Comparison of four commercial real-time PCR assays for detection of *Mycobacterium tuberculosis* complex, associated or not to detection of anti-tuberculosis drug-resistance genes

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**BACKGROUND**

- Tuberculosis (TB) is one of the world’s most important infectious causes of morbidity and mortality.
- Emergence and large spread of drug-resistant TB cause major therapeutic problems worldwide.
- Early detection, with rapid and reliable diagnosis methods, is essential to reduce the death rate and interrupt transmission of TB, particularly drug-resistant TB.
- Various PCR-based assays are currently available and they enable the direct and fast detection of the *Mycobacterium tuberculosis* complex (MTBC) in clinical samples.
- Some of these kits also permit the detection of resistance to the most important anti-tuberculosis drugs.
- However, their sensitivity varies according to the technique or the type of clinical sample, particularly in the case of smear-negative specimens.

**OBJECTIVES**

- Comparison of diagnostic performances of four commercial PCR-based kits for the direct detection of MTBC in respiratory and non-respiratory samples.
- Evaluation of two of them for their ability to detect resistance genes to rifampicin (RMP) and/or isoniazid (INH).

**MATERIAL AND METHODS**

- **PCR assay**
  - Manufacturer (provider in France)
  - Target
  - Detection of resistance
- **PCR sensitivity**
  - **PCR specificity**

**RESULTS**

- **Patients with very low clinical suspicion of TB:**
  - 73 specimens were negative by smear, culture and PCR techniques
- **Patients with high clinical suspicion of TB:**
  - 2 culture-negative specimens (patients under anti-TB treatment)
    - 1 ME+/PCR+ (for all kits tested)
    - 1 ME+/PCR+ (for 3 kits) : Anyplex = 1 false negative result
  - 15 culture-positive specimens (13 respiratory + 2 others)
    - 11 ME+/PCR+ (for all kits tested)
    - 4 ME+/PCR+ : Xpert 4/4 > FluoroType/Seeplex 3/4 > Anyplex 2/4

  **PCR sensitivity : 82,4 to 100%**
  **PCR specificity : 100%**

- **Results for anti-TB drug-resistance detection :**
  - resistance to RMP (n=3) : Xpert 3/3 > Anyplex 2/3
  - resistance to INH (n=2) : Anyplex 2/2

**CONCLUSION**

- This study compare for the first time the performances of these four commercial molecular assays.
- All molecular methods tested exhibited excellent specificity and higher sensitivity than ME for the detection of MTBC.
- The Xpert™ MTB/RIF test provided the best performances for MTBC detection associated to simultaneous diagnosis of resistance to RMP.

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