INFECTION DISEASE OUTCOMES RESEARCH

A24

C. ALBICANS AND C. GLABRATA BLOODSTREAM INFECTIONS IN ADULTS: OUTCOMES AND ASSOCIATED COSTS

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OBJECTIVE: Mortality and economic consequences associated with Candida bloodstream infections are considerable, and the incidence of Candida glabrata infections is increasing. This investigation aimed to evaluate inpatient costs, length of stay (LOS), and mortality associated with candidemia in adults ≥18 years, focusing on differences between Candida glabrata and Candida albicans. METHODS: The study cohort consisted of all patients hospitalized at Duke University Medical Center from February 1996 to July 2007 with a blood culture positive for C. glabrata or C. albicans. Patients were stratified according to whether their first positive culture occurred within the first two days of hospital admission or thereafter. Detailed cost accounting data were available since December 2002. Generalized linear models using gamma distributions and log links were used to compare costs, negative binomial models for LOS, and chi-square tests for inpatient mortality. RESULTS: A total of 241 adults with C. glabrata and 402 adults with C. albicans bloodstream infections were identified. Complete data on LOS was available for 99.1% and cost data for 38.1%. Approximately 20% of patients had a positive blood culture within the first two days of admission (C. glabrata, 18.7%; C. albicans, 21.1%). Among these patients, those with C. glabrata versus C. albicans had longer LOS (19.7 days vs. 14.2 days, p = 0.03), higher costs ($56,026 vs. $31,168, p = 0.02), and comparable mortality rates (33.3% vs. 35.3%, p = 0.82). Among patients in whom the first positive blood culture occurred later, LOS (22.0 days vs. 20.1 days, p = 0.29), costs ($68,280 vs. $51,688, p = 0.06) and inpatient mortality (48.5% vs. 44.8%, p = 0.42) were more similar. CONCLUSION: Candida bloodstream infections in adult patients are associated with substantial costs, long LOS, and high mortality rates. Unadjusted comparisons revealed longer inpatient stays and higher costs among patients with early evidence of bloodstream infection with C. glabrata relative to C. albicans.

UPPER RESPIRATORY ILLNESS AND EMPLOYEE PRODUCTIVITY—RESULTS FROM THE CHILD AND HOUSEHOLD INFLUENZA-ILLNESS AND EMPLOYEE FUNCTION (CHIEF)

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OBJECTIVE: Evaluate the effect of pediatric and household upper respiratory illness/common cold (URI) on employee function. METHODS: The CHIEF Study is a prospective cohort study of 2295 United States employees with children among three large Fortune 500 companies. Prospective monthly survey responses are collected during the 2007–2008 influenza season and linked to an administrative health care claims database. The survey component asks employees about the effect of both personal and household member (HHM) illnesses/injuries and URI on their absenteeism and presenteeism. The administrative claims database component includes information about health care utilization and expenditures. RESULTS: Initial monthly results indicate that employees with URI (n = 680) reported more days of absenteeism (0.53 vs. 0.44, respectively; p = 0.2453) and more hours of presenteeism (0.88 hours vs. 0.38 hours, respectively; p < 0.0001) than employees without URI (n = 1536). Employees with at least one HHM experiencing URI reported missing more days of work (0.17 vs. 0.06, respectively; p = 0.0016) and more hours of presenteeism (0.43 and 0.14, respectively; p < 0.0001) than employees reporting otherwise. Among employees reporting URI, symptoms lasted 4.77 days on average—about half of which were “most severe” (2.31 days). Employees also reported that it took 6.20 days to “get back to normal” following symptom onset. Employees reporting URI and any productivity loss missed 1.36 days of work and experienced 2.79 hours of presenteeism because of their symptoms. Productivity was also negatively affected for employees with at least one HHM experiencing URI—employees reported missing 1.25 days of work and having 0.56 hours of presenteeism as a result of HHM symptoms. CONCLUSION: Employees are significantly less productive—in terms of both absenteeism and presenteeism—when they have URI symptoms. Furthermore, employee productivity is also significantly impacted when a HHM reports URI symptoms.

