The angels (AcuteNetworks strivinG for ExceLlence in Stroke) initiative: solving a problem by giving physicians the tools they need to create a solution

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ABSTRACT

Stroke can be a devastating event, not only for the victims, but also for their families, friends, work colleagues, and carers. The burden of stroke in terms of absolute numbers and number of disability adjusted life years (DALYs) is increasing worldwide and is impacting health services on a global scale. Despite an earlier reluctance to prioritize stroke as a health issue, authorities are now starting to realize that provision of organized stroke care does make a difference to patient outcomes and long-term implications of stroke, including the economical consequences. International guidelines recommend that acute stroke patients should have access to organized services, including priority emergency services, a pre-notification system to the receiving unit, rapid assessment and imaging protocols, and expert stroke care. Where this is not available, telemedicine facilities should be in place. Sadly, these guidelines are not met in many regions of the world. In part, this is due to the lack of tools, administrative support, and even incentive to change and improve systems of stroke care. The angels initiative was launched in 2015 with the aim of providing physicians with the tools they need to set up and optimize a stroke network. Registered physicians and stroke centers have free access to educational materials, standing orders, and protocols for acute stroke care, which were developed together with the international expert steering committee. In addition, quality analysis tools to create an initial benchmark and measure on-going performance of the stroke centre are available via an online platform.

Key words: Angels initiative, organized stroke care, stroke networks, acute stroke, protocols

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INTRODUCTION

Stroke is a global health problem and has reached pandemic levels. Worldwide, an estimated 10.3 million strokes occurred in 2013.[1] Over the past 20 years, the burden of stroke has increased in terms of absolute numbers of people experiencing a stroke as well as the sequelae of a stroke, including the number of disability adjusted life years (DALYs) and death rate.[1] Although the most significant increases have been seen in low- and middle-income countries (LMIC), no country has actually seen a decrease in their stroke burden.[1]

Ischemic strokes are the main contributors to the stroke burden, being responsible for 68% of all strokes in 2013, over half (51%) of all stroke deaths, and 58% of the 113 million DALYs lost to stroke.[1]

The Problem (Lack of Organized Stroke Care, Networks, Awareness)

Despite its impact, until recently stroke was not a top priority on the agenda of healthcare authorities and this is unfortunately still the case in some regions of the world.[2] This is in part due to lack of data on the stroke situation at large within a country,[2] but also on the scarcity of resources—both physical and economical—that can be allocated to stroke care. Examination of the wider picture, however, estimates that the cost of stroke care is set to increase three-fold between 2012 and 2030, from $71.6 billion to $184.1 billion.[3,4] This alone would indicate that stringent measures need to be introduced on an international scale to increase prevention and effective management of acute stroke in order to reduce the long-term consequences.

Clinical Guidelines

International guidelines, including those of the European Stroke Organisation (ESO)[5] and American Heart Association/American Stroke Association (ASA/AHA),[6] recommend several key elements to improving stroke care:

1. Stroke education and awareness campaigns
2. Priority emergency medical services
3. Pre-hospital systems
4. Stroke unit & specialist care
5. Telemedicine and stroke networks
6. Rapid access to imaging

7. Timely administration of thrombolytic treatment in eligible patients
8. Prevention and management of complications
9. Multidisciplinary rehabilitation

Although guidelines may vary in the wording and details on a regional scale, there is little discussion on the accuracy of these main points. The problem lies more in their implementation.

Timely Thrombolysis

Ultimately, acute ischemic stroke care needs to be directed toward restoring adequate blood flow to the area of the brain affected by the stroke. Large international studies and registries have demonstrated that intravenous thrombolysis with rt-PA is highly beneficial in eligible patients and is more effective the earlier it is given up to 4.5 hours after onset of stroke symptoms.[7-10] Therefore, 4.5 hours is the guideline-recommended time window for the administration of intravenous rt-PA to eligible patients following an acute ischemic stroke.[5,6]

In practice, thrombolysis is gravely underused and a large part of this is due to pre-hospital delays caused by a lack of coordinated services to ensure the patient reaches the hospital in time.[11-13]

Stroke Education and Awareness Campaigns

The first delay in the onset to treatment time is often caused by reluctance to seek emergency medical attention and lack of recognition of the signs of stroke.[11] Public health campaigns to increase awareness of stroke, recognition of stroke signs, and instruction on how to react—by calling the emergency medical services (EMS)—have been shown to be effective while they are in place, but the long-term benefit and retention of the information is poor once they have been withdrawn.[14-16] Ideally campaigns should be on-going or at least repetitive,[16] and although international organizations are capable of this,[17] it can be challenging to sustain at a local level.

