

DAFTAR PUSTAKA

- Abbas, A.K., Lichtman, A.H. & Pillai, S., (2007). Cellular and Molecular Immunology 6th Edition. Elsevier Publisher, Philadelphia.
- American College of Surgeons, 1997, *Advance Trauma Life Support*. United States of America: First Impression, 1997.
- Angeloni, C., Prata C., 2 Segal, F.V.D., Piperno R. and Hrelia. S. 2015, Traumatic Brain Injury and NADPH Oxidase: A Deep Relationship, *Oxidative Medicine and Cellular Longevity*, 2015: 1-10. Benveniste, E. N. (1998). Cytokine actions in the central nervous system. *Cytokine Growth Factor Rev.* 9, 259–275.
- Arief Sjamsul, *Radikal Bebas*, Bagian Ilmu Kesehatan Anak Fakultas Kedokteran Universitas Airlangga Rumah Sakit dr Soetomo Surabaya, 2003: 1-9.
- Bartnik, B. L., Sutton, R. L., Fukushima, M., Harris, N.G., Hovda, D.A., and Lee, S. M. (2005). Up regulation of pentosephosphate pathway and preservation of tricarboxylic acid cycle flux after experimental brain injury. *J. Neurotrauma* 22, 1052–1065. doi: 10.1089/neu.2005.22.1052
- Bartnik, B. L., Lee, S. M., Hovda, D. A., and Sutton, R. L. (2007). The fate of glucose during the period of decreased metabolism after fluid percussion injury: a ¹³C NMR study. *J. Neurotrauma* 24, 1079–1092. doi: 10.1089/neu.2006.0210
- Bhatia P (2002). Dexmedetomidine: a new agent in anaesthesia and critical care practice. Dept. of Anaesthesiology & Critical care. Dr. S.N Medical College, Jodhpur.
- Brain Trauma Foundation. Guidelines for the Management of Severe Traumatic Brain Injury. BTF. 2007;24:S1-S106.
- Brisby, H., Olmarker, K., Rosengren, L., Cederlund, C. G., and Rydevik, B. (1999). Markers of nerve tissue injury in the cerebrospinal fluid in patients with lumbar disc herniation and sciatica. *Spine* 24, 742–746.
- Brough, D., Tyrrell, P.J., and Allan, S.M. (2011). Regulation of interleukin-1 in acute brain injury. *Trends Pharmacol. Sci.* 32, 617–622.

- Brustovetsky, N., Brustovetsky, T., Jemmerson, R. and Dubinsky, J.M. 2002, Calcium induced cytochrome c release from CNS mitochondria is associated with the permeability transition and rupture of the outer membrane, *Journal of neurochemistry*, 80 (2): 207–18.
- Cernak, I. 2005, Animal Models of Head Trauma, *The Journal of the American Society for Experimental Neuro Therapeutics*, 2: 410–422.
- Budi Harto Batubara, Nazaruddin Umar, Chairul M. Mursin, Perbandingan Osmolaritas Plasma Setelah Pemberian Manitol 20% 3 mL/kgBB dengan Natrium Laktat Hipertonik 3 mL/kgBB pada Pasien Cedera Otak Traumatik Ringan-Sedang, *Jurnal Anestesi Perioperatif [JAP]*. 2016;4(3): 154–61]
- Carpenter, K. L., Jalloh, I., Gallagher, C. N., Grice, P., Howe, D. J., Mason, A., *et al.* (2014). (13) C-labelled microdialysis studies of cerebral metabolism in TBI patients. *Eur. J. Pharm. Sci.* 57,87–97. doi: 10.1016/j.ejps.2013.12.012
- Casey PA, Mckenna MC, Fiskum G, Saraswati M, Robertson Cl. Early and sustained alterations in cerebral metabolism after traumatic brain injury in immature rats. *J Neurotrauma*. 2008;25:603-14.
- Castro MA, Beltran FA, Brauchi S, Concha II. A metabolic switch in brain; glucose and lactate metabolism modulation by ascorbic acid. *J Neurochem*. 2009;110:423-40
- Cernak, I. 2005, Animal Models of Head Trauma, *The Journal of the American Society for Experimental NeuroTherapeutics*, 2: 410–422.
- Chiry O, Fishbein WN, Merezhinskaya N, Clarke S, Galuske R, Magistretti PJ, *et al.* Distribution of the monocarboxylate transporter MCT2 in human cerebral cortex: An immuno histochemical study. *Brain Res*. 2008;1226:61-9.
- Chiry O, Pellerin L, Monnet-Tschudi F, Fishbein WN, Merezhinskaya N, Magistretti PJ, *et al.* Expression of the monocarboxylate transporter MCT1 in the adult human brain cortex. *Brain Res*. 2006;1070:65-70.

