Improving Early Referral and Emergency Care in Acute Stroke

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Introduction

Tissue plasminogen activator (TPA) and other new drugs that may improve outcome if acute stroke is treated early, but optimal use of these agents will require earlier stroke detection by the public, faster transportation of the stroke patient to the hospital, faster evaluation by emergency room staff, and prompt administration of therapeutic agents. Improving stroke referral and treatment systems is key to achieving maximum benefits from these new agents.

Organizing a Better Patient Referral System

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Effective therapy requires early arrival of the patient at the hospital. This, in turn, requires early recognition by patient and family that a stroke may be happening. No matter how good treatment is, it will be useless if given too late. However, a community survey in the United States revealed that only 27% of the public could name even one warning sign of stroke [1]. When asked, respondents were likely to mention dizziness and headaches as warning signs.

Once stroke is suspected, the next requirement is for immediate contacting of emergency medical service and prompt transport to the hospital. This requires that emergency medical services approach the stroke patient like a trauma patient, with the assumption that “every second counts” and the designation of stroke as a Level One emergency like heart attack or severe trauma (Fig. 1).

Optimal care requires emergency department evaluation and treatment by a stroke team incorporating the emergency department, radiology, pharmacy, and the clinical laboratory. The key role on this team is a physician experienced at treating stroke.

The main obstacles to be overcome in emergency care of stroke are thus patient recognition of stroke, patient access to the hospital, patient evaluation in the hospital, and obtaining treatment by an experienced physician. The referral network for handling cases of suspected stroke can be a major resource for overcoming these obstacles.

One such network has been set up in Cincinnati, Ohio. This network includes 19 hospitals in an area of 1.3 million people. It is tied together by an excellent emergency transportation network. Ambulance personnel and paramedics are
considered to be part of stroke team and are given continuing medical education about stroke. The network of contacts and relationships also includes hospitals, physicians, nursing homes, emergency departments, and clinics.

Time to emergency department arrival is largely determined by where the patient calls for help. A pilot study in Cincinnati, Charlottesville, Virginia, and Cornell University Hospital in New York City found that those who called the “911” emergency number available in most U.S. cities got to the hospital nearly twice as fast as those calling their physician or the hospital itself (Fig. 2). Mean minutes between initial medical contact and emergency department arrival were 155 for those calling emergency services, 379 for those calling a private physician, and 333 for those calling the hospital [2].

A subsequent study in Cincinnati found that once the call came to the emergency medical service number, the time spent was 3 minutes from dispatch to arrival at the patient, 22 minutes to evaluate at the scene, and 17 minutes to travel to

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**Fig. 1. Time is Brain**

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**Fig. 2. Initial Medical Contact Versus Time of ED Arrival**