Value of polymerase chain reaction in etiological diagnostic of infective endocarditis
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Introduction: Identification of a causative agent in patients with infective endocarditis (IE) is crucial for diagnostic and prescribing etiotropic therapy which defines positive outcome of a disease. High rate of a culture negative IE and inaccurate results of traditional microbiological methods raise a concern. So the methods of etiological diagnostics in IE are in need of development, particularly introduction of polymerase chain reaction (PCR) method might be helpful.

Aim: Modernisation of the algorithm of IE etiological diagnostic by introducing PCR

Materials and methods: The study included 85 cases of IE [first episode of IE (n=79), recurrence/relapse (n=6)] verified by DUKE criteria 2009, 2015, hospitalized in Moscow primary hospital from 2012 to 2017. All patient had venous blood investigated both with microbiological method and with broadrange and specific PCR. Following microorganisms’ DNA were assessed by PCR: Staphylococcus spp. (MRCoNS, S. aureus and others), Streptococcus spp. (S. agalactiae, S. pyogenes and others), Enterococcus spp. (E. faecium, E. faecalis and others), Enterobacteriaceae, Klebsiella spp. (K. pneumoniae and others), E. coli, Proteus spp., A. baumanii, P. aeruginosa, Fungi (C. albicans, C. glabrata, Aspergillus spp. and others).

Results: Median age was 55.48 years (95% confidence interval (CI) 51.16–59.8), males 67.9%. History of cardiovascular diseases was in 54 (68.35%), diabetes mellitus in 18 (22.78%), hepatitis B and/or C in 31 (39.2%), intravenous drug dependency in 27 (34.18%), chronic kidney disease in 38 (48.1%), median Charlson comorbidity index was 5.44 (95% CI 4.52–6.37). Left-side IE was in 50 (63.29%), right-side IE – in 23 (29.12%), left-right-side IE in 6 (7.59%). Secondary IE was in 53 patients (62.3%). Embolic events were diagnosed in 27 cases (34.18%), in-hospital mortality – in 22 (27.8%).

Microbiological method identified etiological agent in 55 of 85 cases (61.2%), featuring Staphylococcus aureus (n=23), Staphylococcus CoNS (n=6), Escherichia coli (n=1), Acinetobacter spp. (n=2), Streptococcus spp. (n=2), Enterococcus spp. (n=8), Klebsiella pneumoniae (n=2), Gemella haemolysans (n=2), several causative agents (n=6). Additional PCR testing identified etiology in 14 of 33 (42.2%) featuring Staphylococcus spp. (n=6), Enterococcus spp. (n=3), Streptococcus spp. (n=1), Aspergillus sp. (n=1) Pasteurella multocida (n=1), Enterococcus spp. + Staphylococcus spp. (n=1), Staphylococcus spp. + A. baumanii + E. coli (n=1).

PCR method identified 6 fals-positive results of microbilogical investigation [S. epidermidis (n=2), G. haemolysans, Acinetobacter spp., E. faecalis, K. pneumoniae], that are most probably due to preanalytical sample contamination

Conclusions: Introduction of PCR into the algorithm of IE etiological diagnostic increased validity of laboratory findings on 23.5%. True culture negative IE was present in 19 of 85 patients. Rate of mortality and complications in IE remains high.