FERNE
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Neurological Emergencies: approaches in Europe and Turkey

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Introduction

The approach to neurologic emergencies varies throughout Europe, depending on the treament setting, the training of the practitioner, the resources available to the patient and practitioner, and active involvement in research projects. The findings in this brief characterization of the approach used in emergency departments throughout Europe and Turkey is of course limited in scope. The following comments are based upon personal experience in Turkey, personal interviews with health personnel (E, F, G, TR), and answers to a short questionnaire that was sent to physicians around Europe (B, D, GB, N, TR). The general health care environment and approaches to various neurological emergencies in different settings in Turkey are described. Then, common treatments used by European physicians for the same clinical problems are listed, as well as some of the current experimental studies being conducted in Europe for patients with ischemic stroke.

Key Questions

What are some characteristics of the population and the health care environment in Turkey that influence the care given for neurological emergencies?

What are some of the experimental therapies for ischemic stroke currently being studied in Europe?

Where can more information be obtained about neurological emergencies in Europe?

Health Care in Turkey

Because health is not routinely taught in schools and few information resources are available to the public, atients in Turkey are often ill informed about their health. Culturally, patients tend to be passive, not questioning the decisions or decision-making of the doctors.

To serve a population of about 70 million, Turkey has 5900 public health clinics, 1300 hospitals (950 government, 40 university, and the rest private). Access of the clinicians to journals and the internet at the government hospitals is usually not available. Emergency departments of these hospitals are staffed by medical school graduates, with no board certification or further training beyond medical school. The first EM residency graduate finished his training in 1998, and to date only 90 have finished their training at EM residencies around the country. In some very large government hospitals, neurologists are stationed in the ED, along with an assortment of general practitioners, orthopedists, internists,

general surgeons, anesthesiologists, and neurosurgeons. Except in EM residency program EDs, documentation of the patient encounter is very scant. Intensive care units are only found in large university medical centers, other facilities typically have only a 'monitored bed' unit.

Most of the population is bound by insurance status (or lack of insurance) to receive care in a government hospital, which are typically underequipped and undersupplied. Because of limited supplies and equipment and long delays in clinic care in the government hospital systems, patients who can afford paying out of pocket are increasingly choosing private medical care. The number of private hospitals has doubled in the past 10 years, and new emergency medicine graduates are in great demand by the private sector. Additional facts concerning the private medical sector in Turkey: more MR machines (80!) are located in Istanbul than in the whole UK; and competition has driven down costs for diagnostic tests, $40-50 for a head CT, and $80-100 for an MR.

A large pre-hospital ambulance system was set up in 1993, and further legislation in 2002 designated mandatory equipment and staffing for both BLS and ALS ambulances. Patients transported are among the following types: 25% trauma, 20% cardiac, and 10% neurologic. The ambulance system is still not widely used though; a study in 2002 found that 60% of stroke patients presenting to one university ED arrived by taxi or private car.[i]

As has been reported in other countries, patients with ischemic stroke often present for health care many hours after the onset of symptoms. In one study from Turkey, 50% of stroke patients presented within two hours to a health care provider (to a clinic or hospital without an ICU), but only 30% came to a tertiary-care hospital within 2 hours. The most common reasons for coming late were: 'Thought it would go away by itself', transportation problems, distance from care, and 'Didn't realize it was an illness'.[1] In summary, the public is often ill-informed about their health status, and does not fully utilize access to emergency care for neurologic problems. Health personnel in many settings have limited access to up-to-date references for neurologic emergencies.

Ischemic Stroke

In univeristy hospital settings across Europe, persons presenting with symptoms and signs of acute ischemic stroke undergo a careful history and physical exam, and then are subject to extenisve laboratory testing and a non-contrast head CT scan. In Turkey, very few centers use IV tPA routinely. One center has used intra-arterial tPA a few times. Usual treatment then consists of aspirin or heparin, if the symptoms are mild. Labetalol is not available in Turkey, so oral ACE inhibitors or IV furosemide are used for high blood pressure, and if intracranial pressure is thought to be increasing, mannitol is given and fluids are restricted. One center had performed craniectomy in several patients for severe cerebral edema after stroke. In large government hospitals in Turkey, the general approach is the same, but tPA is never used, heparing is given with or without clopidogrel for small infarcts, and piracetam is sometimes added as adjunctive therapy. Steroids are routinely given as 'anti-edema' therapy. In rural government hospitals, stroke patients may be transferred immediately without any initial treatment, or they might be given dexamethasone and mannitol before transfer. The use of sublingual nifedipine has declined significantly in the last ten years in Turkey, but is still used in some outlying centers.

Patient with symptoms of acute stroke are sometimes delayed in their presentation to the health system due to application of folk remedies. In Turkey, common remedies include applying cold water to the patient's head, giving an additional dose of blood pressure medicine, or pouring cologne on the patient. Less commonly, relatives will massage the affected limbs of stroke patients, and/or give the patient lemon juice or yogurt water to drink.

In other European countries, stroke patients are typically cared for by internists initially in the emergency department, and if older (>65 years old), may be cared for by internists as inpatients (Norway). Neurologists would care for the younger stroke patients. In Germany, stroke patients are initially cared for by anesthesiologists in their ICU.

