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Editorial

When antimicrobial stewardship programmes reach the home

Cuando los programas de optimización de antibioterapia llegan al domicilio

There are several home hospitalization units in Spain, most of them in the North, with different care models depending on the specific needs of each region. Traditionally, they have been coordinated by Internal Medicine departments, responsible for the general care of the patient, using different intravenous treatments, from diuretics to palliative care, and including antibiotics when necessary. These units have accumulated considerable experience and achieved good results in terms of reducing hospital stays and improving the quality of life of patients. The attending doctors of home hospitalization units have specialized in this model of care, which is different in several aspects from the conventional one. Treatment of patients with infectious diseases has improved significantly over the last two decades, with a good example being the application of antimicrobial stewardship programmes (ASP).[1] The study by Sanchez Fabra et al.[2] evaluates how optimization of antibiotic use has been implemented in the home setting. The authors focused on patients with community-acquired pneumonia (CAP) receiving intravenous antibiotics at home. In order to measure prescription quality, they used five quality-of-care indicators including requests for microbiological testing, adequacy of antibiotic choice to clinical practice guidelines, indications for and performance of antimicrobial de-escalation, indications for and performance of sequential oral therapy, and duration of treatment. This study has limitations and potential biases given its retrospective nature. Nevertheless, the results are very interesting and pave the way for a much-needed way of working. It is important to note that CAP is not the easiest disease against which to measure prescription quality, which would surely have had an effect on the relatively low compliance with the indicators. Microbiological diagnosis of lower respiratory tract infections is difficult and is frequently limited, since many patients already are receiving active antibiotic treatment. With the exception of pneumococcal antigen tests, other microbiological tests are not usually available. Even in patients requiring hospitalization, the diagnostic yield of blood cultures is very low,[3] which often makes de-escalation difficult. Unlike conventional hospitalization, the absence of continuous medical monitoring and the lack of clinical follow-up, do not favor completion of the treatment duration recommended by the guidelines, as the authors point out in the discussion.

We probably need to go a little further and assess how many of these patients actually require intravenous treatment, rather than oral therapy. We should not forget that intravenous therapy entails the additional risk of catheter-related bacteraemia, although the incidence is usually low in this kind of programmes. The most frequently intravenous antimicrobial used is ceftriaxone,[2] and one of the cornerstones of ASP is to avoid cephalosporins whenever possible due to their ability to select for extended spectrum beta-lactamase-producing *Enterobacterales*. The high rates of penicillin susceptibility of microorganisms (mainly *Streptococcus pneumoniae*) in our environment allows for the use of oral amoxicillin and amoxicillin/clavulanic acid in most cases.[4,5] In this study, among those patients in whom an etiological diagnosis was reached in the cohorts studied, 57% of CAP were caused by *S. pneumoniae*. Probably, the reason for the intravenous prescriptions was the complexity of the cases, although the number of complicated pneumonias was below 15%. It might be advisable to reserve outpatient parenteral antimicrobial treatment (OPAT) for nosocomial cases with some type of complication, as well as those caused by multidrug-resistant microorganisms where oral options are not available. Generating information related to cases of complicated pneumonia treated at home is a key issue. Many options are available for the treatment of multidrug-resistant *Enterobacterales*, *Pseudomonas aeruginosa,* and methicillin-resistant *Staphylococcus aureus*.[6] Clinical experience at home with new antibiotics such as ceftolozane/tazobactam or ceftobiprole is very limited.[7,8] Another means of optimization concerns how the antibiotic is administered in the home. It is possible to use intermittent perfusion pumps without the patient's cooperation, when the pumps can be programmed for extended or continuous perfusion if necessary. The majority of home hospitalization programmes are based on daily visits by the nursing team, accompanied by a physician on a scheduled basis or upon request. In patients with sufficient clinical stability, home visits can be made every 2 days using antibiotics with sufficient chemical stability at room temperature such as ceftriaxone or piperacillin-tazobactam. We have employed this strategy in selected patients in our OPAT programme using intermittent perfusion pumps and obtained results comparable to daily visits.[7] This strategy allows for resource optimization in OPAT. Another way to extend home visits is to use the self-administration modality, which is feasible even in cases of antibiotics that are stable for less than 24 hours, such as ceftazidime/avibactam or meropenem.[6,9,10]

With respect to treatment duration, some OPAT studies have shown treatment durations extending beyond the recommendations given by the guidelines.[11] Possible reasons for the longer

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duration include etiologies involving multidrug-resistant organisms, previous treatment failures, sources that are not well controlled, or various circumstances related to the patient's baseline characteristics. Home hospitalization treatment allows for empirical treatment until the results of the cultures are known, followed by a switch to oral therapy when possible. As stated in the OPAT Guidelines of the Spanish Society of Clinical Microbiology and Infectious Diseases (SEIMC) and the Spanish Domiciliary Hospitalisation Society (SEHAD), the intravenous route can be inappropriately prolonged in cases where the patient is not correctly controlled and monitored under the OPAT programme, when home hospitalization physicians do not have sufficient specific training, or when hospitalization at home is used to justify discharging difficult cases from hospital (social problems, insecurity of the patient or family members, etc.).[6]

A complementary, although not less important aspect of home hospitalization and OPAT is how to quantify the improvement in quality of life relative to conventional hospitalization.[12,13] A study along these lines would be of great interest to add value to this alternative modality of care, beyond cost savings and improved use of hospital resources. To our knowledge, no specific scores have been published that allow us to measure this performance indicator in a systematic way.

Based on the results published by Fabra et al.,[2] there is still room for improvement in terms of at home compliance with the ASP recommendations for hospitals. The application of ASP to OPAT will improve the quality of these programmes and hopefully contribute to their further extension.

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Conflicts of interest

LELC has served as scientific advisor for Novartis, speaker for MSD, Pfizer, Angelini, ViiV, Gilead and Correvio, and has served as trainer for MSD and ViiV. The rest of authors have no conflicts of interests to declare.

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