- Clayton TJ, Nelson RJ, Manara AR. Reduction in mortality from severe head injury following introduction of a protocol for intensive care management. *British Journal of Anaesthesia*; 2004. 93. h. 761–7.
- Coburn, K. (1992). Traumatic brain injury: the silent epidemic. *AACN Clin. Issues Crit.CareNurs.* 3, 9–18.
- Dahlan, S.M. 2011, *Statistik untuk Kedokteran dan Kesehatan: Deskriptif Bivariat, dan Multivariat*, Edisi 5, Salemba Medika, Jakarta.
- David A. Bender, PhD & Peter A. Mayes, PhD, DSc, Rodwell. Harper's *Illustrated Biochemistry*, 30th edition, section IV, Metabolism of Carbohydrates. 2015. 139-210
- Desborough JP. (2000). The stress response to trauma and injury. *BJA* 2000;85(1): 115-9.
- Dikmen *et al*, 2009 Dikmen Sureyya S., PhD; John D. Corrigan, PhD, ABPP; Harvey S. Levin, PhD; Joan Machamer, MA; William Stiers, PhD, ABPP; Marc G. Weisskopf, PhD, ScD. 2009. Cognitive Outcome Following Traumatic Brain Injury. *J Head Trauma Rehabil.* Vol. 24, No. 6, pp. 430–438
- Dinarello, C.A. (2009). Immunological and inflammatory functions of the interleukin-1 family. *Annu. Rev. Immunol.* 27, 519–550.
- Dusick, J. R., Glenn, T. C., Lee, W. N., Vespa, P. M., Kelly, D. F., Lee, S. M., *et al.* (2007). Increased pentose phosphate pathway flux after clinical traumatic brain injury: a [^{1,2-13}C₂] glucose labeling study in humans. *J. Cereb. Blood Flow Metab.* 27, 1593–1602. doi: 10.1038/sj.jcbfm.9600458
- Fan, L., Young, P. R., Barone, F. C., Feuerstein, G. Z., Smith, D. H., and McIntosh, T. K. (1995). Experimental brain injury induces expression of interleukin 1 beta RNA in the rat brain. *Brain Res. Mol. Brain Res.* 30, 125–130.
- Fiorentino, D. F., Zlotnik, A., Mosmann, T. R., Howard, M., and O'Garra, A. (1991). IL-10 inhibits cytokine production by activated macrophages. *J. Immunol.* 147, 3815–3822.
- Foda, M. A., and Marmarou, A. (1994). A new

- model of diffuse brain injury in rats. Part II: morphological characterization. *J. Neurosurg.* 80, 301-313.
- Gallagher, C. N., Carpenter, K. L., Grice, P., Howe, D. J., Mason, A., Timofeev, I., *et al.* (2009). The human brain utilizes lactate via the tricarboxylic acid cycle: a ¹³C-labelled microdialysis and high-resolution nuclear magnetic resonance study. *Brain* 132(Pt10), 2839–2849. doi:10.1093/brain/awp202
- Goldstein, M. (1990). Traumatic brain injury: a silent epidemic. *Ann. Neurol.* 27, 327.
- Hanna, Ahmad MR. Effect of equiosmolar solutions of hypertonic sodium lactate versus mannitol in craniectomy patients with moderate traumatic brain injury. *Fakultas Kedokteran Universitas Hasanuddin. Med J Indonesia.* 2014;23;30–5.
- Hansson, M.J., Mansson, R., Morota, S., Uchino, H., Kallur, T., Sumi, T., *et al.* 2008, Calcium-induced generation of reactive oxygen species in brain mitochondria is mediated by permeability transition, *Free Radic Biol Med*, 45(3): 284–94.
- Hoffman WE, Kochs E, Werner C, Thomas C, Albrecht RF. (1991) Dexmedetomidine improves neurologic outcome from incomplete ischaemia in rat. *Anesthesiology*;75:328-32.
- Hutchinson, P. J., O’Connell, M. T., Seal, A., Nortje, J., Timofeev, I., Al-Rawi, P. G., *et al.* (2009). A combined microdialysis and FDG-PET study of glucose metabolism in head injury. *Acta Neurochir.(Wien)* 151, 51–61; discussion 61. doi:10.1007/s00701-008-0169-1
- Ide, K., Schmalbruch, I. K., Quistorff, B., Horn, A., and Secher, N. H. (2000). Lactate, glucose and O₂ uptake in human brain during recovery from maximal exercise. *J. Physiol.* 522(Pt1), 159–164. doi: 10.1111/j.1469-7793.2000.t01-2-00159.xm
- IONI, Pusat Informasi Obat Nasional, Bab 9.2.1 <http://pionas.pom.go.id/ioni/bab-9-gizi-dan-darah/92-cairan-dan-elektrolit/921-gangguan-keseimbangan-cairan-dan-elektrolit-4>, totilac

