Moxifloxacin Use and Outcomes Evaluation with a Focus on Quality of Care

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Background

- Over 11,000 doses of moxifloxacin dispensed at Surrey Memorial Hospital (SMH) fiscal year 2015
- Prescribing patterns and clinical outcomes with moxifloxacin have not been investigated in the local medicine inpatient population
- Knowledge of local usage helps identify opportunities for antimicrobial stewardship intervention

Objective

To evaluate moxifloxacin **use** and **clinical outcomes** in patients with lower respiratory tract infections, considering:

- Apparent appropriateness of moxifloxacin initiation
- Conversion from IV to PO form
- Duration of therapy

Methods

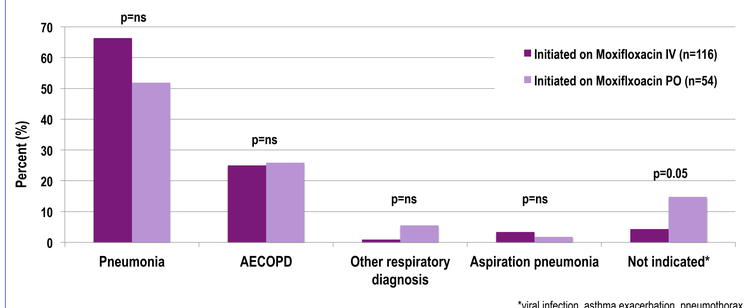
- **Study Design:** Retrospective cohort study
- **Inclusion Criteria:** Age ≥19 years admitted to SMH Nov 14, 2013-Mar 14, 2014 with lower respiratory syndrome and received ≥2 doses of moxifloxacin within 4 days of hospitalization
- **Exclusion Criteria:** Direct ICU/HAU admission, TB, CF, or HIV with CD4 <350 cells/mm^3, hematologic malignancy, chemotherapy or immunosuppressant therapy, concurrent systemic antibiotics, change to alternate antibiotic due to allergy or microbiological findings
- **Outcomes:** Indication, clinical success, 30-day readmission, hospital length of stay, treatment duration, eligibility for discontinuation of moxifloxacin by day 5
- **Statistical Analysis:** Student's T-test, Chi-squared test

Results

Table 1: Patient characteristics (initiated on IV vs. initiated on PO) *Represents statistical significance

Characteristics	Initiated on Moxifloxacin IV (n=116)	Initiated on Moxifloxacin PO (n=54)
Age, mean ± SD (years)	71.9 ± 16.6	69.9 ± 15.5
Female	55 (47.4%)	28 (51.8%)
Temp >37.5°C at start of therapy	24 (20.7%)	5 (9.2%)
Beta-lactam allergy	21 (18.1%)	10 (18.5%)
Receiving oral medications	101 (87.1%)	51 (94.4%)
Indication		
Pneumonia	77 (66.4%)	28 (51.9%)
Aspiration pneumonia	4 (3.4%)	1 (1.8%)
Acute exacerbation of COPD	29 (25.0%)	14 (25.9%)
Other respiratory diagnosis (bronchiectasis, empyema/abscess, pulmonary fibrosis)	1 (0.9%)	3 (5.5%)
Moxifloxacin not indicated (viral pneumonia, pneumothorax, asthma exacerbation)	5 (4.3%)	8 (14.8%)
Comorbidity		
Diabetes mellitus	42 (36.2%)	21 (38.9%)
Congestive heart failure	30 (25.9%)	17 (31.5%)
Chronic obstructive lung disease	44 (37.9%)	22 (40.7%)
Neurologic disease (CVA, dementia, Parkinson's disease, seizure disorder)	38 (32.8%)	13 (24.1%)
Alcoholism	13 (11.2%)	7 (13.0%)
Viral illness (Influenza A/B, RSV)	7 (6.0%)	5 (9.2%)
Current smoking/substance abuse	29 (25.0%)	17 (31.5%)
GI disease (Crohn's, colectomy/resection, colostomy, feeding tube)	1 (0.9%)	2 (3.7%)
Residence		
Home	96 (82.%7)	43 (79.6%)
LTC/assisted living/group home	17 (14.6%)	10 (18.5%)
Homeless/shelter/recovery house	3 (2.6%)	1 (1.8%)

Figure 1: Indication for initiation of moxifloxacin



Figures 2 & 3: Outcomes in patients initiated on IV vs. PO moxifloxacin

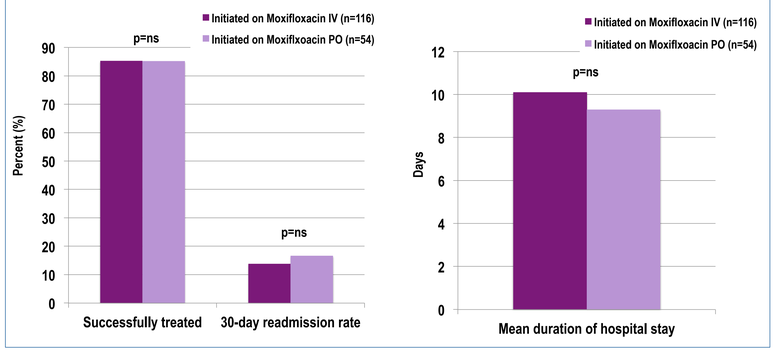
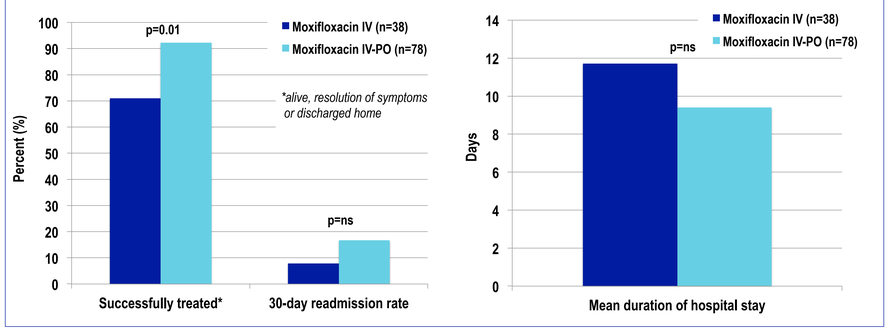


