

## CASE REPORT

### ***Trueperella bernardiae*: first report of wound infection post laparoscopic surgery**

Alysson L. R. Rattes<sup>1</sup>, Maria Rita Araujo<sup>2,3</sup>, Marilia P. Federico<sup>1,4</sup>, Carlos D. Magnoni<sup>2</sup>, Pedro Aurelio M. Neto<sup>2</sup> & Guilherme H. Furtado<sup>1,2</sup>

<sup>1</sup>Division of Infectious Diseases, Hospital Epidemiology Committee, Hospital São Paulo, Federal University of São Paulo, São Paulo, Brazil

<sup>2</sup>Hospital of Coração-HCor, São Paulo, Brazil

<sup>3</sup>Hospital Beneficência Portuguesa, São Paulo, Brazil

<sup>4</sup>Department of Health, State University of Feira de Santana, Bahia, Brazil

#### Correspondence

Guilherme H. Furtado, Hospital Epidemiology Committee, Division of Infectious Diseases, Hospital São Paulo, Federal University of São Paulo, Rua Napoleão de Barros, 690, 04024002, São Paulo, Brazil. Tel: +55-11-55718935; Fax: +55-11-5571-8935; E-mail: ghfurtado@gmail.com

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## Introduction

*Trueperella bernardiae* is a nonspore-forming, nonmotile, facultative anaerobic, gram-positive coccobacilli; it is catalase and oxidase negative and has variable hemolytic activity. Colonies are circular, smooth, and slightly convex with a glassy appearance and diameters range from 0.2 to 0.5 mm [1].

This bacterium was first described as a likely opportunistic pathogen based on its morphological, biochemical, and chemical properties as part of *Coryneform* Group 2 [2].

This group was characterized using biochemical and chemotactic methods (16S rRNA sequence analysis) from bacteria isolated from blood samples and human abscesses and the name *Actinomyces bernardiae* sp. nov. was proposed [3]. It was classified as part of the genus *Arcanobacterium* [1] and was later reclassified as part of the genus *Trueperella* [4].

There are some documented cases of infection caused by *Trueperella bernardiae*. These bacteria usually come from the skin as it can be part of the regular skin flora [5].

#### Key Clinical Message

We report the first case of wound infection caused by *Trueperella bernardiae* after laparoscopic surgery. The patient was treated with oral amoxicillin/clavulanate which was continued for 1 week after discharge with a successful clinical response. There are few cases described but none related to wound infection after laparoscopic surgery.

#### Keywords

*Arcanobacterium*, infection, laparoscopic cholecystectomy, *Trueperella bernardiae*, wound infection.

*Trueperella bernardiae* was previously identified from blood culture, abscesses, and eye infections [3]. There are case reports of severe urinary tract infections complicated by septicemia [6], septic arthritis [7], coinfection with *Staphylococcus aureus* from chronic osteitis [8], prosthetic joint infection [9], necrotizing fasciitis [10], bacteremia secondary to soft tissue infection [11], bacteremia due to chronic ulcers of the lower limbs [5], diabetic foot infection, and sepsis [12].

As far as we know, this report describes the first case of wound infection caused by *Trueperella bernardiae* after laparoscopic cholecystectomy.

## Case Report

In December 2014, a 24 year-old woman was admitted to the Emergency Unit of the Hospital of Coração in São Paulo, Brazil, with fever, pain, and purulent periumbilical secretion 7 days after a laparoscopic cholecystectomy intervention in Belém, Pará, located in the northern region of Brazil. The patient has no immunologic

impairment. She underwent cholecystectomy because she was found to have biliar stones and previous biliar colic.

Medical examination revealed painful cellulitis with purulent drainage in the periumbilical region. Laboratory data included a blood leukocyte count of  $15,610/\text{mm}^3$ , neutrophil count of  $11,551/\text{mm}^3$ , platelet count of  $489,000/\text{mm}^3$ , C-reactive protein level of 90 mg/L and ESR of 42 mm. Computerized tomography showed a  $4 \times 3.5 \times 2.5$  cm infraumbilical collection with local subcutaneous fat densification and also ultrasonography (Figs. 1 and 2). Both anaerobic and aerobic blood cultures were negative. The Gram stain of the umbilical purulent secretion showed a moderate number of leukocytes and gram-positive short bacilli suggesting coryneform bacteria. The initial direct aerobic culture assembled in Sheep Blood Agar (SBA), Chocolate Agar (CA), and



**Figure 1.** Computerized tomography showing infraumbilical collection with local subcutaneous fat densification.



**Figure 2.** Ultrasonography showing infraumbilical collection with local subcutaneous fat densification.

MacConkey Agar (MCA) plates was negative after 48 h, but after 4 days of incubation in enrichment broth (thioglycolate with resazurin), the culture was positive and subcultured in SBA, CA, and MCA plates when we isolated in SBA and CA, a facultative anaerobic beta-hemolytic gram-positive bacilli that was not initially identified by Vitek 2<sup>®</sup> (bioMérieux Marcy l'etoile, France).

