**1920. Ocular Involvement in Candidemia Patients at an Urban Tertiary Care Center: Is Inpatient Ophthalmologic Consultation Essential?**

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***Background.*** Visual loss is a feared consequence of candidemia. The IDSA recommends dilated eye examination for all patients diagnosed with candidemia, irrespective of symptoms. Approximately 1% of patients with candidemia have ocular involvement. Given the low incidence, we posit that inpatient ophthalmologic consultation may not be required for every candidemic patient.

***Methods.*** We retrospectively reviewed records of all patients with candidemia from June 2015 to March 2017. Age, gender, comorbidities, time to initiation of antifungal treatment, *Candida* species and choice of antifungal medication were recorded. We also obtained time to ophthalmology consultation and associated cost.

***Results.*** A total of 120 patients with candidemia were identified (mean age 61; 62% male, 38% female). Seventy-nine percent had an indwelling venous catheter, 37% had DM, 24% were immunosuppressed, 16% had CKD, 14% were receiving TPN, and 15% were IVDU. Ninety-five percent of patients had received antibiotics in the previous 30 days. Twenty-six percent had undergone major surgery in the preceding 90 days. The majority of isolates were *Candida albicans* (46%). Average duration of candidemia was 4 days (range 1–18). Of the 120 patients, 73 (60%) underwent Ophthalmology evaluation. Two of those patients (2.7%) endorsed ocular symptoms, but only one had objective ocular involvement (retinitis without vitritis) which did not necessitate intravitreal therapy or surgery. The majority of our patients (68%) were treated with fluconazole. Initiation of antifungal therapy ranged from the day candidemia was diagnosed to 5 days later. Time to Ophthalmology consultation (from the time consult was requested) ranged from 1 to 9 days. Total cost for all ophthalmology consultations approximated $22,000.

***Conclusion.*** Ocular involvement was rare in our study. No change in short-term management was made based on ocular findings. However, there was substantial cost associated with inpatient ophthalmology consultation and probably with length of stay in patients awaiting eye examination. Hence, we suggest that inpatient eye evaluation may be reserved for patients with ocular symptoms (and those unable to verbalize complaints) as long as outpatient ophthalmology examination can be arranged.

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**1921. Attributable Inpatient Costs of Hospital-Onset *Clostridium difficile* Infection: A Nationwide Case–Control Study in Japan**

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***Background.*** Hospital-onset *Clostridium difficile* infections (CDIs) have a considerable clinical and economic impact on both patients and payers. Quantifying the economic impact of CDIs can guide treatment strategies. However, previous studies have generally focused on acute care hospitals, and few have included cost estimates from nonacute care hospitals such as rehabilitation centres and long-term care facilities. The aim of this study was to quantify the hospital-onset CDI-attributable inpatient costs and length-of-stay durations in all healthcare institutions that provide inpatient care (including acute and nonacute care) in Japan.

***Methods.*** Using national-level insurance claims data, we analyzed patients who had been hospitalized between April 2010 and December 2016. CDI case patients were identified and matched with non-CDI control patients using hospitalization year, treating hospital, age, sex, surgical procedure, comorbidities, and main diagnoses. Using multivariable regression analyses, we estimated the CDI-attributable inpatient costs and length-of-stay durations while adjusting for variations in factors such as age, sex, comorbidities, surgery, prescribed antibiotic, geographic region, and hospitalization year. We also analyzed the CDI-attributable inpatient costs and length-of-stay durations according to hospital type (acute care and rehabilitation/long-term care).

***Results.*** The analysis was conducted using 3,768 matched pairs. Overall CDI-attributable inpatient costs and length-of-stay durations were US$3,213 and 11.96 days, respectively. Rehabilitation/long-term care hospitals had substantially higher inpatient costs and longer hospitalizations than acute care hospitals.

***Conclusion.*** This study quantified the hospital-onset CDI-attributable inpatient costs and hospitalizations in both acute and nonacute care hospitals. The inclusion of nonacute care hospitals provides a more accurate representation of the economic burden of CDIs.