Neurologists see the patients after they have 'been stabilized.' Throughout Europe, tPA is used in large centers for ischemic stroke patients who meet NINDS guidelines. Spain has 'stroke teams' in many of the larger medical centers. Its neurologists have phones which can be directly dialed by ambulance personnel, which enable them to meet the patient immediately in the emergency department. IN countries where internists play a prominent role in the initial treatment of ischemic stroke patients, the decision to use and administration of tPA is controversial – are the internists able to give tPA, or should one wait until a neurologist is available to evaluate the patient before tPA is given? Most hospitals do not have enough neurologists on staff to be on a 24/7 stroke team (Spain). In general, smaller hospitals do not typically use tPA, and physicians are less aggressive with older patients in their treatment for ischemic stroke.

The following are just some of the experimental studies being performed throughout Europe:

• DIAS: Desmoteplase in Acute Stroke ('DEDAS' in North America). This study enrolls ischemic stroke patients from 3-9 hours of stroke onset, if a penumbra is seen on diffusion-weighted MR. The agent is the active ingredient in vampire bat saliva. The first preliminary study was published as an abstract this year, and was positive when compared with placebo.
• ECASS III: This study enrolls ischemic stroke patients from 3-4 hours of stroke onset.
• IMAGES: This study enrolls ischemic stroke patients from 12 hours of stroke onset. The study medication is MgSO4, which is given as a 5 gm IV load, then continued as a 10 gm over 24 hour infusion.
• ENOS: Efficacy of Nitric Oxide in Stroke. This study enrolls ischemic stroke patients from 48 hours of stroke onset. The study medication is a transdermal glyceryl trinitrate patch (a NO donor), which is applied daily for seven days.
• IST-3: International Stroke Trial-3: This study enrolls ischemic stroke patients from 6 hours of stroke onset. The study medication is tPA (0.9 mg/kg), which is given as a bolus (10% of the total dose) and then as an infusion (90% of the total dose).

Transient Ischemic Attack

At university medical centers around Europe, patients with symptoms and signs of TIA are typically subjected to many blood tests, and a head CT. Patients are admitted for observation and may be treated with a variety of combinations of the following: aspirin, ticlopidin, clopidogrel, and dipyridamole. If the patient reports a crescendo pattern, patients are usually treated with heparin (LMWH in some centers). Additional imaging studies are usually performed after admission, and include MR, carotid doppler, echocardiogram, and transcranial doppler. Endarterectomy is reserved for patients with high-grade stenosis.

In large government hospitals in Turkey, high-risk patients are given heparin, and low-risk patients aspirin. Patients are discharged to be followed-up as outpatients by neurologists.

Other Neurologic Problems

Some neurologic problems seen more commonly in Turkey than in North America include Behçet's disease, Wilson's disease, and complications of infectious diseases. Behçet's disease is recurrent inflammatory disease, which has the following clinical manifestations: aphthous oral ulcers, genital ulcers, uveitis, and erythema nodosum. In 30% of patients, neurologic signs are present and may include: recurrent meningoencephalitis, CN palsies, and transient brainstem dysfunction. Wilson's disease ("progressive hepatolenticular degeneration") is an autosomal recessive disease, which can manifest itself with tremor of the tongue, jaw muscle dysfunction which results in dysphagia and drooling, and rigid or slow moving limbs. Infectious diseases frequently resulting in neurologic complications (menengitis and vertebral osteomyelitis) are brucella and tuberculosis.

Medications in Europe

Europe and Turkey have some medications available for patients with neurologic/psychiatric emergencies which have not yet received approval in the USA:

- Piracetam (Nootropil®). This is widely used for "psycho-organic syndromes" in Turkey - memory loss, vertigo, learning difficulties, and even TIA. Of the many studies done with piracetam, most are animal studies, non-blinded, non-randomized, and finding "a trend towards significance", but no statistically significant results for any clinical finding in humans.
- Clomethiazole. This is a hypnotic widely used to attenuate alcohol withdrawal symptoms in Germany.
- Olanzapine. Another atypical antipyschotic, which has a rapid dissolving tablet formulation for under the tongue application.

Education in Neurologic Emergencies

Most countries have neurology and emergency medicine societies, which are giving educational conferences, some portion of which is dedicated to neurologic emergency topics. Textbooks also contain information on these topics. In Turkey, *Emergency Medicine: a companion handbook*, 5th ed. (by Ma & Stein), has been translated into Turkish, as well as several neurology texts: *Neurology for the House Officer* and *Merrit's Neurology*.

Organizations for further information

British Association of Stroke Physicians (www.basp.ac.uk)
European Federation of Neurological Societies (www.efns.org)
European Stroke Initiative (www.eusi-stroke.com)
European Stroke Council (eurostroke.org)
European Brain Council (www.europeanbraincouncil.com)

Key Learning Points

- Physicians with various training backgrounds give initial care and in-hospital care to patients with neurologic emergencies
- Physicians in Europe and Turkey approach patients with neurologic emergencies in various ways, depending on patient and institutional resources.
- A variety of medications are currently being studied for the treatment of ischemic stroke.

References

1. Dora B, Yardimsever M, Balkan S. Acute stroke therapy, are we ready? Admission time and factors delaying admission in acute stroke. Akdeniz University Dept. of Neurology, Antalya, TR.

Web sites of a few ischemic stroke studies:
DIAS study (desmoteplase 3-9 hrs.):
ENOS study (NO 0-48 hrs.): www.nottingham.ac.uk/strokemedicine/enosindex.htm
IMAGES study (Mg 0-12 hrs.): www.medther.gla.ac.uk/studies/images
IST-3 (tPA 3-4 hrs.): www.dcn.ed.ac.uk/ist3