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Patient delay in acute stroke response:

Delay is the deadliest form of denial.(1)

Stroke has become the second most common cause of death worldwide in adults over the age of 65.(2) An estimated 1.9 million neurons die every minute after ischemic stroke.(3) Current acute stroke therapy can only aid patients within the first few hours of stroke onset but only 3-8.5% of all stroke patients receive thrombolytic therapy.(4,5) Delaying the presentation to the emergency department (ED) is a major limiting factor.(6) The report by Palomeras et al in this *Journal* adds to our understanding of what leads to this delay.^(cit)

Others had reported that patient delay is responsible for 30-70% of stroke patients not arriving soon enough in the ED to receive acute thrombolytic therapy.(5-8) Shortening this delay could improve the number of patients receiving t-PA.(9)

Agyeman et al. had previously shown that patient with higher NIHSS and stroke in the carotid territory present sooner to the ED than patients with small vessel ischemic disease.(10) The report in this *Journal* supports these findings and finds patients with language deficit and cardio-embolic stroke are most likely to report sooner to the ED.

Contact with a local physician; calls to a primary care provider or health maintenance organization (HMO) are associated with longer times to arrival. Palomeras et al. confirmed this by showing shorter delays on Sundays when the primary care providers were not available. Educating the public, healthline operators and primary care systems may reduce this delay. In a recent report, Jarrell et al found that healthline operators in the US when presented with a caller with stroke symptoms recommended calling primary care instead of EMS.(11)

Calling Emergency Medical Services (EMS) is associated with shorter time to ED arrival and increased t-PA use.(12) In addition, stroke patients who arrive in the ED via EMS receive physician attendance sooner.(6,13)

The recognition of stroke symptoms and the perception of an emergency situation are strong predictors for a shorter delay to arrival in the ED. Public education and mass media campaigns may be one way to increase stroke awareness and increase the number of patients recognizing stroke and the emergency situation.(14) Mass media campaigns, however, are costly. Morgenstern et al are testing a creative way of using limited resources in educating school children in stroke recognition.(15) By snow-balling their knowledge into the families and communities such a focused effort may shorten time to ED presentation significantly.

The American Heart Association has formed a task force on reducing delay in seeking treatment for heart attack and stroke and improving symptom recognition.(16) In 1995, 89% of adult respondents to a survey in the US reported the warning signs of heart attack correctly(17); only 57% were able to identify at least 1 out of 5 established stroke warning signs.(18) With public education this number has increased to 70%.(19) This encouraging news is contrasted by reports from Italy and Turkey with considerably fewer respondents with knowledge about stroke symptoms.(20,21)

Most of the reports on patient delay focus on tertiary care system in Western Europe and the United States of America. Little is known about acute stroke care in other regions. Living in urban centers correlates well with shorter times to ED arrival.(22) Recent advances in

Telemedicine may aid in reaching more rural medical systems and make the shortened patients delay even the more important in these areas.(23)

Lack of proper timely treatment for stroke is greater in women and minorities.(24-26) In the USA, special focus has been given to the racial disparity in stroke treatment and the fact that minorities have a longer delay in the time for symptom onset to ED arrival.(27) Focusing attention on racial disparity, gender bias and better support in rural systems, in conjunction with improved public education may vastly increase the number of stroke victims receiving proper medical care.

Even patients who arrive within due time in the ED, however, often do not receive proper medical therapy. In two statewide surveys from California and Michigan only 18% and 13% of patients who are eligible to receive t-PA were treated.(28,29) This failure may be due to organizational deficits and is not addressed by Palomeras et al.(30,31)

A combined effort between health care and public education systems is needed, so more stroke patients care receive proper acute therapy. Both, the public's perception of stroke as an emergency; and the willingness of healthcare providers and systems to increase proper stroke care utilization need our full attention.

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