

# A new era in stroke care

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## INTRODUCTION

The face of stroke has changed. As the Heart and Stroke Foundation of Canada has recently presented in its public awareness campaigns, stroke is occurring more often in the young and in women.<sup>1</sup> Stroke is devastating on patients, families, and the healthcare system. However, stroke care has also changed. In 2018, stroke is now preventable in some individuals, treatable, and amenable to rehabilitation. Included in this edition of the *CJEM* is a synopsis of the updated and comprehensive *Canadian Stroke Best Practice Recommendations*, 6th Edition (2018), directed to emergency physicians and nurses, emergency medical services (EMS) personnel, diagnostic imaging teams, and acute stroke teams.<sup>2</sup> These guidelines reflect a new era in stroke care.

In 2001, the first Canadian Association of Emergency Physicians (CAEP) stroke guideline was published.<sup>3</sup> The guidelines were developed to provide guidance to emergency physicians in a time when the literature was developing with respect to thrombolysis in acute stroke. At that time, the guidelines recommended the administration of thrombolysis for stroke only as part of clinical trials or in highly specialized centres. In 2015, these were revised to reflect new literature in thrombolysis, but also included recommendations on stroke systems, EMS, telestroke, and post-stroke (specifically, stroke unit) care.<sup>4</sup> Only 3 years later, the guideline summary enclosed herein reflects major advances in stroke treatment and prevention.

The *Canadian Stroke Best Practice Recommendations*, 6th Edition (2018), authored by Boulanger et al., was developed by the Heart and Stroke Foundation of Canada, with input from Canadian stroke experts and emergency physicians with expertise in stroke.

Endorsed by CAEP, it reflects the current state of knowledge in stroke care. Consistent between these guidelines and previous are recommendations regarding thrombolysis for acute stroke, under 3 hours of the time of onset. However, other recommendations have changed substantially, and other aspects of stroke care are now addressed in these updated guidelines, recognizing the current literature and best practice.

Firstly, the importance of public awareness cannot be understated. Public awareness campaigns, specifically the FAST campaign, have shown benefit.<sup>5</sup> High-risk patients should be counselled to be aware of stroke symptoms and signs and to call 9-1-1. Secondly, the development of stroke systems of care (site designation, bypass, and transfer) is paramount to improved stroke outcomes. EMS screening tools to assist in the identification of eligible thrombolysis or endovascular therapy (EVT) candidates are included in these recommendations and are a critical component of organized stroke systems of care. Thirdly, the administration of intravenous thrombolysis for acute ischemic stroke within 4.5 hours of stroke onset is endorsed as Level A evidence, reflecting a careful and thorough review of all published literature. Finally, the recognition of transient ischemic attack (TIA) as “unstable angina of the brain” is reflected in the guidelines, and the need to apply risk stratification to TIA patients is endorsed.

Of note, two major recommendations within these guidelines mark the beginning of a new era in stroke care and are of particular importance to emergency providers. The first is EVT. Multiple trials in the last few years have proven benefit for this procedure, not only in reducing disability, but also in reducing mortality (the first stroke trials to do so).<sup>6</sup> With respect to EVT, emergency physicians are critical in the

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leadership and oversight of EMS systems and transport, in the implementation of acute stroke protocols, and in rapid consultation and referral. The second recommendation, which is a paradigm shift, is the recognition of *tissue-based* not *time-based* eligibility for reperfusion. Non-contrast computed tomography (CT) of the head is suboptimal for determining eligibility for reperfusion – intravenous or endovascular. What is now known, through cerebrovascular imaging (e.g., CT angiogram, CT perfusion, multiphase CT angiogram, or magnetic resonance angiogram), is that time is not the only determinant of salvageable brain; core infarct size, collateral circulation, clot (location and size), and penumbra are additional factors to determine mode and response to therapy.<sup>7</sup> Advanced imaging assists in the phenotyping of stroke, to allow for targeted and directed therapies. The need to have cerebrovascular imaging as part of acute stroke imaging, as reflected in these guidelines, is a new and substantial change.

Despite this, there remain many questions that have not been answered. Evidence on transport and timing for EVT after intravenous thrombolysis is in development. Further, the agent of choice for thrombolysis (tenecteplase versus alteplase) is now in question after some preliminary evidence.<sup>8</sup> Management of hypertension in the acute stroke period also has weak recommendations, based on limited randomized clinical trial evidence. Finally, despite the pragmatic approach and clarity of risk stratification for TIA and minor stroke presented in these guidelines, this risk stratification approach has not yet been proven in clinical trials.

What is known clearly, though, is that acute stroke outcomes are dependent on the many links in the stroke chain of survival. Developing EVT programs without (in parallel) the considerations and engagement of emergency providers around transport, triage, and post-stroke (stroke unit) care is not in the best interests of patients, providers, clinicians, and the healthcare system. What is also clear is that emergency physicians play an important role in this new era for stroke care.

Without EMS directors and leaders, regional emergency leads, and emergency department staff and clinicians, a coordinated stroke system of care cannot be realized. The new stroke guidelines reflect that excellence in stroke care is dependent on excellence in timely emergency care.

**Keywords:** Stroke; ischemic attack, transient; practice guideline

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