- Iskandar, Japardi, 2004, Penatalaksanaan Cedera Kepala *secara Operatif*. Sumatra Utara: USU Press 2004, 1-27.
- Jalloh, I., Helmy, A., Shannon, R. J., Gallagher, C. N., Menon, D. K., Carpenter, K. L., et al. (2013). Lactate uptake by the injured human brain: evidence from an arteriovenous gradient and cerebral microdialysis study. *J. Neurotrauma* 30, 2031–2037. doi: 10.1089/neu.2013.2947
- Kagiwada K, Chida D, Sakatani T, Asano M, Nambu A, Kakuta S et al. (2004) Interleukin (IL)-6, but not IL-1, induction in the brain downstream of cyclooxygenase-2 is essential for the induction of febrile response against peripheral IL-1 α . *Endocrinology*;(11)145:5044-6.
- Kamm, K., Vanderkolk, W., Lawrence, C., Jonker, M., and Davis, A. T. (2006). The effect of traumatic brain injury upon the concentration and expression of interleukin-1beta and interleukin-10 in the rat. *J. Trauma* 60, 152–157.
- Kinoshita, K., Chatzipanteli, K., Vitarbo, E., Truettner, J. S., Alonso, O. F., and Dietrich, W. D. (2002). Interleukin-1 beta messenger ribonucleic acid and protein levels after fluidpercussion brain injury in rats: importance of injury severity and brain temperature. *Neurosurgery* 51, 195–203; discussion203.
- Krueger, J. M. (2008). The role of cytokines in sleep regulation. *Curr. Pharm. Des.* 14, 3408– 3416
- Lee *et al.*, 2004 Lee, L.L., Galo, E., Lyeth, B.G., Muizelaar, J.P. and Berman, R.F. 2004, Neuroprotection in the rat lateral fluid percussion model of traumatic brain injury by SNX-185, an N-type voltage-gated calcium channel blocker, *Exp Neurol*, 190: 70–78.
- Levasseur JE, Alessandri B, Reinert M, Clausen T, Zhou Z, Altemeni N, dkk. Lactate, not glucose, up-regulates mitochondrial oxygen consumption both in sham and lateral fluid percussed rat brain. *J Neurosurg.* 2006;59(5):1122-31.
- Liao J, Keiser J, Scales W, Kunkel S, Kluger MJ. (1995). Role of epinephrine in TNF and IL-6 production from isolated perfused rat liver. *Am. J. Physiol*; 37 (268) :896-8.

- Lifshitz, J., Friberg, H., Neumar, R.W., Raghupathi, R., Welsh, F.A., Janmey, P., *et al.* 2003, Structural and functional damage sustained by mitochondria after traumatic brain injury in the rat: evidence for differentially sensitive populations in the cortex and hippocampus, *J Cereb Blood Flow Metab*, 23 (2): 219–31.
- Lu, B., Rutledge, B. J., Gu, L., Fiorillo, J., Lukacs, N. W., Kunkel, S. L. (1998). Abnormalities in monocyte recruitment and cytokine expression in monocyte chemoattractant protein 1-deficient mice. *J. Exp.Med.* 187, 601–608.
- Lucas SM, Rothwell NJ, Gibson RM. (2006) The role if inflammation in CNS injury and disease. *British Journal of Pharmacology*:147(51):232-4
- Marijata., 2006. Pengantar Dasar Bedah Klinis. Unit Pelayanan Kampus (UPK) Fakultas Kedokteran Universitas Gajah Mada. Yogyakarta. 2006: 83-108.
- Mauritz W, Wilbacher I, Majdan M, *et al.* *Epidemiology, Treatment and Outcome of Patients after Severe Traumatic Brain Injury in European Regions with Different Economic Status. The European Journal of Public Health.* 2008;18:575-580.
- Moppet, I.K. 2007, Traumatic Brain Injury: Assessment, Resuscitation, and Early Management, *Br J Anaesth*, 99 (1): 18-31.
- Mustafa, A.G. and Al-Shboul, O. 2013, The role of free radicals and reactive species following traumatic brain injury, *OA Biotechnology*, 2 (3): 23.
- O'Connor, J. J., and Coogan, A. N. (1999). Actions of the pro inflammatory cytokine IL-1 beta on central synaptic transmission. *Exp. Physiol.* 84, 601–614.
- Pellerin L. Lactate as a pivotal element in neuron–glia metabolic cooperation. *Neurochem Intern.* 2003;43 331-8.
- Quiney N, Cooper R, Stone ham M. (1996) Pain after craniotomy: a time for reappraisal ?. *Br J Neurosurg*;10: 295.
- Rice, A. C., Zsoldos, R., Chen, T., Wilson, M. S., Alessandri, B., Hamm, R. J., *et al.* (2002). Lactate administration attenuates cognitive deficits following

