LETTER TO THE EDITOR

Factors Requiring Improvement for Timely and Effective Treatment of Acute Stroke

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Dear Editor,

With interest, we read the article by Shah and Diwan on an 18-month observational, single-center study of the factors preventing thrombolysis (TL) in acute stroke.[1] Included were 257 patients with acute stroke, of whom only 20% underwent TL.[1] Out-of-hospital and in-hospital reasons for non-TL were given.[1] The authors concluded that the treatment of acute stroke needs to be improved about extra- and intra-hospital factors that prevent indicated TL in acute stroke.[1] There are some points that require discussion.

As for the non-recognition of stroke symptoms before hospitalization, this can be improved through educational programs aimed at the general population but also at healthcare professionals involved in extra-hospital stroke management.[2] Intensive education through electronic and print media can significantly improve awareness of initial stroke symptoms and improve the response time of laypeople and professionals involved in the out-of-hospital recognition of acute stroke presentations.

As for transport delays, transport can be speeded up by introducing helicopter transport and creating a dedicated lane on roads for emergency vehicles. Speeding up transport depends heavily on transport policy decisions and must be improved through lobbying the responsible authority. It is also conceivable to establish mobile stroke units in cars that are equipped with imaging and TL facilities that travel to the stroke patients and perform the TL in the vehicle, as is established in some countries.

About wake-up stroke or an unknown onset time, it is important to know that the age of the stroke should be determined not only by the history but also by a multimodal MRI, which allows an assessment of the age of an acute stroke. If the stroke is already hyperintense at T2, there is no longer an indication for TL. If the T2 image is isointense and there is still a DWI/PWI mismatch (core/penumbra mismatch), there is still an indication for TL, even if it was a wake-up stroke. Therefore, the indication for/against TL should be based on MRI and not on the time at which stroke symptoms began.

Given the bed's unavailability, the local stroke management system needs to be reorganized. A network of stroke units must be established that work together and complement each other, with the bed covering management organized centrally. Such a system aims to ensure that in the event of an acute stroke, there is always at least one free bed available. This can be achieved by regularly updating how many beds are available in which stroke unit. The central bed allocation department should be regularly informed about the status of available beds.

Regarding the imaging delay, acute stroke imaging needs to be prioritized and announced in advance so that the MRI is ready when the stroke patient arrives. There is also a need to install MRIs as they are more efficient than CTs in diagnosing acute stroke.

The diagnostic delay caused by treating physicians can be quickly remedied through training, further education, instructions, and practice.

With a high NIHSS score, which usually corresponds to high stroke volume, mechanical thrombectomy (TE) should be considered when interventional radiologists with equipment and expertise are available.

As for uncontrolled blood pressure, it should be possible to reduce blood pressure to normal levels using available means in any acute stroke patient. One prerequisite for TL is normal blood pressure.

With regard to anticoagulation, it should be emphasized that vitamin-K antagonists (e.g., warfarin, phenprocoumon) can be antagonized by vitamin-K or prothrombin-complex. Direct oral anticoagulants (DOACs) can be antagonized by prothrombin-complex for anti-factor Xa antagonists or by idarucizumab for factor-II antagonists.

Regarding advanced age, we disagree with the notion that advanced age is a contraindication for TL There is ample evidence that TL is safe even in patients with advanced age when the inclusion criteria are taken into account.[3] Thrombectomy is an alternative if a large artery is occluded.

Regarding the delay or unavailability of consent, it must be emphasized that the legal requirements vary from country to country. If consent from the treating physician is not possible, if the patient is unable to do so, or if caregivers or relatives are not available, legal policy should allow for a change in legal practice.

In summary, several improvements can be recommended for the management of acute stroke. If these suggestions are adopted, treatment of acute stroke can be accelerated, diagnosis

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and treatment improved, and a more favorable outcome for the patient achieved.

Contributor Roles

JF: Design, literature search, discussion, first draft, critical comments, final approval.

Ethical Approval

The study used only secondary data.

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