

Book Reviews

Acquired brain injury in the fetus and newborn, M. Shevell, S. Miller, editors (Wiley-Blackwell, UK) 2012. 318 pages. Price: not mentioned. ISBN 978-1-907655-02-9

In the developed world, there have been great advances in knowledge about neurological conditions of the newborn. There are considerable insights into the genetic basis of development of brain, however, effects of injury to the brain during the foetal and neonatal period are not fully understood. This book gives a comprehensive review of scientific basis of neurological conditions with special reference to outcome in brain injured infants. It has 20 chapters divided into four sections covering the foetus, the preterm infant, the term infant and specialized topics. The text in each chapter is complimented with illustrative figures which make learning easier.

The first section covers brain injury to the foetus. Normal development of the foetal brain occurs through a sequence of overlapping phases each having specific period of peak activity. The developing brain is more susceptible to injury. However, it is also noted that the immature state sometimes has an advantage of remarkable ability to compensate for injury through ill-understood phenomenon. Different mechanisms of foetal brain injury are described in this chapter. These include foetal substrate deprivation and restriction of specific nutrients and energy essential for nervous system development. These may be caused by placental pathologies such as abnormal vascular development, inflammatory processes and acquired degeneration. Foetal circulation may be disrupted by certain forms of foetal cardiac malformations leading to restriction of oxygen substrate delivery.

Ischaemic and haemorrhagic brain lesions occurring during foetal period can now be easily

distinguished. Substances having toxic effects on the developing brain may have teratogenic and destructive consequences. Effects of alcohol and cocaine abuse and that of maternal phenylketonuria are described in detail.

The conventional MRI can be of great help in detecting acute brain injury such as haemorrhage, cerebral oedema, cerebral infarction and thrombosis, ventriculomegaly, white matter injury, abscess, and calcifications. Diagnosis of subtle disturbances like impaired volumetric growth of brain tissue, micro-architectural disorganization and brain metabolite alterations is now possible with advanced MRI techniques. These methods provide the clinicians with novel clinical tools to detect and monitor the high risk foetus.

Section II on the preterm infants begins with in-depth description of mechanisms of acute and chronic brain injury in preterm infants. Pathological features of white matter injury (WMI) include cystic necrosis and/or focal or diffuse myelination disturbances. Several studies have reported that neuroinflammatory mediators are detected in association with WMI. Cellular-molecular mechanisms of acute and chronic white matter injury are described.

The next chapter describes clinical assessment indicative of presence of brain injury in preterm infants. The lower the gestational age, the greater is the risk of obscured clinical symptoms of brain injury. Concurrent illnesses such as respiratory distress syndrome, cardiovascular instability, recurrent apnoea of prematurity, sepsis and necrotizing enterocolitis complicate the manifestations of brain injury in preterm infants. The standardized neurological examination, structured observation of spontaneous activity in form of 'general movements' and assessment of behaviour

are commonly used clinical methods for assessment of neurological status in preterm infants.

Diagnosis of seizures can be difficult as majority of seizures are subclinical. EEG monitoring and use of near-infra red spectroscopy (NIRS) are useful for detecting neural dysfunction and adverse cerebral haemodynamic effects. Techniques and usefulness of NIRS and EEG are described in detail in this chapter.

The chapter on imaging the brain of the preterm infants gives a complete review of cranial ultrasound and MRI findings of brain injury in preterm infants. Advantages of MRI in defining the location and extent of lesions, myelination stages, maturational changes and subtle abnormalities in white matter are highlighted with illustrations.

Section II also deals with an important aspect of neuroprotection of preterm infant. Numerous studies have explored the neuroprotective effect of antenatal corticosteroid use, especially in reducing the rates of intraventricular haemorrhage (IVH). Adequate calorie intake of an appropriately balanced diet is critical to cerebral development. This has been emphasised in this chapter.

Epidemiology, clinical features, differential diagnosis, investigations and treatment of seizures in preterm infants are described briefly. In the chapter on outcomes after brain injury in preterm infants, the entire spectrum of motor impairment, cognitive impairment, behavioural and psychiatric disorders are described. Many outcome studies have demonstrated a wide range of neurodevelopmental disturbances. Advances in care of preterm infants have resulted in improvements in survival of very low birth weight infants. It is estimated that 10 to 15 per cent of preterm survivors sustain permanent motor impairment. By school age, 25 to 50 per cent manifest spectrum of cognitive visual, social, behavioural, attention and learning disabilities.

Section III includes chapters on mechanisms of neurodegeneration, clinical approach to term encephalopathy, imaging term infants with suspected hypoxic-ischaemic encephalopathy (HIE), neuroprotection, seizures and outcomes after brain injury in the term infants. Neural loss is a prominent feature of acquired neurologic injury. Selective vulnerability is seen in areas of somatosensory system, basal ganglia, and motor neurons of spinal cord or brachial plexus. Glutamate receptor excitotoxicity and oxidative damage are believed to be the key mechanisms in the evolution of the acquired injuries. The most common

forms of neurodegeneration are necrosis, apoptosis and autophagy. The pathogenesis of these forms is described in detail. The chapter on clinical approach to term encephalopathy covers the diagnosis of neonatal encephalopathy which considers three important features namely (i) evidence of foetal distress, (ii) neonatal depression at birth, and (iii) presence of an overt neurologic syndrome in the first hours and days of life. The basic concepts in neurological examination explained in this chapter are extremely important from a clinician's point of view. Association of neurological examination and MRI patterns of brain injury is well described.

Chapter 11 explains importance of imaging the brain of term infant with HIE. MRI is the preferred tool and optimal time to image is between 3 to 5 days after birth. The patterns of injuries imaged during the first few days of HIE are well illustrated with MRI and CT plates. A potential role of quantitative MRI tool in predicting outcomes and evaluating early intervention plain is described.

