

# Diagnostic Errors Cause More Death & Disability Than Surgical or Medication Errors— A Roadmap for Trial Lawyers

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**“My left hand feels numb and tingly. I also get dizzy. This lasts a short time. Do you think I’m having a stroke?”** Betty, age 72, a retired wife, mother and grandmother, asked her family doctor. Without rechecking Betty’s elevated blood pressure, listening to her carotid arteries, inquiring how often her hand “feels numb,” or asking her to describe the dizziness, her doctor announced, **“You’re not having a stroke. I think you have carpal tunnel.”** Betty’s doctor prescribed a wrist brace and pain medication, and referred her to an orthopedist.

Betty’s symptoms worsened and began to occur more frequently. She returned to her family doctor, not the hand specialist. The nurse checked Betty’s blood pressure one time. Her blood pressure was much higher than the prior visit. Besides her hand numbness and dizzy spells, Betty reported new symptoms. She now had blurred vision, anxiety, and depression. **“Do you think I’m having a stroke?”** Betty asked again. **“Don’t worry. Give the pain medicine time to work. Go Christmas shopping,”** her doctor said reassuringly.

The next day, Betty’s face and tongue suddenly went numb. Her speech slurred. She became weak on one side. She could not move her left hand. Betty was rushed to the emergency room. The same family doctor who told Betty to “give the medicine time to work” was on duty in the emergency department. He diagnosed Betty with a right cerebral ischemic stroke caused by a blocked carotid artery. Betty was left paralyzed on her left side. She died a year and a half later due to complications from the stroke.

Had Betty’s doctor performed a proper differential diagnosis, he would not have closed the diagnostic process with carpal tunnel syndrome. He would have sent Betty for a Carotid Doppler Study, a test that could have been performed that day. The blockage in Betty’s carotid artery would have been

discovered and medication treatment would have been started immediately. A safe surgical procedure would have been performed.

The lesson is clear—never rush to a conclusion. If Betty’s doctor had merely ruled out stroke as the cause of her symptoms, she would not have suffered a massive stroke, become paralyzed, and died. A physician must test when a serious, life-threatening condition may be involved. “Test—don’t guess” is a fundamental rule of medicine.

## **FAILURE TO DIAGNOSE *A Billion Dollar Problem***

Research articles concerning malpractice and patient safety usually focus on medication and surgical mistakes. However, important research reveals diagnostic errors far outnumber treatment or medication errors as the main cause of malpractice claims.<sup>1</sup> In the United States, over 12 million people receive a mistaken medical diagnosis every year. Almost every person in the U.S. is likely to be misdiagnosed once in their lifetime. It is estimated that 40,000 to 80,000 deaths each year are caused by errors in diagnosis.<sup>2</sup>

A Harris poll for the National Patient Safety Foundation revealed one in six patients have experienced a misdiagnosis.<sup>3</sup> Reviewing 25 years of U.S. malpractice payouts, researchers found that diagnostic errors amounted to \$38.8 billion in payouts to injured patients between 1986 and 2010.<sup>4,5</sup>

David E. Newman-Toker M.D. has written extensively about diagnostic errors. His 2013 study found that of 350,706 paid claims, diagnostic errors were the leading type and accounted for the highest proportion of payments. The study found diagnostic errors resulted in death or disability almost twice as often as other error categories. In his study he states, “This is more evidence that diagnostic errors could easily be the biggest patient safety and medical malpractice problem in the United States.”<sup>6</sup>

Diagnostic errors result from physicians’ biases and failed heuristics (mental shortcuts). The most common cognitive error is premature closure of the diagnostic process, in which the physician does not even consider the correct diagnosis as a possibility. A study of 583 diagnostic errors, found that “failure or delay in considering the diagnosis” was the most common mistake in the diagnostic process.<sup>7</sup>

Diagnostic errors are not front-page news. Surgery that removes the wrong foot or ovary make nightly news and receive front-page headlines. Surgical errors are observable immediately. Medication errors are usually discovered promptly. Errors in diagnosis are often downplayed or ignored by the health care community.<sup>8</sup> One of the most disastrous diagnostic errors a physician can commit is failing to timely diagnose and treat stroke.<sup>9</sup>

