Dalbavancin use in lower limb revision arthroplasty patients

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Background

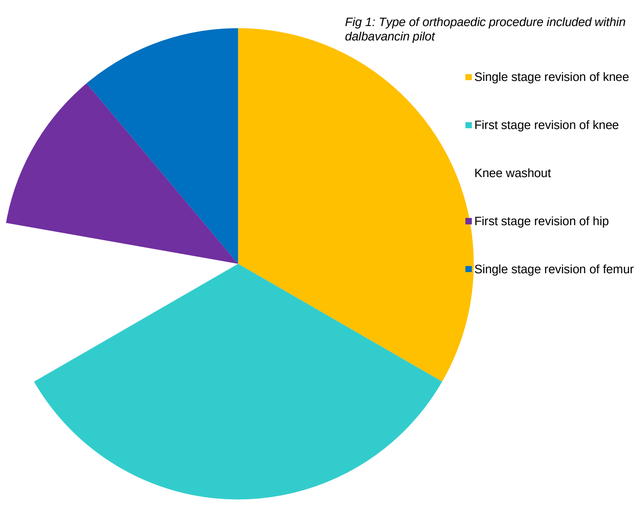
Orthopaedic infections can have a devastating effect on patient quality of life. Multiple surgical and medical interventions have reduced the incidence of lower limb primary arthroplasty surgical site infections in the UK to 1.1% for hips and 0.6% for knees[1]. In this population the recommended management of prosthetic joint infections is antibiotics, in conjunction with either surgical debridement, with or without implant retention, or one or two stage joint replacement surgery[2].

The use of prolonged courses of antimicrobial therapy is a common adjunct to surgery. Ideally the organisms isolated at initial diagnosis of prosthetic joint infection should be identified, antimicrobial sensitivities established and treated with appropriate antimicrobials. The majority of micro-organisms isolated from prosthetic joint infections tend to be gram positive so many of the antimicrobial treatment regimens will contain a glycopeptide component[3].

Dalbavancin (Xydalba®) is a lipoglycopeptide that exhibits a bacteriocidal effect by binding to the terminal d-alanyl-d-alanine in bacterial cell wall peptidoglycan preventing cross linkage. One of the advantages of dalbavancin over other glycopeptides is its long terminal elimination half-life of 372 hours (range 333-405hrs)[4]. Combined with the distributional half life which constitutes the clinically relevant concentration-time profile, the range of 5-7 days is consistent with once weekly dosing.

We present a case series of successful use of dalbavancin in revision arthroplasty surgery in a large NHS Trust in the South Yorkshire region with a large revision arthroplasty service.

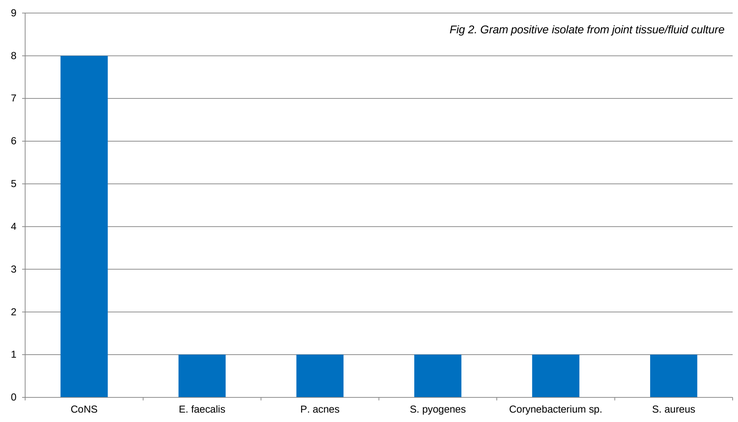
As many of these patients tend to be older (70 years for knee, 72 years for hips) prolonged stays in hospitals carry an increased risk of acquisition of hospital acquired infection. Hospital-acquired organisms tend to be more resistant organisms than the original infection. Early mobilisation and discharge of patients would have the potential for avoiding such hospital-acquired infections, and have financial savings as well as improving the patient experience.