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**1922. The Challenges of Caring for People Who Inject Drugs: An Opportunity for an Infectious Diseases Service**

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***Background.*** The Royal London Hospital is a tertiary public hospital in the eastern region of London, UK—an ethnically diverse area with high levels of poverty and homelessness. Since its inception in 2015 the Infectious Diseases (ID) service has cared for 229 inpatients—10% were people who inject drugs (PWID). Such patients have complex problems including homelessness, domestic violence and psychiatric illness which impact their inpatient stay and discharge from the hospital.

***Methods.*** To retrospectively evaluate the management and treatment of PWID managed by the ID team from April 2015 to June 2017 and identify strategies to improve care.

***Patients were identified via electronic records.*** PWID not under the direct care of the ID team were excluded. Reason for admission, microbiological diagnosis, antibiotic choice, blood borne virus status, central venous access and other specialist input were noted.

***Results.*** Twenty-two PWID were identified; 13 (59%) were male, median age was 39.5 years (IQR 32.5–46).

**Table 1:** Infectious Diagnoses of PWID

| | |
|---|---|
| Complicated MSSA bacteremia | 12 |
| Complicated MRSA bacteremia | 2 |
| Complicated other bacteremia | 2 |
| Non bacteremic presentations | 6 |
| Pulmonary TB | 3 |
| Groin abscess | 2 |
| Vertebral osteomyelitis | 1 |

Eighteen patients (82%) received antibiotics via a central line. There was one case of line-associated infection (*Candida glabrata*). Three patients (14%) left hospital against advice, eight attended follow-up after discharge. There were no deaths. The mean length of stay was 39 days. Thirteen patients were identified as homeless and eight of these (62%) were discharged to a home.

***Conclusion.*** The majority of PWID managed by the ID team had complicated bacteremia requiring long courses of intravenous antibiotics. Despite concern regarding central access, line associated infection was rare. Significant proportions also had blood borne virus infection (86%) and over 50% had psychiatric illness and/or are homeless. Together these factors represent major obstacles to providing the considered "gold standard" care. These findings highlight the currently unmet need for an integrated multidisciplinary approach to the care of PWID.

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**1923. OPAT or No-PAT? Evaluation of Outpatient Parenteral Antimicrobial Therapy (OPAT) Patients Receiving Daptomycin or Ertapenem for "Ease of Administration"**

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***Background.*** Outpatient parenteral antimicrobial therapy (OPAT) allows for long-course intravenous treatment of infections without lengthy hospital stays. Upon discharge, antimicrobial therapy may be broadened to ertapenem or daptomycin for "ease" of once-daily administration. Patients requiring subsequent readmission should be properly tailored to pre-OPAT regimens to minimize collateral damage and reduce cost. This study assessed the continuation of "ease of administration (EOA) regimens" upon hospital readmission during or immediately following OPAT.

***Methods.*** This was a single-center, retrospective review of adult patients enrolled in OPAT and discharged between January 1, 2014 and September 30, 2017 on ertapenem or daptomycin for "EOA." This was defined by the presence of the terms "convenience" or "EOA" in OPAT notes or by broadening of coverage to ertapenem or daptomycin upon OPAT enrollment despite adequate therapy with more narrow-spectrum agents. Patients receiving directed carbapenem or daptomycin therapy prior to OPAT enrollment were excluded. The primary outcome was the percentage of patients readmitted during or within 90 days of their OPAT course and maintained on an "EOA regimen" of antibiotics. Secondary outcomes included inpatient therapy cost, rates of *Clostridium difficile* infection, and adverse drug reactions. Demographics and outcomes were summarized using descriptive statistics.