## **STROKE IS A MAJOR CAUSE OF DEATH & DISABILITY**

### ***Stroke Statistics are Staggering***

Each year, over 795,000 people suffer a stroke. About 610,000 of these are first attacks and 185,000 are recurrent.<sup>10</sup> Someone in the United States has a stroke every 40 seconds.<sup>11</sup> Strokes kill someone every 3 minutes 45 seconds—nearly 133,000 a year.<sup>12</sup> While most strokes occur in the community or during a presentation to the emergency room, 17% have their onset during hospitalization for other reasons.<sup>13</sup>

Aside from the massive toll on human life, stroke is the leading cause of long-term disability in the United States.<sup>14</sup> Strokes cost the nation \$34 billion annually related to health care services, medications, and lost productivity.<sup>15,16</sup> By 2030, the total annual cost of strokes is projected to reach \$240.67 billion.<sup>17</sup>

## **STROKES OCCUR VIA TWO MECHANISMS *Bleeds versus Blockages***

Strokes are divided into two categories. Ischemic strokes cause 87% of all strokes.<sup>18</sup> An ischemic stroke (both emboli and thrombi) occurs when a blood vessel carrying blood to the brain is blocked by a blood clot.<sup>19</sup> Hemorrhagic strokes cause the remaining 13% of strokes.<sup>20</sup> A hemorrhagic stroke occurs when a blood vessel ruptures, releasing blood into brain tissue.<sup>21</sup> Because most strokes are ischemic, that is the focus of this article.

Ischemic stroke severity ranges from transient (with no injury) to clinically mild to severe.<sup>22</sup> Despite the difference in severity, the underlying causes are very similar.<sup>23</sup> The majority (90%) of strokes occur when blood flow to the brain is stopped or reduced.<sup>24</sup> Most commonly caused when a clot reaches the narrowest arteries in the neck and head.<sup>25</sup>

## **STROKES ARE PREVENTABLE**

### ***Failure to Heed “Warning Signs” is Malpractice***

The National Stroke Association is a trusted source for reliable information on stroke and the misconceptions that exist.<sup>26</sup> It is a myth that strokes cannot be prevented. Up to 80% of strokes are preventable.<sup>27</sup> It is a myth that strokes only affect the elderly. Strokes can happen to anyone. Up to 25% of strokes occur in juveniles.<sup>28</sup> The belief that strokes are not hereditary is a myth. If a patient has a family history of stroke, their risk of having a stroke is increased substantially.<sup>29</sup> If stroke symptoms go away, the patient need not see a doctor is a dangerous myth.<sup>30</sup> Temporary stroke symptoms are bright red flags. Red flags must be taken seriously.

Identification of stroke symptoms is easy. Sudden onset of neurologic symptoms, peaking within a few minutes, is a stroke, until proven otherwise.<sup>31</sup> The symptoms of stroke include:

1. Sudden numbness, tingling, weakness or loss of movement in the face, arm, or leg—especially on only one side.
2. Sudden vision changes.
3. Sudden trouble speaking.
4. Sudden confusion or trouble understanding simple sentences.
5. Sudden dizziness or problems with walking or balance.<sup>32</sup>

Headache or head, facial, or neck pain may be a symptom, but stroke is typically painless.<sup>33</sup> Further, not all symptoms occur with every stroke.<sup>34</sup> Although face weakness, arm weakness, and speech difficulties are present with most strokes, symptoms and signs vary according to the region of the brain affected.<sup>35,36</sup>

Recognized and treated promptly, stroke injuries and deaths can be reduced and often avoided. When a stroke diagnosis is missed and treatment is delayed, the patient often suffers an array of serious injuries.<sup>37</sup> Patients often suffer subsequent strokes, permanent brain injury, paralysis, loss of motor skills, memory problems, difficulty speaking or understanding words, difficulty reading and writing, difficulty swallowing, seizures, pain, emotional or behavioral changes and death.<sup>38</sup> Thus, the physician who fails to recognize stroke signs can be responsible for a patient's death or a lifetime of disabilities.