A MICROSIMULATION OF THE COST-EFFECTIVENESS OF MARAVIROC FOR ANTIRETROVIRAL TREATMENT-EXPERIENCED HIV-INFECTED INDIVIDUALS

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OBJECTIVE: Maraviroc (MVC) is a CCR5 co-receptor antagonist indicated for combination antiretroviral treatment of adults infected with only CCR5-tropic HIV-1 detectable, who have evidence of viral replication and HIV-1 strains resistant to multiple antiretroviral agents. The cost-effectiveness of a strategy of testing and treating with optimized background therapy (OBT), ±MVC according to tropism test results, compared to treating with OBT alone, was modeled from a US payers’ perspective using 48-week MOTIVATE-1 and -2 trial endpoints. METHODS: The MOTIVATE screening cohort (mean age: 45 years, male: 86%, mean baseline CD4: 184 cells/μL, mean baseline HIV-1 RNA: 4.72 log10 copies/mL, CCR5-monotropic: 51%, history of opportunistic infections: 67%) was microsimulated using the previously reported ARAMIS model. To achieve convergence, the cohort was sampled 200,000 times with replacement. MVC cost $29/day, tropism testing cost $1960, and care costs were taken from HIV Research Network data. Utilities were based on a published US survey. RESULTS: In the MOTIVATE trials, 56.1% of patients receiving MVC + OBT and 22.5% receiving OBT alone were virologically suppressed to <400 copies/mL at 48 weeks. Projecting observed virologic failure rates linearly, ARAMIS predicted life expectancy of 94.5 and 88.9 months for the OBT ± MVC and OBT strategies, respectively. Mean QALYs and lifetime costs per patient were 5.03 and $236,900 for OBT ≥ MVC and 4.75 and $220,400 for OBT, for an incremental cost-effectiveness ratio (ICER) of $60,100 per QALY gained ($55,000–$62,600) at 95% CI for MVC + OBT suppression. Varying the proportion of CCR5-monotropic individuals from 30%–80% gave ICERs from $65,500–$56,400. For patients with HIV susceptible to ±2 drugs, life expectancy for OBT ≥ MVC and OBT alone was 92.5 and 85.5 months respectively, giving an ICER of $55,400.
CONCLUSION: The ICER for the maraviroc strategy is comparable to values reported for use of antiretrovirals in similar populations, and was most favorable for individuals with few active treatment options.

COST-EFFECTIVENESS OF DORIPENEM IN THE TREATMENT OF NOSOCOMIAL PNEUMONIA
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OBJECTIVE: Nosocomial pneumonia (NP), the second most common hospital-acquired infection in the US, is associated with excess morbidity, mortality, hospital days and health care costs. The objective of this study was to compare treatment costs and cost-effectiveness of doripenem (currently under FDA review for NP indication) to two common NP treatments. METHODS: Outcomes for a population of hospitalized patients with NP, including a subset of ventilator-associated pneumonia (VAP) patients were modeled. Patients were assumed to be treated with doripenem, imipenem or piperacillin/tazobactam as first-line therapy for NP. Clinical cure and utilization data, including receipt of concomitant medications (vancomycin/amikacin), days on mechanical ventilation (MV), ICU days, and LOS in hospital, were estimated by combining data from two randomized, multicenter, non-inferiority clinical trials of doripenem. Wholesale acquisition costs were used for study drug; costs of MV, ICU and ward days were estimated from published literature. The primary outcomes were total costs and incremental cost per clinical cure. Robustness of the baseline cost-effectiveness analysis was evaluated using one-way and probabilistic sensitivity analyses (PSA). RESULTS: In base-case analyses, initial treatment with doripenem was least costly at $42,041/treated patient, followed by piperacillin/tazobactam ($43,743), and imipenem ($44,834). Doripenem dominated piperacillin/tazobactam by being less costly with a higher probability of clinical cure (72.3% vs. 67.8%). Imipenem had a clinical cure rate of 72.6%, but at an additional cost of $992,200/cure. Results among the subset of VAP patients were similar. One-way sensitivity analyses show the model to be most sensitive to changes in the probability of cure with each therapy. Probabilistic sensitivity analysis results indicate that doripenem is cost saving versus imipenem in 77.1% and versus piperacillin/tazobactam in 70.6% of 1,000 iterations. CONCLUSION: First-line therapy with doripenem yields lower costs and similar efficacy compared to common NP treatments. Doripenem is a cost-effective treatment for NP versus imipenem and piperacillin/tazobactam.