Pre-hospital Care

Time is of the essence in stroke management and it is critical that patients with a suspected stroke are dealt with as high priority cases. This means that once an emergency call has been initiated, the dispatch center needs to immediately activate the EMS. Most delays in stroke care occur within the pre-hospital phase. Therefore it is essential that pre-hospital systems operate efficiently and effectively. Accuracy of assessment and rapid recognition of a suspected stroke can help to reduce pre-hospital delay.[16,18] Educational programs, specifically targeting EMS personnel, have been shown to increase the accuracy of stroke recognition, and improve stroke management times.[11,19] In addition, provision of evidence-based protocols that help the EMS capture pertinent data about the patient and guide the emergency personnel through the initial assessment of the patient using standardized scales to identify stroke symptoms can be invaluable in preparing the patient for arrival in hospital.[6,11,20]

An extremely important role of the EMS is to pre-notify the receiving unit of the impending arrival of a stroke patient. Prior alert of the in-hospital stroke team can improve the in-hospital management and has been shown to have significant impact on reducing the time delays from onset to arrival (onset-to-door time), arrival to physician assessment, initiation of CT, and interpretation of CT.[6,21-24]

Stroke Unit Care

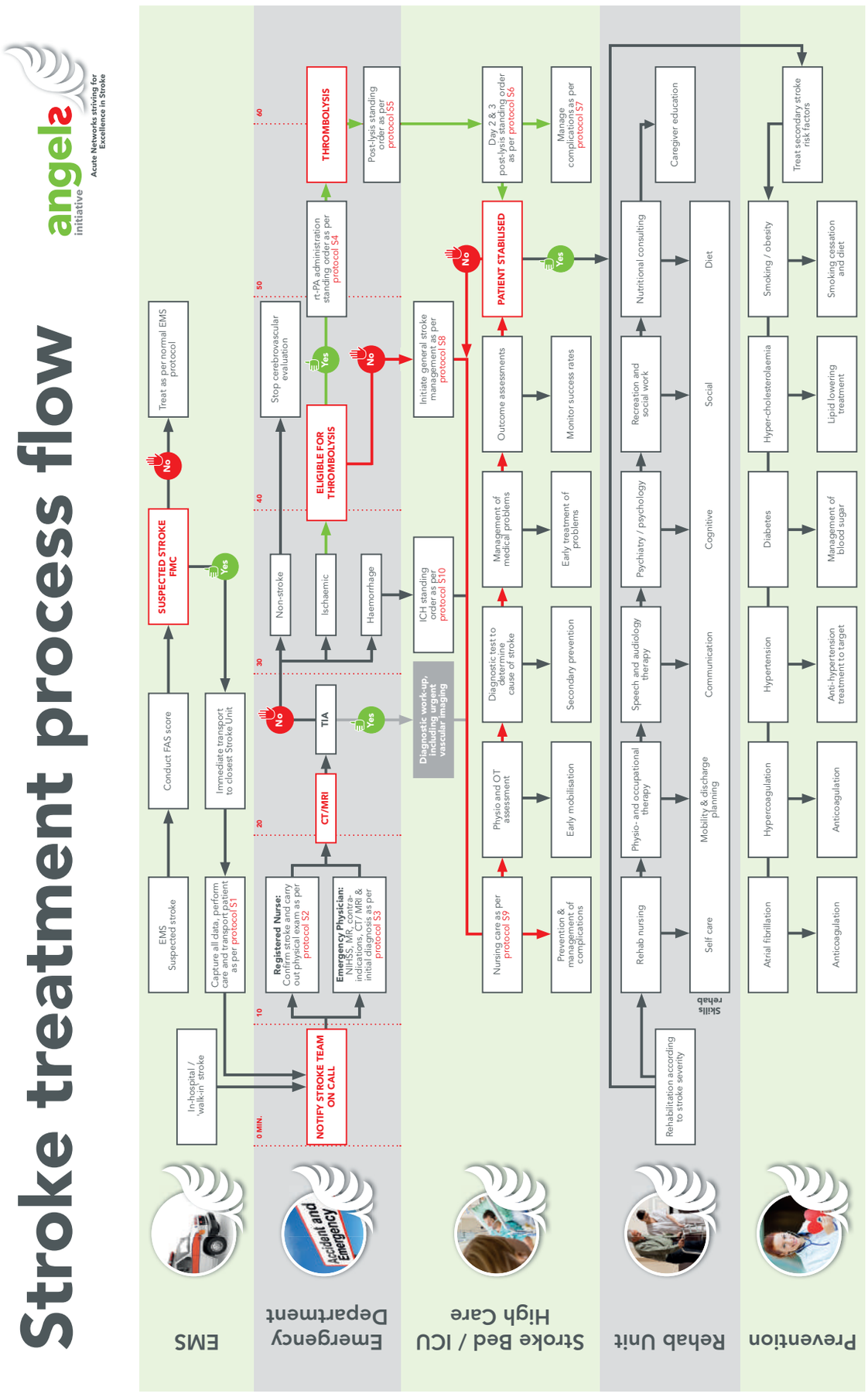
Guidelines recommend that stroke patients be admitted directly to a specialized stroke unit with a dedicated stroke team.[5,6] The improved efficiency of care that is provided by stroke units has been shown to benefit all patients, regardless of age, stroke severity, or stroke type, in terms of decreasing mortality and long-term dependence, while still remaining cost effective.[25-29] Establishment of a stroke unit within an existing hospital, together with the development of a stroke network and referral system within the surrounding catchment area, can result in increased patient numbers and increased access to intravenous thrombolysis.[30]

