Letter to the Editor

RE: ‘Streptococcus pluranimalium: A novel human pathogen?’

Peter Pongratz *, Meinolf Ebbers, Hilte Geerdes-Fenge, Emil C. Reisinger

Rostock University Medical Center, Division of Tropical Medicine and Infectious Diseases, Ernst-Heydemann-Strasse 6, 18057 Rostock, Germany

**Dear Editors,**

We read with great interest the case report by Aryasinghe et al. [1] entitled ‘Streptococcus pluranimalium: A novel human pathogen?’ The article describes the case of a 17-year-old male with subdural empyema caused by Streptococcus pluranimalium as a possible complication of subclinical frontal sinusitis. In addition to this case Streptococcus pluranimalium has been reported in the literature on twelve occasions in humans (Table 1) [2–7].

Aryasinghe et al. make a brief reference to two other reported cases of Streptococcus pluranimalium in humans. The first paper describes only that the strain was grown on blood cultures taken during a febrile episode in a neutropenic patient [7], the second case occurred in a 53 year old female who presented with septic arthritis and finally died from septic shock. Streptococcus pluranimalium was grown on blood culture as well as pus aspirated from the infected joint [5].

In all reported cases in humans the microorganism was detected by the Vitek2®. Paolucci et al. described that Streptococcus pluranimalium was not detectable by the PCR test [7]. However, great advances in microbiology have led to the introduction of new analytical techniques such as MALDI-TOF or 16S rRNA analysis during the last decades, thus enabling a more detailed discrimination of pathogens with similar gene sequences. For closely related species such as the nonhemolytic streptococci a sequence analysis of the highly conserved 16S rRNA gene is required to identify the exact strain. This was only performed by Dhotre et al. [2] revealing that none of the 6 isolates were identified as Streptococcus pluranimalium. Four strains were identified as Streptococcus mitis, one as Streptococcus tigurinus and one as Granulicatella adiacens.

Recently we treated a 95-year old women with transcatheter aortic valve infective endocarditis (TAVIE). Streptococcus pluranimalium was detected from blood culture by Vitek2®. However, neither a sequence analysis of the 16S rRNA gene, nor PCR nor MALDI-TOF techniques could define uniquely the exact pathogen.

The case of Aryasinghe et al. as well as the other reported cases highlight the possibility of a novel human pathogen, but indicate the problem of misidentification with normal culture based identification systems [8].

We conclude that according to our best present knowledge there is no conclusive evidence of a human infection of Streptococcus pluranimalium even when using the most advanced and exact present day identification techniques.

**Conflict of interest**

None.

* Corresponding author. Present address: Rostock University Medical Center, Division of Tropical Medicine and Infectious Diseases, Ernst-Heydemann-Strasse 6, 18057 Rostock, Germany.

E-mail addresses: ppongratz1@me.com, peter.pongratz@med.uni-rostock.de (P. Pongratz).

https://doi.org/10.1016/j.ijscr.2017.10.067
2210-2612 © 2017 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
Table 1
Reported cases of Streptococcus pluranimalium infection in humans between 2012 and 2017. 1 After 16S rRNA analysis identified as: 4x Strept mitis, 1x Strept tigurinus, 1x Granulicatella adiacens; F female, M male, ND no data, 4 Microorganism not detectable by PCR test.

| Published | Gender | Age  | (n) | Disease                          | Diagnostic  | Microbiological prove | Discussed etiology | Outcome |
|-----------|--------|------|-----|----------------------------------|-------------|-----------------------|--------------------|---------|
| 2012      | ND     | ND   | 1   | febrile neutropenia              | PCR (blood) | Vitek², SeptiFast⁴    | ND                 | ND      |
| 2014      | F      | 53   | 1   | Septic arthritis                 | blood culture, aspirate of pus | Vitek², SeptiFast⁴ | unknown            | ND      |
| 2014      | M      | 17   | 1   | subdural empyema                  | aspirate of pus                     | Vitek², 16SrRNA   | left frontal sinusitis, dental infection | full recovery |
| 2014      | ND     | ND   | 6⁴ | periodontitis, bacteremia         | 5 subgingival plaque, 1 blood culture | Vitek²      | Periodontitis, extraction of a tooth piecicision procedure (teeth) | ND |
| 2014      | F      | F    | 1   | bacteremia                        | blood culture                         | Vitek²      | intravenous drug use | died |
| 2015      | M      | M    | 1   | endocarditis (mitral-aortic valve) | blood culture | Vitek²   | farm animal          | full recovery |
| 2016      | M      | M    | 1   | endocarditis (mitral valve)       | blood culture                         | Vitek²   |                  |         |
| 2017      | F      | F    | 1   | TAVI associated endocarditis      | blood culture                         | Vitek², 16SrRNA, MALDITOF⁵ | extraction of a tooth | died |

Funding
None.

Ethical approval
None.

Consent
None.

Author contribution
Peter Pongratz: Data collection, data analysis and interpretation, writing the paper.
Meinolf Ebbers: Data collection, data analysis and interpretation.
Hille Geerdes-Fenge: Data collection, data analysis and interpretation.
Emil C Reisinger: data analysis and interpretation, writing the paper.

Guarantor
Peter Pongratz.

References
[1] L. Aryasinghe, S. Saweera, K. Yasmin, M.A. Liaqat, K.N.K. Hammad, Streptococcus pluranimalium: A novel human pathogen? Int. J. Surg. Case Rep. 5 (3) (2014) 1242–1246.
[2] S.V. Dhote, G.T. Mehetre, M.S. Dharne, N.M. Suryawanshi, B.S. Nagoba, Isolation of Streptococcus tigurinus – a novel member of Streptococcus mitis group from a case of periodontitis, FEMS Microbiol. Lett. 357 (2) (2014) 131–135.
[3] A. Fotoglidis, E. Pougourelas, P. Kyrialou, V. Vassilikos, Endocarditis caused by unusual Streptococcus species (Streptococcus pluranimalium), Hippokratia 19 (2) (2015) 182–185.
[4] Z. Ileri, M. Akin, E.A. Erdur, H.T. Dagi, D. Findik, Bacteremia after piezocision, Am. J. Orthod. Dentofacial Orthop. 146 (4) (2014) 430–436.
[5] E. Jacob, S. Kiran, A. Jithendranath, S. Sheetal, S.V. Gigin, Streptococcus pluranimalium-close encounter of a new kind, J. Assoc. Phys. India (2014) 62, Available from: http://www.japi.org/Oral_June_2014/Poster_Infectious_Diseases.html [accessed 07.10.2017].
[6] E. Muñoz Ortiz, J.H. Ramirez Urrea, S. Atchontua Muñoz, E.F. Arevalo Guerrero, Endocarditis infecciosa por Streptococcus pluranimalium: reporte de un caso, Arch. Cardiol. Mex. 86 (4) (2016) 383–384.
[7] M. Paolucci, M. Stanzani, F. Melchionda, et al., Routine use of a real-time polymerase chain reaction method for detection of bloodstream infections in neutropenic patients, Diagn. Microbiol. Infect. Dis. 75 (2) (2013) 130–134.
[8] R. Srinivasan, U. Karaoz, M. Volegov, et al., Use of 16S rRNA Gene for Identification of a Broad Range of Clinically Relevant Bacterial Pathogens, PLoS One 10 (2) (2015) e0117617.

Open Access
This article is published Open Access at sciencedirect.com. It is distributed under the IJSCR Supplemental terms and conditions, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.