

Characterization of neomycin/polymyxin bladder irrigation use at a pediatric institution

Purpose

Neomycin/polymyxin solution is an antibiotic solution that has been used at Children's Mercy Kansas City (CMKC) for several years primarily as UTI prophylaxis in patients at risk for such infections. Given limited data on antibiotic bladder irrigations, interest has been shown to assess current utilization of this irrigation at CMKC. Characterizing patients receiving neomycin/polymyxin irrigations will allow for determination of the most common uses of this irrigation and provide an assessment on the overall incidence of UTIs in patients receiving irrigations at CMKC.

Methods

A retrospective chart review of patients receiving neomycin/polymyxin bladder irrigation during an inpatient encounter between July 1st, 2018 and June 30th, 2020 was completed to characterize the use of neomycin/polymyxin bladder irrigation. Collected data included patient demographics and characteristics; comorbid conditions, primary admission diagnosis, neomycin/polymyxin prescription/order characteristics, prescriber characteristics, concurrent systemic antimicrobial during the inpatient encounter, and characteristics of subsequent UTIs while on antibiotic bladder irrigation. The charts of the patients identified from the inpatient encounters were reviewed to determine outpatient use of the neomycin/polymyxin bladder irrigation during the study period. Prescriptions written during the study window were reviewed to calculate the number of days a patient was receiving the bladder irrigation. Collected data was analyzed using descriptive statistics to determine the most common uses of neomycin/polymyxin bladder irrigation and to provide an assessment on the overall incidence of UTIs in patients receiving irrigations.

Results

There was a total of 82 inpatient encounters with neomycin/polymyxin bladder irrigation from 28 unique patients between July 1, 2018 and June 30, 2020. 25 (89%) of the included patients had neurogenic bladder. Urology was involved in 26 (93%) of the patients who had received an inpatient order for neomycin/polymyxin bladder irrigation. For the duration of the study period, 23 patients received neomycin/polymyxin bladder irrigation continuously, and 5 patients received it intermittently. The median cumulative duration of time the patients who received this irrigation during the study window was 502.5 days. Frequency of irrigation use for inpatient encounters, included once daily (78.6%); twice daily (15.5%); and greater than twice daily (3.57%). Most encounters had a dose of 20 mL (84.2%). Across the 28 patients, there were 39 positive urine cultures: 17 had <50,000 CFU/mL of bacteria; 6 had 50,000-<100,000 CFU/mL of bacteria; and 16 had ≥100,000 CFU/mL of bacteria. Of the positive urine cultures with <50,000 CFU/mL, 27.8% were treated with antimicrobials; of the positive urine cultures with 50,000-<100,000 CFU/mL, 31.2% were treated with antimicrobials; and of the positive urine cultures with ≥100,000 CFU/mL, 87.5% were treated with antimicrobials. 12 positive urine cultures were treated with broad spectrum antibiotics (as defined by having anti-pseudomonal activity), 8 positive urine cultures were treated with narrow spectrum antibiotics, and 5 positive urine cultures were treated with an antifungal. The most common pathogens were *Candida* species and *Klebsiella* species.

Conclusion

Neomycin/polymyxin bladder irrigation use during July 1, 2018, and June 30, 2020, was for UTI prophylaxis in all patients. Neomycin/polymyxin bladder irrigation was not effective in preventing UTIs. Further research is needed to determine the efficacy of neomycin/polymyxin bladder irrigation. Criteria for use and/or dose standardization may also be warranted. Criteria to be considered should include adherence, frequency of UTIs, and pathogens present in addition to standard dose in mL and frequency. Limitations of this study included inconsistencies in documentation, not obtaining outside hospital urine culture data and determining duration of use of the bladder irrigation through retrospective chart search of available prescriptions.