Stroke
Stroke Subtypes, Recognition and Treatment

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Stroke is the leading cause of adult disability and the second most common cause of death in adults in the developed world.[1] The impact of stroke on the developing world is also growing and is arguably more devastating in these areas of need.[2] Clinicians usually distinguish 2 different types of stroke, *ischaemic* and *haemorrhagic,* although, the symptoms can be quite similar. Ischaemic stroke occurs when a blockage occurs in a blood vessel in the brain. This is usually the result of a blood clot, which can originate from the heart or a larger blood vessel, or can occasionally form inside the vessel in the brain. This causes part of the brain which is supplied by that vessel to stop functioning, as the brain depends on adequate supply of blood and oxygen in order for it to function normally. Depending on the part of the brain which is involved, this may cause different symptoms such as weakness, loss of sensation, loss of balance, loss of vision, or speech difficulty. If blood flow is not restored urgently, the part of the brain which is threatened may be permanently damaged, a process known as infarction. In a haemorrhagic stroke, the wall of a blood vessel in the brain becomes fragile and leaky to the point that blood escapes from the circulation and into the brain tissue. This causes damage to the surrounding brain. It is not possible to differentiate the two types of stroke with complete confidence without a scan of the brain, usually either a CT scan or MRI scan.

Stroke symptoms typically occur very quickly and due to the sensitivity of the brain to low oxygen levels, urgent medical attention is critical to improve the patient's chances of survival and recovery. If you or someone you know suffers any sudden neurological symptoms such as arm or leg weakness, loss of vision, severe imbalance, or loss of speech, it is critical that you call an ambulance immediately as 'time is brain'.

Treatment of the different stroke types is quite different. When a stroke patient arrives in the emergency department they are first rapidly assessed by the doctors and nurses. Urgent scanning of the brain, usually with a CT scan, then happens to work out which type of stroke the patient has had. If the patient is having an ischaemic stroke, or blockage of a vessel, the priority is to unblock the artery and restore blood flow to the brain. The standard therapy for this purpose is called thrombolysis and uses a 'clot-buster' drug called tissue plasminogen activator (tPA), which is given as an infusion through a drip. This is approved for patients with ischaemic stroke who can be treated within 4.5 hours of the onset of their symptoms.[3] Research trials are also underway to potentially identify patients who would respond to the treatment beyond the standard 4.5 hour timeframe, as well as patients who should go on to have a procedure to mechanically remove the clot from their artery via a catheter angiogram.

Once the patient has received treatment, they are then transferred to the stroke care unit, where they receive specialist medical, nursing and allied health care (physiotherapy, occupational therapy, speech pathology etc…) in order to maximize

their recovery, and minimize the risk of complications such as pressure ulcers, deep vein thrombosis (clots in the veins of the legs as a result of immobility), and chest infections. This type of dedicated and multidisciplinary stroke care unit treatment has been shown to improve the chances of survival as well as improving levels of independence.[4]

In the case of haemorrhagic stroke, the treatment strategies are more limited but they include blood pressure control[5], nursing care, allied health, and in a select population, possible surgical drainage of the blood products.

In both situations, the patients are assessed by the doctors for risk factors, which increase the chance of developing vascular disease such as stroke and heart attack. These risk factors include high blood pressure, high cholesterol, cigarette smoking and diabetes. When one or more of these risk factors are found, they are treated aggressively with medication and lifestyle modification in order to reduce the patient's risk of having recurrent strokes in the future.

Patients are also often referred to rehabilitation specialists for ongoing specialist rehabilitation programs in order to improve their recovery and work on specific goals such as returning home, driving or returning to work.

As more stroke research takes place, more and more patients will have access to new and improved treatments for stroke, both in the early phase, as well as in the recovery and rehabilitation phase. The aim of these treatments will be to minimize the burden of this disease and to improve patient's quality of life.

(787 Words)

References

1. Feigin VL, Lawes CMM, Bennett DA, Anderson CS. Stroke epidemiology: a review of population-based studies of incidence, prevalence, and case-fatality in the late 20th century. *The Lancet Neurology*. 2003;2:43-53
2. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *The Lancet*. 2013;380:2095-2128
3. Lees KR, Bluhmki E, Von Kummer R, Brott TG, Toni D, Grotta JC, et al. Time to treatment with intravenous alteplase and outcome in stroke: an updated pooled analysis of ECASS, ATLANTIS, NINDS, and EPITHET trials. *Lancet*. 2010;375:1695
4. Stroke Unit Trialists' Collaboration. Organised inpatient (stroke unit) care for stroke. *Cochrane Database Syst Rev*. 2007;4
5. Anderson CS, Heeley E, Huang Y, Wang J, Stapf C, Delcourt C, et al. Rapid blood-pressure lowering in patients with acute intracerebral hemorrhage. *N. Engl. J. Med.* 2013