Detection of KPC carbapenemase with the EasyQ Kpc system, using NASBA technology
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Objectives: 55 Klebsiella pneumoniae from a collection of clinical isolates, with different level of resistance to carbapenems and well characterized mechanism, were analysed with the new EasyQ® KPC system (BioMeriux) and compared with Modified Hodge Test (MHT) and PCR, to determine the strains producers of the carbapenemase KPC. The study was conducted with 17 KPC producers, 5 MBL producers (VIM and NDM), 17 ESBL producers and 16 strains with porin defect. Materials and Methods: MICs were performed by microdiluition and interpreted according to EUCAST documents. Carbapenemase was investigated by hydrolysis of imipenem. The presence of bla(KPC), blaIMP, blaVIM, blaNDM were investigated by PCR and MHT for detection of class A carbapenemase. The EasyQ® KPC test was performed following the instruction of manufacture and time of analysis is about 2 hours. Results: The phenotype of all strains was confirmed for the presence of carbapenemase by PCR and hydrolysis of carbapenems. Twenty strains have a positive result with the Modified Hodge Test, other than: the 17 KPC producers, also 2 MBL producers and one strain with a porin defect. These three strains continued to be positive any time the test was repeated. All the strains were also tested with the new system EasyQ® KPC. All the KPC producers were positive at first analysis like as the MBL producers were negative. Five strains with porin defect and two ESBL producers resulted as KPC producers at the first analysis, but the amplification curve analysis of these discordant strains showed to be clearly different from the amplification curve of positive strains. In comparison with PCR both methods, MHT and EasyQ® KPC showed a 100% of sensitivity. The specificity was respectively of 92% and 81.6%, but specificity of EasyQ® KPC improved to 100% with a modified interpretation of the cut-off value. Conclusions: The EasyQ® KPC system presents a very high sensitivity (100%) and is able to detect all the KPC producers strains without false negative results. It present a specificity of 81.2% detecting false positive between strains producing ESBL and/or with porin defects. A better interpretation of the amplification curve, choosing a more sensitive cut-off will able to increase the specificity of test to 100%. Three hours it will be sufficient to screen directly from the clinical sample all the patients infected or colonized by KPC producer strains, reducing noticeable the time of analysis.