Neuroprotection strategy in term infants includes use of antiepileptics for decreasing excitotoxicity of neurons, use of cell death inhibitors, anti-inflammatory therapy, antioxidant therapy, growth factors, stem cell therapy and hypothermia. Merits and demerits of each of these modalities are discussed. The chapter on seizures in term infants describes treatment and prognosis in neonates with seizures.

Section IV covers specialized topics related to foetal and neonatal neurology. The Neonatal Neurology is an important chapter that gives comprehensive review of epidemiology, risk factors, incidence and outcome of neonatal encephalopathy. Preventive strategies to reduce the burden of perinatal asphyxia in low and mid-resource settings are described. Some of the Indian studies on cooling of asphyxiated neonates are mentioned.

The chapter on perinatal stroke includes definition and classification, incidence, clinical presentation and diagnosis. Management and outcomes in such neonates are well described.

Chapters on brain injury in newborn infants with congenital heart disease and with metabolic brain injury in the foetus and the neonate are important. These chapters give detailed account of types, presentation, treatment and risks of brain injury in infants with congenital heart disease (CHD) as well as in infants with metabolic encephalopathies. The effects

of nutrient deficiencies on the developing brain are described with supportive studies.

Neonatologists and paediatric neurologists face many ethical dilemmas while managing the neonates with brain injuries. Accurate prognosis in most instances is incredibly challenging and decision making painfully difficult. The chapter on ethical consideration in foetal and neonatal neurology presents the approach to ethical issues in newborn care. Two categories of general agreements regarding decisions on neonatal care are presented. Category 1 explains a scenario when initiating and continuing intensive care is not recommended, generally corresponding to gestational age of less than 22 wk. Category 2 covers the scenario corresponding to gestational age greater than 25-26 wk when chance of survival is high and risk of unacceptably severe morbidity is low. The authors acknowledge the cultural and societal perspectives influencing decision-making during antenatal and neonatal care.

This comprehensive book will be useful for neonatologists, paediatric neurologists and scientists from many other disciplines interested in the foetal and neonatal brain.

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Hemophilia and hemostasis: A case-based approach to management, 2nd ed., A.D. Ma, H.R. Roberts, M.A. Escobar, editors (Wiley-Blackwell, UK). 2013. 224 pages. Price: not mentioned. ISBN 978-0-470-65976-2

Blood coagulation is an important but complex biological phenomenon. Defects in blood coagulation have two important facets- haemorrhage and thrombosis. Both these pathologies can be caused by genetic and acquired mechanisms. Most common genetic condition leading to disorder in blood coagulation and haemorrhage is haemophilia. However, there are many other genetic defects of various coagulation factor genes and platelet related genes associated with thrombohaemorrhagic phenomenon.

The present book is in its second edition and the authors are leading experts in the field. The get up of the book is nice and the book is compact and handy.

The subject matter of inherited bleeding and thrombotic disorders and their management has been presented through 60 well selected cases. The language is lucid and easy flowing. As the individual cases have been discussed, the advantage of reading this book is that it can be read in any order. Each case management is complete by itself, and so is the investigation. Authors have been careful to include routine day-to-day investigations to arrive at the diagnosis. Special diagnostic tests have also been mentioned.

Important complications of haemophilia which affect 15-30 per cent of haemophilia A as well as 1-3 per cent of haemophilia B population have been discussed well and the management of bleeding in such patients has also been discussed. One would have expected a chapter on how major emergency operations in haemophilia patients with very high levels of inhibitor can be conducted safely; however, such a case was not discussed. A few cases have been discussed where more than one inherited conditions of bleeding disorder exist. Often the cases are not only difficult to diagnose but these also pose substantial problem in their management. Certain unusual cases like amyloid related factor X deficiency, heparin like substance in monoclonal gammopathy as a cause of coagulation defect and a chapter on acquired Von Willebrand disease syndrome (AVWS) have enriched this book. Photographs are in black and white and are clear and relevant. As haemophilia and Von Willebrand disease are relatively common congenital bleeding disorders, enough data in the world literature exist on the biology of these diseases and management. Rare congenital bleeding disorder is a different game altogether. These disorders are uncommon ($<1 \times 10^6$) and are often concentrated in those parts of the world where consanguineous marriages are common. Factor V deficiency, prothrombin deficiency, factor VIII deficiency, factor X deficiency have been discussed from the management perspective as individual cases.

Reproductive option in haemophilia patient is an important chapter, particularly for people with haemophilia (PWH) in developing countries where management options are restricted. Hence, carrier detection and prenatal diagnosis form important components of the management. Mild/moderately severe PWH with discrepant factor VIII levels may not have been picked up in developing countries because chromogenic assays are not routinely used for factor VIII level determination.

Thrombosis and thrombophylaxis in haemophilia patients are becoming increasingly relevant and difficult management decisions as haemophilia patients are living longer and are now developing heart disease, atherosclerosis, malignancy, *etc.* They also need hip/knee replacement therapy where thromboprophylaxis is also relevant. Familial thrombophilia is an important addition in this book so also Bayesian technique of risk assessment in bleeding disorder.

There are very few shortcomings in this book. One would have liked to see some more discussion on modern thrombin inhibitors and factor Xa inhibitors for management of thrombophilia. Hereditary platelet defects and some of the important challenges on blood coagulation have not received much attention though discussion on bleeding in patients with

prostatic malignancy has been included. A chapter on pharmacokinetics of factor concentrates and their application in the management of difficult cases in haemophilia is appreciated but recent development of long acting clotting factors and prophylaxis in this condition has not received attention.

Overall, this is an extremely well written book suitable for consultants, trainees and, postgraduates, and is a must for all medical college libraries.

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