whether it may be overcome by higher doses or longer therapies remains to be established.

Eventually, we recommended a prolonged therapy including PPI (40 mg of omeprazole three times daily) and amoxicillin (1 g three times daily) for 4 weeks, which turned out to be successful, as shown by negative $^{[13]}$C urea breath test, rapid urease test, histopathology, culture and molecular genetic testing 6 weeks after therapy.

Multiresistant clinical $H$. pylori isolates exist in Germany and will probably be increasingly detected in the future. To avoid treatment failures, to minimize the risk of the development of antimicrobial resistance and to reduce costs, we recommend susceptibility testing after the first unsuccessful empirical $H$. pylori eradication therapy. In patients who have already received multiple antibiotic treatments due to unrelated bacterial infections, susceptibility testing prior to the first eradication attempt may be considered. The presented case demonstrates the risk of upcoming difficult-to-treat $H$. pylori infections and underlines the need for ongoing studies to keep antibiotic resistance under surveillance.

Acknowledgements
We thank Erik Glocke and Georg Häcker for critical reading of the manuscript prior to submission, and Beate Habmaier and Marianne Vetter-Knoll for excellent technical assistance.

Funding
This work was supported by the Robert-Koch-Institut by a grant to M. K. (1369-239) of the German Ministry of Health.

Transparency declarations
None to declare.

References

D. M. Palma*, A. N. Cracchiolo and R. Tetamo

II Department of Anesthesia and Intensive Care, Azienda di Rilevamento Nazionale e Alta Specializzazione (ARNAS), Ospedale Civico, Di Cristina e Benfratelli, piazza N. Leotta 2, 90100, Palermo, Italy

*Corresponding author. Tel: +39-091-666-5501-513; Fax: +39-091-525488; E-mail: danipalma73@yahoo.it

Keywords: soft tissue infection, myopathy, acute kidney injury

Sir,

Daptomycin is licensed in the USA and Europe for the treatment of complicated skin and soft tissue infections caused by Gram-positive organisms, at a dose of 4 mg/kg once daily, and right-sided endocarditis with associated bacteremia, at a dose of 6 mg/kg once daily.1 Daptomycin has 92% plasma protein binding in vitro, a volume of distribution of 0.097 L/kg and a plasma elimination half-life of ~9 h and is primarily excreted unchanged by the kidneys. Patients with a creatinine clearance <30 mL/min exhibit AUC values twice those of patients with normal renal function. Daptomycin is removed by haemodialysis (HD); ~15% of an administered dose is eliminated in a 4 h HD session. Therefore, in patients with reduced renal function, including those receiving HD, the recommended daily dose interval is 48 h.2 To our knowledge there is little published about the use of daptomycin in patients who undergo continuous renal replacement therapy (CRRT), and in one only case were plasma concentrations recorded.3

A person in their thirties, who was previously well, was admitted to our Emergency Department following a motorcycle accident, having suffered extensive trauma. The patient was transferred to the intensive care unit following surgery and empirical antibiotic therapy of amoxicillin/clavulanic acid and tetracycline was commenced. On the fourth day of recovery the patient developed septic shock and acute renal failure. Blood cultures and wound swabs from the left leg were collected and CRRT was started. We used a LYNDAL dialysis system (Belico, Italy). The programme we used was continuous venous–venous haemofiltration (CVVH) 24 h/day, using a high-filtration polysulfone membrane (HFT 22, surface area 2.2 m², Belico) with a blood flow of 150 mL/min and a dialyser flow of 3000 mL/h (50% pre and 50% post).

Antibiotic therapy was changed to a combination of glycopeptide plus piperacillin/tazobactam. On the seventh day, blood cultures and wound swabs grew methicillin-resistant Staphylococcus epidermidis (MRSE). An antimicrobial susceptibility test was carried out using the VITEK-2 system (bioMérieux, Marcy l’Étoile, France). MRSE was susceptible to rifampicin, co-trimoxazole, linezolid, tigecycline and

J Antimicrob Chemother 2011
doi:10.1093/jac/dkq399
Advance Access publication 1 November 2010

The use of daptomycin in continuous renal replacement therapy

D. M. Palma*, A. N. Cracchiolo and R. Tetamo

II Department of Anesthesia and Intensive Care, Azienda di Rilevamento Nazionale e Alta Specializzazione (ARNAS), Ospedale Civico, Di Cristina e Benfratelli, piazza N. Leotta 2, 90100, Palermo, Italy

*Corresponding author. Tel: +39-091-666-5501-513; Fax: +39-091-525488; E-mail: danipalma73@yahoo.it

Keywords: soft tissue infection, myopathy, acute kidney injury

Sir,

Daptomycin is licensed in the USA and Europe for the treatment of complicated skin and soft tissue infections caused by Gram-positive organisms, at a dose of 4 mg/kg once daily, and right-sided endocarditis with associated bacteremia, at a dose of 6 mg/kg once daily.1 Daptomycin has 92% plasma protein binding in vitro, a volume of distribution of 0.097 L/kg and a plasma elimination half-life of ~9 h and is

Sir,

Daptomycin is licensed in the USA and Europe for the treatment of complicated skin and soft tissue infections caused by Gram-positive organisms, at a dose of 4 mg/kg once daily, and right-sided endocarditis with associated bacteremia, at a dose of 6 mg/kg once daily.1 Daptomycin has 92% plasma protein binding in vitro, a volume of distribution of 0.097 L/kg and a plasma elimination half-life of ~9 h and is primarily excreted unchanged by the kidneys. Patients with a creatinine clearance <30 mL/min exhibit AUC values twice those of patients with normal renal function. Daptomycin is removed by haemodialysis (HD); ~15% of an administered dose is eliminated in a 4 h HD session. Therefore, in patients with reduced renal function, including those receiving HD, the recommended daily dose interval is 48 h.2 To our knowledge there is little published about the use of daptomycin in patients who undergo continuous renal replacement therapy (CRRT), and in one only case were plasma concentrations recorded.3

