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## Editorial

# Antimicrobial Stewardship Programs and Surgery: What Is Our Role?☆



## Programas de optimización de antibióticos y cirugía: ¿cuál es nuestro papel?

Antimicrobial resistance is, in the words of the World Health Organization (WHO), “a threat to the achievements of modern medicine”, and there is already talk of “the post-antibiotic era as a real possibility for the 21st century”. In Europe, it is responsible for some 25 000 annual deaths as well as 1500 million euros in healthcare costs and loss of productivity.<sup>1</sup> Furthermore, infections caused by resistant microorganisms are associated with higher morbidity, mortality and costs than those caused by a sensitive germ of the same species.<sup>2</sup>

Following WHO recommendations, an effort must be made towards the development of new antibiotics, prevention/control measures for infection and optimization of the use of antimicrobial agents<sup>3</sup>; among these, the use of antibiotics is the factor most susceptible to direct intervention. Therefore, the focus is justifiably targeted at the correlation between the use of antibiotics and the development of resistance, since some 50% of current prescriptions are sub-optimal.<sup>4</sup>

Safe antibiotic use programs (also known in English as Antimicrobial Stewardship Programs, or ASP) aim to improve clinical outcomes, while minimizing adverse effects or resistances to antibiotics; any associated cost benefits are a secondary outcome.<sup>5</sup> Antibiotic treatment should comply with the “4D rule”: right drug, right dose, right duration and de-escalation.

ASP are considered mandatory and necessary within the Spanish National Antimicrobial Resistance Plan<sup>6</sup> and mandatory in the United States to obtain quality certifications from the Joint Commission since 2017.<sup>7</sup>

Recent literature demonstrates that ASP can reduce and optimize antibiotic prescription, while reducing adverse effects, hospital stay and associated costs.<sup>8,9</sup>

With regards to infection in surgery, the increase in the prescription of carbapenems has been very significant in

recent years. Thus, the gram-negative bacilli (GNB) producing extended-spectrum beta-lactamases (ESBL) and carbapenemases are the main sources of alarm at present, due to their high speed of intra and interhospital dissemination, the risk of becoming clinically uncontrollable diseases and the increase in associated costs.<sup>10</sup>

The resistance rate of *Pseudomonas aeruginosa* to meropenem is greater than 20% in the United States and Spain. In the case of *Klebsiella pneumoniae*, the data have grown considerably in recent years, reaching 4% in Spain, 8% in the United States and 36% in Italy in 2015.<sup>11</sup>

Too often, antibiotic prescription patterns in surgery do not adhere to evidence-based practices, abusing broad-spectrum antibiotics, prescribing antibiotics longer than necessary and/or using broad-spectrum antibiotics when a narrow-spectrum antibacterial agent would be sufficient.<sup>7</sup> Intra-abdominal infections are complex and surgeons must be at the forefront of their treatment, so educating surgeons and teaching them to change their prescription habit is crucial to optimize the use of antibiotics.<sup>12</sup>

Due to the relevance of surgical infection and the prescribing habits of antibiotics in surgery, caution has been given about the need to improve this area.<sup>7</sup> But, the literature on ASP in surgery is limited, with much variability and mainly focused on the implementation of protocols for antibiotic prophylaxis and/or empirical treatment,<sup>13</sup> so there is an opportunity for surgeons to be involved in this commitment. Therefore, in 2016, a global alliance was created (AGORA), whose objective is to promote the rational use of antibiotics in intra-abdominal infections.<sup>14</sup>

The ASP team must be multidisciplinary, with a central core composed of a clinical expert in infectious diseases, a microbiologist and a hospital pharmacist.<sup>4,15,16</sup> According to

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the National Antimicrobial Resistance Plan,<sup>6</sup> a clinician who specializes in surgery care should be included whenever possible.

The administration of antimicrobial agents should be understood as a part of surgical practice, and it is crucial that surgeons be aware that the rational use of antibiotics is an integral part of any ASP. The active participation of surgeons is vital for the success of these programs, as they increase awareness of the problem of antimicrobial resistance and encourage the rational use of antibiotics.<sup>12,17,18</sup>

The role of surgeons within an ASP includes auditing antibiotic prescriptions, educating others about the rational use of antibiotics and providing information and education within their respective departments about the management of antimicrobial agents.<sup>14</sup>

Therefore, it is fundamental to raise awareness about the threat of antimicrobial resistance with a socio-ecological vision: antibiotics must be perceived as a valuable and finite asset. When clinicians comprehend dosages, duration and adverse effects, antibiotic prescription becomes a habit, and habits and time are the enemies of change. Making change is especially difficult when the objective is to modify practices rooted in the clinical setting. "The mind is slow in unlearning what it has been long in learning." – Seneca.

Thus, the optimization of antibiotic use is relevant for patients, institutions and society. It is complicated by logistical aspects, technical knowledge and tolerance to uncertainty. Moreover, it is not spontaneous. Its relevance is reflected in the role played by the ASP in the National Antimicrobial Resistance Plan, and the active participation of surgeons is fundamental for the success of ASP in this area.

## Conflict of Interests

None declared.

