A Rare Case of Cholecystitis Caused by *Raoultella planticola*

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A 62-year-old female patient presented to the Accident and Emergency Department with abdominal pain and nausea. She described a 3-week history of worsening right upper quadrant pain but denied any nausea, vomiting, or fevers. Her past medical history included coeliac disease, a hiatus hernia, and irritable bowel syndrome. Her regular medications were Mebeverine, Omeprazole, and Movicol with no known drug allergies. She worked as a cleaner, did not smoke, and drank minimal alcohol. Of note, she had not travelled recently, never had instrumentation of her abdomen, and did not have any recent antimicrobial treatments. Specifically, she denied any intentional or accidental ingestion of soil or aquatic material.

On admission, she was apyrexial with normal observations. Significant examination findings were that of localised tenderness in the right upper abdominal quadrant, consistent with acute cholecystitis. Blood tests revealed raised inflammatory markers with mildly deranged liver function tests. (White Cell Count $24.0 \times 10^9/L$, Erythrocyte Sedimentation Rate 98, C-Reactive protein 248, Bilirubin 12, Alkaline Phosphatase 189 U/L, Alanine aminotransferase 58 U/L, Gamma-glutamyl Transferase 141 U/L, Albumin 37 g/L). An ultrasound was performed which reported—“The gallbladder is distended, containing debris and calculi. It is thick walled, tender with some pericholecystic fluid around it. There is no drainable abscess or collections. The ultrasound appearances are consistent with a chronic inflamed gallbladder. The common bile duct is not dilated, and there are no dilated intrahepatic ducts. Normal appearances of the liver, spleen, and both kidneys.”

She received 3 days of intravenous Co-amoxiclav, and her symptoms resolved. She was discharged with a 5-day course of oral Co-amoxiclav with arrangements to return for an elective laparoscopic cholecystectomy.

Five months after her initial presentation, she reattended electively for a laparoscopic cholecystectomy. Due to adhesions throughout the epigastrium and right upper quadrant, this was converted to an open procedure. The gallbladder was buried in omentum, and there was a chronic abscess cavity due to a localised perforation of the gallbladder. Fluid from...
Table 1: Reports on clinical infection by R. planticola in humans.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Location</th>
<th>Clinical manifestation</th>
<th>Comorbidities</th>
<th>Invasive procedure/truma prior to infective episode</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freney et al., [8]</td>
<td>France</td>
<td>Septicaemia</td>
<td>Bacterial endocarditis</td>
<td>Mitral valve replacement</td>
<td>Cefotaxime and Tobramycin</td>
<td>Full recovery</td>
</tr>
<tr>
<td>Freney et al., [9]</td>
<td>France</td>
<td>Septicaemia and pneumonia</td>
<td>Coronary artery disease</td>
<td>Postcoronary artery bypass graft</td>
<td>Ceftriaxone</td>
<td>Full recovery</td>
</tr>
<tr>
<td>Alves et al., [10]</td>
<td>Brazil</td>
<td>Acute pancreatitis and retroperitoneal abscess</td>
<td>Pneumonia and alcohol excess</td>
<td>Nil</td>
<td>Imipenem and Amikacin</td>
<td>Full recovery</td>
</tr>
<tr>
<td>O'Connell et al., [11]</td>
<td>Ireland</td>
<td>Cellulitis of the thumb</td>
<td>Nil</td>
<td>Crush injury from hammer</td>
<td>Benzyl penicillin, Flucloxacillin, Clindamycin, and Ciprofloxacine</td>
<td>Full recovery</td>
</tr>
<tr>
<td>Wolcott and Dowd., [12]</td>
<td>USA</td>
<td>Surgical site infection following *ORIF of the left tibia</td>
<td>Nil</td>
<td>*ORIF</td>
<td>Cephalexin, Clindamycin, and Ertapenem</td>
<td>Full recovery</td>
</tr>
<tr>
<td>Yokota et al., [13]</td>
<td>Japan</td>
<td>Cholangitis</td>
<td>Metastatic apocrine adenocarcinoma of the neck</td>
<td>**ERCP</td>
<td>Cefoperazone-sulbactam, Meropenam and piperacillin tazobactam</td>
<td>Clinical improvement</td>
</tr>
<tr>
<td>Current report</td>
<td>UK</td>
<td>Cholecystitis</td>
<td>Coeliac disease, hiatus hernia</td>
<td>Nil</td>
<td>Co-amoxiclav</td>
<td>Full recovery</td>
</tr>
</tbody>
</table>