A person in their thirties, who was previously well, was admitted to our Emergency Department following a motorcycle accident, having suffered extensive trauma. The patient was transferred to the intensive care unit following surgery and empirical antibiotic therapy of amoxicillin/clavulanic acid and tetracycline was commenced. On the fourth day of recovery the patient developed septic shock and acute renal failure. Blood cultures and wound swabs from the left leg were collected and CRRT was started. We used a LYNDAL dialysis system (Belico, Italy). The programme we used was continuous venous–venous haemofiltration (CVVH) 24 h/day, using a high-filtration polysulfone membrane (HFT 22, surface area 2.2 m², Belico) with a blood flow of 150 mL/min and a dialyser flow of 3000 mL/h (50% pre and 50% post).

Antibiotic therapy was changed to a combination of glycopeptide plus piperacillin/tazobactam. On the seventh day, blood cultures and wound swabs grew methicillin-resistant Staphylococcus epidermidis (MRSE). An antimicrobial susceptibility test was carried out using the VITEK-2 system (bioMérieux, Marcy l’Étoile, France). MRSE was susceptible to rifampicin, co-trimoxazole, linezolid, tigecycline and
glycopeptides with an MIC of vancomycin of 2 mg/L. The MIC of daptomycin by Etest (AB Biodisk) was 0.125 mg/L. Informed consent was obtained from the patient’s next of kin and therapy with daptomycin was started at a daily dose of 8 mg/kg; the other antibiotics were stopped. The high dose of daptomycin was chosen because of the elevated volume of distribution (which is typical of septic patients, together with lower plasma albumin concentrations) and because polysulphone daptomycin clearance is higher than for other types of ultrafiltration. It was not possible to determine plasma concentrations of daptomycin, and we therefore decided to monitor plasma concentrations of creatinine phosphokinasine (CPK), aspartate aminotransferase, alanine aminotransferase and lactate dehydrogenase to exclude myopathy, a well-recognized adverse effect of daptomycin. Since CPK can be eliminated by CVVH, we also measured the ultrafiltrate concentrations of CPK. The plasma concentration of CPK always remained ≤200 IU/L (normal: 50–397 IU/L) and the ultrafiltered CPK concentration never exceeded 86 IU/L. The patient’s condition improved and therapy was discontinued after 14 days.

Dosing of antibiotics for patients in intensive care can be challenging, particularly when they undergo renal replacement therapy. Ideally, plasma concentrations should be checked regularly, but this may be impractical in real time. Data from in vitro models of CRRT suggest that a substantial amount of daptomycin can be removed. Since we could not monitor antibiotic concentrations in order to avoid subtherapeutic exposure, we decided to use a higher daily dose (8 mg/kg) and no adverse effects were demonstrated. Despite the limitations of this report we suggest that higher doses can be given safely in CRRT, but patients should be closely monitored for evidence of myopathy. Further studies, with plasma monitoring, are required to refine dosage regimens for CRRT.

**Funding**

No specific financial support.

**Transparency declarations**

None to declare.

**References**


**J Antimicrob Chemother** 2011
doi:10.1093/jac/dkq385
Advance Access publication 20 October 2010

**Posaconazole cerebrospinal concentrations in an HIV-infected patient with brain mucormycosis**

A. Calcagno1*, L. Baietto2, F. G. De Rosa1, M. C. Tettoni1, V. Libanore1, R. Bertucci3, A. D’Avolio4 and G. Di Perri1

1Department of Infectious Diseases, University of Torino, Torino, Italy; 2Pharmacokinetics and Pharmacogenetics Laboratory, University of Torino, Torino, Italy

*Corresponding author. Clinica Universitaria di Malattie Infettive Ip, Ospedale Amedeo di Savoia, C.so Svizzera 164, 10159 Torino, Italy. Tel: +39-011-439-3856; Fax: +39-011-439-3942; E-mail: andrea.calcagno@unito.it

**Keywords:** antifungals, CSF penetration, darunavir, interactions

Sir,

The blood–brain barrier (BBB) is known to selectively decrease the transfer of several xenobiotics into the CNS with a significant effect on the concentration of antimicrobial drugs at the site of action. Posaconazole, an orally administered triazole, has enhanced in vitro activity against the Mucorales, with reported MIC90s of 1 to ≥4 mg/L. However, posaconazole monotherapy cannot be recommended for primary treatment of CNS mucormycosis because of limited pharmacokinetic data, pharmacodynamic concerns and the results of some experiments in murine models, although data from open-label salvage studies suggest that posaconazole is effective when patients are refractory to or intolerant of polyenes. Two of four reported cases showed very low to undetectable posaconazole levels in CSF, disruption of the BBB was suggested as the mechanism underlying the striking differences in the reported CSF-to-plasma ratios (2.4 to <0.01).

We describe the case of a young West African presenting with weight loss and left foot palsy (with external popliteal sciatic nerve impairment), affected by type 1 diabetes, on insulin therapy and showing moderate chronic renal impairment (creatinine 1.3 mg/dL, estimated glomerular filtration rate by the Modification of Diet in Renal Disease equation 50 mL/min/1.73 m²). An HIV test revealed branched hyphae typical of Mucorales infection and PCR was positive for *Mucor* DNA, suggesting the possibility of infection by both microorganisms. An antiretroviral regimen consisting of abacavir, lamivudine and darunavir/ritonavir at a dosage of 600/100 mg twice daily was started. Given the patient’s renal impairment and the large volume of...