Listeriosis in pregnancy

Ratima Issarachaikul, M.D.,
Chusana Suankratay, M.D., Ph.D.

INTRODUCTION

Listeriosis is an uncommon infectious disease in the general population, but it is usually observed in certain groups of persons including newborns, elderly individuals, pregnant women, and patients with cell-mediated immunity (CMI) defect. Listeriosis in pregnancy has several unique features, compared to others. The severity of maternal illness is always mild, while it can cause serious adverse effects in the fetus.

Epidemiology

According to the surveillance of the Centers for Disease Control and Prevention (CDC), approximately 1,600 listeriosis cases are reported annually in the United States, and among these, there are about 2.4 outbreaks per year. The last outbreak reported in December 2011 in 28 states and appeared to be associated with contaminated cantaloupes from Jensen Farms in Colorado. Thirty patients died, and one pregnant woman had a miscarriage.¹ The annual incidence of listeriosis is 0.7 per 100,000 in the general population, compared with that of 12 per 100,000 in pregnancy², indicating a 20 times higher susceptibility of pregnant women to listeriosis than other healthy individuals.

From 2001 to 2008, 1959 cases of listeriosis were reported in France (the mean annual incidence 0.39 per 100,000 residents). Among these, 347 cases were pregnant, accounting for the incidence being of >100 times than that of general population aged less than 65 years.³

To date, only 4 sporadic cases have been reported in Thailand: 3 patients with meningitis⁴,⁵, and 1 with brain abscess.⁶ No listeriosis in pregnancy has been reported. The true prevalence of listeriosis is probably underestimated due to unawareness of caring physicians and unavailability of microbiologic laboratory. Therefore, a high index of suspicion of listeriosis should be made when caring patients at risk who present with flu-like symptoms, enteric fever, meningitis, brain abscess, and brain stem encephalitis.

Pathogenesis

During pregnancy, there is a local suppression of CMI in the placenta caused by the changes in the levels of several hormones and serum factors, contributing to the natural protection of the fetus from maternal immunity.⁷,⁸

Listeria monocytogenes, a facultative intracellular bacterium, is capable to cross the intestinal mucosal, blood-brain, and placental barriers by active endocytosis of organisms by mucosal, endothelial, and trophoblastic cells, respectively.⁹ After entry, L. monocytogenes can spread from cell to cell and disseminate to its target organ without being exposed to host's immune response.¹⁰

Both factors including the impairment of CMI and the invasiveness of the organism are the explanation...
for the higher susceptibility of pregnant women than normal individuals to listeriosis.\textsuperscript{10,11}

The widespread presence of microabscesses and granulomas from fetopsy is pathognomonic signs of disseminated listeria infection in utero termed “granulomatosis infantiseptica”.\textsuperscript{12}

**Clinical syndromes**

*L. monocytogenes* can cause a wide range of clinical manifestations including self-limited acute febrile illness, enteric fever, central nervous system (CNS) infection, endocarditis, primary bacteremia, and perinatal infection.\textsuperscript{13,14}

Most pregnant women with listeriosis are healthy without additional contributing factors. Maternal illness is frequently asymptomatic or mild (usually described as “flu-like syndrome”), whereas it can be severe in the fetus or neonate (Tables 1 and 2).\textsuperscript{15} For unknown reasons, CNS infection, one of commonly reported forms of listeriosis in nonpregnant groups, is very rare during pregnancy.\textsuperscript{14}

Approximately 1 of 5 pregnancies complicated by listeriosis leads to spontaneous abortion or stillbirth.\textsuperscript{15,16}

**Outcomes**

Considering the mild severity of illness in most pregnant women, to my knowledge, there have been no reports of maternal mortality.\textsuperscript{3,15} However, the illness causes adverse pregnancy outcomes.\textsuperscript{3,15-17} Several reports have shown that acute chorioamnionitis was observed in all pregnant women with listeriosis, resulting in 68% and 20% of neonatal infection and fetal loss, respectively.\textsuperscript{15,16}

<p>| Table 1. Presenting symptoms and signs of pregnant women with listeriosis.\textsuperscript{15} |
|---|---|---|
| <strong>Literature Review</strong> (n=180 episodes) | <strong>Present Series</strong> (n=11 episodes) | <strong>Total</strong> (n=191 episodes) |</p>
<table>
<thead>
<tr>
<th>No. (%)</th>
<th>No. (%)</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever\textsuperscript{a}</td>
<td>117 (65)</td>
<td>9 (82)</td>
</tr>
<tr>
<td>&quot;Flu-like&quot; syndrome</td>
<td>61 (34)</td>
<td>-</td>
</tr>
<tr>
<td>Abdominal or back pain</td>
<td>38 (21)</td>
<td>3 (27)</td>
</tr>
<tr>
<td>Vomiting/diarrhea</td>
<td>11 (6)</td>
<td>3 (27)</td>
</tr>
<tr>
<td>Headache</td>
<td>18 (10)</td>
<td>2 (18)</td>
</tr>
<tr>
<td>Myalgia</td>
<td>6 (4)</td>
<td>2 (18)</td>
</tr>
<tr>
<td>Sore throat</td>
<td>5 (3)</td>
<td>2 (18)</td>
</tr>
<tr>
<td>None</td>
<td>55 (31)</td>
<td>-</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Patients may have more than 1 symptom. Total may not equal 100% due to rounding.

\textsuperscript{a}In the present case series and when data were available in the literature, fever was defined as temperature $\geq 38.2^{\circ}$C.
Listeriosis in pregnancy:—

Issarachaikul R & Suankratay C.

Treatment

No randomized controlled study has been carried out to determine the drug of choice for treatment of listeriosis either in pregnant or nonpregnant patients. Most in vitro studies demonstrated that penicillin, ampicillin, and amoxicillin could reduce the number of organisms within the cells, indicating a bactericidal effect. In addition, the higher intracellular drug concentration correlated well with the higher killing effect of the antibiotic.  

Ampicillin is considered the drug of choice especially in pregnancy, despite its superiority to penicillin being questionable. The high dose of 6 g or more per day is recommended to assure adequate penetration into the host cell and placenta. In contrast, cephalosporins including cefotaxime, ceftriaxone, and ceftazidime are considered ineffective. In vitro studies showed a synergistic effect when a aminoglycoside is added to ampicillin or penicillin treatments. However, experimental studies in animals did not consistently support the synergistic effect of combination treatment. Cotrimoxazole and erythromycin are alternatives for pregnant patients allergic to penicillins.

Prevention

*L. monocytogenes* is usually the known contaminant in ready-to-eat meats or dairy products including hot dogs, raw cheeses, and unpasteurized milk. The United States Food and Drug Administration recommends to not eat uncooked hot dogs, luncheon meats, or deli meats including soft cheeses and raw milk unless they are reheated until steaming hot.

In Thailand, where cold cuts and dairy products are not preferred, Listeriae are also found contaminated in raw meats, seafood, and ready-to-eat products. It is important to provide information, specifically to people at risk, to cook food well before consuming.

References

2. Southwick FS, Purich DL. Intracellular pathogenesis