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Contact: catherine.pluess@ifik.unibe.ch

Impact of weekly clinical audits and feedback on consumption of protected anti-Gram negative antibiotics in 8 hospitals of the French-speaking part of Switzerland

Estelle Moulin*[1], Catherine Plüss Suard*[2], Cristina Bellini[3], Laurent Christin[4], Christian Chuard[5], Olivier Clerc[6], Alain Cometta[7], Véronique Erard[5], Oscar Marchetti[8], Nicolas Troillet[3], Cathy Voide[3], Giorgio Zanetti[1,9], Laurence Senn[1,9]

[1] Centre Hospitalier Universitaire Vaudois, Lausanne, [2]Institute for Infectious Diseases, University of Bern, Swiss Centre for Antibiotic Resistance (ANRESIS), Bern, [3]Institut Central des Hôpitaux, Sion, [4]Groupement Hospitalier de l'Ouest lémanique, Nyon, [5]Hôpital de Fribourg, Fribourg, [6]Hôpital de Pourtalès, Neuchâtel, [7]Etablilssement hospitalier du nord Vaudois, Yverdon-les-Bains, [8]Etablissement Hospitalier de la Côte, Morges, [9]Université de Lausanne, Lausanne, Switzerland

*contributed equally as submitting author

Introduction

- Multiple antibiotic stewardship (ABS) proactive interventions **improve antibacterials prescribing practices in hospitals.**
- Such interventions are so far **limited in Switzerland.**
- Unnecessary or inappropriate antimicrobial therapies were reported in acute care hospitals.

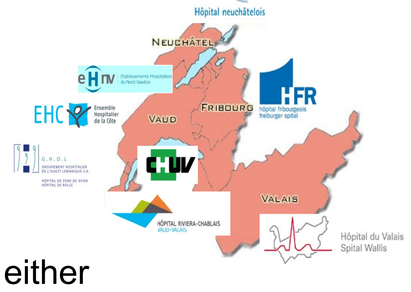
Objectives:

A. Evaluation of **the impact of weekly clinical audits and multifaceted feedback strategies on reducing the use of anti-Gram-negative antibiotics:**
   - ✓ quinolones
   - ✓ 3rd- and 4th-generations cephalosporins
   - ✓ piperacillin/tazobactam
   - ✓ carbapenems

B. Evaluation of the:
   - ✓ **appropriateness** of targeted anti-Gram-negative antibiotics **prescriptions**
   - ✓ **nature of changes** in intervention units
   - ✓ **rate of adhesion** to the tandem propositions (within the 24 hours following the audit)

Method

- **8 participating hospitals** located in the French-speaking part of Switzerland



- **Targeted units:**
  - ✓ Medicine (MED)
  - ✓ Surgery (SURG)
  - ✓ Intensive care (ICU)

- **Units randomly allocated** to either
  - ✓ Intervention (n=14) or
  - ✓ Control group (n=10)

- **The intervention:**
  - ✓ Weekly clinical audit over **6 months**
  - ✓ Evaluation by a **tandem** of an infectious diseases specialist and a senior physician
  - ✓ **Immediate feedback to prescribers**
  - ✓ Monthly reports (using newsletters), teaching rounds with medical teams (0, 3 months)
  - ✓ Use of didactic material on a website: www.objectif-preservation-antibiotiques.ch

- **Analysis**

A. The impact of the ABS intervention on antibiotic consumption was estimated using a segmented interrupted time series analysis (12 months before, 6 months during and 12 months after the intervention period)

B. Rates of inappropriateness and adhesion to propositions

Results

A. Impact on consumption

- **Statistically significant impact of a 6-month intervention in 8/14 different intervention units** when the pre-intervention period was used as control (table 1):
  - ✓ 3/14 units with a decrease of total fluoroquinolone use
  - ✓ 4/14 units with a decrease of parenteral fluoroquinolone use
  - ✓ 3/14 units with a decrease of 4th-generation cephalosporins
  - ✓ 2/14 units with a decrease of piperacillin-tazobactam

- **No significant change in the use of of 3rd-generation cephalosporins and carbapenems**