Methodology

Dalbavancin use was trialled as a pilot project in nine patients with dalbavancin-susceptible gram positive isolates undergoing lower limb revision arthroplasty over a 6-month period. Other orthopaedic patients were given dalbavancin in this time period but we have excluded the upper limb revision patients from this cohort.

Data was collected about organism isolated and time until positive culture result, any delays in discharge, complications, re-admission rate within 30 days, cost-effectiveness, and whether the patient would have been suitable for other options, such as linezolid via the Outpatient Parenteral Antibiotic Team (OPAT).



Results

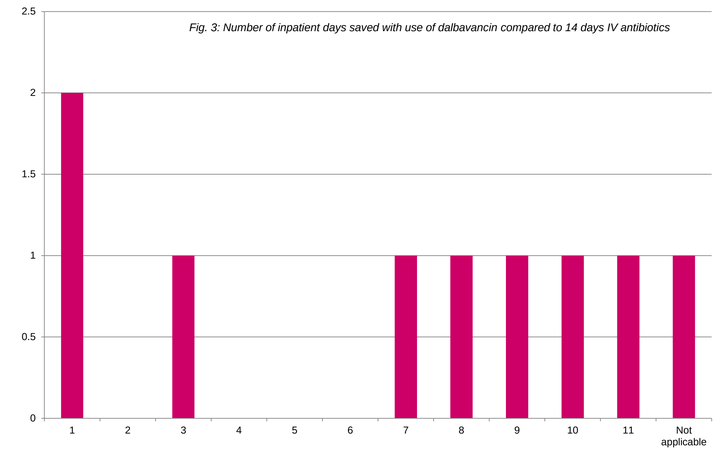
Within the pilot there were 7 male patients and 2 female patients, with an average age of 62 years. The procedure undertaken is outlined as in Fig. 1. The majority of patients were given several days of intravenous antibiotics before administration of dalbavancin (mean = 5 days), however one patient was incorrectly administered dalbavancin prior to admission. Tissue and fluid samples sent from the procedure took an average of 4.9 days to grow a positive organism on culture. The majority of organisms cultured were Gram positive (Fig. 2), with two patients growing a mixture of Gram positive and negative organisms and one also growing Candida sp.

As per the table & Fig. 3, an average of 6.25 inpatient days were saved within this cohort, equating to significant potential financial savings. Two patients had a delay in their stay following dalbavancin administration due to therapy input, post-operative wound leakage and anticoagulation for new-onset atrial fibrillation. Other patients were able to be discharged shortly after administration.

No patients were re-admitted within 30 days. In terms of complications, one patient developed post-operative swelling at 4 months, however no organism was isolated from the aspirate. One patient developed a rash to dalbavancin, and this allergy was submitted formally via the Yellow Card system.

Patient journey	Average time (days)
Post-op stay until MFFD	5.7
MFFD until discharge	1.6
Time between op and dalbavancin	6.5[1]
Time to discharge after dalbavancin	1.8[1]
Total post-op inpatient stay	8.2
Inpatient days saved	6.25[2]

1. Excluding patient who was administered dalbavancin pre-op
2. Excluding patient with single stage revision and amputation as 14 days IV antibiotics not an appropriate regime for comparison



Conclusion

Although this pilot study involved only a small cohort of patients, it shows some promising results. Administration of a once weekly antimicrobial regimen would facilitate the early mobilisation of arthroplasty patients with a possible concomitant decrease in the risk of acquisition of hospital acquired infections. In addition the rapid transition to outpatient treatment would decrease inpatient bed-days, which would allow more elective orthopaedic surgery cases to be carried out in the same time span.

Our pilot showed there are some improvements to be made in terms of communication from the parent medical team about dalbavancin use. One patient had received an extra dose of teicoplanin following dalbavancin administration as it had not been crossed off the drug chart. Only one-third of TTOs mentioned the duration of action of dalbavancin, with one neglecting to mention its use at all. OPAT would have been a potential alternative for 40% of patients, with linezolid as a potential option for two out of nine patients. The patient who had single stage revision arthroplasty of the femur and amputation, who later underwent further revision and closure, was given linezolid in addition to dalbavancin.

We look forward to extending the use of dalbavancin within revision arthroplasty patients, and to trialling its use elsewhere in the trust.

References

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