Retrospective Chart Review of Antibiotic Usage for Urinary Tract Infections at Selkirk General Hospital

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Introduction

Urinary Tract Infections (UTIs) affect greater than 30% of people around the world, and are among the most common infections in hospitalized patients.[1,2] The most common infecting organism is *Escherichia coli* (*E. coli*).[3,4] With the increasing emergence of drug-resistant organisms it has become important for physicians to prescribe appropriate antibiotics based on antimicrobial stewardship programs. It has been found that between 20-50% of antimicrobials prescribed in hospitals are either inappropriate or unnecessary.[5]

In the Selkirk General hospital antibiogram, for *E. coli* the susceptibility percentage for ampicillin, cefazolin, ciprofloxacin, and trimethoprim/sulfamethoxazole were all below 80, with some as low as 60%.[4] This limits the effectiveness of these antibiotics when treating UTI in hospitalized patients. Therefore, it is important to analyze the use of these antimicrobials within the hospital to determine appropriate antibiotic prescription.

The purpose of this retrospective chart review is to identify the use of appropriate antibiotic use for UTI during admission to Selkirk General Hospital by analyzing the selected antibiotics using the antibiogram for the Selkirk region. Thus determining if appropriate antibiotics are being chosen to treat the organisms most likely to lead to the UTI.

Methods

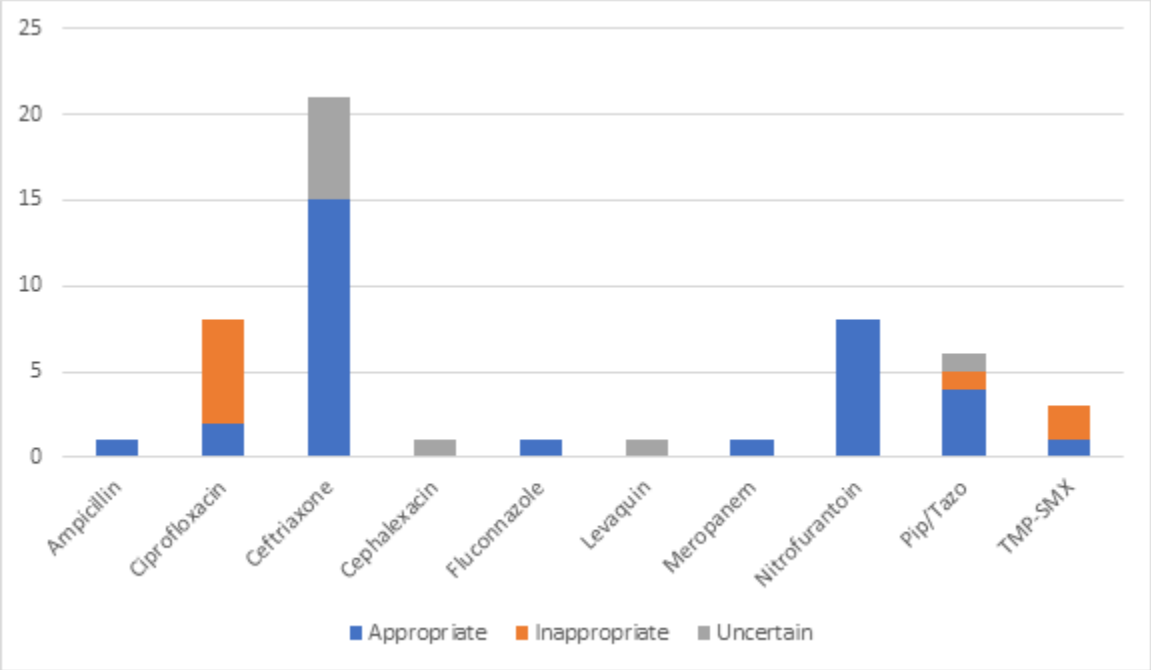
This study reviewed cases of UTI in patients admitted to Selkirk General Hospital during 2016 and 2017. Cases of UTI that passed through the emergency department but not admitted were not included in this study. Charts were selected for review if they had been coded by medical records as containing a diagnosis of UTI during 2016 or 2017. The initial antibiotics administered to the patient was used as the selected antibiotic, changes in antibiotics afterwards were not considered. The cutoff susceptibility of >80% was selected to determine appropriate antibiotic administration. If two or more antibiotics were administered concurrently, the lower susceptibility percentage was used for analysis. UTI based on clinical diagnosis were assumed to be due by *E. coli* due to the likelihood of this organism to be the cause of infection.

Results

The study review 50 charts of UTI admissions to Selkirk General Hospital from 2016 to 2017. Using the described cut off of > 80% organism susceptibility to describe acceptable antibiotic use, data was collected. Of the 50 reviewed charts, 33 (66%) were found to be acceptable antibiotic use, 9 (18%) unacceptable antibiotic use and 8 (16%) defined as unconfident that the antibiotic use was acceptable (Chart 1). The 33 cases where antibiotic use was found to be acceptable showed organism susceptibilities ranging from 88% - 100%, significantly higher than the 80% threshold. In the 9 cases where antibiotic use was found to be unacceptable, organism susceptibilities ranged from 77-79%, slightly lower than the threshold of 80%. Additionally, the 8 cases of unconfident antibiotic use were due to a lack of data on either the organisms' susceptibility or the effectiveness of the antibiotic prescribed. For instance, the

antibiotic Levaquin was prescribed for an E. *coli* infection but no data is available on effectiveness of this antibiotic, and in another case the antibiotic Ceftriaxone was prescribed for *Stenotrophomonas maltophilia,* but there is no data available for this organisms' susceptibility.

Chart 1. Antibiotic Selection



Discussion

A majority of antibiotics prescribed to treat UTI in Selkirk General Hospital from 2016-2017 were appropriately chosen. Of those that were inappropriately prescribed, ciprofloxacin was the most likely to be chosen. This could suggest that physicians may not have been aware of the change in organism susceptibility, or a resistance in changing common practice. This suggests that further education on antibiotic stewardship is important not only in new healthcare professionals, but also in those with years of experience. Antibiotic stewardship is especially important during use within the hospital due to the increase in multi-drug resistant bacterial strains and the higher risk of infection for inpatients. This can in turn result in prolonged hospitalizations, treatment failures, and increased costs and mortality.[6]

Antibiotic stewardship can be achieved by tailoring antibiotic selection for each individual patient appropriately and determining cases when antimicrobial use is indicated and avoiding antimicrobial use when it is not.[6] Upon selection of an antibiotic, the severity of the UTI, the individual patient and the pattern of antimicrobial resistance should all be taken into consideration. As well, antibiotic stewardship encompasses selection of the best antibiotic, the correct dosage and the shortest clinically effective duration of therapy when possible.[6] Aside from utilizing these strategies for selection, it is also important to limit unwanted consequences of antimicrobial use, including toxicity, in order to optimize antibiotic stewardship.[6]

Limitations

All cases were in-patient and had many comorbidities, leading to complication in antibiotic selection. In future studies, it would be recommended to examine a combination of in- and outpatients to determine if physicians are appropriately selecting antibiotics that will target susceptible organisms.

In addition, the selection of 50 cases is relatively small, thus further studies that examine a larger population within the hospital should be done to determine the true use of antibiotics for UTIs.

Conclusion

Physicians at Selkirk General Hospital show good antibiotic stewardship toward UTIs, however further investigation is warranted to determine if this is true for outpatients as well as inpatients.

References

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