Neonatal Respiratory Tract Involvement by *Trichomonas vaginalis*: A Case Report and Review of the Literature

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Abstract. Only occasional cases of *Trichomonas* spp. infection have been reported in neonates, and these usually represent vaginal infections with *Trichomonas vaginalis* acquired during passage down the birth canal. We report the case of a 2-week-old girl who was brought by her mother to the Children’s Emergency Clinic at our institution for symptoms of lethargy and poor appetite. The neonate was subsequently diagnosed with herpetic encephalitis and developed increasing respiratory difficulty, requiring intubation. Routine viral culture of a nasopharyngeal wash showed no viral organisms, but trichomonads were abundant microscopically on the viral culture medium. Molecular studies identified the organism as *T. vaginalis*. The significance of this organism as a neonatal respiratory pathogen and its contribution to neonatal respiratory distress are discussed.

INTRODUCTION

Three species of *Trichomonas* occur in humans: *Trichomonas tenax*, *Trichomonas hominis*, and *Trichomonas vaginalis*. *T. tenax*, a commensal of the oral cavity seen particularly in individuals with poor oral hygiene, has been found in up to 20% of the general population in some studies. *T. hominis* resides in the lower gastrointestinal tract, and although it has been recovered from diarrheal stool, no evidence has proven it to be a cause of human disease. *T. vaginalis*, an inhabitant of the genitourinary tract of men and women, is a sexually transmitted parasite that causes symptomatic and asymptomatic infections in affected individuals. It is considered the only pathogenic trichomonad. Although *T. vaginalis* commonly affects adults, documented cases of *T. vaginalis* vaginitis have also been seen in neonates who apparently acquired the infection vertically from the maternal genitourinary tract. Only occasional reports have documented the presence of *T. vaginalis* outside the genitourinary tract. In these rare cases, *T. vaginalis* has been identified in the pharynx and lower respiratory tract of neonates and adults.

CASE REPORT

A 2-week-old girl was brought by her mother to the Children’s Emergency Clinic at our institution for symptoms of lethargy and poor appetite. The neonate had several crusted scalp lesions that were clinically suspicious for herpes virus infection. The lesions were cultured, and a lumbar puncture was performed to investigate possible meningitis. Viral culture of the scalp lesions showed herpes virus, and a polymerase chain reaction for herpes simplex virus performed on a portion of the cerebrospinal fluid was positive. Imaging studies of the brain showed a pattern consistent with herpetic encephalitis, and the neonate also manifested ocular symptoms compatible clinically with herpes retinitis. Review of the maternal history revealed no evidence of prior herpes infection. The mother had received no prenatal care. The neonate developed increasing respiratory difficulty and required intubation. At the time of intubation, a nasopharyngeal wash was performed, and routine bacterial and viral cultures were requested. No bacterial or viral organisms were identified in the specimen, but microscopic examination of the viral shell vial inoculated with material from the nasopharyngeal wash specimen showed trichomonads that measured 16–22 μm in length and had an undulating membrane that extended approximately one half the length of the organism’s body, which are findings compatible with *T. vaginalis*. The organisms had the characteristic wobbling pattern of locomotion common to all trichomonads. Organisms from the shell vial sample were collected in glutaraldehyde for analysis by scanning and transmission electron microscopy; again, the organisms showed the morphologic traits indicative of *T. vaginalis* (Figures 1 and 2). A portion of the nasopharyngeal wash specimen was frozen, and trichomonal DNA was subsequently extracted. A polymerase chain reaction assay using specific primers for small subunit rRNA genes of *Trichomonas* spp. was performed, and cloned amplicon sequences were compared with known archival sequences of *T. vaginalis* and *T. tenax*. The cloned sequences were most compatible with *T. vaginalis*. The patient was treated with metronidazole, improved from a respiratory standpoint, and was eventually extubated. Repeat respiratory viral cultures revealed no viral organisms or trichomonads. The patient continued to display significant neurologic impairment secondary to her herpetic encephali-

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**Figure 1.** Scanning electron micrograph of trichomonads from the nasopharyngeal wash specimen showing characteristic pear-shaped organisms with flagella (arrow) and undulating membranes (arrowhead).
tis, and she was eventually transferred to hospice care where she died 3 weeks later.

DISCUSSION

The presence of trichomonal organisms in respiratory specimens was first reported by Leyden and Jaffe in 1867. Multiple reports followed over the next century, during which the taxonomic classification of these organisms changed repeatedly. By 1963, when Walton and Bacharach published a review of cases of Trichomonas spp. isolated from respiratory sources, 30 cases were known in the medical literature. However, it was not until 1964, in a case report by Rebuhn, that T. vaginalis was implicated as a possible cause of respiratory disease. In this case, trichomonads were found in the sputum of a patient with chronic bronchitis who had a history of sexual promiscuity. Although the organism was never specified, the author implicated T. vaginalis as the etiologic agent, citing mouth to vagina contact as the mode of transmission. No species of Trichomonas other than T. vaginalis has been shown to exist in the genitourinary tract.