Table 1: Comparison of antibiotic consumption before, during and after the intervention period where coefficients correspond to the trend during the 12 months prior to the intervention (units/month) (1), to the change between the month just before the intervention period and the first month of the intervention (2), to the change in trend during the 6 months of the intervention compared to the trend of the 12 months before (units/month) (3), to the change between the last month of the intervention period and the first month of the post-intervention period (4) and to the change in trend during the 12 months after intervention compared to the 6-month trend during intervention (units/month) (5)

Intervention units impacted by the intervention	Trend during the pre-intervention period (1)	Level change just after the beginning of the intervention (2)	Trend during the intervention (3)	Level change just after the end of the intervention (4)	Trend during the post-intervention period (5)
Use of total fluoroquinolones					
Hospital B - ICU	NS	coef = -13.4 p=0.022	coef = 4.6 p=0.001	coef = - 14.7 p= 0.005	coef = -5.46 p=0.000
Hospital E - MED	NS	NS	coef - 1.0 p=0.049	NS	coef 1.01 p=0.05
Hospital G -SURG	NS	coef = -6.5 p = 0.02	NS	NS	NS
Use of parenteral fluoroquinolones					
Hospital A - MED	coef 0.17 p=0.033	coef-2.4 p=0.024	NS	NS	NS
Hospital B- ICU	NS	NS	coef 3.38 p=0.001	coef -9.5 p=0.009	coef -3.9 p=0.000
Hospital D - SURG	NS	coef 2.9 p=0.001	coef -0.42 p=0.035	NS	coef 0.42 p=0.036
Hospital E- MED	NS	coef 0.74, p= 0.003	coef -0.16, p= 0.004	NS	coef 0.15, p=0.006
Use of 4th-generation cephalosporins					
Hospital B - ICU	NS	NS	NS	coef=-6.0 p=0.006	NS
Hospital C - ICU	coef= 0.29 p=0.033	coef=-4.1 p=0.019	NS	NS	NS
Hospital D - MED	NS	coef=-1.0 p=0.047	NS	NS	NS
Use of piperacillin-tazobactam					
Hospital A - MED	NS	coef -5.5 p=0.024	NS	NS	NS
Hospital E - ICU	NS	NS	NS	coef=-10.8 p=0.002	NS

B. Evaluation of the appropriateness of the antibacterial prescriptions and adhesion to propositions

- **9715 in-patients screened, 1683 prescriptions** of protected antibiotics prospectively reviewed (table 2)
- **24% of included patients with a proposition of optimization of the antibacterial therapy, including most frequently:**
  - ✓ Interruption of the antibiotic (42%)
  - ✓ De-escalation (23%)
  - ✓ Switch to oral route (22%)
- **Variation of the rate of inappropriateness of prescriptions and rate of adhesion to propositions** regarding the type of units or the type of targeted antibiotic

Table 2: Rate of inappropriateness and adhesion to propositions regarding the type of unit or targeted antibiotic

		Type of unit			Type of targeted antibiotic			
	Total n (%)	Medical n (%)	Surgical n (%)	ICU n (%)	C3G/C4G n (%)	Pip/taz n (%)	Carbapenems n (%)	Quinolones n (%)
Patients with prescription(s) of targeted antibiotic(s)	1683	693	755	235	652	448	250	333
Patients with prescription(s) considered inappropriate	**405 (24%)**	141 (20%)	245 (32%)	19 (8%)	140 (22%)	101 (23%)	37 (15%)	127 (38%)
Patients with proposition(s) followed within 24 hours by the physician in charge	**227 (56%)**	109 (77%)	108 (44%)	10 (53%)	91 (65%)	61 (60%)	26 (70%)	49 (39%)

Conclusions

- **Potential of designed proactive multifaceted strategy interventions** to:
  - ✓ globally raise awareness of antibiotic resistance
  - ✓ improve the long-term practices among prescribers
- To optimize their impact, interventions need to be adapted to the **internal organization, the size of the clinical units and the local needs: One size does not fit all!**
- **Global appropriateness** of protected antibiotic prescriptions is already good in our hospital setting.
- **Opportunities of improvement exist to:**
  - ✓ shorter durations of antibacterial therapies
  - ✓ daily reassess antibacterial prescriptions
- **Future interventions should target surgical wards and quinolones** in a first instance