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Original research article

The findings of the oesophageal echocardiography in patients with acute cerebral ischaemia



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ABSTRACT

Introduction: The cerebrovascular accident ranks among the main causes of mortality and morbidity worldwide. In the Czech Republic, the cerebrovascular disease was the direct cause of death in 10% of the cases in the year 2012 (Healthcare Annual CZ 2012).

Aim: The aim of our study was to evaluate the transoesophageal echocardiogram findings (TOE) in patients with suspicion for cardioembolic stroke or TIA who were indicated to this examination in our echocardiography laboratory.

Methodology: During the period from July 2009 to March 2013 (45 months), 108 TOE had been realized in our echocardiographic laboratory that was indicated for ischaemic stroke or TIA. We monitored the occurrence of pathological findings that have the cardioembolic potential according to the literature.

Results: The examination was performed for a suspect of an infective endocarditis 10 times, this was proven in 3 cases. 5 patients were holders of a mechanical valvular prosthesis, and its dysfunction was discovered in neither case. The most frequent diagnosis was foramen ovale patens in the other patients (30 patients, i.e. 37%); in 3 cases it occurred simultaneously with an atrial septal aneurysm. We found a haemodynamic little significant atrial septal defect in 3 patients and a presence of an endocardial thrombus in 2 patients. A left atrial dilation and a systolic dysfunction of a left atrium auricle can relate with an occurrence of an atrial fibrillation. A left atrium volume was determined in 86 cases; only 35 patients (i.e. 40.7%) have the normal left atrium volume. A pathology, which can be connected with a cerebral ischaemia that took place, was found in 56% of the patients.

Conclusion: Transoesophageal echocardiography is an independent method in examination of potential sources of cardioembolism. In our sample, a pathology in more than half of the patients was diagnosed that could refer to a suffered ischaemic stroke and the diagnosis led to a change in a treatment strategy in 17 cases of the total number of 95 patients (i.e. at 18%).

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Introduction

The cerebrovascular accident ranks among the main causes of the mortality and morbidity worldwide. In the Czech Republic, the cerebrovascular disease was the direct cause of death in 10% cases in the year 2012 (Healthcare Annual CZ 2012). It is predictable that the increasing life expectancy and the growing incidence of stroke risk factors in population will bring even higher incidence and prevalence [1].

The therapy of patients with the ischaemic form of stroke or the transient ischaemic attack (TIA) – which is considered an equivalent clinical unit – includes not only the acute treatment but, in addition to that, the earliest possible assessment of the aetiology for the purpose of secondary prevention.

Cardioembolism is one of the possible causes of the stroke. It is responsible for about 15–30% of ischaemic attacks [2–4]. The prognosis of patients with cardioembolic type of stroke is significantly adverse – 50% of the patients die within 3 years and unidentified origin of the embolization increases the incidence of the next attack two to three times [2,5]. Recognition of aetiology is the basic principle here, as an accurate diagnosis often initiates a change of the therapy strategy.

Cardioembolic aetiology is suspected if the neurological deficit develops rapidly. The neurological deficit is the largest at the beginning and it is mostly severe. The ischaemia most often affects the cortex or it causes subcortical lenticulostriate infarctions. The infarctions may be multilobar and of different time of origin. More systemic thromboembolic symptoms can be present (affecting e.g. kidneys or spleen) [2,5].

The most common origin of cardioembolism is the atrial fibrillation – be it paroxysmal, persistent, or the chronic one (it is supposed to be responsible for 50% stroke of cardioembolic origin) [2]. Other diseases like acute myocardial infarction, ischaemic cardiomyopathy (mostly with aneurysm formed in the left ventricle), dilated cardiomyopathy, pathological intracardial mass presence (intracardial thrombus or tumour), vegetation in infective endocarditis, rheumatic heart disease (especially mitral stenosis) and the presence of a mechanical valve prosthesis significantly increase the cardioembolic disease incidence. Other possible factors with lower risk include the patent foramen ovale, presence of an atrial septum aneurysm, aortic valve calcification, mitral annular calcification, mitral valve prolapse or giant Lambl's excrescences [2,4,6,7].

In many cases, the presence of a heart disease that is behind the cardioembolic stroke is evident as soon as the patient's history has been taken and the initial examinations routinely done at every patient have been done (ECG – 12-lead graphic record and continual heart rhythm monitoring after the patient's admission) [1]. A transthoracic echocardiographic examination is performed if need be. If these examinations do not reveal an embolic origin, the transoesophageal probe examination is indicated. Generally it is indicated in younger patients with ischaemic stroke of unknown origin, patients with valve prosthesis, and patients with suspected infective

endocarditis [3,5] and in the case of a difficult interpretable transthoracic diagnosis.

Aim

In the present literature only limited information is available about findings in transoesophageal echocardiographic examinations in patients with ischaemic stroke or TIA. Available papers dealing with this issue come from the nineties, their conclusions may therefore be difficult to interpret in retrospect because of an advance in a technical quality of echocardiographic apparatus and transoesophageal probes (nowadays multiplanar are used as a standard) and development of view of a cardioembolic potential of the individual heart diseases [6,8]. The aim of our study was to evaluate the actual transoesophageal echocardiographic findings (TOE) in patients with suspicion for cardioembolic stroke or TIA who were indicated to this examination in our echocardiography laboratory.

Methodology

During the period from July 2009 to March 2013 (45 months), 1207 TOE had been realized in our echocardiography laboratory. 95 patients from this group were put into our group. These are patients who suffered an ischaemic stroke or TIA. Everybody was examined by a neurologist on admission. He indicated a graphic examination of the brain and the afferent cerebral arteries, according to a clinical situation and he expressed a suspicion of cardioembolic aetiology of the ischaemic stroke/TIA. It was thought of the cardioembolic aetiology of an ictus in the case of a typical clinical picture and an anamnesis, a diagnosis compatible with a cerebral ischaemia on the graphic examinations and simultaneously an absence of a significant stenosis of an ipsilateral carotid artery (i.e. stenosis $\geq 50\%$) or a vertebral artery. In the case of the patients with TIA an exclusion of the significant stenosis of the ipsilateral carotid artery or the vertebral artery and the typical clinical picture was enough. The age of the patients was not a deciding factor in indicating TOE. There were 75 patients with the ischaemic stroke in total and 20 patients with TIA in a carotid and vertebrobasilar basin. The patients with lacunar infarcts were not included in the group.

Chart 1 presents a representation of the individual graphic examinations used for diagnostics of the cerebral ischaemia and an imaging of the afferent cerebral arteries.

In order to get the basic characteristics of the patients (present risk factors of stroke, comorbidity, antithrombotic therapy at the beginning of the stroke), we used the patients' medical records.

Echocardiographic examination with transoesophageal probe itself always followed after transthoracic examination. An examining echocardiographer decided on the indication of TOE definitively. A patient was equipped with peripheral vein catheter for application of premedication. Subsequently it was used for application of the echo contrast not passing through pulmonary microcirculation; in our case, the agitated physiological solution was used.

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