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# Biomolecular methods in comparison to bacteriological methods using to establish the aetiology of infective endocarditis

Maria Sorokina*[1], Nikita Povalyaev[1], Alexandra Pisaruk[2], Elizaveta Kotova[2], Elvira Domonova[3], Olga Silveystrova[3]

[1]*Lomonosov Moscow State University; Basic Medicine*

[2]*Peoples' Friendship University of Russia*

[3]*Central Research Institute of Epidemiology*

**Background:** Infective endocarditis (IE) is difficult to diagnose and associated with high mortality. In the majority of cases, the effectiveness of the therapy is based on the verification of etiological agent in blood. The objective of the study is to investigate peculiarities of bacteriological and biomolecular methods used to establish the etiology of IE.

**Material/methods:** 53 patients with verified IE (DUKE 2015), hospitalized in city clinical hospital №64 in Moscow from September 2012 to January 2015, were included in the study. All patients were performed parallel one-moment bacteriological and biomolecular (PCR or PCR with follow-up sequenition) tests. The blood (20-25 ml) was taken from three different peripheral veins in every patient, three times with 20-30 min interval. The PCR method with hybridization and fluorescence detection of results was used to detect DNA of MSSA and MRSA species of *S. aureus,* MRSA species of coagulase-negative *Staphylococcus spp.*, DNA of *Enterobacteriaceae*, *Candida*, enterococci's, *Streptococcus spp., A.baumanii, K.pneumoniae, P.aeruginosa, E.coli, S.agalactiae, S. pyogenes.* The average duration of bacteriological test was 5-7 days, PCR – 4-6 hours, PCR with follow-up sequenition – 1-2 days.

**Results:** We studied 53 patients with IE (DUKE 2015), age median 62 [34-73], 31 (58,5%) male and 22 (41,5%) female. Using bacteriological method, infectious agents were identified in 28 patient's blood (*Staphylococcus spp.* (n-16, 57,1%), *Enterococcus spp.* (n-4, 14,3%), *Streptococcus spp*. (n-2,

7,1%), *K.pneumoniae* (n-1, 3,5%)*, E.coli* (n-1, 3,5%)). Poliflora was detected in 4 (14,3%) cases and we didn't identify any bacteria growth in 25 (47,1%) cases. We succeeded in DNA detection using PCR with sequenition in 34 cases (64,2%), 21 (75%) case (from upper mentioned) results were concordant and 7 (25%) results were discordant with traditional method. We detected full inequality in 3 out of these 7 cases: *Enterococcus spp.* growth was detected using bacteriological method, but there were DNA of other agents by PCR results. Positive results of bacteriological study were collected for the other 4 patients, but no DNA at all was identified using PCR. Negative result of bacteriological test was in 23 (47,2%) cases, but in 10 of them PCR method succeeded to detect DNA.

**Conclusions:** An etiological agent of IE in venous blood was identified in 52,8% cases using bacteriological method, in 64,2% cases using PCR, and in 71,7% cases using both methods. Concordant results were shown for 67,9% patients, discordant – for 32,1%. In 18,9% of cases (out of discordant) culture-negative IE was detected, but PCR identified DNA of the infectious agent. Discordant results are likely to be linked with special technical aspects of both methods and declare difficulties in etiologic diagnostic of IE. It seems challenging to extend indication for PCR not only for culture-negative IE, but also for controlling bacteriological methods of diagnostics.