***Results.*** Of the 188 patients receiving an OPAT "EOA regimen," 71 were readmitted, representing 113 unique readmissions. Patients were mostly male (81%) with a median age of 57 years. "EOA regimens" were continued in 27% of hospital

readmissions. The Infectious Diseases team was consulted in 48% of cases, and the Antimicrobial Stewardship Team intervened in 26%, prompting de-escalation in a total of 28% of cases. *C. difficile* infections and adverse events occurred in 7% and 12% of readmissions respectively. The median drug acquisition cost of inpatient "EOA regimens" was $121 per readmission.

***Conclusion.*** At our institution, OPAT "EOA regimens" were continued in 27% of hospital readmissions indicating a role for improved indication documentation and antimicrobial stewardship involvement.

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**1924. Most Patients Tolerate Penicillin Administration Despite History of Nonanaphylactic Penicillin Allergy: A Systematic Review and Meta-Analysis**

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***Background.*** True allergy to penicillin is rare, despite the high frequency with which it is reported. Misrepresented allergy drives unnecessary use of alternative antibiotics which may be less effective, more toxic, and more expensive than the penicillins. While most patients reporting penicillin allergy are not prone to anaphylaxis, it is not currently known what percentage of these patients go on to fully tolerate systemic doses of penicillin-based antibiotics. This review aims to determine the tolerance rate in patients with non-anaphylactic penicillin allergy when challenged with systemic doses of penicillin-based antibiotics.

***Methods.*** We searched MedLine, Embase, and Cochrane Library for publications with English language translations between the years 2000 and 2017. We included controlled trials, quasi-experimental, and observational studies of reportedly penicillin-allergic subjects who received at least one systemic dose of a penicillin in the form of a challenge. At least two independent reviewers extracted data from included studies, and assessed the quality of each included study. To generate primary outcome data, we calculated a summary estimate rate of penicillin tolerance from a pooled fraction of subjects receiving a penicillin with no adverse effects, among all subjects receiving a penicillin challenge.

***Results.*** Initial literature search yielded 5,554 studies, of which 22 studies were ultimately included in our review. A total of 4,572 study participants, each with a history of penicillin allergy low risk for anaphylaxis, were challenged with systemic dosing of a penicillin. After weighting for sample size, an average of 94.8% [95% CI 93.3%, 96.3%] of these patients tolerated penicillin challenge without any adverse reaction.

***Conclusion.*** In addressing the problem of penicillin allergy over-diagnosis, evaluation should go beyond risk for type 1 hypersensitivity. Our data suggest that 94.8% of 4,572 subjects with reported penicillin allergy determined to be low risk for anaphylaxis tolerated repeat administration of penicillin-based antibiotics without any adverse reactions. This review generates meaningful information useful to clinical predictive analytics, in evaluating and managing patients with a reported history of penicillin allergy.

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**1925. Vancomycin Treatment and Time to Adverse Drug Reactions During Outpatient Parenteral Antimicrobial Therapy (OPAT)**

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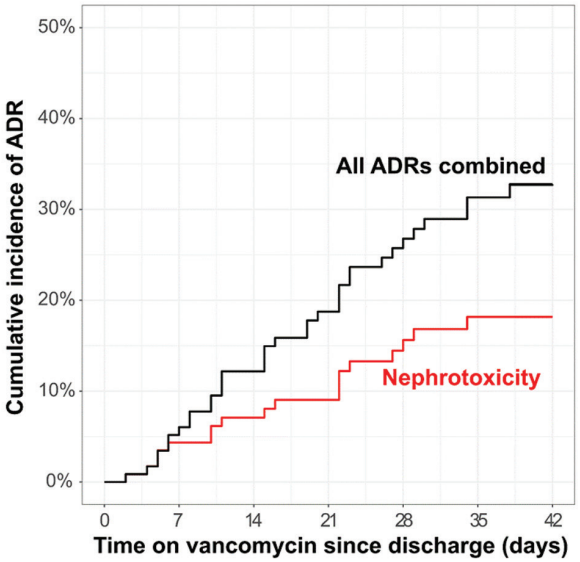
***Background.*** The UNC Medical Center Outpatient Parenteral Antimicrobial Therapy (OPAT) program was started in 2015 to provide multidisciplinary monitoring and management of patients discharged on parenteral antimicrobials. Laboratory abnormalities are a frequent complication of antimicrobial therapy, as are drug reactions such as rash and diarrhea. We examined characteristics of incident adverse drug reactions (ADRs) observed among patients receiving parenteral vancomycin therapy over a two year period.

