Antimicrobial Prescription Patterns for Acute Sinusitis 2015-2022: A Comparison to Published Guidelines

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Background

- Acute rhinosinusitis (ARS) is one of the most encountered conditions in primary care and otolaryngology clinics [1]
- Treatment of ARS depends on the infectious cause; viral, bacterial, or fungal causes must first be differentiated
- The American Academy of Otolaryngology – Head & Neck Surgery (AAO-HNS) set forth updated clinical practice guidelines (CPG) for ARS, including antimicrobial recommendations, in April 2015 [2]
- Guidelines for ARS suggest an initial prescription of amoxicillin +/- clavulanate for any adult with suspected acute bacterial rhinosinusitis, if a decision is made to treat medically [2]
- Little is known about how actual antibiotic prescription practices for encounters following a diagnosis of ARS compare to AAO-HNS guidelines

Objective

To investigate the epidemiology of ARS and the corresponding antibiotic prescribing practices by physicians in a single healthcare system in Tennessee from April 2015-2022.

Methods

TriNetX Live Database

- Single institution – University of Tennessee Health Science Center in Memphis, TN.
- Cohort:
  - All patients diagnosed with ARS between April 2015 and December 2022.

Cohort			
Acute Sinusitis since 04/01/2015			
must have	diagnosis	UMLS:ICD10CM: J01	Acute sinusitis
cannot have	diagnosis	UMLS:ICD10CM: Z88.0	Allergy status to penicillin
date constraint	The terms in this group occurred on or after Apr 1, 2015		

- Data extracted/ analyzed:
  - Investigated demographic background
  - First prescribed antibiotic within one day of ARS diagnosis
  - Compared antibiotic prescription pattern to published guidelines
  - Defined amoxicillin with or without clavulanic acid, while other antibiotics were grouped into their respective classes

Outcomes		
Treatment definition		
Medication	NLM:RXNORM:723	amoxicillin
Medication	NLM:RXNORM:48203	clavulanate
Medication	NLM:VA:AM117	CEPHALOSPORIN 3RD GENERATION
Medication	NLM:VA:AM200	ERYTHROMYCINS/MACROLIDES
Medication	NLM:VA:AM400	QUINOLONES
Medication	NLM:VA:AM700	ANTIFUNGALS
Medication	NLM:VA:AM250	TETRACYCLINES
Medication	NLM:VA:AM650	SULFONAMIDE/RELATED ANTIMICROBIALS
Medication	NLM:VA:AM300	AMINOGLYCOSIDES

Results

81,310 patients diagnosed with ARS were identified in the specified time frame. Demographically, the cohort was 66% Female, 49% African American and 44% White, and the mean age was 47±20 years [Range 1-90]. Of this cohort, 56,719 patients (69.8%) of patients were prescribed an antibiotic within one day of ARS diagnosis. The six most common antibiotics first prescribed for ARS were amoxicillin/clavulanic acid [14,609 (25.8%)], erythromycins/macrolides [14,322 (25.3%)], amoxicillin [9,300 (16.4%)], 3rd generation cephalosporins [7,733 (13.6%)], quinolones [3,648 (6.4%)] and tetracyclines [2,235 (3.9%)].

