Can inevitable credence of caregivers and surgeon’s instinct dominate existing evidence based practice?

Introduction

It is not unusual to face problems like malignant stroke and devastating post operative hemorrhagic infarction (POHI) in clinical practice. These conditions are akin to be perplexing nightmares for neurosurgeon especially when it comes to convince attendants for either surgical intervention or continuing the medical management. Early intervention has a key role in changing outcome in terms of survival but at the cost of a severely disabled or ventilator dependent (difficult to wean off) patient. In this review, we intend to highlight fallacies in management of malignant stroke and POHI focusing on a disregarded indication – “surgeon's instinct and caregiver’s cultural belief”.

Cerebrovascular accidents are leading cause of mortality and disability throughout the world. Malignant cerebral edema with hemorrhagic stroke constitutes a significant proportion of these patients. Ever since Cushing performed first decompressive craniotomy (DC), the confusion on appropriate management of malignant cerebral edema continues. The present era of evidence based management and quality of life care has manipulated the literature with heterogeneous results and conundrums. Presently, the famous trials talk about functional improvement after DC and advantages of tracking secondary brain injury pathogenesis highlighting the insufferable outcome of various trials. Being a neurosurgeon, I believe that each one of us must have face a situation wherein, either caregiver’s forceful cultural belief or sometimes our own inner conscience push us against all available evidences; and a surprisingly better than expected results are achieved. We never report these cases but the question persistently troubles us is “whether to operate or not?” in a case of malignant cerebral edema.

Malignant cerebral stroke or devastating POHI usually manifests with a severe hemispheric syndrome including hemiparesis, gaze deviation and higher cortical signs followed by headache, papilloedema and decreasing consciousness. The life-threatening edema usually develops between 24 hours to several days propagating to midline shift and death.1 The hemorrhagic infarct in middle cerebral artery distribution complicates the clinical presentation with ocular motor apraxia,2 contralateral dens hemiplegia masquerading as subtle cerebral herniation syndromes. The alarming “line of danger” is very difficult to draw in these patients so point of intervention is rather depending on surgeon’s experience and rather serial radiological investigations. The incidence of surgical demand is never less than 2%6 with overall poor outcome. Early surgical intervention is demanded but at risk of disability. So, question arises, is there any objective parameter below which one can manage these patients with medical options.

At present, role of intracranial pressure monitoring is controversial and radiological parameters have high variability.4 The expanding armamentarium on molecular research, may guide us with objective predictors on monitoring cerebral autoregulation failure and secondary brain injury, in near future. Bert Bosche et al studied the level of extracellular substrate concentrations by microdialysis, intracranial pressure (ICP), and tissue oxygen partial pressure (PtO2) along with neuromonitoring of neuroactive substances like transmitter amino acids (TAAaS), lactate, pyruvate, and purines in peri-infarct tissue for early determination of patients at risk for malignant infarction.5 Likewise, Heiss WD et al highlighted the importance of positron emission tomography in early differentiation of malignant edema from benign counterpart.6

The heterogeneity in defining “malignant” progression demands low threshold for surgeon but evidences from metaanalysis and randomized trials preclude surgeon in view of poor surgical outcome.1,7,8 Among the conservative medical options available, only hypothermia shows some beneficial effects in reducing postschismic secondary brain injury and blood brain barrier disruption in animal models.9 Other measures like osmotic therapy with hypertonic saline solutions, mannitol and glycerol did not significantly improve outcome.9 These measures are effective for transient lowering of intracranial pressure. The decompressive craniotomy is always last choice for stroke managing team. There is added risk of infection, reoperation, hydrocephalus, external brain tamponade, sinking skin flap syndrome, paradoxical brain herniation and seizures.10,11

Two problems that often come across are malignant strokes (usually middle cerebral artery stroke) in young patients and need for surgical interventions in POHI. We operated a twelve-year child with systemic lupus nephritis and intracranial hemorrhagic infarct. The child had acute renal failure, pericardial effusion and septic shock with very poor general condition. There was midline shift and frontal-parial region edema. We operated him in view of younger age and our inner instinct. The parents were willing for perioperative risks. Post operative course was surprisingly better than what one could believe. The patient was discharged in full sensorium and underwent reconstruction cranioplasty in follow up. There is no level 1 evidence guidelines on management of malignant edema in age less than 18 years. Thereafter, severe comorbidity and poor general status precludes surgical intervention as per conclusions of trials. But the surgical decision based on inner conscience and experience based instinct resulted in unexpected good outcome contrary to what is quoted in famous trials.

Similarly, another case of left cerebello- pontine angle giant schwannoma was operated. The patient landed in disseminated intravascular coagulation and surgical site POHI (Figure 1). Patient was managed on continuous mechanical ventilation. There was severe electrolyte disturbances and poor neurological brainstem response; so
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