*Trueperella bernardiae* was identified by Vitek MS<sup>®</sup> (bioMérieux) mass spectrometry (matrix-assisted laser desorption/ionization time-of-flight [MALDI-TOF]). A disk diffusion (DD) in Mueller Hinton Blood Agar test showed resistance to erythromycin and clindamycin (zone diameter inhibition = 6 mm) and susceptibility to levofloxacin and linezolid using the CLSI DD criteria for *Staphylococcus* spp., and susceptibility to vancomycin using criteria for *Enterococcus* spp.. These results may be controversial, since there are no DD breakpoints for *Actinomyces* or coryneform bacteria given by CLSI or EUCAST [13–15]. The minimal inhibitory concentration (MIC) for penicillin, as determined by Etest<sup>®</sup> (bioMérieux), was  $0.064 \mu\text{g}/\text{mL}$ , which was considered susceptible. Because there is no specific MIC breakpoint for benzylpenicillin described by Clinical and Laboratory Standard Institute (CLSI), we used EUCAST breakpoints for gram-positive anaerobes including *Actinomyces* spp, with reference values of  $\leq 0.25 \mu\text{g}/\text{mL}$  for considering penicillin susceptibility [15].

A combination of 4.5 g of piperacillin/tazobactam and 1 g of vancomycin was given intravenously every 8 h until the microbiological results were available. After 6 days of hospitalization, laboratory parameters improved, showing a leukocyte count of  $9580/\text{mm}^3$ . Also, the skin lesion showed improvement. Based on these results, the treatment was changed to oral amoxicillin/clavulanate which was continued for 1 week after discharge with a successful clinical response. We sought to change amoxicillin/clavulanate for a penicillin but the assistant physician insisted on utilizing a  $\beta$ -lactamic/ $\beta$ -lactamase inhibitor.

## Discussion

The virulence of *Trueperella bernardiae* is unclear, and its occurrence is rare. This pathogen is usually susceptible to several antibiotics, but differences in its microbiological profile have been described.

As far as we know, this is the first report of *Trueperella bernardiae* causing a wound infection after laparoscopic cholecystectomy. In this report, *Trueperella bernardiae* was resistant to clindamycin and erythromycin. This result differs from the findings of other studies, in which all samples from Canada, USA, and Switzerland were susceptible to all antimicrobial drugs except ciprofloxacin

[3]. The bacterium was susceptible to erythromycin, piperacillin/tazobactam, linezolid, moxifloxacin, and rifampicin and resistant to norfloxacin and fosfomycin in previous studies [5, 12]. There are also reports of different MIC values for penicillin in previous studies (e.g.,  $\leq 0.03 \mu\text{g/mL}$  [3],  $0.016 \mu\text{g/mL}$  [5],  $0.25 \mu\text{g/mL}$  [12], and  $0.064 \mu\text{g/mL}$  in our study).

In this case report, piperacillin/tazobactam and vancomycin were used as empirical therapy. After laboratory confirmation of the presence of *Trueperella bernardiae*, we suggested narrowing the antibiotic spectrum to penicillin or amoxicillin but the suggestion was refused and the treatment was de-escalated to oral amoxicillin/clavulanate, which resulted in a favorable clinical outcome. Otto et al. [5] also successfully used amoxicillin/clavulanate as a directed therapy, while Schneider et al. [12] used amoxicillin isolatedly.

The identification of *Trueperella bernardiae* is difficult because it can sometimes be confused with streptococci and other coryneform or non-diphtheroid gram-positive bacilli [5, 16]. These microorganisms are frequently not accurately identified by the Vitek 2<sup>®</sup> or API<sup>®</sup> systems (bioMérieux) and reliable identification often requires confirmation by molecular methods, including PCR and DNA sequencing. The use of MALDI-TOF mass spectrometry might represent an alternative to 16S rRNA gene sequencing and might replace these time-consuming and expensive techniques for the majority of difficult-to-identify isolates in the clinical microbiology laboratory [17–19]. This new technology is an important resource for the rapid identification of less frequent microorganisms bringing more elucidative aspects of certain kind of infections and helping to choose the more suitable antimicrobial therapy.

This case illustrates the first occurrence of *Trueperella bernardiae* in Brazil. Our study reinforces the need to identify aerobic, nonspore-forming, gram-positive bacilli obtained in pure cultures even from nonsterile sources. A complete understanding of the role of this microorganism as a causative pathogen of infection is needed.

## Conflict of Interest

None declared.

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