PATIENT-REPORTED OUTCOMES RESEARCH

VARIABILITY OF HEALTH UTILITIES INDEX MARK 3 (HUI3) MEASUREMENTS DURING TREATMENT FOR ACUTE LYMPHOBLASTIC LEUKEMIA IN CHILDHOOD
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OBJECTIVE: To assess differences in serial mean utility scores, from Health Utilities Index (HUI) Mark 3 (HUI3) measurements for patients undergoing treatment for acute lymphoblastic leukemia (ALL) in childhood. These scores will be used for identifying determinants of health. METHODS: Patients were aged 5 years or older at time of health-related quality of life (HRQL) survey and enrolled in the Dana Farber Cancer Institute 95–001 clinical trial. Parents-of-patients completed self-administered HUI questionnaires during the four major phases of treatment: induction of remission (t1); CNS prophylaxis (t2); intensification (t3); and maintenance (t4). HRQL scores are on a scale where 0.00 equals dead and 1.00 equals perfect health. Significant differences between treatment phases, for mean HRQL and single-attribute utility scores, were assessed using 1-way ANOVA and paired t-test. Magnitude of change in mean HRQL scores between treatment phases was assessed by effect size. Differences in mean HRQL scores of >0.03 are clinically important. RESULTS: A total of 375 patients were surveyed (53.2% males). Patients with complete sets of parental measurements at all treatment phases were included in this analysis (n = 86). Mean HRQL score at t1 = 0.68 (SD = 0.306), t2 = 0.74 (SD = 0.245), t3 = 0.77 (SD = 0.267), and t4 = 0.88 (SD = 0.204 (p < 0.001). There was substantial inter-patient variability in HRQL scores within treatment phases. The effect sizes were 0.200 for t2-t1, 0.120 for t3-t2 and 0.395 for t4-t3. Mean HRQL change scores were 0.06 for t1 to t2 (p = 0.085), 0.03 for t2 to t3 (p = 0.416), and 0.10 for t3 to t4 (p = 0.001). For single-attribute scores significant differences between treatment phases were observed for ambulation (p < 0.001), emotion (p < 0.001), pain (p < 0.001). CONCLUSION: Mean HRQL, ambulation, emotion and pain scores generally improved over time. The large inter-patient variability may reflect, in part, the considerable heterogeneity of treatment-related side effects among patients. Further analyses will explore whether demographic or diagnostic risk factors contribute to this variability.

VALIDATION OF THE PATIENT HEALTH QUESTIONNAIRE IN BRFSS—APPLICATION OF CROSS-VALIDATION METHOD
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OBJECTIVE: Research has shown that the individuals with diabetes have a higher chance of being depressed compared to those without diabetes. To provide effective interventions for diabetes with depression, practitioners need a reliable and valid instrument to examine patients’ levels of depression. The purpose of the study was to evaluate the psychometric properties of the Patient Health Questionnaire (PHQ) in 2006 Behavioral Risk Factor Surveillance System (BRFSS). METHODS: The BRFSS is an on-going telephone health survey system, recording U.S. adults’ health and risk behaviors yearly. The PHQ measures the depressive symptom that subjects have had over the last two weeks. In the current investigation, only Washington residents who were under diabetic treatment(s) and completed the questionnaire were included in the analyses. Of 750 subjects in the analyses, 338 (45.07%) were male and 412 (54.93%) were female. The average age was 63.18 years (SD = 12.53). The split-half, cross-validation method was applied to assess the psychometric properties of the PHQ. RESULTS: Exploratory factor analysis was first conducted to determine the measurement structure with the first half of the sample on the first step. A one-component solution was obtained. All items loaded heavily on the target component. Cronbach coefficient Alpha was 0.82, suggesting good internal consistency. The second step involved an examination of the cross-validation of the measurement structures from first step with the second half of the sample using confirmatory factor analysis procedures. The one-factor model fitted the data well,