IMPACT OF ANTIBIOTIC STEWARDSHIP PROGRAM (ASP) ON ANTIBIOTIC USE AND CLINICAL OUTCOMES IN PATIENTS HOSPITALIZED WITH COMMUNITY-ACQUIRED PNEUMONIA (CAP): RETROSPECTIVE OBSERVATIONAL BEFORE-AFTER STUDY

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Background and importance

Community-acquired pneumonia (CAP) (Figure 1) is still one of the leading causes of death worldwide. In our previous studies, the guideline adherence to national and international CAP guidelines in terms of agent choice was found to be poor [1]. Implementation of the Antibiotic Stewardship Program (ASP) aimed to improve the correct and responsible antibiotic use by encouraging guideline adherence.
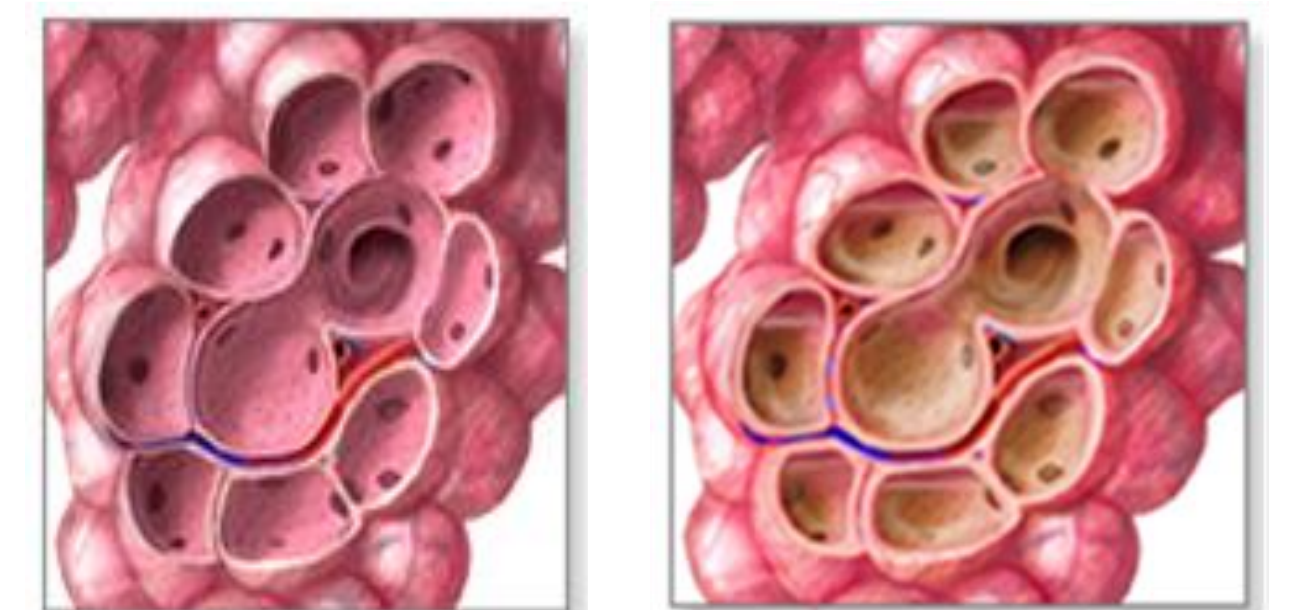

Figure 1: Physiological and pathological state of alveoli

Aim and objectives

This retrospective observational before-after study aimed to evaluate whether the ASP may improve guideline adherence, antibiotic exposure and clinical outcomes in patients hospitalized with CAP in Hungary.

Materials and methods

➢ The study was conducted at a Pulmonology Department of a tertiary care medical centre in Hungary. The ASP implementation consisted of **written and published guidelines** available to all professionals, continuous supervision (inclusive **antibiotic restrictions**) and counselling service on antibiotic therapies. The intervention was performed by a multidisciplinary antibiotic stewardship team (AST) at an individual level, with the aim to ensure compliance with CAP guidelines (Figure 2).

➢ Overall guideline adherence (agent selection, route of administration, dose), clinical outcomes (length of stay-LOS, 30-day survival), and antibiotic exposure were compared between the pre-intervention and ASP periods (both retrospective observational).

➢ Fisher's exact test and t-test were applied to compare categorical and continuous variables, respectively. Significant p values were defined as below 0.05.
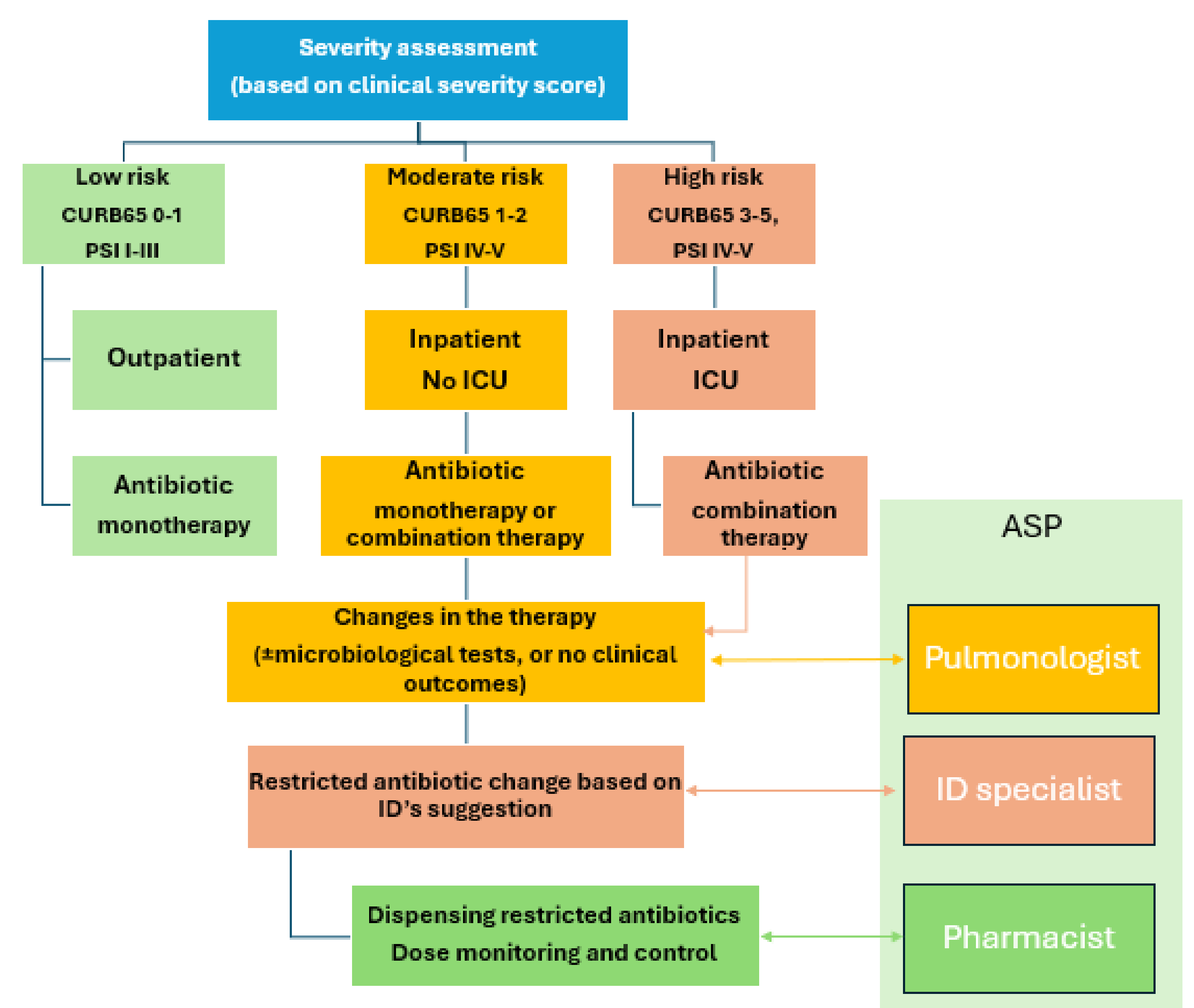

Figure 2: Flow diagram of the implemented ASP. (ID-infectious disease specialist)

Results

Significant improvement in overall CAP guideline adherence, duration, antibiotic exposure, costs, and clinical outcomes were observed (Table 1).

Table 1: Impact of implemented ASP on empirical antibacterial therapy of CAP.

Parameters	Pre-intervention period N=103 (%)	ASP period N=194 (%)	Increase /Decrease	p-values
Guideline-adherent agent(s)	60 (58.3%)	181 (93.3%)	35%	p <0.05
Guideline-adherent agent, dosage	48 (46.6%)	149 (76.8%)	30.2%	p <0.05
Guideline-adherent agent, dosage, and duration	23 (22.3%)	91 (47.0%)	24.7%	p <0.001
Guideline non-adherent therapies with metronidazole	32 (31.1%)	6 (3%)	-28.1%	p <0.001
Sequential therapy	4 (3.9%)	28 (14.4%)	10.5%	p <0.05
Duration of total antibiotic therapy - days (Median ± SD, Median)	8.17±4.06 (8)	6.35±3.92 (6)	-16.0%	p <0.001
Need for post-hospitalization AB treatment	51 (49.6%)	110 (56.7%)	7.1%	n.s.
DDD/patient (Mean ± SD)	19.89 ± 11.66 (18)	14.52 ± 9.55 (14)	-23.6%	p <0.001
LOS - days (Median ± SD, Median)	8.85±6.10 (8)	7.09±5.84(6)	-13.5%	p <0.05
30-Day survival	75 (72.5%)	152 (78.4%)	5.9%	n.s.
Direct empirical antibiotic costs (HUF/patient)	19334.10±46040.22	10582.25±11124.98	-33.2%	p <0.001

DDD – Daily Defined Dose; SD: standard deviation; LOS – Length of Stay; AB-antibiotic; n.s.: non-significant (p>0.05).

Conclusions

ASP (written and published guidelines, antibiotic restrictions) improved guideline adherence, antibiotic exposure and clinical outcomes in patients hospitalized with CAP.

Reference

Fesus, A., et al., *Impact of Guideline Adherence on Outcomes in Patients Hospitalized with Community-Acquired Pneumonia (CAP) in Hungary: A Retrospective Observational Study.* Antibiotics (Basel), 2022. **11**(4).

Resources