***Methods.*** This was a retrospective cohort study of patients enrolled in the UNC OPAT program who received vancomycin July 2015–August 2017. Patients with end-stage renal disease receiving hemodialysis were excluded. The primary outcome was time-to-first ADR during the first 42 days of vancomycin therapy, estimated using Kaplan–Meier methods. Secondary outcomes included type of ADR and time-to-first nephrotoxicity ADR (>50% increase in serum creatinine). We also assessed indication for OPAT, comorbidities, and concomitant medications among patients with an ADR.

***Results.*** One hundred sixteen patients were followed on vancomycin therapy for 3,367 person-days (~111 person-months). Risk of any ADR within the first 42 days of vancomycin therapy was 33% (95% CI 24%–42%) (Figure 1); risk increased steadily by 6%–8% during the first 4 weeks on vancomycin therapy. The 42-day risk of nephrotoxicity was 18% (95% CI 10%–26%) (Figure 1), and followed a similar trajectory to overall ADR risks over time on OPAT. Other ADR risks (%) were: neutropenia (<1,000 cells/mm$^3$), 5%; rash, 4%; thrombocytopenia (<100 × 10$^3$ cells/mm$^3$ and decrease >50%), 2%; and other, 7%. The most common indications for OPAT vancomycin were osteomyelitis (53%), joint infection (16%), and bacteremia (10%). The most common comorbidities were hypertension (54%) and diabetes (40%). Among patients who experienced an ADR, the most frequent concomitant medications included: NSAID, 62%; ertapenem, 27%; ACE-I, 24%; loop diuretic, 17%; and ARB, 12%.

***Conclusion.*** Risk of ADR increases with duration of parenteral vancomycin therapy during OPAT. Nephrotoxicity was the most common type of ADR during vancomycin therapy. Use of concomitant nephrotoxins during OPAT vancomycin therapy should be evaluated.

**Figure 1. Cumulative risk of all ADRs combined (black) and nephrotoxicity (red) during OPAT vancomycin therapy.**

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**1926. Evaluation of Safety and Effectiveness of Continuous Infusion Ceftolozane/Tazobactam as Outpatient Parenteral Antimicrobial Therapy**

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***Background.*** Ceftolozane/tazobactam (C/T) is indicated for complicated intra-abdominal infections and complicated urinary tract infections (cUTI). Its spectrum of activity extends to most Gram-negative bacteria including multidrug-resistant (MDR) *Pseudomonas aeruginosa* and extended-spectrum β-lactamase-producing enterobacteriaceae. Current dosing requires 8-hour intervals in order to meet appropriate concentrations above the MIC, making outpatient delivery logistically difficult. C/T is stable up to 24 hours at room temperature, allowing for potential continuous infusion. This study evaluated patients who received this novel dosing regimen at an outpatient infusion center.

***Methods.*** This study was a nonrandomized, retrospective chart review of adult patients who received C/T August 2016–January 2018 for any indication, including off-label, in the outpatient setting as a continuous infusion. Primary outcome evaluated was symptom resolution at the end of therapy documented in outpatient records. Secondary outcomes were microbiologic resolution at the end of therapy, if available, and patient satisfaction via a modified patient satisfaction survey assessed from follow-up phone call to patient.

***Results.*** Seven patients received C/T in the outpatient setting and were included in the study. Infections treated varied and included pneumonia (three), cUTI (two), skin and soft tissue (one), and bacteremia (one). Most patients received 4.5 g (with one receiving 9 g) C/T over 24 hours mixed with normal saline via an ambulatory infusion