

Stroke: Insights into Thromboembolism Treatment and Prevention through the Decades

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With the availability of back issues online for *Thrombosis & Haemostasis* ever since the original first published issue in 1957 (then under the name *Thrombosis et Diasthesis Haemorrhagica*), we felt that stroke could be an initial special focus, given the publication on this topic in Volume 1, Issue 1 of this journal.¹

Way back in 1957, the era that *'the treatment for all cerebral vascular diseases was futile'*¹ and *'the physician's choice lay between masterly inactivity and skilful neglect'*², was slowly giving its place to a period of progress in stroke prevention and treatment. At that time, physicians were beginning to feel optimistic that they had started climbing up the learning curve, although it was still clear that they *'did not consider present treatment entirely satisfactory'*.¹

Let's take a hypothetical patient, Michael, in the 1950s. If only Michael could share his optimism this evening. For the last 2 hours, he was lying on a bed in the emergency department of the hospital waiting for a physician to examine him and help him talk and move his right leg and hand again. It was easy for him to guess that he was having a "brain attack"—many of his friends had suffered something similar, and many of them did not make it through. Next day, although dizzy, Michael could listen to the doctor talking to his daughter:

– 'We took some fluid from his spinal cord for examination and we tend to conclude that this is probably a non-haemorrhagic infarction (1). We don't really know why it happened, for most of our patients we don't.¹ I won't fool you, *the management of this entity is discouragingly inadequate.*³ We tried all our weapons: *we blocked his stellate ganglion to increase the collateral vessels around the dead zone,*³ we administered *intravenous procaine*⁴ and *histamine*⁵, *carbon dioxide*², *nicotine and whiskey,*³ *ephedrine and ritalin*⁶, *cortisol,*⁶ we tried everything... I am sorry, no improvement'.

– 'Will you do an arteriogram to my father, doctor?', she asked.
 – 'Of course not, *there are no indications for this,*⁶ *it is only experimental*¹', the doctor responded decisively.
 – 'Will you treat him with anticoagulants, doctor?', she asked again looking desperately for a glimpse of hope.
 – 'No', he said avoiding looking her in the eyes. *'We are rather reluctant with this form of treatment. In our own hospital we have been impressed by the dangers of using anticoagulants in the severely hypertensive patient and by the incidence of haemorrhagic problems that occur when long-term anticoagulation is undertaken. It certainly should not be considered a benign procedure but rather one which presents definite risks.'*⁶

The doctor proved to be right: Michael did not make it through, and he never made it to see Helena, his fourth grandchild, to be born a few weeks later.

Time Passes, and the Approach to Stroke Care Changes with Time

Helena never met her grandfather, but her parents told her the story of his last weeks, on several occasions. On her 60th birthday, the last weeks of her grandfather suddenly came back to her in a flash when she fell down unable to move her left hand and leg. 'It's a stroke', she said, but her son could not understand a single word from what she was trying to say. He immediately called an ambulance, which arrived within just 10 minutes. 'This doesn't look like a usual ambulance', he mumbled. 'Yes', the physician of the ambulance responded, 'it has a computed tomography (CT) scanner and your mother will have a CT scan on her way to the hospital, and perhaps, she may even start receiving a drug to dissolve the

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clot which blocked her arteries, before she reaches the hospital'.^{7,8}

Indeed, Helena started receiving alteplase while being rushed to the hospital.^{7,8} When she reached the hospital, she was taken directly into the angio suite and a wire was used to retrieve the clot which was blocking her artery.^{9,10} Next day, she was walking and smiling again.

- 'So, what happened to me, doctor?', she asked.
- 'We found that you have an arrhythmia that you were not aware of, it's called atrial fibrillation.¹¹ This formed a thrombus in your heart, which then left your heart and blocked one of the large arteries in your head.¹² You were lucky...', she heard him saying. 'You will start a medication to prevent this clot formation again, and we know that it can help you.¹³⁻¹⁶ It's easy to take and you should not stop it.¹⁷ If you follow my instructions, there is a very good chance that this will not happen again'.¹⁸⁻²⁰

Next day, Helena was back home again enjoying her time with Anastasia, her granddaughter—how blessed she felt that she could teach her again how to play the piano.

Historical Perspectives

Looking back from 2017 to 1957 and from Helena to Michael through the prism of our current knowledge, one can only smile with enthusiasm and excitement of the huge progress which took place in thromboembolic stroke treatment and prevention. What was once a lost case, is now a treatable and preventable condition. Stroke research, directed toward all aspects of stroke medicine like primary and secondary prevention, acute treatment and rehabilitation, is continuously expanding the borders of our knowledge and our ability to help our patients. Many physicians from different specialty backgrounds are now actively engaged to stroke medicine helping more and more patients prevent their stroke or receive specialized stroke care and rehabilitation if it occurs. The focus on atrial fibrillation and stroke prevention has moved towards a simple integrated or holistic approach ('easy as ABC': 'A' Avoid stroke with Anticoagulation; 'B' Better symptom management; 'C' Cardiovascular and comorbidity risk management), which has been associated with much improved clinical outcomes.²¹⁻²³

It is likely that in 60 years from now, the stroke physicians of the future will be looking back at us smiling again with enthusiasm and excitement with the progress which will have occurred in the meantime. It is also likely that in 60 years from now, our current standards of stroke prevention and treatment will prove to be absolutely outdated, and stroke will have become a rather infrequent and easily treatable condition. We certainly hope so.

Conflict of Interest

Dr. Lip: Consultant for Bayer/Janssen, BMS/Pfizer, Medtronic, Boehringer Ingelheim, Novartis, Verseen and Daiichi-Sankyo. Speaker for Bayer, BMS/Pfizer, Medtronic, Boehringer Ingelheim and Daiichi-Sankyo. No fees was directly received personally. Dr. Ntaios: Speaker fees from

Sanofi, Boehringer-Ingelheim, Galenica, Elpen, BMS/Pfizer and Bayer; is an advisory board member for Boehringer Ingelheim. No fees was directly received personally.

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