### **TRANSIENT ISCHEMIC ATTACKS or "TIA" *The Ominous Warning***

TIA is an abbreviation for "trans ischemic attack." It is a "mini-stroke."<sup>39</sup> It is a temporary and mild stroke that *usually causes no permanent damage*.<sup>40</sup> It has the same symptoms as a full-blown stroke, but usually resolve rapidly—within minutes.<sup>41</sup> However, a TIA is not a benign event. It is often a precursor to a stroke.<sup>42</sup> The cause of the TIA must be promptly explored and then treated.

A TIA is a strong predictor of a future stroke. About a third of patients with a TIA will have a severe stroke within a year. Half of the patients who suffer a stroke after a TIA, do so within 48 hours.<sup>43</sup> Prompt treatment of a TIA has been shown to significantly reduce recurrent strokes.<sup>44</sup> Because TIAs rarely occur during the doctor visit, health care providers must ask questions during the patient history phase and appreciate the importance of symptoms consistent with stroke.

All primary care physicians must know and recognize the physical signs and symptoms of TIA and stroke to safely

practice medicine. Knowing the physical signs and symptoms of stroke and the importance of a TIA is only half of the physicians' responsibility. Physicians must also consider and appreciate both modifiable and non-modifiable patient risk factors for stroke. The more risk factors that are present, the higher the patient's risk of having a stroke.

### **RISK FACTORS FOR STROKE *Two types—Modifiable and Non-Modifiable***

Anyone can have a stroke at any age, even children.<sup>45</sup> However, certain individuals are at increased risk of having a stroke based on two factors—modifiable and non-modifiable.<sup>46</sup> Modifiable risk factors that increase stroke risk involve patient lifestyle and medical conditions.<sup>47</sup> Non-modifiable risk factors that increase stroke risk are family history, older age, female sex, race or ethnicity, and low birth weight.<sup>48</sup>

#### ***Some Risk Factors Cannot be Changed***

Family history of stroke increases a patient's risk by nearly 30%.<sup>49</sup> The patient's sex is also an important factor. Studies have consistently shown that although men have a higher incidence of TIA, women have a higher lifetime risk of a full-blown stroke.<sup>50</sup> Also, ethnicity is risk factor, with African Americans having a 38% higher incidence rate than Caucasians.<sup>51</sup>

Age is a major non-modifiable risk factor. The fact is, the risk of having a stroke more than doubles each decade after the age of 55.<sup>52</sup> Studies have also shown, nearly three-quarters of all strokes occur in individuals over the age of 65.<sup>53</sup>

Physicians undeniably know the age, race, and sex of their patients, but as discussed, it is imperative they inquire about family history of strokes—especially if the patient is elderly, female, and a member of an ethnic group known to be at increased risk. Each of these non-modifiable risk factors are key to patient assessment, but do not end the physician's job. The physician still needs to explore and address their patients' modifiable risk factors.

#### ***Medical Conditions and Lifestyle Can Increase Risk for Stroke***

Every patient has a medical history. Some present with histories and lifestyles that increase their chances of suffering a stroke.<sup>54</sup> These modifiable risk factors must be recognized and addressed by the physician.

Hypertension is the most common modifiable risk factor seen by family physicians and primary care providers. If untreated, it can lead to stroke.<sup>55</sup> Stroke risk varies directly with blood pressure.<sup>56</sup> The association is very strong. This is one reason lifestyle changes and medications that reduce blood pressure are so important. Depending on how high the

blood pressure is, reducing it may be the single best way to reduce a patient's risk of stroke.<sup>57</sup>

High cholesterol is another important modifiable risk factor.<sup>58,59</sup> Medications used to lower cholesterol level, the class of drugs known as statins, have been shown to lower the risk of having a stroke and may reduce the severity of a stroke. By reducing cholesterol, statins and other cholesterol-lowering drugs help prevent plaque formation and stroke and heart disease.<sup>60</sup> One meta-analysis (a study that reanalyzes the results of several other studies) found that statin usage reduces stroke risk by 21%, and that every 10 percent reduction in LDL levels resulted in a 15.6% reduction in stroke risk.<sup>61</sup>

