# A simple pneumococcus infection...

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Underrating is not an unusual attitude in front of infections caused by *Streptococcus pneumoniae*, since they are classically a community disease and universally sensitive to penicillin. The importance of pneumococcus infections is however undeniable. It is one of the main agents causing community meningitis and pneumonia. Invasive pneumococcus infections present high mortality rates. For example, in a Brazilian study, 50% of patients with a bacteremic infection died [1]. Another aggravating factor in the treatment of these infections is the increasing resistance to penicillin and to other antimicrobial drugs commonly used to fight them. There are few Brazilian studies on the prevalence of pneumococcus resistance to penicillin. They were usually carried out in large cities, such as São Paulo, Ribeirão Preto, Rio de Janeiro [2-4], and may not reflect what is occurring in other parts of the country. That is what makes the study published by Spiandorello *et al.* in this issue of *Jornal de Pneumologia* so important. Because of the severity of the invasive pneumococcus infection, it is often necessary to start an empirical therapy even before culture and antimicrobial resistance sensitiveness test results are available. Recommendations published in domestic consensus papers and foreign guidelines frequently direct the choice of drugs in this situation. The prevalence of resistance certainly shows a regional variation in Brazil, as it occurs in other countries [5], and the consensus directions may not apply to different regions or even to different cities or hospitals of the same region. Although resistance to penicillin has rapidly increased over time in many countries, such as Argentina, Colombia, and Uruguay [6], this does not seem to have happened in Brazil, where relative resistance has remained steady between 14% and 20%, and complete resistance close to 1% or little more. In the study carried out by Spiandorello *et al.* in Caxias do Sul – RS, relative resistance was 2.28%, which is a surprisingly low value, as compared to those found in other Brazilian studies. Complete resistance was 3.42%, which is similar to other Brazilian results. The interpretation of sensitivity follows the usually proposed cutoff levels: sensitive whenever the minimum inhibitory concentration (MIC) is lower than 0.12μg/ml; relative resistance (or intermediate susceptibility) whenever MIC is between 0.12 and 1.0μg/ml; and complete resistance at MIC over 1.0μg/ml. These values were set for the treatment of pneumococcus meningitis, taking into account that the CNS levels are lower than the serum levels or those found in other tissues. Thus, the treatment of infections caused by pneumococcus with relative resistance in organs different from the CNS is not a contraindication to the use of good doses of penicillin. Considering the study of Spiandorello *et al.*, the great majority of pneumococcus infections at Caxias do Sul should respond adequately to the use of penicillin, not requiring alternative drugs. In meningitis cases, non-sensitivity has to be considered as resistance when selecting the treatment; in this study, it amounted to 5.7%, which is still much lower than that described in other regions of Brazil. Pneumococcus resistance to penicillin develops by means of alterations of the binding sites of beta-lactam antibiotics, which are the penicillin-binding proteins or PBP, rather than by production of beta-lactamase enzymes [7]. Thus, the use of a beta-lactamase inhibitor associated with penicillin, suggested by the "Consenso Brasileiro de Pneumonias" (Brazilian Consensus on Pneumonia)[8], has no improving effect whatsoever on the sensitivity of *S. pneumoniae* to this antimicrobial drug. Regarding other drugs routinely used to treat pneumococcus infections, such as tetracyclin, sulfametoxazol/trimetoprim (S/T), and macrolides, there are different results in different regions. Brazilian studies show resistance rates to tetracyclin and S/T of almost 30% [1-3] and rare resistance to macrolides, in contrast to results from other countries [9,10].

Finally, it should be remembered that an antipneumococcus vaccine that is active against 23 serotypes is available. More than 80 pneumococcus serotypes were described, based on the profile of their polysaccharide capsule, but, in the Brazilian studies, vaccine coverage exceeds 80%, including almost all serotypes in which resistance is more frequent [1-4,11]. Thus, it is of fundamental importance to perform vaccination in the groups at higher risk of acquiring pneumococcus infections: the elderly, patients with chronic lung disease, patients with kidney disease, diabetics, patients with heart disease, patients infected with HIV. The polysaccharide vaccine is highly effective in subjects over two years of age. At younger ages, the response to the vaccine is unsatisfactory, therefore a combined vaccine is required. The biggest problem is that no more than eight or nine serotypes can be

included in the combined vaccine, and regional studies are necessary to make the vaccine adequate to the prevalence of the more frequent and resistant serotypes of young children.

Studies on sensitivity and the determination of serotypes are crucial, and should be routinely performed in different regions and populations. In an ideal situation, these data should be centralized and made available, so as to guide clinical practice and the development of vaccines.

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