**Haemophilus parainfluenzae** Biliary Tract Infection: Rationale for an Ascending Route of Infection from the Gastrointestinal Tract

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Haemophilus parainfluenzae was isolated from a bile specimen of a 56-year-old patient with elevated liver enzymes and chronic cholecystitis. Several factors contributing to nonbacteremic *H. parainfluenzae* infection of the biliary tract include (i) the not infrequent occurrence of *H. parainfluenzae* in stool specimens, (ii) the presence of an outer membrane protein similar to those found in enteric bacteria which facilitates adherence to the colonic mucosa, and (iii) an adequate supply of V factor (nicotinamide adenine dinucleotide) supplied from bile and the local flora, which is necessary for *H. parainfluenzae*’s growth. Because *H. parainfluenzae* rarely occurs in the biliary tract, direct cultivation of bile specimens on chocolate agar seems unwarranted. However, bile specimens showing a gram-negative coccobacillus on a Gram-stained smear that fails to grow on routine media should be subcultured on chocolate agar.

Although the genus *Haemophilus* is composed of 15 members, *Haemophilus* species other than *Haemophilus influenzae* and *Haemophilus parainfluenzae* are uncommon agents of human infection. *H. parainfluenzae*, a commensal of the upper respiratory tract, has been found to be associated with a variety of infections, including soft tissue abscesses (2), upper respiratory tract infections (7), bacteremia, endocarditis, meningitis (5, 6), septic arthritis, genital tract infections (2), osteomyelitis (1), and, rarely, meningitis and brain abscesses (2). Furthermore, two cases of nonbacteremic *H. parainfluenzae* liver abscesses have been documented (2, 4). Among the truly rare, and perhaps often unrecognized, consequences of infection with this species is its involvement in the biliary tract. To date, only one case of *H. parainfluenzae* biliary tract infection has been reported (3). Herein we describe the isolation of *H. parainfluenzae* from a bile culture of a patient with chronic cholecystitis and discuss those factors that contribute to its presence in the biliary tract.

The patient was a 56-year-old female with a history of increasingly unfavorable liver function tests and chronic cholecystitis who presented with an exacerbation of symptomatology. The survey conducted by Megraud et al. (10) of 450 appendices removed from children aged 3 to 14 years, *Haemophilus* species (*H. influenzae* and *H. parainfluenzae*) were recovered from 35 specimens (7.8%). Of these, 27 were *H. influenzae* and 8 were *H. parainfluenzae*. Interestingly, however, of 820 stool specimens from subjects between 5 months and 15 years of age, 22 had a *Haemophilus* species, of which 16 were *H. parainfluenzae* and 3 were *H. influenzae* (10). Additionally, by plating feces on a selective medium, Palmer (12) recovered hemophilus from 222 of 1,137 stool samples from patients ranging in age from 1 week to 92 years (group 1) and from meat workers aged 15 to 64 years (group 2). In the former group 16.7% (23 of 138) and in the latter group 12% (63 of 525) were individuals 20 years or older. Of 289 strains of hemophilus isolated from the 222 fecal samples, 17 were classified as *H. influenzae*, 235 were classified as *H. parainfluenzae*, and 37 were unclassified.

The above data firmly establish that *Haemophilus* species, especially *H. parainfluenzae*, may be found in the gastrointestinal tract of some individuals. This revelation is germane to the understanding of biliary tract involvement by a *Haemophilus* species that is not generally invasive and that may be acquired by a different (nonbacteremic) route. Unfortunately, although our patient was discharged before we cultured her...
TABLE 1. Documented cases of H. parainfluenzae hepatobiliary tract infection

<table>
<thead>
<tr>
<th>Clinical presentation</th>
<th>Patient age (gender)</th>
<th>Reference (yr) or source</th>
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<tbody>
<tr>
<td>Hepatic abscess</td>
<td>26 yr (M)</td>
<td>4 (1983)</td>
</tr>
<tr>
<td></td>
<td>12 mo (M)</td>
<td>2 (1988)</td>
</tr>
<tr>
<td>Biliary tract infection</td>
<td>65 yr (F)</td>
<td>3 (1992)</td>
</tr>
<tr>
<td></td>
<td>56 yr (F)</td>
<td>This study</td>
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</tbody>
</table>

a For each patient, the route of infection may have been the gastrointestinal tract, as blood cultures were negative for H. parainfluenzae.

b M, male; F, female.

H. parainfluenzae involvement in the biliary tract seems to be an extremely rare event as only one case has been previously reported (3) and as this microorganism has been recovered only once from numerous bile specimens submitted for analysis to the Microbiology Laboratory of the Mount Sinai Hospital and cultured directly on chocolate agar. Thus, it would seem unnecessary to routinely culture bile specimens on chocolate agar. However, bile specimens showing a small gram-negative coccobacillus on a Gram-stained smear which fails to grow on routine media should be subcultured on chocolate agar. In this fashion, a true incidence of Haemophilus species, especially of H. parainfluenzae, involvement of the biliary tract may be ascertained.

REFERENCES