- traumatic brain injury. *Brain Res.* 928, 156–159. doi: 10.1016/S0006-8993(01)03299-1
- Salmond C. H, D. A. Chatfield, D. K. Menon, J. D. Pickard, B.J. Sahakian. 2005. Cognitive sequelae of head injury: involvement of basal forebrain and associated structures. *Brain* Vol. 128 No.1: 189–200
- Subowo (2009). *Imunobiologi*. Edisi 2. Jakarta. Sagung Seto.
- Timofeev, I., Carpenter, K. L., Nortje, J., Al-Rawi, P. G., O’Connell, M. T., Czornyka, M., *et al.* (2011a). Cerebral extracellular chemistry and outcome following traumatic brain injury: a microdialysis study of 223 patients. *Brain* 134(Pt2), 484–494. doi: 10.1093/brain/awq353
- Timofeev, I., Czornyka, M., Carpenter, K. L., Nortje, J., Kirkpatrick, P. J., Al-Rawi, P.G., *et al.* (2011b). Interaction between brain chemistry and physiology after traumatic brain injury: impact of autoregulation and microdialysis catheter location. *J. Neurotrauma* 28, 849–860. doi: 10.1089/neu.2010.1656
- Timofeev, I., Nortje, J., Al-Rawi, P. G., Hutchinson, P. J., and Gupta, A. K. (2013). Extracellular brain pH with or without hypoxia is a marker of profound metabolic derangement and increased mortality after traumatic brain injury. *J. Cereb. Blood Flow Metab.* 33, 422–427. doi: 10.1038/jcbfm.2012.186
- Tobias JD. (2007) Dexmedetomidine in trauma anesthesiology and critical care. *International trauma care (ITACCS)*;17(1): 10-2.
- Tyson, R. L., Gallagher, C., and Sutherland, G. R. (2003). ¹³C-Labeled substrates and the cerebral metabolic compartmentalization of acetate and lactate. *Brain Res.* 992,43–52. doi:10.1016/j.brainres.2003.08.027
- vanHall, G., Stromstad, M., Rasmussen, P., Jans, O., Zaar, M., Gam, C., *etal.* (2009). Blood lactate is an important energy source for the human brain. *J. Cereb. Blood Flow Metab.* 29, 1121–1129. doi:10.1038/jcbfm.2009.3
- Winarsih, H. 2007, *Antioksidan Alami dan Radikal Bebas*, Edisi 5, Kanisius, Yogyakarta, pp 122-204.

- Woodcock Thomas, Cristina Maria, 2013, The role of markers of inflammation in traumatic brain injury, Fontiersin.org, Australia
- Xiong,Y., Gu, Q., Peterson, P. L., Muizelaar, J. P., and Lee, C. P. (1997). Mitochondrial dysfunction and calcium perturbation induced by traumatic brain injury. *J.Neurotrauma* 14, 23–34. doi:10.1089/neu.1997.14.23
- Yan, E. B., Hellewell, S. C., Bellander, B. M., Agyapomaa, D. A., and Morganti Kossmann, M. C. (2011). Post-traumatic hypoxia exacerbates neurological deficit, neuro inflammation and cerebral metabolism in rats with diffuse traumatic brain injury. *J. Neuroi nflammation* 8, 147
- Ziebell dan Morganti-Kossman 2010 Ziebell, J.M. and Morganti-Kossmann, M.C. 2010, Involvement of Pro- and Anti-Inflammatory Cytokines and Chemokines in the Pathophysiology of Traumatic Brain Injury, *The Journal of the American Society for Experimental Neuro Therapeutics*, 7: 22–30.