THE STREPTOCOCCUS PLURANIMALIUM

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Introduction:

Streptococcus pluranimalium (S. pluranimalium) is unusual streptococcal species, which is rarely identified from humans. Limited cases are reported from this new species; the present study is the first case report from India indicating infection with S. pluranimalium causing empyema.

Streptococcus pluranimalium was first isolated in 1999 from a case of bovine mastitis, but has been isolated from a number of other animals like chickens, goats, cats, canaries, sheep, Nile tilapia, a pheasant, and an alpaca. S. pluranimalium can be cultured from various mucosal surfaces (e.g. cervix, vagina, lung, tonsils) and from milk of infected dairy animals. S. pluranimalium has some animal reservoirs because the source of this species are milk and other infectious secretions of animals and transmitted to human in the form of zoonosis. According to previous experience with rare case reports, vancomycin, aminoglycosides, and cephalosporins are the drugs of choice for S. pluranimalium infection.

The aim of present study was to report the first case of human empyema due to S. pluranimalium in India.

Table 1: Reported cases of Streptococcus pluranimalium infection in humans between 2012 and 2017

<table>
<thead>
<tr>
<th>Age</th>
<th>Disease</th>
<th>Source</th>
<th>Specimen</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Febrile neutropenia</td>
<td>Not identified</td>
<td>Blood PCR</td>
<td>n/a</td>
</tr>
<tr>
<td>53</td>
<td>Septic arthritis</td>
<td>Not identified</td>
<td>Pus, Blood</td>
<td>died</td>
</tr>
<tr>
<td>17</td>
<td>Subdural empyema</td>
<td>Sinusitis, Dental infection</td>
<td>pus</td>
<td>recovered</td>
</tr>
<tr>
<td>N/A</td>
<td>Periodontitis, Bacteremia</td>
<td>Periodontitis</td>
<td>Blood c/s</td>
<td>n/a</td>
</tr>
<tr>
<td>N/A</td>
<td>Endocarditis</td>
<td>IV drug user</td>
<td>Blood c/s</td>
<td>died</td>
</tr>
<tr>
<td>N/A</td>
<td>Endocarditis</td>
<td>Animal</td>
<td>Blood c/s</td>
<td>Recovered</td>
</tr>
<tr>
<td>N/A</td>
<td>TAVI associated endocarditis</td>
<td>Dental extraction</td>
<td>Blood c/s</td>
<td>died</td>
</tr>
</tbody>
</table>

Case presentation:

A 59 years old male from pune, known case of Diabetes type 2 and hypertension since 10 years, admitted in ICU of poona hospital and research Centre, pune, India with complaints of dyspnea on exertion, dry cough, fever and decreased appetite since 7 days.

He consulted outside prior one day of admission and his investigations showed WBC count of 17000, HbA1c of 14.2% with fasting sugar 462 and post prandial sugar 498 along with negative Dengue NS1 and IgM antibodies.
On arrival at our hospital, he was tachypnic with respiratory rate of 22/min, spo2 of 91% while breathing on ambient air, Blood pressure was 140/90 mm of Hg, Heart rate was 104/min, on auscultation air entry was reduced on right infra mammary area and crepitations was heard over right infrascapular and infraaxillary area. Chest x-ray showed right lower lobe consolidation with pleural effusion.

On ultrasonography of chest, right lower lobe was consolidated and thick pus was present in the pleural cavity, for which diagnostic tapping was done at the same time. On investigation of the pleural fluid, protein was 3.45, albumin was 1.10, total nucleated cells were 87200/mm³, among which 93% were neutrophils and 7% were lymphocytes. On gram stain many gram-negative bacilli and gram-positive cocci were seen along with negative acid-fast stain. Pleural fluid LDH was 10990, ADA was 166 and GeneXpert for tuberculosis was negative. So patient was started on meropenem and clindamycin intravenously. Next day he underwent thoracoscopic drainage of empyema along with intrathoracic tube placement and pleural biopsy. After 2 days, pleural fluid culture showed gram positive growth on BacT/ALERT culture system, so teicoplanin was added to the regimen.

On further subculture after 4 days, organism was identified as streptococcus pluranimalium on vitek2 system and drug sensitivity was obtained by Kirby Bauer Disc Diffusion method which showed that Organism was sensitive to all antibiotics including azithromycin, ceftriaxone, clindamycin, levofoxacin, linezolid, tetracycline and vancomycin. Meanwhile, patient developed septic shock and worsening of pneumonia, required inotrope support, mechanical ventilation for 6 days. So, IV clindamycin with IV teicoplanin was continued for 10 days then teicoplanin was stopped and shifted to oral clindamycin once he became hemodynamically stable and oxygen requirement reduced. AFB culture and pleural biopsy culture was negative. Histopathology was consistent with empyema. Oral clindamycin continued for total 6 weeks. Patient was regularly followed up after discharge and repeat chest x-ray at 6 weeks showed resolution of consolidations and effusion along with fibrotic changes in right lower lobe.

<table>
<thead>
<tr>
<th>Laboratory Marker</th>
<th>Patient’s Value On admission</th>
<th>Patient’s Value after 6 weeks</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin/ hematocrit</td>
<td>12.3/36.2%</td>
<td>11.7/34.7%</td>
<td>13-17 g/dl/40-50%</td>
</tr>
<tr>
<td>WBC count</td>
<td>22231</td>
<td>5770</td>
<td>4000-11000 /mm³</td>
</tr>
<tr>
<td>Platelets</td>
<td>4.24 lacs</td>
<td>4.06 lacs</td>
<td>1.5-4.5 lacs/mm³</td>
</tr>
<tr>
<td>Creatinine</td>
<td>2.55</td>
<td>1.49</td>
<td>0.7-1.3 mg/dl</td>
</tr>
<tr>
<td>Serum albumin</td>
<td>1.98</td>
<td></td>
<td>&gt;3.5 gm/dl</td>
</tr>
</tbody>
</table>

HRCT (High Resolution Computed Tomography) showing Right lower lobe consolidations with pleural effusion.
Discussion:

Streptococcus pluranimalium is a rare species of streptococcus group which causes infection in humans. Till now, only a few cases reported by this organism in humans. So, details regarding pathogenesis and natural history of this bacteria is not well understood due to rare nature of the organism. Considering data from previous case reports, it is thought that defective immunity has a role in pathogenesis as patient in this case report is diabetic.

In our case report, Diabetic patient presented with right sided empyema and on culture of pleural fluid, streptococcus pluranimalium identified as slow growing gram positive bacterium. On drug sensitivity profile, most antibiotics against gram positive organisms e.g. clindamycin, linezolid, teicoplanin, ceftriaxone, vancomycin are sensitive and patient was treated with clindamycin with teicoplanin for initial days and then oral clindamycin for total 6 weeks. So, third generation cephalosporin, clindamycin, linezolid and vancomycin are mainstay of treatment against infection by this organism.

Conclusion:

This case study demonstrates the first case of empyema by streptococcus pluranimalium. According to present and previous studies, it seems that this organism is a opportunistic organism and it is a slow growing on standard bacterial culture. Third generation cephalosporin, clindamycin, linezolid, teicoplanin and vancomycin forms the therapeutic regimen against this organism.

References:

8. Dhotre SV, Mehetre GT, Dharne MS, Suryawanshi NM, Nagoba BS. Isolation of Streptococcus tigurinus—a novel member of Streptococcus mitis group from a case of periodontitis. FEMS microbiology letters. 2014 Aug 1;357(2):131-5.