



Anaesthesia for the stroke patients: New challenges for anaesthesiologist

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Abstract

Neurosurgical anaesthesia focuses on stroke patients undergoing craniotomy as an urgent nature with life threatening conditions. In developed countries coronary heart disease and stroke are the first and second leading cause of death respectively among adult men and women. Cardiovascular diseases killed 18.5 million people in 2019 that is 3 in every 10 deaths. Of these, 7.4 million people died of ischemic heart disease and 6.7 million from stroke. However, the burden of stroke in developing countries has been increasing significantly. Twice as many deaths from stroke occur in developing countries as in developed countries. Overall in developing countries stroke ranks second or third in disease burden. By 2020 stroke is thought to be the leading cause of death in developing countries. Deaths rates from stroke for people of <65 years have fallen by 23% in the last 10 years in developed countries but in developing country still it is remaining higher. In the last 10 years a significant increase in the life expectancy has occurred in developing countries like Bangladesh. So there is increase in the number & incidence of cerebrovascular diseases in Bangladesh. The need for emergency neuro anaesthesia for the stroke patients are gradually increasing both for intracranial neurosurgical & neuroendovascular procedures. The mortality in patients requiring emergency neurosurgical procedures is still quite high.

Keywords: Neurosurgical anaesthesia, cardiovascular diseases, stroke

1. Introduction

Stroke is the third leading cause of death in Bangladesh (8.57%). Among the strokes 70-80% are ischemic & 20-30% are hemorrhagic [1]. Ischemic strokes (thrombotic strokes and embolic strokes) are mostly managed conservatively by removing the obstruction which help to restore blood flow in the brain. Carotid endarterectomy, stenting of the cervical and intracranial vessels or decompression craniotomy are the mostly used surgical and non-surgical maneuvers in the management of ischaemic stroke patients and these maneuvers may help in reducing recurrent stroke in some cases or reduce intracranial pressure due to edema. 2-5% patients' needs anaesthesia support during these maneuvers [2]. A hemorrhagic stroke (intracerebral and subarachnoid) can be caused from hypertension, rupture of an aneurysm or vascular malformation, or as a complication of anticoagulation medications. 10-20% of hemorrhagic stroke patients usually requires surgery to relieve intracranial pressure caused by bleeding [3]. Surgical treatment for hemorrhagic stroke caused by an aneurysm or defective blood vessel can prevent additional strokes. Surgery may be performed to seal off the defective blood vessel and redirect blood flow to other vessels that supply blood to the same region of the brain. Recently start endovascular treatment involves inserting a long, thin, flexible tube (catheter) into a major artery, usually in the thigh, guiding it to the aneurysm or the defective blood vessel and inserting tiny platinum coils (called stents) into the blood vessel through the catheter. Stents support the blood vessel to prevent further damage and additional strokes. Both of endovascular & neurosurgical procedure need special care by anaesthesiologists. 10-30% stroke patients need admission in intensive care unit and the Anaesthesiologists have to play a vital role in the initial resuscitation, controlling of raised intracranial pressure,

cardiovascular & respiratory support or post-operative care [4]. Acute stroke is the second leading cause of death worldwide and the leading cause of long-term disability [5]. Ischaemic stroke is responsible for 87% of strokes [6]. In acute ischaemic strokes, an embolus, thrombus, or stenosis can decrease brain perfusion. The goal of early therapy for acute ischaemic stroke is to restore perfusion. I.V. thrombolysis with recombinant tissue plasminogen activator (RTPA) is the only proven medical therapy shown to improve patient outcomes in acute ischaemic stroke, with better outcomes achieved with earlier administration [7, 8].

2. Case Study

Acute care neurosurgery covers a broad range of disorders and procedures all sharing in common an emergent or urgent nature. This type of service requires 24-7 coverage by a team, comprising of neurosurgeons and neuroanaesthesiologists. A significant proportion (80-90%) of neurosurgical emergencies were related to trauma only ten years back. Now there is change in the trends and more than 50 percent of emergency and urgent neurosurgical consultations involve a broad scope of brain and spinal disorders such as intracranial hemorrhages (bleeding within the brain), ventriculo-peritoneal shunt, hemorrhagic in the spine, cerebral aneurysm ruptures, hemorrhagic strokes and sometime ischemic strokes. Primary intracerebral hemorrhage (ICH) accounts for 10% to 20% of strokes but carries the highest rates of mortality and morbidity of all stroke subtypes. Most of the cerebrovascular diseases both hemorrhagic & ischemic strokes were being managed conservatively even in ten years back. But during the last few years the practices are changing and the emergency neuro surgical procedures which need special attention by anaesthesiologists are gradually increasing. This increased

surgical treatment of stroke patient not only involves the anaesthesiologist tasks in the operation theatre but there is increasing need of the anaesthesiologist expert involvement in the pre-operative management and in the ICU. Hence management of these group of patients is a new burden and challenges for the Anaesthesiologist. There is increase trends of burden of emergency neuroanaesthesia for stroke patient are favourable in several developed areas of the world, but there are major problem in developing country like Bangladesh both from shortage of skill manpower with adequate facility. It is very much essential to increase the number of skilled neuroanaesthetist for providing emergency and acute care neurosurgical services for stroke patient. Though there is lack of interest for providing emergency neuroanaesthesia by the anaesthesiologist due to high mortality of hemorrhagic stroke patient. Anaesthetic management of the acute stroke patient demands consideration of the penumbra as the central focus. Recent studies have shown that patients who receive general anaesthesia for endovascular therapy for acute ischaemic stroke have worse outcomes than those who receive local anaesthesia. Although baseline condition of the patients in these studies differed, we should heed the warnings evident in the results. 'Time is brain': therapy should be quickly provided. Arterial pressure should be monitored carefully upon induction, avoiding a drastic reduction, and allowing for a reduction in arterial pressure upon recanalization. Keeping these factors in mind, anaesthetic technique (general, monitored anaesthesia care, or local) must be selected considering the individual patient's risks and benefits. Unfortunately, there are no proven neuroprotective strategies to date for use in acute ischaemic stroke.

3. Conclusion

The issue need proper addressing and policy have to be made to encourage the anaesthesiologist to become a skilled neuroanaesthesiologist. In a patient with acute ischaemic stroke, time is of the essence to save the vulnerable penumbra. With the current evidence, the decision between general anaesthesia, monitored anaesthesia care, or local anaesthesia for endovascular procedures should be made with the individual risks and benefits of each patient considered.

4. References

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