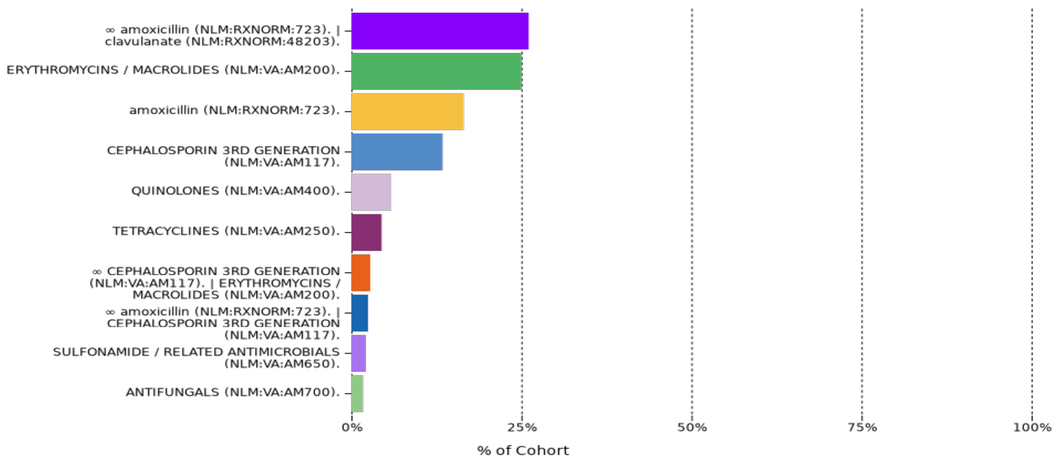

Figure 1. Medication treatment pathways for the first prescribed antimicrobial agent one day after ARS diagnosis.

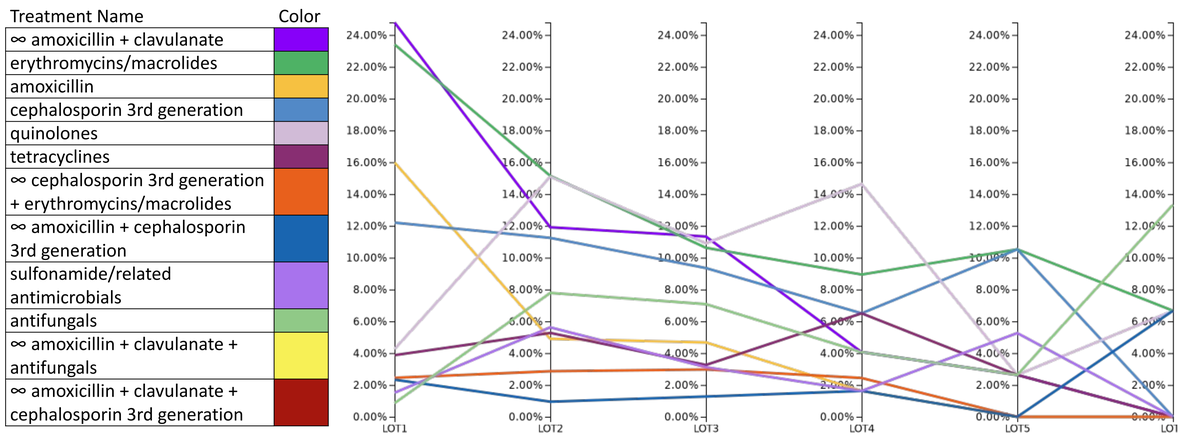

Figure 2. Distribution diagram for the most commonly prescribed antimicrobial agents after ARS diagnosis. Each lot represents the order in which a medication was prescribed, with Lot 1 being the initial first-line treatment chosen.

Conclusions

- **Despite guidelines recommending amoxicillin with or without clavulanic acid as first line treatment for confirmed acute bacterial sinusitis, only 42.2% of prescribed antibiotics followed this guideline.**
- When accounting for patients with penicillin allergy potentially treated with cephalosporins, quinolones and tetracyclines, the most represented antibiotic was erythromycins/macrolides, which are specifically recommended against because of high rates of S. Pneumoniae resistance [2,3].
- Difficult to determine which groups of physicians are incorrectly prescribing antibiotics, and if they correctly prescribe after distinguishing between viral and bacterial causes.
- Our results suggest that further investigation into the causes of erythromycin/macrolide prescriptions for ARS and practices at other institutions should be conducted.
- Continuing education of published ARS guidelines for physicians may be useful in improving antibiotic stewardship in treatment of ARS and reducing the rate of prescribing antimicrobials not indicated in the management of ARS.

Acknowledgements

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References

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