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

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Introduction: 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. It is reported that infectious agents, which are found in the valve tissue and those found in the bloodstream are not always identical. To make etiologic diagnostics more precise we suggest using biomolecular methods, such as polymerase chain reaction (PCR).

Objective: to investigate peculiarities of bacteriological and biomolecular methods used to establish the etiology of IE.

Methods:

53 consecutive patients verified IE (DUKE 2015) City hospital №64, Moscow 2012 - 2017

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Blood sampling in a volume of 25 ml, three times, with an interval of 30 minutes, from three different peripheral veins.

- biomolecular (PCR or PCR with follow-up sequenition) tests
- bacteriological tests

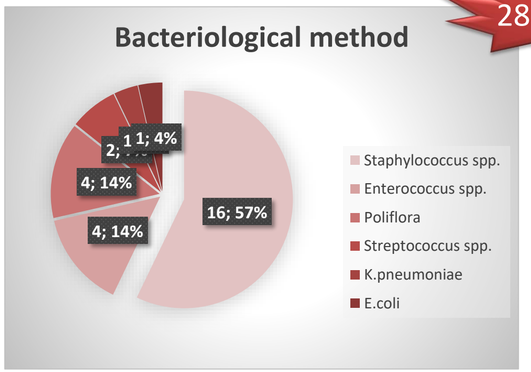
The PCR method with hybridization and fluorescence detection of results was used to detect DNA of:

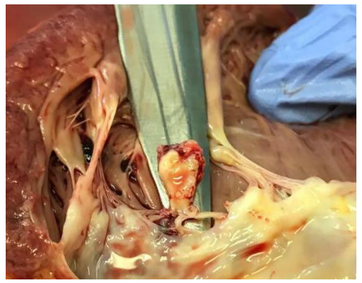
- ❑MSSA and MRSA species of *S. aureus;*
- ❑MRSA species of coagulase-negative *Staphylococcus spp.*;
- ❑*Enterobacteriaceae* (*E.coli*, *Klebsiella spp*., *Proteus* spp.);
- ❑ *Staphylococcus spp*. and *Streptococcus spp*.;
- ❑*A.baumanii*, *K.pneumoniae*, *P.aeruginosa*, *E.coli, S.agalactiae*, *S. pyogenes;*
- ❑*Candida* (*C.albicans*, *C.glabrata*, *C.krusei*, *C.parapsilosis* и *C.tropicalis*);
- ❑*E. faecium, E.faecalis*.

The average duration of bacteriological test was 5-7 days, PCR – 4-6 hours, PCR with follow-up sequenition – 1-2 days.

In case of death, affected valves (n=8) were tested with the same technique.

Results:





Intra-operation photos: affected valve tissue

34 patients

DNA detection using PCR with sequenition

in 34 cases (64,2%), 26 (75%) case (from upper mentioned) results were concordant and 6 (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:

Investigation of affected valve tissues, resected for etiological agent identification in 8 IE patients, demonstrated a wider specter of bacteria than in blood culture. This is probably caused by the presence of bacterial biofilms on affected valves. Biomolecular methods demonstrated wider possibilities in comparison with traditional bacteriological techniques.

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