Native mitral valve endocarditis due to *Neisseria elongata* following an untreated dental abscess

Maud Foissac^{1,*}, Ludovic Bergon², Morgane Mourguet³, Laurent Prudhomme⁴, Sarah Khatibi⁵

Dear Editor, we report a new case of *Neisseria elongata* endocarditis to educate clinicians about this rare but serious disease. We also made a review of previously published cases.

A 60-year-old man suffering from mitral valve prolapse presented with a 4-day history of fever and diarrhea. He had no other medical history and had never taken drugs. A month earlier he had endured transient dental pain that disappeared spontaneously, reason why he didn't consult a dentist about it. On admission his temperature was 38.7°C, blood pressure 118/59 mmHg, heart rate 91 bpm, and oxygen saturation was normal. Physical examination detected a previously known systolic murmur at the left sternal border, without any sign of heart failure. The patient had neither pain nor skin lesions suggestive of septic emboli, but examination of the oral cavity showed a dental abscess. Laboratory tests mainly revealed thrombopenia

($57 \times 10^9/L$), and elevation of both creatinine (111 $\mu\text{mol/L}$) and CRP (335 mg/L). Chest X-ray was normal, total body CT scan only showed splenomegaly, and brain MRI was unremarkable. Empirical therapy with amoxicillin/clavulanate (2 g/200 mg, 4-hourly) plus gentamicin (3 mg/kg daily) was started due to suspicion of endocarditis. The next day transesophageal echocardiography confirmed the diagnosis, showing a 10 mm vegetation on the mitral valve and a severe mitral regurgitation. On the third day, several blood cultures grew Gram-negative rod-shaped bacteria (incubation at 35°C, Bact/ALERT VIRTUO® BioMérieux, Marcy l'Etoile, France), which is why the antibiotics were changed to ceftriaxone (2 g intravenously daily). Under ceftriaxone the patient became afebrile and CRP decreased but given the mobile nature of the vegetation, the severe mitral regurgitation, and a worsening ejection fraction, he was transferred to a cardiothoracic center. There, he was operated on his dental abscess, and then underwent a surgical repair of his mitral valve on day thirteen of hospitalization.

Blood subcultures quickly became positive at $35 \pm 1^\circ\text{C}$ on usual culture media (Columbia agar + 5% sheep blood, Chocolate agar + PolyViteX, BioMérieux) except on Drigalski media, which was not suggestive of HACEK-group bacteria. Otherwise the colonies were moist, mucous and had a slight yellow pigmentation, which is usual for *Neisseria* spp. The colonies were non-motile, tested positive for oxidase and negative for catalase reaction. Biochemical identification was impossible because of poor discrimination between *Kingella denitrificans*, *N. cinerea* and *N. elongata* (VITEK®, NH card, BioMérieux). The rapid API® NH identification (BioMérieux) was also inconclusive, but MALDI-TOF mass spectrometry finally identified *N. elongata* (Bruker Daltonik GmbH, Bremen, Germany). Drug-susceptibility testing was performed with gradient diffusion method (minimum inhibitory

Received: 16 March 2020; revised: 12 April 2020; accepted: 20 April 2020

¹MD, Service de Maladies Infectieuses, Centre intercommunal de Castres – Mazamet, 6 avenue de la montagne noire, 81100 Castres, France; ²MD Service de Bactériologie, Centre intercommunal de Castres – Mazamet, 6 avenue de la montagne noire, 81100 Castres, France; ³MD, Service de Maladies Infectieuses, CHU de Toulouse, Place du Docteur Baylac - TSA 40031 - 31059 Toulouse cedex 9, France; ⁴MD, Service de Maladies Infectieuses, Centre intercommunal de Castres – Mazamet, 6 avenue de la montagne noire, 81100 Castres, France; ⁵MD, Service de Maladies Infectieuses, Centre intercommunal de Castres – Mazamet, 6 avenue de la montagne noire, 81100 Castres, France.

*Corresponding author: Maud Foissac. maud.foissac@chic-cm.fr; maudpikmin@yahoo.fr

Article downloaded from www.germs.ro

Published June 2020

© GERMS 2020

ISSN 2248 - 2997

ISSN - L = 2248 - 2997

Table 1. Main characteristics of our patient, and 36 other cases of *Neisseria elongata* endocarditis described in the literature

Cases	Age: range (median)	Risk factors for endocarditis		Left-sided endocarditis N / total (%)	Antibiotic treatment		Cardiac surgery N / total (%)
		Recent dental procedure or recent dental infection N / total (%)	Predisposing heart or valvular disease N / total (%)		Beta-lactam + at least 2 weeks of aminoglycosides N / total (%)	Beta- lactam + at least 2 weeks of quinolones N / total (%)	
Our case	60 years	Dental abscess	Mitral valve prolapse	Yes: mitral valve	-	-	Yes: mitral valve repair
Review of the literature, apart from our case ¹⁻⁵	7-82 years (42 years)	12/36 (33)	22/36 (61)	26/29 (89.5)	16/29 (55)	3 /29 (10)	14/29 (48)

concentration – MIC) test strip, Liofilchem, Roseto degli Abruzzi, Italy), and MICs were as follows: penicillin G 0.25 mg/L, amoxicillin 0.125 mg/L, ceftriaxone 0.032 mg/L, ciprofloxacin 0.003 mg/L. After the surgery the patient received an additional 4 weeks of ceftriaxone with a favorable outcome, and the six-month follow-up was uneventful.