Although centralization of stroke care is occurring in many high-income countries,[31,32] quality of care throughout Europe remains very variable and there is a need for standardization of procedures, protocols, and quality assurance.[33] In low- and middle-income countries (LMIC), access to stroke care facilities remains generally poor.[34] Some countries, such as Brazil and Russia, have initiated programs in an attempt to improve the infrastructure of stroke care and it is hoped that other countries will follow suit.[35,36] However, the task can seem daunting without external assistance and limited funding.

The Angels Initiative

The angels (**A**cute **N**etworks strivin**G** for **E**xce**L**lence in **S**troke) initiative was established in 2015 by Boehringer Ingelheim with the aim of providing physicians with the necessary tools and support they need to set up and optimize an acute stroke centre. Based on the ESO[5] and AHA/ASA[6] guidelines, the angels initiative has been developed together with the angels steering committee of international stroke experts, and builds on their personal experience of organized stroke networks, participation in multi-national clinical studies and registries, as well as their global advisory roles.

Physicians and stroke centers are able to register with the angels initiative for free via the website, www.angels-initiative.com. The individual physician then has access to a comprehensive starter kit of training materials to educate the stroke team, standing orders and protocols to optimize the stroke treatment flow, as well as other resources, such as videos and posters to increase awareness and motivation to improve stroke management. The Stroke Treatment Process Flow chart (see figure) guides the stroke team through the patient management and indicates which protocols or standing orders need to be applied at specific stages.



In addition, hospitals that register with the angels initiative have access to benchmarking and quality analysis tools. In selected countries, project managers are on hand to provide guidance and assist individual hospitals in the implementation of the angels initiative and the set up and optimization of acute stroke networks.

Basically, the angels concept can be subdivided into three steps.

- **Step 1**: The first step allows participating hospitals to compare their initial situation with best practice standards and international guidelines. Hospitals complete a detailed questionnaire, which creates a benchmark to work on.
- **Step 2**: Based on the results of the initial questionnaire, a gap analysis is performed to identify areas for possible improvement. More often than not, this is the stage that the stroke team comes together or is formed to analyze the results within a workshop. Key action steps are agreed on together with performance indicators and realistic timelines for implementation. At this stage, it is essential that the stroke team feels involved, as the remainder of the process is dependent on their buy-in and cooperation.
- **Step 3**: In the third step, the team decides which of the angels initiative tools need to be implemented to address the action steps identified in Step 2. This is unique for each hospital and all the tools have the flexibility of being adaptable to suit the local situation.

Measuring Performance

The angels initiative places high importance on measurement of performance and quality control with all stroke centers to ensure high standards and timelines are met. For this reason, the existing QUICK (QUality Improvement of aCute ischaemic stroKe patient management) initiative has been incorporated into the angels initiative. Stroke centers are able to complete a user-friendly online spreadsheet to capture information that identifies areas of delay in stroke patient management. These include:

- Time that first symptoms were suspected
- Whether the emergency services were alerted, and time of the call
- Method and time of arrival of the patient at hospital
- Time of blood laboratory analysis and time when results were available
- Timing of initial imaging procedure
- Time of therapeutic decision
- Whether reperfusion therapy was initiated and time of initiation

From these data, diagnostic audits can be performed at specific time points and these allow key elements in the system to be identified and improved, for example supplying members of the stroke team with a stroke pager, preparing imaging facilities for suspected stroke patients prior to their arrival.

A second audit acts as a method of comparing whether the action plan made a difference and will allow on-going improvements in the system.

CONCLUSION

The international burden of stroke is increasing, especially in low- and middle-income countries. Stroke units save lives and reduce disability. International guidelines recommend that stroke patients are assessed rapidly by EMS and transported directly to a stroke unit where they can receive specialist stroke care. Many countries and regions of the world do not meet these recommendations and there is an urgent need to standardize stroke care on a global scale. By providing physicians and hospitals with the educational and clinical resources pack and support they need to set up and optimize acute stroke units, as well as essential quality control and performance measuring tools, the angels initiative is aiming to improve stroke treatment on an international scale.

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Conflict of Interest

Thorsten Steiner is a member of the angels advisory board and has received consultation fees from Boehinger Ingelheim.

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