SHOULDER SURGERY AND PROPIONIBACTERIUM ACNES (P. ACNES) BACTERIA

Terry L. Whipple, M.D., F.A.C.S.

About P. acnes

*P. acnes* is a rod-shaped, anaerobic (but oxygen tolerant) bacteria that develops in low oxygen environments such as hair follicles and deep within pores – *Figure 1*. It is closely linked with the commonly known “acne” skin condition, and is therefore prevalent on the shoulders, as well as the neck and face.

Additionally, *P. acnes* is gram-positive, meaning it turns violet during the Gram staining method of bacterial determination – *Figure 2*. Fortunately, its gram-positive nature makes *P. acnes* more vulnerable to antibiotics.

P. acnes shoulder infections

*P. acnes* shoulder infections are generally similar in their manifestation. The slow growth of the bacteria results in late-stage infections with frequently negative cultures\(^1\). To identify *P. acnes*, studies normally recommend culture incubation for 14 to 28-days\(^2\).

Figure 1. *P. acnes* bacteria

Figure 2. Gram Staining of *P. acnes* Bacteria

Extraordinarily slow growing

Peer-reviewed studies demonstrate infection rates between 2% and 7.8% for most shoulder procedures\(^3-6\). In these procedures, *P. acnes* is one of the three most commonly found bacteria\(^7\). However, the time taken to positively identify *P. acnes* through a culture is significantly longer than the other two bacteria – *Table 1*.

![Infection appears 3-7 weeks after surgery](image)

*Figure 3. How a *P. acnes* shoulder infection generally manifests*

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Culture Time to Positively Identify</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Staphylococcus aureus</em> (Staph)</td>
<td>2 hours to 4 days(^8)</td>
</tr>
<tr>
<td><em>Staphylococcus epidermidis</em> (Staph)</td>
<td>10 to 24 hours(^9)</td>
</tr>
<tr>
<td><em>Propionibacterium acnes</em> (<em>P. acnes</em>)</td>
<td>Minimum of 13-days in anaerobic environment(^10)</td>
</tr>
</tbody>
</table>

Table 1

Sonoma Orthopedics Products, Inc
LB-1231 Rev. A
Managing P. acnes

Peer-reviewed literature suggests the following measures for reducing incidence of P. acnes infections:

- Prepare the surgical site several times with ChloraPrep® (or other chlorhexidine solution)\textsuperscript{11}
- Perform routine intraoperative cultures and incubate for 28 days\textsuperscript{2}
- Administer antibiotics for sustained periods upon observing signs of inflammatory reaction\textsuperscript{12}
- Incise and drain any fluctuant process, or skin swab re-culture without fluctuance without necessarily removing the implant, if possible\textsuperscript{13}

References

3. Leroux T et al. Rate of and risk factors for reoperation after ORIF of midshaft clavicle fractures. JBJS July 2014 (2.6% deep infection)
4. Blonna D. Incidence and risk factors for acute infection after prox hum fx. JSES April 2014 (4% infection)