

## Letter to the Editor

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# Dalbavancin treatment of methicillin-susceptible *Staphylococcus aureus* pyomyositis with torpid evolution: a case report

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### Article history

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Sir,

Clinical guidelines for skin and soft tissue infections complicated by bacteraemia recommend treatment of methicillin-susceptible *Staphylococcus aureus* (MSSA) infection with cloxacillin or cefazolin and drainage of abscesses, if required [1]. We present a case of bacteraemic multiple pyomyositis associated with subcutaneous abscesses and acromioclavicular arthritis refractory to treatment with optimal doses of cloxacillin and clindamycin, which was resolved after switching to dalbavancin.

A 57-year-old man with a history of type 2 diabetes mellitus with adequate glycemic control presented to the emergency department for pain in the left hip that had started 5 days previously, with subsequent onset of pain in the left forearm and right shoulder. He had neither fever nor shivering. On physical examination, his blood pressure was 131/70 mmHg, heart rate 100 bpm and temperature 37°C. He had fluctuating oedema in the right acromioclavicular joint and a swelling in the muscles of the right forearm. Laboratory tests showed leukocytes 25,570/mL, erythrocyte sedimentation rate 109 mm/h and C-reactive protein 36.9 mg/dL. Empirical antibiotic therapy was started with ceftriaxone (2 g every 24 hours), cloxacillin (2 g every 4 hours) and vancomycin (adjusted according to the weight of the patient). MSSA (minimum inhibitory concentration [MIC]  $\leq 0.25$  mg/L) was isolated in blood cultures, with a vancomycin MIC of 1 mg/L. Abdominal computed tomography revealed a left iliopsoas muscle abscess. Scintigraphy showed numerous subcutaneous abscesses in both thighs, the left forearm and right arm. Incision and drainage of the psoas abscess was performed, isolating *S. aureus* with the same susceptibility pattern as in the blood cultures. Transthoracic and

transesophageal echocardiography found no lesions suggestive of endocarditis.

Antibiotic therapy was modified according to antimicrobial susceptibility testing to cloxacillin (2 g every 4 hours) with rapid resolution of the bacteraemia, disappearance of fever and decrease in acute phase reactants. After two weeks the patient had a torpid evolution with reappearance of fever and leukocytosis. New muscle abscesses and enlargement of psoas and left thigh abscess were detected. Clindamycin was added according to antibiogram. Surgical drainage of abscesses was performed on many occasions (*S. aureus* with the same susceptibility pattern was isolated at all times) with emergence of new abscesses after drainage, despite intravenous antibiotics for 5 weeks.

Given his poor progress, dalbavancin (1,500 mg dose) was administered, after which he presented gradual clinical improvement. At a check-up in the clinic one month later, residual abscesses and increased acute phase reactants were observed, so he was given a final 1,500 mg dose of dalbavancin, with both clinical and radiological resolution of the infectious process.

The case presented exemplifies a problem in staphylococcal infections: despite adequate  $\beta$ -lactam antibiotic therapy and drainage of abscesses, the infection progressed slowly with emergence of new lesions, even after the addition of an antibiotic that inhibits protein synthesis and that has good skin and soft tissue diffusion, namely clindamycin. The switch to dalbavancin treatment brought about a marked clinical improvement, with resolution of the abscesses.

Dalbavancin is a lipoglycopeptide antibiotic, derived structurally from a teicoplanin-like natural glycopeptide produced by *Nonomuria* spp [2]. It is approved for the treatment of acute skin and soft tissue infections in adults caused by Gram-positive bacteria. Its mechanism of action is the same as that of vancomycin, but dalbavancin also has a lipophilic side chain that anchors it to lipid II in the bacterial cell membrane,

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strengthening its adherence to the D-alanyl-D-alanine target site and enhancing its activity. It has high plasma protein binding and a long half-life, which allows once-weekly dosing [3].