Diabetes increases a patient's risk for having a stroke.<sup>62</sup> Diabetes causes sugars to build up in the blood.<sup>63</sup> High blood sugar can prevent oxygen and nutrients from getting to the brain.<sup>64</sup> High blood pressure is also common in people with diabetes. A person with diabetes and high blood pressure is at an increased risk of suffering a TIA or stroke.<sup>65</sup>

Atrial fibrillation (AFib) affects over 2 million people in the United States. About 15% of embolic strokes occur in people with AFib.<sup>66</sup> It occurs when one, or both, of the upper chambers of the heart—called the atria—don't beat correctly.<sup>67</sup> This can cause blood to pool in the left atrium, where a blood clot can form. If that clot breaks loose, it can travel to the brain, where it can cause an ischemic stroke.<sup>68</sup> It is estimated that AFib is the most common irregular heartbeat in people over the age of 65.<sup>69</sup> AFib can be treated with several medications.

Carotid artery disease occurs when fatty deposits called plaque build up inside the carotid arteries which can clog the blood vessels that deliver blood to your brain and head.<sup>70</sup> This disease can and should be treated. Blockages in the carotid arteries increase the risk of stroke.<sup>71</sup> To determine if a blockage is present, the physician must look for it. Blocked carotid arteries can be detected by a stethoscope or a carotid sonogram.<sup>72</sup> If symptoms are present caused by the narrowing of the carotid artery, medical procedures can fix or relieve the symptoms.<sup>73</sup>

Additional modifiable risk stroke factors require education and treatment, including physical inactivity, smoking, and alcohol.<sup>74</sup> A sedentary lifestyle increases the risk of developing obesity, high blood pressure, high cholesterol, and diabetes.<sup>75</sup> Smoking or use of tobacco, in any form, increases the risk for stroke.<sup>76</sup> Even secondhand smoke puts a person at a higher risk.<sup>77</sup> Too much alcohol can raise blood pressure and increase the fat in the blood which can harden the arteries.<sup>78</sup> Health care providers must assess all these factors when obtaining the patient history. If risk factors exist, they should be treated. At a minimum, the patient should receive education and information on how these factors increase their risk for having a stroke.

Aspirin is often recommended by family physicians to prevent and reduce the risk of heart attacks and strokes.<sup>79</sup> Physicians must evaluate their patient's stroke risk and determine if they should take aspirin.<sup>80</sup> The U.S. Preventive Services Task Force recommends low dose aspirin therapy if the patient is age 50 to 59 and not at increased bleeding risk.<sup>81</sup> Physicians should consider daily aspirin therapy in all patients age 60 to 69 who are not at increased bleeding risk.<sup>82</sup>

Patients should avoid taking aspirin if they have a stomach ulcer, are allergic to aspirin, have uncontrolled high blood pressure, or have asthma that gets worse when they take aspirin.<sup>83</sup> For patients who cannot take aspirin, clopidogrel is an alternative medication for preventing stroke.<sup>84</sup>

A new blood test is available to evaluate stroke risk. The PLAC test measures an enzyme known as Lp-PLA2 in the blood.<sup>85</sup> It was originally approved by the FDA in 2003 to help predict people's risk of heart disease. The FDA approved the test for predicting stroke risk. The test was approved after a large study showed that people with higher than normal levels of Lp-PLA2 in the blood are twice as likely to suffer an ischemic stroke associated with hardening of the arteries.<sup>86</sup>

Modifiable risk factors for stroke require careful attention by treating physicians to protect the health, safety, and welfare of their patients. To assist physicians, there are simple, quick online calculators that can be used to determine patients' risk of having a stroke. These "stroke calculators" are available for free on the internet.<sup>87</sup>

## **PRACTICE TIPS**

### **PHYSICIANS HAVE A DUTY TO PROTECT THE HEALTH, WELFARE, AND SAFETY OF PATIENTS *A Rules of the Road™ Approach to Stroke Cases***

