealed a blind ended right bronchial stump which confirmed the diagnosis of esophageal lung. Ultrasound abdomen and echocardigraphy were normal. Child improved with oxygen, intravenous antibiotics and nebulisation with bronchodilators. Child started accepting orally and was gradually tapered off oxygen. She was advised operative intervention for esophageal lung (right pneumonectomy with resection of the esophageal bronchus and repair of the esophagus at the site of bronchial communication), which the family refused.



Web Fig. **1** *Inflamed umbilicus in a neonate with umbilical diphtheria.*