Shoulder Infections in Ottawa, Ontario, Canada

Background

Propionibacterium acnes is a gram-positive anaerobic bacterium commonly found in hair follicles. It is one of the most common bacteria causing shoulder implant infections. Our standard practice of anaerobic culture is 4 days incubation may enhance recovery of this organism as a contaminant, and thus the cumulative rates for isolation were 0, 0, 0%, 66.7%, and 100% at days 1-5 of incubation, respectively. For cultures regarded as contaminants, the cumulative rates for isolation were 0, 0, 67%, and 100% at days 1-5 of incubation, respectively. The average length of incubation required to grow P. acnes was 3.5+/-0.8 days in specimens from patients with infection. Of the 80 patients with positive shoulder joint cultures, P. acnes was isolated from 20 patients (25%), representing the second most common bacteria isolated from shoulder joints. P. acnes was incriminated as a pathogen in 17 of the 20 (85%) from shoulder specimens. The sensitivity and specificity of more prolonged incubation remains to be determined.

Methods

This study evaluated our current microbiology practice in diagnosis of shoulder infections and identified the clinical characteristics of P. acnes infection.

Methods

A retrospective study was conducted to assess the length of incubation of standard microbiology culture required for P. acnes isolation from shoulder joint specimens. A total of 499 shoulder joint cultures (Synovial fluid or tissue specimen) from TOH patients were analyzed. The clinical characteristics of patients with positive culture from the shoulder joint were determined. 59 of 499 (11.8%) culture positive shoulder specimens were P. acnes, of which 56 were deemed responsible for shoulder infection in 18 patients, and the remaining 3 positive specimens from 3 patients were considered contaminants. For the cultures regarded as significant, the cumulative rates for isolating P. acnes from shoulder specimens were 1.9%, 1.9%, 41.6%, and 100% at days 1-5 of incubation, respectively. For cultures regarded as contamination, the cumulative rates for isolation were 0, 0, 67%, and 100% at days 1-5 of incubation, respectively. The average length of incubation required to grow P. acnes was 3.5+/-0.8 days in specimens from patients with infection.

Results

Inclusion criteria: All cases with positive shoulder cultures (Synovial fluid or tissue specimen) from TOH

Exclusion criteria: non-TOH cases with positive shoulder cultures.

1. Propionibacterium infection was categorized as early infection (infected within 6 months after index surgery), delayed infection (infected 6-24 months after index surgery), and late infection (infected after 2 years after index surgery).

2. The definition of true shoulder infection for this retrospective study is clinical presentation with local infection (joint pain, localized swelling, redness or drainage), fever, pain on shoulder movement (Synovial fluid or tissue specimen), with or without positive culture.

3. Data and statistical analysis: The data were analyzed using Excel and SAS statistical software. Statistical analysis was performed using the Chi-square and Fisher exact test. p<0.05 was considered to be statistically significant.

All specimens from clinically suspected shoulder infection positive for P. acnes were cultured within 5 days of standard incubation period and standard culture procedure. Total 499 shoulder specimens were culture positive, of which 59 (11.8%) grew P. acnes. 56 of 59 P. acnes positive specimens were clinically significant (group A) and 3 patients were detected for the culture to be positive 3.5-0.8 days compared to 4.3-0.6 days for the remaining 3 specimens (group B) (p<0.02). The cumulative positive rates for isolating P. acnes from group A were 1.9%, 41.6%, 94.6% and 100% at day 1 to day 5 of incubation, respectively, compared to 0, 0, 66.7%, and 100% at day 1 to day 5 of incubation, respectively, from group B.

Abstract: This study evaluated our current microbiology practice in diagnosis of shoulder infections and identified the clinical characteristics of P. acnes infection in 18 patients with shoulder joint infections. It was found that P. acnes infection is more frequently isolated in patients with mixed infection. The sensitivity and specificity of more prolonged incubation remains to be determined.