Using a "safety rules" approach to a failure to diagnose a stroke case is simple and effective. We suggest that a "safety rules" approach should be considered in all medical malpractice cases. Recently, the Kansas Supreme Court approved a medical expert's opinion about patient safety and how it relates to compliance with standard of care in a stroke case.<sup>88</sup>

The Eighteenth Judicial District Court case of *Castleberry vs. DeBrot* resulted in a 2013 jury verdict for the estate of a woman who died because of stroke-caused disabilities.<sup>89</sup> Her doctor failed to recheck her elevated blood pressure, to treat her high blood pressure, and to check her carotid arteries twice. Faced with obvious TIA symptoms, her doctor assured her she was not having a stroke during two separate office visits.

The decedent's doctor prematurely closed the diagnostic process by deciding she had carpal tunnel syndrome—a benign condition. Unfortunately, he ignored or discounted her TIA symptoms. She had a massive stroke shortly after the last visit. The stroke contributed to her death about one year later.

The jury verdict in *Castleberry* was appealed to the Kansas Court of Appeals. There, the defendant doctor alleged a multitude of errors claiming he had been deprived of a fair trial. The defendant argued heavily that the subject of patient safety was improperly introduced into evidence. In April 2016, The Court of Appeals, in a unanimous decision, ruled that safety was admissible and the trial was fair. The panel concluded “the district court did not err by permitting these questions because they went to the standard of care, which is defined by experts, while the duty of care is defined by law.”<sup>90</sup>

Defendant petitioned the Kansas Supreme Court for review in May 2016. Defendant again alleged the trial was unfair because of the expert's opinion evidence that doctors must protect and consider the safety of their patients. On August 24, 2018, the Supreme Court released its opinion.

The Kansas Supreme Court found that the Appellate panel's analytical path was sound when they reasoned that **“since expert testimony was required to prove the standard of care, testimony that this standard involved ‘err[ing] on the side of safety’ did not ‘create a new legal standard but instead defined the applicable standard of care, as an expert witness is allowed—and required—to do.”** The Court stated, **“When a district court permits a witness to testify as an expert, ‘the court cannot regulate the factors or mental process used by the expert in reaching his opinion or conclusion on the case. The factors and mental processes used by the expert ‘can only be challenged by cross-examination testing the witness’ credibility.’”** *Pope v. Ransdell*, 251 30 Kan. 112, 123, 833 P.2d 965 (1992) (quoting *City of Bonner Springs v. Coleman*, 206 Kan. 689, 695, 481 P.2d 950 [1971]).<sup>91</sup>

We follow Rick Friedman and Patrick Malone's sage advice from their landmark book *Rules of the Road*<sup>TM</sup>.<sup>92</sup> This approach entails development of a should-or-must statement that guides the physician's conduct. The rule must be clear, inarguable, important to the case, and violated by the doctor.<sup>93</sup> Valid and reliable standard of care rules come from many sources. You may find rules on physician web sites, professional associations for physicians' website, physician continuing medical education materials and seminars, jury instructions, professional literature, product instruction manuals, statutes, regulation and case law. A defendant physician's hospital or clinic policies are another powerful source for rules and you can always use common sense.

To successfully prove malpractice due to failure to diagnose stroke, the lawyer representing the patient must understand and anticipate the doctor's favorite excuse. The defendant

doctor will usually argue their behavior was “reasonable” under the circumstances. Defense counsel often argue it is unfair to judge a healthcare provider's conduct on facts that could not be known until the stroke occurred. The response to this common defense theme can be found in the medical records and the statements of the victim and witnesses.

In a failure to diagnose stroke case, the patient's history is often the key. It may have been the most important clues to a prompt and accurate diagnosis. Nothing can replace what the patient communicates to the physician about when their symptoms started, what it feels like, and how it differs from before.<sup>94</sup> It is easy to miss important clues if the doctor does not listen carefully. So, the simple inarguable rule is “[A] doctor must listen carefully to the patient's history.”

