Cost-effectiveness of telavancin versus vancomycin for treatment of complicated skin and skin structure infections

Laohavaleeson S, Barriere SL, Nicolau DP, Kuti JL

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study examined the cost-effectiveness of telavancin versus vancomycin for the treatment of complicated skin and skin structure infections (cSSSIs) in adult patients with a diagnosis of cSSI and with suspected or confirmed methicillin-resistant Staphylococcus aureus (MRSA). Based on the results from a single study, telavancin was a cost-effective alternative to vancomycin, particularly in patients infected with MRSA. The study was well conducted and reported and the authors’ conclusions appear to be valid, but future studies should corroborate these findings.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the cost-effectiveness of telavancin versus vancomycin for the treatment of complicated skin and skin structure infections (cSSSIs) in adult patients with a diagnosis of cSSI and with suspected or confirmed methicillin-resistant Staphylococcus aureus (MRSA) infection.

Interventions
The two antibiotic regimens were telavancin 10mg per kilogram of total body weight intravenously once a day, and vancomycin 1g intravenously every 12 hours. Either treatment was administered by protocol for at least seven days and no more than 14 days.

Location/setting
USA/hospital.

Methods
Analytical approach:
A simple decision analytic model was developed to examine the costs and benefits of the two treatments using data from a single source. The time horizon of the analysis was restricted to the hospital stay. The authors reported that the perspective was that of the hospital.

Effectiveness data:
The clinical data came from the Assessment of Telavancin in Complicated Skin and Skin Structure Infections (ATLAS) phase III, double-blind, randomised controlled trial (RCT), which involved 129 US and international hospitals. Of the 1,897 patients enrolled in the trial, 1,044 patients were included in this analysis with 514 (mean age 51.2 years; 55.4% men) in the telavancin group, and 530 (mean age 51.8 years; 59.1% men) in the vancomycin group. A subset of patients with MRSA was analysed separately (159 in the telavancin group and 179 in the vancomycin group). Patients were followed-up until discharge from the hospital. The primary endpoint was the cure rate, which was defined as the clinical response or resolution of signs and symptoms associated with the skin infection and present at the study admission.

Monetary benefit and utility valuations:
Not included.

Measure of benefit:
The summary benefit measure was the cure rate, which was derived directly from the clinical analysis.
Cost data:
The economic analysis considered the costs of hospital bed, laboratory, radiology, antibiotics, and vancomycin monitoring. As the hospital costs were not available for all patients in the ATLAS trial, some economic data were derived from billing data, collected during the fiscal year 2003 to 2004, in a Medicare database. The details of the diagnosis-related group codes were reported. The costs of concomitant drug use were based on prices reported in the Red Book. The cost of vancomycin monitoring was derived from a published pharmacoeconomic study and included vancomycin assay and pharmacist consultations. The unit costs for drugs were reported, but the hospital costs were presented as macro-categories by length of stay. The acquisition cost of telavancin was assumed to be equal to that of vancomycin in the base case, as it was not on the market at the time. All costs were in US dollars ($) and the price year was 2006.

Analysis of uncertainty:
A sensitivity analysis was undertaken by varying the telavancin daily acquisition price ($50, $100, and $200) and the MRSA rates. Cost-effectiveness acceptability curves were generated, using 25,000 bootstrap analyses.

Results
In the base case, where the telavancin and vancomycin prices were the same ($13.44), the median costs per patient were $8,118 and the interquartile range (IQR) was 6,291 to 11,758 with telavancin, and they were $8,185 (IQR 6,474 to 11,405) with vancomycin. This difference was not statistically significant (p=0.560).

The clinical success rate was 86.2% in the telavancin group and 84.9% in the vancomycin group. The difference was 1.3%, with a 95% confidence interval of -3.0 to 5.6, but this was not statistically significant (p=0.617).

Telavancin was the dominant strategy, which means it was more effective and less expensive than vancomycin.

Similar findings were observed in the MRSA subgroup where the differences in costs and effectiveness were more favourable to telavancin, but were still not statistically significant. The probability of telavancin being dominant over vancomycin was 48.4% in the total population and 64.7% in the MRSA subgroup.

The sensitivity analysis showed that, in general, as MRSA rates increased, the cost difference between the two drugs increased where negative or decreased where positive, both favouring telavancin. The cost-effectiveness ratios for telavancin in the subgroup of MRSA patients ranged from dominant to $27,889 per additional patient cured as its acquisition price was increased; it remained dominant up to $50 per day. In the whole sample the cost-effectiveness ratio for telavancin ranged from dominant to $113,452 as the acquisition price increased.

Authors’ conclusions
The authors concluded that, based on the results from the ATLAS study, telavancin was a cost-effective alternative to vancomycin, particularly in patients infected with MRSA.

CRD commentary
Interventions:
The authors stated that vancomycin was generally considered to be the gold standard for the treatment of MRSA infections in cSSSIs, while telavancin had recently shown, in clinical trials, microbiologic superiority over MRSA. Thus, the selection of the comparators was justified.

Effectiveness/benefits:
The clinical evidence came from a well conducted RCT, which is usually considered to be a valid source of data due to the strengths of its design (randomisation, minimisation of bias, and double-blind). The further advantages of this specific study were its multi-country design and the baseline comparability of the groups. These issues enhance the validity of the clinical estimates. The benefit measure was disease specific and might not be easily comparable with the benefits of other health care interventions.

Costs:
The analysis of costs appears to have been appropriately carried out. The cost categories reflected the economic
viewpoint stated. The details of the unit costs of drugs were clearly presented. The hospital costs were not broken down into individual items and were reported as macro-categories, due to the use of diagnosis-related group data, which are average total costs. The analysis considered the length of stay as a key input and the assumptions made were clearly reported.

Analysis and results:
The costs and benefits were appropriately synthesised using an incremental approach, which allowed the identification of dominated strategies. The analysis was replicated in the subgroup of MRSA patients, making the findings relevant for this population. The issue of uncertainty was extensively investigated and reported. The authors stated that their results should be interpreted with caution as the price of telavancin was unknown at the time of their study, and the duration of treatment could be different in clinical practice to the one used in this analysis.

Concluding remarks:
The study was well conducted and reported. The authors' conclusions appear to be valid, but future studies should corroborate these findings.

Funding
Supported by Theravance Inc, South San Francisco, California.

Bibliographic details

PubMedID
19025428

DOI
10.1592/phco.28.12.1471

Original Paper URL

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Aged; Algorithms; Aminoglycosides /chemistry /economics /therapeutic use; Anti-Bacterial Agents /economics /therapeutic use; Clinical Trials, Phase III as Topic; Cost-Benefit Analysis /methods; Databases, Factual /economics /statistics & numerical data; Drug Utilization Review /economics /statistics & numerical data; Female; Hospitalization /economics /statistics & numerical data; Humans; Male; Methicillin-Resistant Staphylococcus aureus /drug effects /isolation & purification; Middle Aged; Multicenter Studies as Topic; Skin /drug effects /microbiology /pathology; Staphylococcal Skin Infections /drug therapy /microbiology; Vancomycin /economics /therapeutic use

AccessionNumber
22009100220