Critical Review Form
Therapy

PGY-4

Farkas A, Sassine J, Mathew JP, Stavropoulos C, Stern R, Mckinley G. Outcomes associated with the use of a revised risk assessment strategy to predict antibiotic resistance in community-onset pneumonia: a stewardship perspective. J Antimicrob Chemother. 2018 Sep 1;73(9):2555-2558.

Objectives: **"to evaluate the effects of a stewardship-driven, DRIP score-based risk assessment programme on antibiotic utilization, all-cause readmissions and time to clinical improvement in patients presenting with community-onset pneumonia." (p. 2555)**

Methods: **This retrospective, observational cohort study was conducted at Mount Sinai West Hospital in New York, NY. Patients admitted to the hospital with community-onset pneumonia were identified based on primary ICD codes and were included if they had a definite primary diagnosis of pneumonia and met any of the HCAP criteria based on 2005 American Thoracic Society and Infectious Diseases Society of America guidelines. Patients were somehow divided into a usual care (UC) group (for whom risk assessment for multidrug resistant (MDR) organisms was based on the 2005 guidelines) and the revised care (RC) group (for whom risk was assessed based on a strategy using the DRIP score, with a score ≥ 4 conferring a high risk of MDR organisms.**

The primary outcome of interest was total days of broad-spectrum antimicrobial therapy. Secondary outcomes included 30-day all-cause readmission and time to clinical improvement.

A total of 102 patients were included in the analysis, with 46 in the UC group and 56 in the RC care group. The mean ages were 69.5 years and 74.5 years, respectively, and 65.2% and 55.4% were male.

Guide		Comments
I.	**Are the results valid?**	
A.	**Did experimental and control groups begin the study with a similar prognosis?**	
1.	Were patients randomized?	No. The exact mechanism by which patients were assigned to group is not detailed in this article, but does not appear to be randomization. Though not specified, this appears to be a before and after study, subject to risks of bias associated with such research, including unanticipated confounding interventions.
2.	Was allocation concealed? In other	N/A. Patients were not randomized.

	words, was it possible to subvert the randomization process to ensure that a patient would be "randomized" to a particular group?	
3.	Were patients analyzed in the groups to which they were randomized?	Uncertain. As the authors failed to specify how patients were allocated to groups, it is not possible to know if the method of allocation was followed for all patients or if patients intended for one group were instead analyzed in the other group.
4.	Were patients in the treatment and control groups similar with respect to known prognostic factors?	No. Patients in the UC group were older, had a lower incidence of cardiovascular disease (28.3% vs. 35.7%), malignancy (19.6% vs. 25.0%), immunosuppression (19.6% vs. 26.8%), and prior intravenous antibiotics (21.7% vs. 42.9%), with higher rates of chronic kidney disease (32.6% vs 25.0%). A significantly higher percentage of patients in the RC group had a DRIP score ≥ 4 (41% vs. 22%).
B.	**Did experimental and control groups retain a similar prognosis after the study started?**	
1.	Were patients aware of group allocation?	No. Patients were likely unaware that a study was going to be conducted, and likely had no knowledge of the HCAP criteria and DRIP scores. They may have been aware of what antibiotics they received, but this would be unlikely to affect the outcomes.
2.	Were clinicians aware of group allocation?	Yes, although they may not have been aware of the study being conducted. They would have been aware of the criteria being used to guide antibiotic therapy, and would have been made aware of changes made to standard care. It seems unlikely, given the nature of the study, that performance bias on the part of the clinicians would have affected outcomes.
3.	Were outcome assessors aware of group allocation?	Yes. The authors do not mention blinding of outcome assessors, though this would have been possible. The primary outcome (total days of broad-spectrum antibiotic therapy. Time to clinical improvement, which was never defined, would likely be a subjective outcome and potentially subject to observer bias.
4.	Was follow-up complete?	Yes. All patients were followed for 30 days, and purptedly data was available for all patients.
II.	**What are the results ?**	

1.	How large was the treatment effect?	• Following adjustment for covariates, the "intervention" resulted in an estimated decreased in days of therapy for anti-MRSA antibiotics (coefficient -1.44, 95% CI -2.48 to -0.46) and anti-pseudomonal antibiotics (coefficient -2.03, 95% CI -2.99 to -1.06). • The "intervention" resulted in a trend toward decreased 30-day readmission, but this was not statistically significant (OR 0.64, 95% CI 0.16 to 2.57). • The "intervention" had no significant effect on time to clinical improvement (hazard ratio 1.19, 95% CI 0.62 to 2.21).
2.	How precise was the estimate of the treatment effect?	See above.
III.	**How can I apply the results to patient care?**	
1.	Were the study patients similar to my patient?	Likely yes. This study was conducted in a large, urban hospital and included admitted patients with community-onset pneumonia with at least one risk factor for a MDR organism based on the HCAP criteria from previous guidelines. The proportions of comorbidities seems like they would be similar to proportions seen among admitted patients at our institution.
2.	Were all clinically important outcomes considered?	Not really. The authors primarily looked at changes in antibiotic administration; while they did look at other important outcomes readmission and time to clinical improvement), the sample size was too small to detect potentially clinically significant differences in these outcomes. Additionally, the authors did not look at adverse events (opportunistic infection, diarrhea), hospital length of stay, or mortality.
3.	Are the likely treatment benefits worth the potential harm and costs?	Uncertain. This poorly reported study found a significant decrease in anti-MRSA and anti-pseudomonal antibiotic administration following a change to the DRIP score from HCAP criteria, but did a poor job describing the actual intervention used in making this change. Additionally, the authors poorly quantify this reduction in antibiotic usage, providing a coefficient rather than an interpretable measure of effect size (such as relative risk or absolute risk reduction). The study was too small to detect potentially significant changes in secondary outcomes.

Limitations:

1. **Key aspects of reporting were omitted from this paper (CONSORT checklist):**
    a. **The dates of the study were not provided**
    b. **Inclusion and exclusion criteria were not provided.**
    c. **There is also no explanation as what the "intervention" was or how it was implemented (i.e. how DRIP score use was implemented and maintained).**
2. **Details regarding the chart review methods were notably absent (Gilbert 1996 and Worster 2004).**
3. **There is no explanation for how patients were assigned to usual care and revised care groups or what the reported "intervention" was. It would appear that this was a before-and-after study and hence has the potential for inherent biases associated with such studies.**
4. **One of the secondary outcomes (time to clinical improvement) was never defined.**

Bottom Line:

This study found that a change in risk assessment for MDR organisms in pneumonia from HCAP criteria to the DRIP score resulted in a decrease in anti-MRSA and anti-pseudomonal antibiotic administration, but quantifiable measures of effect size were not provided for these changes. The authors also report no difference in 30-day all-cause readmission and "time to clinical improvement," but the latter was not defined in the article. The article was very limited by poor reporting and a poorly defined intervention.