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Letters to the Editor

The crisis of antibiotics: From empirical to directed prescription $^{\rm \star}$



La crisis de los antibióticos: de la prescripción empírica a la dirigida

Dear Editor,

We read with great interest the editorial by Cisneros Herreros,¹ in which he completely dissected and succeeded in addressing the issue of the antibiotics crisis, outlining the causes and solutions. Resistance to antimicrobials is still a major healthcare issue with a significant socio-economic impact, and we would like to offer some comments regarding the possible solutions.

The increase in the volume of information is vast in all sectors of life, and the need for continuous, regulated and objective training among professionals is unquestionable, even more so in the current context, where we are treating an increasingly ageing, comorbid, instrumentalised and treated population. The uncertainty in the evaluation of the infectious process in such a fragile context, in which the earliness of the diagnosis and the optimisation of the treatment are capable of changing the comorbidity period and patient survival, requires a precision medicine.

Precision medicine is defined as prevention or applied treatment, depending on the individual needs of the patients, determined based on genetic, biomarker, phenotypic and psychosocial characteristics, which distinguish some patients from others, despite them having a similar clinical picture.² Precision medicine in infectious disease involves harnessing all the knowledge and technology available to reach a diagnosis, stratify the risk and better adapt the antibiotic treatment earlier, especially in critically-ill and vulnerable patients.

Different scenarios should be considered depending on genetic or epigenetic response patterns in the host, proposing a treatment directed not only at the pathogen, but also at the host, by evaluating the infection model, clinical insufficiencies, severity, comorbidity, and resistant-pathogen selection factors. It is a medicine that should seek to plan a more effective (which reduces mortality) and safer (with a reduced ecological impact) antimicrobial strategy. The current approach, based on resistant-pathogen selection factors, does not lead to better-adapted antibiotherapy, since these scales lack sufficient sensitivity and specificity for this.^{3–6}

We are therefore working on the basis of the following premises: (1) infection is a common reason for consultation; (2) the complexity of patients is progressively greater, as are the cases of

infection due to multidrug-resistant (MDR) bacteria, including community-acquired bacteria; (3) the initial aetiological diagnosis is less common and conditions empirical decision making, which generates a high rate of antibiotherapy inadequacy; and (4) the inadequacy of the initial treatment leads to resistance, morbidity and mortality, and an increase in costs.⁷

In the last decade, microbiological diagnosis has seen a significant development aimed at providing preliminary or definitive results more quickly, based on genetic and molecular biology technology. In line with that indicated, and in order to improve antibiotherapy prescription, in addition to the essential training strategies, it is vital that the use of rapid microbiological diagnostic techniques that help reduce the number of patients who receive treatment is implemented and generalised in an empirical manner. The greatest problem with its application are the costs associated with this generalisation.

It has been explained that inappropriate initial treatment is associated with an increase in mortality in critically-ill patients,⁸ which may determine the need to administer broad-spectrum or next-generation antibiotics to ensure the effectiveness of the antibiotherapy. Precision medicine must also be precise in terms of therapy, by offering each patient the best therapeutic alternative available for their clinical process, early and in an intensive manner. This action should be based on an implementation of the fastest microbiological diagnostic techniques that allow the treatment to be adjusted and de-escalated early, with the aim of reducing mortality without impacting on the ecological niche.

This type of precision medicine could be cost-effective even beyond the context of critically-ill patients. Therapeutic failure would significantly increase the costs, through increasing the consumption of resources, prolonging the average hospital stay, requesting new, additional tests, and the higher rate of readmission,^{9,10} which should be considered when evaluating the costs derived from using a precision medicine.

Therefore, we believe the application of a precision medicine in the diagnostic and therapeutic process for each patient, which helps us optimise the antimicrobial treatment safely and at a lower ecological cost, is necessary. This is, without a doubt, the present and the future of our approach to infectious diseases.

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Evaluation of perceived quality in non-restrictive interventions within the antimicrobial stewardship programme in pediatrics (PROA-NEN)[☆]

Evaluación de la calidad percibida en las intervenciones no restrictivas dentro de un programa pediátrico de optimización de antimicrobianos (PROA-NEN)

Dear Editor:

The objective of antimicrobial stewardship programmes (ASP or programa pediátrico de optimización de antimicrobianos [PROA] in Spanish) is to improve patients' clinical outcome, the use of antimicrobials, and to reduce resistance to these antimicrobials.¹ After more than a decade of work with the various departments involved in the rational use of antimicrobials in children, in 2015 a paediatric ASP, called PROA-NEN, which includes neonatology, and which follows a non-imposing methodology, was officially implemented. One of the fundamental activities of persuasive ASP programmes are the prospective audits and feedback given to prescribers. At our centre, weekly on-site audits are conducted by the paediatric infectious disease specialists and microbiologists at the hospital's main clinical units (5046 in 2016; 5114 in 2017). The advisory group is made up of four members from paediatric infectious diseases, two microbiologists and one pharmacist, with each of them specialised in a specific disease. Prior to the meeting, each of the patients is reviewed through the information extracted from medical records, and an intervention strategy is agreed regarding the diagnostic and treatment procedures (whether to continue, adjust, change or suspend the treatment). During the session with the prescribers (specialists from the various units and resident doctorsin-training) this strategy was discussed and the clinic was advised on the action to be taken, receiving immediate feedback, thereby allowing for greater consensus and thus greater acceptance and adherence.

Although it is known that persuasive strategies are more accepted by clinics, there are few publications that extensively analyse the different ASP interventions, and they are particularly scarce in paediatrics.^{2–7}

The PROA-NEN team designed a study to evaluate how the prescribers perceive the audits in order to detect possible areas for improvement and/or intervention. An anonymous survey was conducted, comprised of 18 questions, divided into four sections (Table 1): (1) affiliation; (2) evaluation of the consultation methodology: with directed responses (yes/no) and with levels of evaluation (from very unsatisfied to very satisfied: from 0 to 10); (3) evaluation of the impact of the audits on clinical decisions; and (4) evaluation of the training actions and free-response questions about suggestions for improvement.

The questionnaires were given to resident doctors (68) and specialists (87) from the centre's various paediatric sub-specialties and paediatric surgery, as well as to specialists in pharmacy and microbiology. One hundred and three professionals out of 155 took part (with a similar representation in both groups). 81.5% of specialists and 77.1% of resident doctors were familiar with PROA-NEN. 94% confirmed that audits were conducted in their department and the overall evaluation in terms of the audit methodology was 8.7 out of 10. 92% said that the on-site format of the audits was better than digital, and they all stated that the conduct of the audits was a positive thing in their daily practice. Likewise, those surveyed viewed the participation of a pharmacist and/or microbiologist in the audits positively (with scores of 7 and 9 out of 10, respectively). Regarding decision making, 92% of those surveyed stated that the audits affected their prescription of antimicrobials, and in 80% of cases the prescription was individually adjusted to that recommended.

In relation to the training actions, it was observed that only 40% of the resident doctors and 50% of the specialists had attended the PROA-NEN continuous training sessions, with those who had attended evaluating it positively (8 out of 10).

This questionnaire has allowed us to learn about the positive overall evaluation of prescribing professionals. Furthermore, we noted the significant impact of the audits on their clinical practice and the high level of adaptation of the methodology used (on-site and non-restrictive) to the specialists' needs. Finally, points for improvement were detected in terms of the training, and it is for this reason that a transmedia and gamification-type training project is being developed for this purpose.

To conclude, we want to emphasise that, for proper implementation of a paediatric ASP with the merited level of excellence and quality, regular analysis and evaluation of the programme's interventions is essential. The unimposing, on-site audit model is

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