Often the doctor will defend by claiming the patient “just didn't tell me enough.” (As was the case with Betty.) The doctor may say, “if the patient had said (fill in the blank) that would have changed my whole course of treatment.” The principles applicable here are straightforward. First, the patient does not know what is medically important. It is not the patient's fault the doctor missed something, unless the doctor asked. Second, it is the doctor's job to ask good, probing questions and to listen carefully. The inarguable rule is clear, “The doctor must ask the appropriate questions and listen carefully to the patient's answers.”<sup>95</sup>

The patient medical chart may be silent on symptoms and signs of an increased risk of stroke. However, the patient and their family and friends will probably know what the patient told the physician. Betty asked, “My left hand feels numb and tingly. I also get dizzy. This lasts a short time. Do you think I'm having a stroke?” Common sense suggests these could be stroke symptoms. Conduct that ignores stroke symptoms can never be reasonable. When a doctor merely suspects stroke, it is never reasonable to ignore those suspicions and do nothing.

To appropriately evaluate a patient, the doctor must use a diagnostic process (often referred to as a “differential diagnosis”). The differential diagnosis process requires a doctor to list, in descending order of probability, his or her “differing” diagnoses of possible causes for the patient's presenting symptoms. Standard of care requires the doctor to list (consider) the worst scenario first. It is never reasonable to focus on benign problems over life-threatening diseases. This is often shortened to “WORST FIRST” and this procedure can never be ignored or skipped.

The second rule doctors must adhere to comes from the founding father of western medicine—Hippocrates. It is the guiding principal underpinning all standards of care. It is universally respected. The rule requires the doctor to think, first do no harm. This rule coupled with the differential diagnosis require a doctor to test not guess. The rules require a doctor to err on the side of the patient's health, welfare, and safety.

This Rules of the Road approach simplifies the issues for jurors. It quails defense attempts to confuse jurors and complicate the issues. In short, a doctor must listen carefully to the patient's history. The doctor must also ask relevant questions and listen carefully to the patient's answers. The physician, not the patient, knows what is medically significant.

## STANDARDS FOR DIAGNOSIS AND TREATMENT OF SUSPECTED STROKE

The cornerstone of the current American Stroke Association public information campaign is "Time Lost Is Brain Lost."<sup>96</sup> Patients with suspected stroke should be triaged with the same priority as those suffering from heart attack or other serious trauma, regardless of the severity of their neurological deficits.<sup>97</sup> Given the narrow therapeutic window for treatment of acute ischemic stroke, timely evaluation, diagnosis, and treatment is paramount.<sup>98</sup> The single most important piece of historical data for a physician to obtain is the time of symptom onset.<sup>99,100</sup> When a patient's history includes periods where neurological symptoms started then resolved, their therapeutic clock resets.<sup>101</sup>

Learning the time of symptom onset is imperative, because of the limited window of time after a stroke to restore blood flow to the brain before the damage is irreversible.<sup>102</sup> This therapeutic window opens when the patient was last known to be symptom-free and closes three to four and a half hours later.<sup>103</sup> Each hour in which treatment fails to occur, the brain loses as many neurons as it does in almost 3.6 years of normal aging.<sup>104</sup>

Accurate diagnosis is dependent on the healthcare provider performing a thorough medical history, a careful clinical assessment of the patient's risk factors, and a proper physical examination. As part of a proper differential diagnosis in a patient presenting with stroke-like symptoms, the physician must ensure they learn the universe of symptoms the patient has had or is experiencing.

The physician should ask how the patient's symptoms appeared, i.e., was it sudden, gradual, or intermittent. Patients may focus on minor non-life-threatening symptoms that are more bothersome to them and not mention others that portend dire consequences. The patient does not know what is and is not important. The duty of the physician is to find out if life-threatening symptoms have occurred—especially when stroke should be on the radar.

It is the physician's responsibility to inquire whether the patient has experienced numbness; tingling; weakness or loss of movement in the face, arm, or leg; sudden vision changes; sudden trouble speaking; sudden confusion or trouble understanding simple sentences; sudden dizziness;

or problems with walking or balance.<sup>105</sup> If the question was important enough to ask, then the healthcare provider should have documented the responses and findings in the patient's medical chart.