Including this case, the number of reported cases of T. vaginalis recovered from a respiratory source currently stands at 11, including this case (Table 1); in only 6 of these cases were the organisms definitively identified as T. vaginalis by molecular studies. Of the 11 cases where T. vaginalis was isolated, 6 occurred in neonates and 5 occurred in adults. The occurrence of T. vaginalis in the respiratory tract of adults has been linked to orogenital sexual activity in four of the reported cases; in addition to the case report by Rebuhn, three cases of pharyngeal T. vaginalis in patients with a history of orogenital contact have been reported by Press and others. Interestingly, in only one of these cases was pharyngitis present; the other two patients showed no active signs of infection. Although all three of these patients were HIV positive, the occurrence of active infection involving T. vaginalis in only one case raises the question of differing host susceptibilities to this organism even in immunocompromised patients. The patient reported by Duboucher and others was also HIV positive but had T. vaginalis isolated from the respiratory tract in the setting of concomitant Pneumocystic carinii pneumonia.

Characteristics of the reported cases in which T. vaginalis was recovered from neonatal respiratory tract specimens are listed in Table 2. In this case and in the five previous cases reported in the medical literature, all cases showed symptoms of neonatal respiratory disease. Viral and bacterial cultures were uniformly negative in all of the neonates, although chest radiographs showed bilateral patchy pulmonary infiltrates. In only one of the six cases was prenatal care of the mother documented. In four of the cases, a diagnosis of maternal T. vaginalis vaginitis had been made before delivery or at the time of delivery. Four of the neonates were delivered prematurely, and three cases had documentation of premature rupture of membranes. The premature rupture of fetal membranes likely plays a role in the transmission of T. vaginalis, because prolonged exposure to vaginal flora enhances the chance of neonatal colonization and infection by these organisms. In this case, the neonate likely acquired not only T. vaginalis but also herpes simplex virus from the maternal genitourinary tract.

Because the clinical significance is still unclear, treatment of cases in which T. vaginalis is recovered from a respiratory site must take into account the symptoms of the individual case. Metronidazole therapy has been shown to clear the organisms, and patients have shown subsequent respiratory improvement. However, improvement in respiratory status has also been achieved with only supportive care. No mortality has been associated with pulmonary distress, implicating T. vaginalis as the etiologic agent; although the neonate in

![Figure 2. Transmission electron micrograph of T. vaginalis showing nucleus (arrowhead) and posterior axostyle (arrow).](Image 63x559 to 303x730)

**Table 1.** Respiratory isolates of T. vaginalis

<table>
<thead>
<tr>
<th>Case no.</th>
<th>Case report</th>
<th>Age</th>
<th>Sex</th>
<th>Specimen source</th>
<th>Respiratory disease</th>
<th>Confirmation by PCR</th>
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<tbody>
<tr>
<td>1</td>
<td>Rebuhn</td>
<td>47</td>
<td>Male</td>
<td>Sputum</td>
<td>Chronic bronchitis</td>
<td>No</td>
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<tr>
<td>2</td>
<td>McLaren and others</td>
<td>Neonate</td>
<td>Female</td>
<td>Tracheal aspirate</td>
<td>Pneumonia</td>
<td>Yes</td>
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<tr>
<td>3</td>
<td></td>
<td>10 weeks</td>
<td>Male</td>
<td>Tracheal aspirate</td>
<td>Rhinitis, pneumonia</td>
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</tr>
<tr>
<td>4</td>
<td>Hiemstra and others</td>
<td>Neonate</td>
<td>Male</td>
<td>Tracheal aspirate</td>
<td>Pneumonia</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Press and others</td>
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<td>6</td>
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<tr>
<td>8</td>
<td>Temesvari and others</td>
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<td>Female</td>
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<td>Respiratory distress</td>
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<tr>
<td>9</td>
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<td>10</td>
<td>Duboucher and others</td>
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<td>11</td>
<td>Carter*</td>
<td>2 weeks</td>
<td>Female</td>
<td>Nasopharyngeal wash</td>
<td>Respiratory distress</td>
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</tr>
</tbody>
</table>

*This case.
PCR, polymerase chain reaction.
this case had a fatal outcome, the cause of death was unrelated to intrinsic respiratory disease.

Although few cases have been reported in the medical literature, it is apparent that *T. vaginalis* can survive outside the human genitourinary tract and may play a role in respiratory disease in affected patients. Spread of the organism to a respiratory site occurs in adults with a history of orogenital contact and in neonates who acquire the organism during passage down the birth canal. No clearly defined risk factors for development of *T. vaginalis*-associated respiratory tract disease have been documented, although 3 of the 11 reported cases occurred in HIV-positive patients; other than testing for the presence of HIV in these 3 patients, evaluation of immunologic status in the remaining cases was not documented. Particularly in neonates, clinical and radiographic evidence of respiratory compromise entails a wide differential diagnosis, which may need to include respiratory disease potentiated by *T. vaginalis*.

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REFERENCES


10. McLaren and others9
