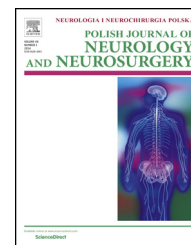


Available online at www.sciencedirect.com

ScienceDirect

journal homepage: <http://www.elsevier.com/locate/pjnns>

Editorial

Team working is crucial in the battle against stroke



Stroke is the main cause of disability and one of the leading causes of death all around the world. How to decrease the risk of stroke and how to improve the diagnosis and clinical outcome are main questions in the twenty first century?

As a cardiologist, I see a lot of similarities between the acute stroke and the acute myocardial infarction: the role of prevention, time to diagnosis and treatment, the intervention, network's organization and the reimbursement by the public health care system.

Hypoperfusion as a result of the cerebral artery obliteration and the main pathophysiology mechanism of stroke. The major risk factors of stroke are: atrial fibrillation, arterial hypertension, diabetes, obesity, hyperlipidemia and smoking. Timely diagnosed stroke and urgent and effective recanalization and reperfusion therapy are keys to a successful management. Time from the onset of symptoms to the first medical contacts depends of public education. Everybody, even young children, should be able to recognize the common symptoms of stroke and should feel responsible to call emergency services.

Delay between the first medical contact and diagnosis and delay between first medical contact and reperfusion therapy depend of the system's organization. They are also the indicators of the quality of care and predictors of outcomes. Time from stroke to the reperfusion therapy should be reduced to possible minimum. All emergency personnel should be trained not only to recognize the symptoms of stroke but also should be aware which hospitals deal with its the diagnosis and treatment. Several published studies clearly show the superiority of the catheter-based interventions over the intravenous thrombolysis for acute ischemic stroke. Ambulance should transport patients to the primary MT stroke center, bypassing the stroke units without the possibilities of the MT. During the ambulance transfer, the MT hospital should be informed of the expected time of patient's arrival.

The differential diagnosis between ischemic and hemorrhagic stroke could be difficult in clinical examination. Once the patient arrives to the hospital, he/she should be admitted directly to the computer tomography (CT) bypassing the emergency department or stroke units. CT is the first-line imaging to exclude intracranial hemorrhage. CT angiography detects the thrombotic occlusion in more than 60% and is used

as a selection criteria in the recent studies showing the benefit of MT [1–3].

Network is expected to reduce the treatment delay and increase the number of patients receiving mechanical thrombectomy. Optimal treatment of stroke should be based on the network of hospitals, like it is organized in respect to the treatment of acute myocardial infarction in patients presenting with ST-segment elevation [4].

Recently published paper: *Mechanical thrombectomy in acute stroke – Five years of experience in Poland*, written by Polish Thrombectomy Initiative led by Professor Agnieszka Słowik, for the first time presents a five years' experience and results of mechanical thrombectomy (MT) in acute stroke in 531 patients in 23 Comprehensive Stroke Centers [5]. This retrospective data, beside the limitations, is crucial to determine the organization, possibilities and outcome of the stroke treatment in Poland. It shows the stroke center organizations, the team composition and diagnostic procedures. The very important, good news is that more than 90% of patients had a MT within 6 h from the onset of symptoms. In addition, near 60% were treated iv r-tPA prior to MT.

But the main questions remains: who is a candidate for the MT? Who and how the MT should perform? Imaging of acute stroke plays a main role in the selection of patients for the MT. At present, not only the information about the size and localization of vessel occlusion is important, but CT and MRI perfusion maps become more and more helpful in the selection of patients for MT. The outcome depends on the proportion between the irreversibly infarcted tissue and potentially reversible ischemic tissue called “penumbra”. Penumbra imaging can improve the results of the MT by a better selection of patients. In cardiology, we are using the perfusion imaging for the decision making in elective angioplasty but not in the acute phase of the myocardial infarction.

The recent trials: EXTEND, MR CLEAN, SWIFT-PRIME show the benefit of the modern vascular imaging and the benefit of catheter-based intervention using new-generation stent retrievers [1–3]. Paper published by the Polish Thrombectomy Initiative shows that penumbra imaging was performed in one Polish center only and the new generation of stent retrievers were used in a half of the population. This new generation of

stent retrievers is available since 2015 and changed the outcome in MT in acute stroke [6].

It should be mentioned that without reimbursement and without additional costs, mechanical thrombectomy was performed in the large group of the Polish patients: 111 pts in 2015 and 268 in 2016. Neurologists, interventional radiologist or neuro-radiologists and cardiologists are responsible for the implementation of the modern healthcare system to decrease the number of strokes and improve the outcome. Neurologist and intervention radiologists should perform the diagnosis of stroke, imaging of the brain and extracranial vessels. The network should be sufficient for reaching the MT-center in the time-window. Basing on many studies we can conclude, that high volume centers have better outcomes. According to the presented data, only two centers in Poland performed more than 40 MT between 2012–2016 and eight 30–40 at the same time. To maximize the experience MT centers should perform the procedure on a 24-h basis, seven days a week. Service limited to the working hours is not cost-effective and the staff experience is not optimal.

The balance between the numbers and localization of centers with the possibility of best imaging, best selection of the candidate for MT and the centers with simpler diagnostic possibilities but reducing time to treatment should be discussed by neurologists.

The experience of cardiologists may be very useful not only in arranging the organization of the system. Well-experienced intervention cardiologists in the high volume centers, could play a very important role working together with neurologists and radio neurologist in the MT in acute stroke. Cardiologists are involved both in the primary and secondary stroke prevention, atrial fibrillation diagnosis and treatment, left atrial appendage occlusion, PFO occlusion and carotid stenting.

Team working is crucial in the battle against stroke. We know now that the modern vascular imaging and new generation stent retrievers are the key for success. It is time for the Polish public system to reimburse the mechanical thrombectomy.

Conflict of interest

None declared.

Acknowledgement and financial support

None declared.

REFERENCES

- [1] Berkhemer OA, Fransen PS, Beumer D, van den Berg LA, Lingsma HF, Yoo AJ, et al. A randomized trial of intraarterial treatment for acute ischemic stroke. *N Engl J Med* 2015; 372:11–20.
- [2] Campbell BC, Mitchell PJ, Kleinig TJ, Dewey HM, Churilov L, Yassi N, et al. Endovascular therapy for ischemic stroke with perfusion-imaging selection. *N Engl J Med* 2015;372:1009–18.
- [3] Goyal M, Demchuk AM, Menon BK, Eesa M, Rempel JL, Thornton J, et al. Randomized assessment of rapid endovascular treatment of ischemic stroke. *N Engl J Med* 2015;372:1019–30.
- [4] Task Force Members. ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: The Task Force on the management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology (ESC). *Eur Heart J* 2012;33 (20):2569–619.
- [5] Słowik A, et al. Mechanical thrombectomy in acute stroke – five years of experience in Poland. *Neurol Neurochir Pol* 2017;51:339–46.
- [6] Widimsky P, Hopkins LN. Catheter based interventions for acute ischemic stroke. *Eur Heart J* 2016;37:3081.

Janina Stępińska

Department of Intensive Cardiac Therapy, Institute of Cardiology,
Warsaw, Poland

E-mail address: jstepinska@ikard.pl

Available online 11 July 2017

<http://dx.doi.org/10.1016/j.pjnns.2017.07.006>
0028-3843/

© 2017 Published by Elsevier Sp. z o.o. on behalf of Polish
Neurological Society.