The initial physical examination of stroke patients requires assessment of the level of consciousness, patency of the airway, respiratory status, blood pressure, and heart rate.<sup>106</sup> Auscultation of the patient's neck may reveal carotid bruits; palpation, auscultation, and observation may reveal signs of congestive heart failure.<sup>107</sup> Auscultation of the chest may also reveal cardiac murmurs, arrhythmias, and rales.<sup>108</sup>

The initial neurological examination should be brief but thorough. If the patient history and brief examination are suggestive of stroke, stroke code activation should occur.<sup>109</sup> Stroke scales, such as the National Institute of Health Stroke Scale/Score (NIHSS), provide important information about the severity of stroke and prognostic information and influence decisions about acute treatment.<sup>110</sup> The overall goal is not only to identify patients with possible stroke, but to also exclude stroke mimics, identify other conditions that require immediate intervention, and determine potential causes of the stroke for early secondary prevention.<sup>111,112</sup>

Depending on the facility where the patient evaluation is taking place, completing the diagnostic workup may require the physician to coordinate immediate transfer of the patient to an emergency department or hospital. In addition, the doctor should promptly engage the services of a cardiologist and a neurologist to evaluate the patient.<sup>113</sup>

A comprehensive examination of stroke intervention and treatment is beyond the focus of this article. However, it is widely accepted that in many patients, the diagnosis of ischemic stroke can be made accurately based on the clinical presentation and either a negative CT or one showing early ischemic changes.<sup>114,115</sup>

For patients with mild stroke, presenting in the 3-to-4.5-hour window, treatment with IV alteplase may be reasonable.<sup>116,117</sup> Baseline ECG and a few hematologic, coagulation, and biochemistry tests are recommended during the initial emergency room evaluation, but only the assessment of blood glucose must precede the initiation of IV alteplase.<sup>118</sup> Other laboratory tests to be considered in all patients include electrolytes with renal function studies, complete blood count with platelet count, cardiac markers, prothrombin time (PT), international normalized ratio (INR), and activated partial thromboplastin time.<sup>119</sup>

When the stroke victim or the heirs call for advice, remember Dragnet's Joe Friday—"Just the facts!" In a potential stroke case, "the facts" are determinative. Always have the client obtain copies of all medical records. Interview the family, heirs, and victims independently and expeditiously. Remember to interview all friendly witnesses with any

knowledge of symptoms and signs—memories fade with time.

Expect there will be differences in recollections—that is normal and natural. What is not believable, is a single memory for all facts. Compare the timeline in the medical records with the timeline received from the client and/or heirs on symptoms and risk factors.

## FINAL THOUGHTS

Diagnostic errors, such as failure to diagnose stroke, are the main cause of malpractice claims, with over 12 million patients misdiagnosed every year. A physician's bias or premature closure of the diagnostic process is an obvious danger to stroke patients. When signs and symptoms of stroke are recognized and treated promptly, injuries and deaths can be reduced and often avoided.

Consider a Rules of the Road™ approach in failure to diagnose stroke cases. Reliable and authoritative literature is replete with simple and clear recommendations for prompt

recognition and diagnosis of stroke. Develop simple rules that are clear, undeniable, important to the care, and violated by the doctor.

Did the doctor listen carefully to the patient and family? Did the doctor perform a thorough medical history? Was a prompt assessment of symptom onset obtained? Was a careful clinical assessment of risk factors undertaken? Was a proper physical exam performed with a tool such as the NIHSS scale? Finally, was prompt treatment initiated? If not, you may have a case.

Always have the client personally obtain a copy of the medical records—that set may be critical down the road. Compare your timeline of events from the medical chart against the patient and family memories of the presenting signs and symptoms. Look to see, if and how, the modifiable and non-modifiable stroke risk factors were considered. Remember, the health and safety of the patient is relevant and admissible and probably the most important factor for your experts to consider—Time Lost is Brain Lost.

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