Carnobacterium inhibens Isolated in Blood Culture of an Immunosuppressed, Metastatic Cancer Patient: A Case Report and Literature Review

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Background
• Carnobacterium spp. are lactic acid-producing Gram-positive bacteria rarely isolated from humans.
• Health Canada approved for use as a bio-preservative in the food/fish industry.
• The use of bacteria as food additives pose a potential risk for immunocompromised patients including bacteria used in probiotics (e.g., Lactobacillus spp.), and bacteria used in bio-preservation.

Purpose
1) Review published reports on human infections with Carnobacterium spp.
2) To present a case report of Carnobacterium inhibens isolated in blood culture of an immunosuppressed patient with pneumonia.

Methods – Literature Search
• Inclusion criteria:
  • English-written articles
  • Human infections with Carnobacterium spp. isolated from any body site or culture
  • Timeline: Inception to March 2020
• Databases:
  • EMBASE, OvidMEDLINE, PubMed, Google Scholar

Discussion & Literature Review
• Non-spore-forming, lactic acid-producing, Gram-positive bacilli.
• Found in both polar and temperate environments.
• Able to tolerate and grow at a wide temperature range (-20 to +10°C).
• Can survive in high-pressure environments including vacuum-packaging process for foods.
• Approved by Health Canada as bio-preservative of ready-to-eat foods:
  • E.g., C. divergens and C. maltaromaticum for smoked fish and vacuum-packed meat/poultry, respectively.
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Case Presentation
• 81M presented with a 2-week productive cough, exertional dyspnea, general malaise and subjective fevers/chills.
• No sick contacts, travel history, exposure to (farm) animals, or handling of fish or meat products.
Past medical history:
• Castrate-resistant prostate cancer with liver and bone metastases on enzalutamide, leuprolide and chronic steroids.
• Triple-bypass cardiac surgery for NSTEMI.
Social history: retired prison clergyman; ex-smoker; social drinker; no history of IVDU.

Physical examination:
• Vitals: afebrile, sinus tachycardia, hypotensive but fluid responsive, O2 sat >95% on room air.
• Lung: decreased air entry to bases; bilateral crackles.
Investigation (septic workup):
• WBC 10.7 (Neut 9.49); ESR 90; CRP 195.9
• Blood culture: ½ sets positive for Gram-positive bacilli, later confirmed C. inhibens by PHL.
• CT chest: multifocal pneumonia.
• TTE echo: no vegetations or valvular dysfunction.
Management:
• Clinically improved with empiric IV ceftriaxone and vancomycin for pneumonia.
• Discharged with step-down oral amoxicillin-clavulanate for total 7 days antibiotics.

Table 1. Previously reported human infections with Carnobacterium spp.

<table>
<thead>
<tr>
<th>Case</th>
<th>RF</th>
<th>Culture/Site</th>
<th>Infection</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-35M</td>
<td>None</td>
<td>Mixed flora; hand abscess</td>
<td>Traumatic wound at water sawmill</td>
<td>Amputation + debridement; Abx</td>
</tr>
<tr>
<td>2-13F</td>
<td>None</td>
<td>Mixed flora; hand gangrene</td>
<td>Traumatic wound; water exposure</td>
<td>Amputation + debridement; Abx</td>
</tr>
<tr>
<td>3-43M</td>
<td>None</td>
<td>½ blood culture sets</td>
<td>Sepsis suspected from GI source; Extensive hx of handling and consuming fish</td>
<td>CTX/AMP → MOX</td>
</tr>
<tr>
<td>4-57F</td>
<td>DM; TPN; post-arrest</td>
<td>4 blood culture sets</td>
<td>Septic shock with necrotizing esophagitis requiring esophagectomy and TPN</td>
<td>Broad spectrum → AMOX</td>
</tr>
</tbody>
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References: