THE EFFECTS AND SUSTAINABILITY OF CLINICAL PATHWAYS AS PART OF ANTIMICROBIAL STEWARDSHIP PROGRAM IN THE PEDIATRIC EMERGENCY DEPARTMENT

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Background

- Italian pediatric antimicrobial prescription rates are among the highest in Europe. Identifying effective stewardship activities is essential [1].
- Where resources are limited for establishment of a robust Antimicrobial Stewardship Program (ASP), clinical pathways (CPs) represent a reasonable and feasible first step for implementation [2]
- Objective:** The primary aim of this study was to assess changes in antibiotic prescription immediately and one year after pediatric CP implementation; secondary aim was to assess treatment failure changes.

Materials and methods

Intervention: On 1 October 2015 CPs for the management of AOM, Pharyngitis and CAP were implemented at the Pediatric Emergency Department of the University Hospital of Padua. Three educational lectures were presented and CPs were distributed as a laminated pocket card.

Outcomes: Proportion provided prescriptions following “wait and see” approach (AOM only), proportion provided prescriptions by drug, days of therapy (DOT) and Length of Therapy (LOT) for combination therapy.

Data Analysis: Interrupted Time Series analysis was used to determine intervention effect, chi squared test to assess treatment failure and Kruskal Wallis test to compare antibiotic dosages and durations.

Definitions:

Broad-spectrum antibiotics: amoxicillin-clavulanate, cephalosporins and macrolides were considered broad-spectrum antibiotics

Treatment failure: 1) change in antibiotic regimen for persistence of symptoms; 2) change in antibiotic regimen for adverse drug events; 3) relapse of symptoms within 30 days from discharge date with new antibiotic prescription; 4) new antibiotic prescription in case “wait and see” was the first line therapeutic choice (only for AOM).

QUASI EXPERIMENTAL STUDY

- 15/10/14 – 15/04/15
- Pre-intervention period

- 01/10/15
- CPs implementation

- 15/10/15 – 15/04/16
- Post-implementation period

- 15/10/16 – 15/04/17
- 1-year post implementation period

Results AOM

Table 1: AOM TREATMENT OPTIONS

An increase in “wait and see” and amoxicillin prescriptions was reported.

Broad-spectrum antibiotics were prescribed in only 4.7% of cases of uncomplicated AOM 1-year post-intervention.

No statistically significant difference in treatment failure observed for AOM

	Pre-intervention period		Post-intervention period		1-year post-intervention period		p-value
Patients included	295		278		301		
Treatment	N	%	N	%	N	%	
Wait and see	64	21.7	92	33.1	87	28.9	p=0.008
Antibiotic treatment	231	78.3	186	66.9	214	71.1	p=0.008
Antibiotic	Pre-intervention period		Post-intervention period		1-year post-intervention period		
Amoxicillin	74	32	96	51.6	113	52.8	p<0.001
Broad-spectrum (amoxi-clav + cephalosporins + macrolides + quinolones)	157	68	90	48.4	101	47.2	p<0.001
Amoxi-clav.	106	45.9	70	37.6	83	38.7	p=0.17
Cephalosporins	47	20.3	16	8.6	16	7.5	p<0.001
Macrolides	4	1.7	4	2.2	1	0.5	p=0.33
Quinolones	0	0	0	0	1	0.5	p=0.38
Broad-spectrum with exclusion of complicated AOM, not fully immunized, and patients who had received amoxicillin within the previous 30 days	88	29.8%	20	7.2%	14	4.7%	p<0.001

BROAD-SPECTRUM ANTIBIOTIC PRESCRIPTIONS FOR CHILDREN NOT-FULLY IMMUNIZED, WITHOUT COMPLICATED AOM AND WHO HAVE NOT RECEIVED AMOXICILLIN WITHIN THE PREVIOUS 30 DAYS

CAP

Table 3: CAP TREATMENT OPTIONS

Amoxicillin prescriptions increased and macrolide prescriptions decreased.

No statistically significant difference in treatment failure observed

	Pre-intervention period		Post-intervention period		1 year post intervention period		p-value
Patients included	56		41		95		
Total number of prescriptions	71		46		97		
Prescriptions/patients ratio	1.3		1.12		1.02		
TYPE OF ANTIBIOTICS	n	% of total prescriptions	n	% of total prescriptions	n	% of total prescriptions	
Amoxicillin	37	52.1	32	69.6	80	82.5	p=0.0001
Broad spectrum (amoxicillin-clavulanate + cephalosporins + macrolides + quinolones)	34	47.9	14	30.4	17	17.5	p=0.0001
Amoxicillin-clavulanate	9	12.7	7	15.2	9	9.3	p=0.56
Cephalosporins	11	15.5	4	8.7	6	6.2	p=0.13
Macrolides	14	19.7	3	6.5	2	2.1	p=0.003

BROAD-SPECTRUM ANTIBIOTIC PRESCRIPTIONS FOR CAP

Pharyngitis

Table 2: PHARYNGITIS TREATMENT OPTIONS

Post-CP amoxicillin was the first choice

No statistically significant difference in treatment failure observed for Pharyngitis

	Pre-intervention period		Post-intervention period		1-year post-intervention period		p-value
Patients not treated with antibiotics	298		366		326		
Patients not treated with antibiotics	147	49.3	200	54.6	120	36.8	p=0.001
Males	82	56	117	58.5	59	49.2	p=0.26
Age							
2 months – 3 years	69	47	110	55.0	49	40.8	p=0.04
3 years – 15 years	78	53	90	45.0	71	59.2	p=0.04
Pharyngitis treated with antibiotics (Strept group A (GAS) Pharyngitis)	151	50.7	166	45.4	206	63.2	p<0.001
Males	86	57	97	58	113	54.9	p=0.78
Age							
2 months – 3 years	39	25.8	36	21.7	38	18.4	p=0.25
3 years – 15 years	112	74.2	130	78.3	168	81.6	p=0.25
Antibiotics							
Amoxicillina	81	53.6	155	93.4	192	93.2	p=0
Broad-spectrum (amoxi-clav, cephalosporins + macrolides)	70	46.4	11	6.6	14	6.8	p=0
Amoxi-clav.	60	39.7	5	3.0	9	4.4	p=0
Cephalosporins	10	6.6	6	3.6	4	1.9	p=0.07
Macrolides	0	0	0	0	1	0.5	p=0.46

BROAD-SPECTRUM ANTIBIOTIC PRESCRIPTIONS FOR PHARYNGITIS

Conclusions

- Evidence-based CP supported by adequate-provider education can effectively influence prescribing practices for AOM, pharyngitis and CAP reducing overall and broad spectrum antibiotic prescription and without compromising clinical outcomes.
- CP represents a promising, resource efficient antimicrobial stewardship tool especially in an ED setting