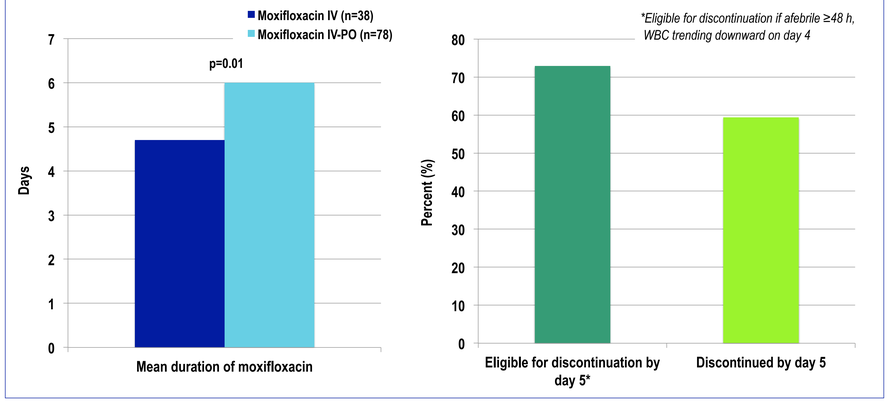
Table 2: Patient characteristics (continued IV vs. converted to PO) *Represents statistical significance

Characteristics	Continued on IV (n=38)	Converted to PO (n=78)
Age, mean ± SD (years)	76.7 ± 14.2	69.6 ± 17.3
Female	22 (57.9%)	33 (42.3%)
Temp >37.5°C at start of therapy	8 (21.0%)	16 (20.5%)
Beta-lactam allergy	11 (28.9%)	10 (12.8%)
Receiving oral medications	33 (86.8%)	68 (87.2%)
Indication		
Pneumonia	28 (73.7%)	49 (62.8%)
Aspiration pneumonia	4 (10.5%)	0
Acute exacerbation of COPD	4 (10.5%)	25 (32.0%)
Other respiratory diagnosis (bronchiectasis, empyema/abscess, pulmonary fibrosis)	1 (2.6%)	0
Moxifloxacin not indicated (viral pneumonia, pneumothorax, asthma exacerbation)	1 (2.6%)	4 (5.1%)
Comorbidity		
Diabetes mellitus	13 (34.2%)	29 (37.2%)
Congestive heart failure	9 (23.7%)	21 (26.9%)
Chronic obstructive lung disease	11 (28.9%)	33 (42.3%)
Neurologic disease (CVA, dementia, Parkinson's disease, seizure disorder)	16 (42.1%)	22 (28.2%)
Alcoholism	3 (7.9%)	10 (12.8%)
Viral illness (Influenza A/B, RSV)	4 (10.5%)	3 (3.8%)
Current smoking/substance abuse	5 (13.1%)	24 (30.8%)
GI disease (Crohn's, colectomy/resection, colostomy, feeding tube)	0	1 (1.3%)
Residence		
Home	28 (73.7%)	68 (87.2%)
LTC/assisted living/group home	10 (26.3%)	7 (9.0%)
Homeless/shelter/recovery house	0	3 (3.8%)

Figures 4 & 5: Outcomes in patients continued on IV moxifloxacin vs. converted to PO form



Figures 6 & 7: Duration of therapy



Limitations

- Retrospective study design
- Small cohort size

Conclusions

- In many cases moxifloxacin might not have been indicated:
  - 7.6% of patients were not suspected or documented to have bacterial infection
  - 81.8% no documented beta-lactam allergy (beta-lactam potentially feasible in at least some patients)
- Initiating moxifloxacin in the PO form did not appear to affect clinical outcomes in most patients presenting with lower respiratory tract infection
- 87% of patients initiated on IV moxifloxacin were receiving scheduled oral medications on admission, suggesting that oral moxifloxacin was potentially feasible in at least some of these patients
- IV-PO conversion did not appear to affect clinical success, but patients converted to PO moxifloxacin were possibly less acutely ill
- IV-PO conversion had the inadvertent consequence of prolonging therapy at SMH (possibly because each new order was assigned a 5-day automatic stop, unless a treatment duration was specified)
- Based on pre-defined criteria, 72.9% of patients appeared to have improved clinically by day 5 and could have discontinued moxifloxacin, but only 59.4% had their therapy discontinued
- Many opportunities exist for antimicrobial stewardship intervention to optimize antimicrobial use
- Observational studies help inform antimicrobial prescribing patterns and identify strategies to improve quality and patient safety