* ORIF: Open reduction and internal fixation.
** ERCP: Endoscopic retrograde cholangiopancreatography.

the gallbladder was sent for microbiological examination and a partial cholecystectomy performed.

Postoperatively the patient was systemically well. Her observations were normal with no pyrexia, and she had minimal pain. The surgical team was contacted two days after the operation and informed that viable Raoultella planticola had been identified by VITEK 2 biochemical identification system with a very good probability of 99%. This was sensitive to Co-amoxiclav, Ciprofloxacine, Cefuroxime, and Tazocin. She was started on oral Co-amoxiclav following discussion with the microbiology team. She continued to make a good recovery and was discharged after a full 7-day course of Co-amoxiclav.

She was reviewed 3 months after discharge with no new complaints.

3. Discussion

R. planticola is a gram-negative, nonmotile bacilli primarily considered to be environmental bacteria. Raoultella was proposed as a genus in 2001, following the analysis of the genus Klebsiella [1]. A comparative analysis of the sequences of the 16S rRNA and rpoB genes were analysed, showing the taxonomic heterogeneity of Klebsiella which form three clusters; cluster II organisms were characterised by growth at 10 degrees Celsius and utilisation of L-sorbose as a carbon source, and the name Raoultella was created as a genus name for this species of cluster II organisms [2, 3]. Until this time, this organism was known that was being part of the Klebsiella genus which was first described in 1981 as Klebsiella planticola and later in 1983 as Klebsiella trevisanii.

Many Klebsiella species are indistinguishable by the conventional methods employed routinely in the clinical microbiology laboratory. There are several recommended additional tests [1, 3–5] to confirm the subspecies of Klebsiella, but there is currently no standardized test available [6]. In this patient, R. Planticola was identified using the automated identification system VITEK 2 with GN Identification Card (bioMerieux) with a probability of 99%. Whilst this is a high probability, confirmation of identification could be strengthened by additional tests or confirmed by a national Klebsiella reference laboratory. This was not carried out firstly because the microbiologists were confident with the 99% probability, and secondly as the patient was clinically stable with a good response to Co-amoxiclav.

R. planticola has been reported as clinical isolates in humans in sputum, stools, wounds, and urine [7, 8] but is a rare cause of invasive human infections. To date, there have only been 6 reported cases of serious infection caused by this organism in humans.

The first case report was described by Freney et al. [8] in Lyon, France where a 69-year-old patient with R. planticola septicaemia was admitted to an intensive care unit 9 days following a mitral valve replacement [9]. In 1986, Freney et al. [9] described a 57-year-old patient from the same intensive care unit with severe pneumonia following

A common theme is that 4 out of the 7 cases had significant comorbidities—Freney et al. [8]; Freney et al. [9]; Alves et al. [10]; Yokota et al. [13]. Another common theme is that 5 of the 7 had some form of trauma or invasive procedure prior to onset of systemic symptoms—Freney et al. [8]; Freney et al. [9]; O’Connell et al. [11]; Wolcott and Dowd [12]; Yokota et al. [13]. The patient in this report did undergo a cholecystectomy; however, this was 5 months after her episode of cholecystitis; hence, her procedure is unlikely to have played a causative role in her infection. This is summarised in Table 1.

4. Conclusion

In conclusion, R. planticola is an environmental bacterium that can cause serious infections in humans. From previous reports, we have identified the potential risk factors to include invasive medical procedures, trauma with potential soil contamination, and significant comorbidities. Interestingly, the patient in this report does not have any of these risk factors. The clinical implications of this are uncertain; nonetheless, the correct identification of bacterial species is essential to guide antimicrobial treatment and improve clinical care.

References