Discussion

Although belonging to the family of Neisseriaceae, *N. elongata* are not cocci but rod-shaped Gram-negative bacteria. They are saprophytes of the human oropharynx but are sometimes responsible for severe infections, such as osteomyelitis or endocarditis.

Three subspecies of *N. elongata* have been described: *N. elongata nitroreducens*, *N. elongata glycolytica* and *N. elongata elongata*. The reason why *N. elongata nitroreducens* are those isolated most often during invasive infections remains unclear. The combination of molecular approach and biochemical profile is usually required for the definite identification of subspecies as they are genetically very close. In this case the identification of the subspecies was inconclusive,

but the negative test for catalase reaction was rather not suggestive of *N. elongata glycolytica*. Fortunately, we believe that the inability to determine precisely the subspecies involved had no consequences for the patient.

Although risk factors for *N. elongata* endocarditis are fairly common (recent dental care or infection, predisposing valvular disease), these infections seem rare since only 37 cases (including ours) have been published. The main features of these cases are summarized in Table 1.¹⁻⁵ In our case, the presence of two predisposing factors prompted us to quickly seek endocarditis, which was confirmed by echocardiography. However, a review of the literature showed that *N. elongata* endocarditis can also occur in the absence of risk factors, which should encourage clinicians to be vigilant when dealing with *N. elongata* bacteremia.¹⁻⁵

We noted other peculiarities of *N. elongata* endocarditis. First of all, they seem to affect people under 40 in almost half of the cases, including in the absence of underlying disease. Secondly, right-sided *N. elongata* endocarditis remained exceptional until now, with only one case reported.⁵

There are no specific recommendations for the treatment of *N. elongata* endocarditis. With regard to antibiotic regimen, European guidelines suggest treating endocarditis due to non-HACEK Gram-negative bacteria for at least 6 weeks with a combination of beta-lactams and aminoglycosides. Quinolones may also be added if necessary. In previously published cases we observed that many different antibiotic therapies had been prescribed, and with variable durations, ranging from 3 to 9 weeks. In our case the combination of amoxicillin/clavulanate and gentamicin was stopped on the third day, and changed to ceftriaxone monotherapy. Ceftriaxone was prescribed for only 6 weeks since all intraoperative samples remained negative. In combination with mitral valve repair this allowed a full recovery.

Regarding surgical treatment, it was required in more than 40% of published cases of *N. elongata* endocarditis, because these bacteria regularly induce large vegetations, valve destructions, or systemic embolizations.^{1,4} Furthermore, European guidelines emphasize its importance in the management of endocarditis due to non-HACEK Gram-negative bacilli. Follow-up by echocardiogram should be careful during *N. elongata* endocarditis, especially since cardiac complications can occur quickly. In our case, despite a satisfactory clinical response to ceftriaxone, the patient had to undergo valve repair because of a severe mitral regurgitation responsible for a degradation of the ejection fraction.

To conclude, we think clinicians should be aware that *N. elongata* endocarditis may also affect young adults or healthy people, and that close echocardiographic follow-up is required because

of potentially severe valvular or perivalvular damage.

Authors' contributions statement: MF has largely written the case report. LB has performed microbiological analysis and partially written the case report. MM, LP and SK have taken care of the patient. All authors read and approved the final version of the manuscript.

Consent: The patient gave his written consent for publication of this case report

Conflicts of interest: All authors – none to declare.

Funding: None to declare.

References

1. Hsiao JF, Lee MH, Chia JH, Ho WJ, Chu JJ, Chu PH. *Neisseria elongata* endocarditis complicated by brain abscess. J Med Microbiol 2008;57(Pt 3):376-81. <https://doi.org/10.1099/jmm.0.47493-0>
2. Jenkins JM, Fife A, Baghai M, Dworakowski R. *Neisseria elongata* subsp *elongata* infective endocarditis following endurance exercise. BMJ Case Rep 2015;2015:bcr2015212415. <https://doi.org/10.1136/bcr-2015-212415>
3. Samannodi M, Vakkalanka S, Zhao A, Hocko M. *Neisseria elongata* endocarditis of a native aortic valve. BMJ Case Rep 2016;2016:bcr2015213311. <https://doi.org/10.1136/bcr-2015-213311>
4. Youssef D, Marroush TS, Levine MT, Sharma M. Endocarditis due to *Neisseria elongata*: A case report and review of the literature. Germs 2019;9:188-92. <https://doi.org/10.18683/germs.2019.1176>
5. Yoo YP, Kang KW, Yoon HS, Yoo S, Lee MS. Infective endocarditis caused by *Neisseria elongata* on a native tricuspid valve and confirmed by DNA sequencing. Tex Heart Inst J 2014;41:227-30. <https://doi.org/10.14503/THIJ-13-3153>

Please cite this article as:

Foissac M, Bergon L, Mourguet M, Prudhomme L, Khatibi S. Native mitral valve endocarditis due to *Neisseria elongata* following an untreated dental abscess. GERMS. 2020;10(2):123-125. doi: 10.18683/germs.2020.1195