The susceptibility breakpoint defined by the European Committee on Antimicrobial Susceptibility Testing (EUCAST) is  $\leq 0.125$  mg/L for staphylococci [4]. A 2009 study that analysed the *in vitro* activity of dalbavancin against gram-positive microorganisms found MIC<sub>90</sub> values of 0.06 mg/L against 27,052 strains of MSSA and 19,721 strains of methicillin-resistant *S. aureus* (MRSA), compared with a vancomycin MIC<sub>90</sub> of 1 mg/L [5]. Other subsequent studies that included both MSSA and MRSA strains found the same dalbavancin MIC<sub>50</sub> and MIC<sub>90</sub> values of 0.06 mg/L [6–7]. Dalbavancin also suppresses toxin production *in vitro*, which may help to control *S. aureus* infection [8].

Finally, dalbavancin has excellent penetration in synovial tissue and fluid, bone, skin [9] and blister fluid [10] which implies high local concentrations that could facilitate the control and eradication of the infection.

In summary, dalbavancin could be a very effective alternative in cases of skin and soft tissue infections caused by MSSA refractory to  $\beta$ -lactam treatment.

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## CONFLICT OF INTERESTS

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## REFERENCES

1. Stevens DL, Bisno AL, Chambers HF, Dellinger EP, Goldstein EJ, Gorbach SL, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. *Clin Infect Dis*. 2014;59:10–52. DOI: 10.1093/cid/ciu296.
2. Malabarba A, Goldstein BP. Origin, structure, and activity in vitro and in vivo of dalbavancin. *J Antimicrob Chemother*. 2005; 55 Suppl 2:15–20. DOI: 10.1093/jac/dki005.
3. Billeter M, Zervos MJ, Chen AY, Dalovisio JR, Kurukularatne C. Dalbavancin: a novel once-weekly lipoglycopeptide antibiotic. *Clin Infect Dis*. 2008;46:577–83. DOI: 10.1086/526772.
4. The European Committee on Antimicrobial Susceptibility Testing. (EUCAST). Breakpoint tables for interpretation of MICs and zone diameters. Version 8,1 2018. Available: <http://www.eucast.org>.
5. Biedenbach DJ, Bell JM, Sader HS, Turnidge JD, Jones RN. Activities of dalbavancin against a worldwide collection of 81,673 gram-positive bacterial isolates. *Antimicrob Agents Chemother*. 2009;53:1260–3. DOI: 10.1128/AAC.01453-08.
6. Jones RN, Flamm RK, Sader HS. Surveillance of dalbavancin potency and spectrum in the United States (2012). *Diagn Microbiol Infect Dis*. 2013;76:122–3. DOI: 10.1016/j.diagmicrobio.2013.01.003.
7. Mendes RE, Castanheira M, Farrell DJ, Flamm RK, Sader HS, Jones RN. Update on dalbavancin activity tested against gram-positive clinical isolates responsible for documented skin and skin-structure infections in US and European hospitals (2011–13). *J Antimicrob Chemother*. 2016;71:276–8. DOI: 10.1093/jac/dkv303.
8. Hobdey SE, Katahira EJ, Dockstader P, Davidson SM, Bond L, Bolz DD, et al. Subinhibitory dalbavancin attenuates exotoxin production from methicillin-sensitive and methicillin-resistant *Staphylococcus aureus in vitro*. *Antimicrob Agents Chemother*. 2017;61. DOI: 10.1128/AAC.01090-17.
9. Dunne MW, Puttagunta S, Sprenger CR, Rubino C, Van Wart S, Baldassarre J. Extended-duration dosing and distribution of dalbavancin into bone and articular tissue. *Antimicrob Agents Chemother*. 2015;59:1849–55. DOI: 10.1128/AAC.04550-14.
10. Nicolau DP, Sun HK, Seltzer E, Buckwalter M, Dowell JA. Pharmacokinetics of dalbavancin in plasma and skin blister fluid. *J Antimicrob Chemother*. 2007;60:681–4. DOI: 10.1093/jac/dkm263.