An audit of community-acquired pneumonia (CAP) antimicrobial compliance using an intervention bundle in an Irish hospital

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Aim:

Primary: To assess if guideline-driven antimicrobial prescribing for CAP can be improved using an intervention bundle
Secondary: Assess hospital length of stay (LOS), mortality, duration of intravenous antibiotics and total antibiotics, improved uptake of appropriate investigations, and documentation of CURB65 score.

Intervention bundle:

1. Educational presentation with a Mobile audience response system (MARS) (Mentimeter® software)
2. Promotion of SUH antimicrobial SHARX app
3. Development and distribution of a physical card with the CAP guideline*
4. Incorporation CURB65 into the medical admission proforma

Methods:

Audit in Sligo University Hospital (SUH), HIPE coded patients with community acquired pneumonia had chart review
Audit standard: SUH CAP guidelines. These draw heavily on 2009 British Thoracic Society CAP guidelines
Retrospective audit of CAP > Intervention bundle implementation > Prospective audit of CAP
August-September 2018 May-June 2019

Statistical analysis

Data collected on Excel 2019, analysis done in SPSS V 26.0
The χ^2 **test** was used for categorical data
The **Mann–Whitney *U*-test** was performed on non-normally distributed nominal data (LOS, duration of antibiotics)
The **Kruskal–Wallis test** was used for non-normally distributed ordinal/nominal data related to a scale (i.e. time to antibiotics for given CURB-65 score)

Results

A total of **69** patients were included in the final study (**37** pre-intervention and **32** post-intervention), 26 excluded due to miscoding as CAP.
Demographics: female: 37 (53.6%), **age:** 74.8 ± 16.08 (S.D) years. **nursing home residents** 11 (15.9%). **CURB-65 score:** 2.16 ± 1.17 (S.D.). **previous respiratory diagnosis** 28 (40.6%) (23% Chronic obstructive pulmonary disease).
The median **white blood cell count** 11 x 10⁹ cells/mL, median **C-reactive protein** 70 mg/L

Pre intervention

GUIDELINE	CURB6 5	Amox	Co-amox	tazocin	cefurox	ceftriax
amox	0		2			
amox	1		5		1	
amox	2	1	8	1	2	
Co-amox	3		7	2	1	
Co-amox	4			4		

Post intervention

GUIDELINE	CURB6 5	Amox	Co-amox	tazocin	cefurox	ceftriax
amox	0		1			
amox	1	2	1		2	
amox	2	4	6	1		1
Co-amox	3		9			
Co-amox	4		2		1	

Table 1: Beta lactam prescription pre and post intervention. Antibiotics prescribed for a given curb65 score. Blue boxes indicate non-compliance with the guidelines. 'Guideline' column represent what patients should have received

Primary outcomes

Pre intervention compliance: 21%
- B-lactam/lactamase 32.4%
- Clarithromycin 51.7%

Post intervention compliance: 65.2% (p<0.001)
- B-lactam/B-lactamase (Table 1) 70.0%
- Clarithyomicin compliance 76%

Secondary outcomes

Findings reaching significance:
- Increase in CURB65 documentation **5.45 – 47%**
- Improved use of streptococcal urinary antigen **18.9%** to **40.9%**
- Reduction in total antibiotic duration **9 days to 7 days**
- No difference in LOS, iv antibiotics, death (see Table 2)

	total	Pre intervention	Post intervention	p value
n	69	37	32	
Streptococcal urinary antigen	20	7	13	.024
CURB65 documentation	17	2	15	<.001
Antibiotic duration (days)				
IV antibiotics mean		4	4	.70
Total antibiotics mean		9	7	.01
Time to antibiotics mean		-	142 minutes	
Deaths	5	2 (5.4%)	3 (9.3%)	0.53
Length of stay median days	4	4	4	0.85

Table 2: Full results of secondary outcomes

Discussion/Conclusion

A simple low-cost quality improvement bundle featuring a MARS can significantly increase appropriate antimicrobial prescribing and shorten total length of antibiotics.

QR code link to full manuscript

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