Challenges in the diagnosis of acute adenovirus infections

Frequent detection of respiratory tract pathogens, such as adenovirus, in asymptomatic controls poses challenges in the use of PCR based methods for accurate diagnostics of acute respiratory tract infections. Antigen testing has the potential to better detect only the clinically meaningful infections.

mariPOC® has been shown to be well suited for rapid diagnostic testing of adenovirus infections. It has been shown to detect the most important respiratory tract associated adenovirus types 1-8, 14, 19, and 21 with high sensitivity [1]. The analytical detection sensitivity of the mariPOC® adenovirus-specific method is 2 pM (0.7 ng/ml of antigen). This level of sensitivity is among the best in the current mariPOC® menu of tested pathogens. A recent Spanish study showed that mariPOC® found as many positive cases as did the old routine techniques based on culture and lateral flow testing [2]. Earlier it has been shown that the mariPOC® adenovirus test sensitivity is approximately 92 % (24/26) when compared to a very sensitive laboratory test based on time-resolved fluorescence (TR-FIA/DELFIA) [3-4]. Therefore, it may be concluded that one commonly referred dogma is false: not all adenovirus antigen tests are insensitive due to poor affinity of available antibodies or their inability to detect different types of adenoviruses.

The PCR based methods show remarkably higher frequency of positive adenovirus findings compared to other detection methods. For many other viruses like influenza or RSV, the difference in prevalence (apparent sensitivity) between PCR and other techniques is much smaller. It is likely that this is, at least partly, explained by the extreme sensitivity of PCR which makes it prone to detect subclinical infections, carriage, persistence and contamination [5]. In a study comparing mariPOC® to multiplex PCR, Ivaska et al. found that the apparent sensitivity of the mariPOC adenvirus antigen test was 25% (n=12). However, part of the confirmatory tests for adenovirus was not finalized before the submission of the manuscript. A retrospective analysis of the 9 mariPOC® “false negative” adenovirus samples by extremely sensitive TR-FIA antigen testing returned equal results with mariPOC®. These confirmatory results were in line with the conclusions made by the authors; adenovirus is often detected by PCR as an innocent bystander simultaneously with another respiratory tract pathogen(s) [6]. In addition, as for example bocavirus, PCR detects adenovirus from asymptomatic, healthy control groups suggesting that PCR also detects much more of the clinically irrelevant findings in respiratory tract infection patients [7-9]. The reasons why adenovirus PCR tests in particular are prone to clinically false positive findings may be related to it being a DNA virus, its stability in the environment, and/or some other virological factors.

In conclusion, more and more evidence is accumulating to show that antigen testing is better in finding clinically meaningful infections. Automated mariPOC® as a sensitive and specific next generation antigen test has the potential for superior clinical specificity over PCR in etiological diagnosis of acute infections.

REFERENCES


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Technical paper
2. Preliminary evaluation of mariPOC® test system for automated antigen detection of respiratory tract viruses from nasal aspirate samples. Sara Sanbonmatsu-Gámez et al. 2013 Servicio de Microbiología, Hospital Universitario Virgen de las nieves, Granada