## REFERENCES

- Comunicación de la Comisión al Parlamento Europeo y al Consejo. Plan de acción contra la amenaza creciente de las resistencias bacterianas 2011. Bruselas: Comisión Europea; 2011. Available from: [http://ec.europa.eu/dgs/health\\_food-safety/docs/communication\\_amr\\_2011\\_748\\_es.pdf](http://ec.europa.eu/dgs/health_food-safety/docs/communication_amr_2011_748_es.pdf)
- Falagas ME, Tansarli GS, Karageorgopoulos DE, Vardakas KZ. Deaths attributable to carbapenem-resistant enterobacteriaceae infections. *Emerg Infect Dis*. 2014;20:1170–5. <http://dx.doi.org/10.3201/eid2007.121004>.
- World Health Organization. Global action plan on antimicrobial resistance; 2015. Available from: [http://apps.who.int/iris/bitstream/10665/193736/1/9789241509763\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/193736/1/9789241509763_eng.pdf?ua=1)
- Dellit TH, Owens RC, McGowan JE, Gerding DN, Weinstein RA, Burke JP, et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing and institutional program to enhance antimicrobial stewardship. *Clin Infect Dis*. 2007;44:159–77. <http://dx.doi.org/10.1086/510393>.
- Gerding DN. The search for good antimicrobial stewardship. *Jt Comm J Qual Improv*. 2001;27:403–4.
- PRAN. Available from: [http://www.resistenciaantibioticos.es/es/system/files/field/files/programas\\_de\\_optimizacion\\_de\\_uso\\_de\\_antibioticos\\_proa.pdf?file=1&type=node&id=363&force=0](http://www.resistenciaantibioticos.es/es/system/files/field/files/programas_de_optimizacion_de_uso_de_antibioticos_proa.pdf?file=1&type=node&id=363&force=0).
- Leeds IL, Fabrizio A, Cosgrove SE, Wick EC. Treating wisely: the surgeon's role in antibiotic stewardship. *Ann Surg*. 2017;265:871–3. <http://dx.doi.org/10.1097/SLA.0000000000002034>.
- Cosgrove SE, Seo SK, Bolon MK, Sepkowitz KA, Climo MW, Diekema DJ, et al. Evaluation of post-prescription review and feedback as a method of promoting rational antimicrobial use: a multicenter intervention. *Infect Control Hosp Epidemiol*. 2012;33:374–80. <http://dx.doi.org/10.1086/664771>.
- Wagner B, Filice GA, Drekonja D, Geer N, MacDonald R, Rutks I, et al. Antimicrobial stewardship programs in inpatient hospital settings: a systematic review. *Infect Control Hosp Epidemiol*. 2014;35:1209–28. <http://dx.doi.org/10.1086/678057>.
- Oteo J, Calbo E, Rodríguez-Baño J, Oliver A, Hornero A, Ruiz-Garbajosa P, et al. La amenaza de las enterobacterias productoras de carbapenemasas en España: documento de posicionamiento de los grupos de estudio de GEIH y GEMARA de la SEIC. *Enferm Infecc Microbiol Clin*. 2014;32:666–70. <http://dx.doi.org/10.1016/j.eimc.2014.02.011>.
- Gelband H, Miller-Petrie M, Pant S, Gandra S, Levinson J, Barter D, et al. The state of the world's antibiotics. Center for Disease Dynamics & Policy (CCDDEP); 2015. Available from: [https://cddep.org/sites/default/files/swa\\_2015\\_final.pdf](https://cddep.org/sites/default/files/swa_2015_final.pdf)
- Sartelli M, Duane TM, Catena F, Tessier JM, Coccolini F, Kao LS, et al. Antimicrobial stewardship: a call to action for surgeons. *Surg Infect (Larchmt)*. 2016;17:1–7. <http://dx.doi.org/10.1089/sur.2016.187>.
- Sartelli M, Labricciosa FM, Scoccia L, Bellesi J, Mazzocanti MR, Scaloni G, et al. Nonrestrictive antimicrobial stewardship program in a general and emergency surgery unit. *Surg Infect (Larchmt)*. 2016;17:485–90. <http://dx.doi.org/10.1089/sur.2016.015>.
- Sartelli M, Weber DG, Ruppé E, Baseetti M, Wright BJ, Ansaloni L, et al. Antimicrobials: A Global Alliance for Optimizing their Rational use in intra-Abdominal infections (AGORA). *World J Emerg Surg*. 2016;11:33. <http://dx.doi.org/10.1186/s13017-016-0089-y>.
- Barlam TF, Cosgrove SE, Abbo LM, MacDougall C, Schuetz AN, Septimus EJ, et al. Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America. *Clin Infect Dis*. 2016;62:e51–77. <http://dx.doi.org/10.1093/cid/ciw118>.
- Rodríguez-Baño J, Paño-Pardo JR, Alvarez-Rocha L, Asensio A, Calbo E, Cercenado E, et al. Programas de optimización de uso de antimicrobianos (PROA) en hospitales españoles: documento de consenso GEIH-SEIMC SEFH y SEMPSPH. *Enferm Infecc Microbiol Clin*. 2012;30:22.e1–22.e23. <http://dx.doi.org/10.1016/j.eimc.2011.09.018>.
- Çakmakçi M. Antibiotic stewardship programmes and the surgeon's role. *J Hosp Infect*. 2015;89:264–6. <http://dx.doi.org/10.1016/j.jhin.2015.01.006>.
- Duane TM, Zuo JX, Wolfe LG, Bearman G, Edmond MB, Lee K, et al. Surgeons do not listen: evaluation of compliance with antimicrobial stewardship program recommendations. *Am Surg*. 2013;79:1269–72.

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