

Contents

PART 1:

Brain injury: ICP management and cerebral physiology

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <i>Lavinio, A., Ene-Iordache, B., Nodari, I., Girardini, A., Cagnazzi, E., Rasulo, F., Smielewski, P., Czosnyka, M., Latronico, N.:</i> Cerebrovascular reactivity and autonomic drive following traumatic brain injury | 3 |
| <i>Shahsavari, S., McKelvey, T., Skoglund, T., Eriksson Ritzèn, C.:</i> A comparison between the transfer function of ABP to ICP and compensatory reserve index in TBI | 9 |
| <i>Won, Y.-D., Yoo, D.-S., Kim, K.-T., Kang, S.-G., Lee, S.-B., Kim, D.-S., Hahn, S.-T., Huh, P.-W., Cho, K.-S., Park, C.-K.:</i> Cranioplasty effect on the cerebral hemodynamics and cardiac function. | 15 |
| <i>Nakamura, T., Kuroda, Y., Yamashita, S., Kawakita, K., Kawai, N., Tamiya, T., Itano, T., Nagao, S.:</i> Hyperbaric oxygen therapy for consciousness disturbance following head injury in subacute phase. | 21 |
| <i>Czosnyka, M., Radolovich, D., Balestreri, M., Lavinio, A., Hutchinson, P., Timofeev, I., Smielewski, P., Pickard, J.D.:</i> Gender-related differences in intracranial hypertension and outcome after traumatic brain injury. | 25 |
| <i>Meier, U., Ahmadi, S., Killeen, T., Al-Zain, F.T., Lemcke, J.:</i> Long term outcomes following decompressive craniectomy for severe head injury | 29 |
| <i>Shaw, M., Piper, I., Daley, M.:</i> Relationship of a cerebral autoregulatory index with outcome in head injured patients. | 33 |
| <i>Narayanan, N., Leffler, C.W., Czosnyka, M., Daley, M.L.:</i> Assessment of cerebrovascular resistance with model of cerebrovascular pressure transmission. | 37 |
| <i>Turalska, M., Latka, M., Czosnyka, M., Pierzchala, K., West, B.J.:</i> Generation of very low frequency cerebral blood flow fluctuations in humans | 43 |
| <i>Schmidt, B., Weinhold, M., Czosnyka, M., May, S.A., Steinmeier, R., Klingelhöfer, J.:</i> Accuracy of non-invasive ICP assessment can be increased by an initial individual calibration. | 49 |
| <i>Wong, G.K.C., Poon, W.S., Ng, S.C.P., Ip, M.:</i> The impact of ventricular catheter impregnated with antimicrobial agents on infections in patients with ventricular catheter: interim report. | 53 |
| <i>Aygok, G.A., Marmarou, A., Fatouros, P.P., Kettenmann, B., Bullock, R.M.:</i> Assessment of mitochondrial impairment and cerebral blood flow in severe brain injured patients | 57 |
| <i>Cattivelli, F.S., Sayed, A.H., Hu, X., Lee, D., Vespa, P.:</i> Mathematical models of cerebral hemodynamics for detection of vasospasm in major cerebral arteries | 63 |
| <i>Pfister, D., Schmidt, B., Smielewski, P., Siegemund, M., Strebel, S.P., Rüegg, S., Marsch, S.C.U., Pargger, H., Steiner, L.A.:</i> Intracranial pressure in patients with sepsis | 71 |
| <i>Figaji, A.A., Fieggen, A.G., Argent, A.C., Le Roux, P.D., Peter, J.C.:</i> Intracranial pressure and cerebral oxygenation changes after decompressive craniectomy in children with severe traumatic brain injury | 77 |
| <i>Jones, P.A., Chambers, I.R., Minns, R.A., Lo, T.Y.M., Myles, L.M., Steers, A.J.W.:</i> Are head injury guidelines changing the outcome of head injured children? A regional investigation | 81 |
| <i>Minns, R.A., Jones, P.A., Chambers, I.R.:</i> Low frequency pressure waves of possible autonomic origin in severely head-injured children. | 85 |

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <i>Murad, A., Ghostine, S., Colohan, A.R.T.:</i> Controlled lumbar drainage in medically refractory increased intracranial pressure. A safe and effective treatment . . . | 89 |
| <i>Burger, R., Duncker, D., Uzma, N., Rohde, V.:</i> Decompressive craniotomy: durotomy instead of duroplasty to reduce prolonged ICP elevation | 93 |
| <i>Timofeev, I., Dahyot-Fizelier, C., Keong, N., Nortje, J., Al-Rawi, P.G., Czosnyka, M., Menon, D.K., Kirkpatrick, P.J., Gupta, A.K., Hutchinson, P.J.:</i> Ventriculostomy for control of raised ICP in acute traumatic brain injury. | 99 |
| <i>Kirkness, C.J., Burr, R.L., Mitchell, P.H.:</i> Intracranial pressure variability and long-term outcome following traumatic brain injury | 105 |
| <i>Potts, M.B., Chi, J.H., Meeker, M., Holland, M.C., Hemphill III, J.C., Manley, G.T.:</i> Predictive values of age and the Glasgow Coma Scale in traumatic brain injury patients treated with decompressive craniectomy | 109 |

PART 2:

Hydrocephalus and cerebrospinal fluid dynamics

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <i>Mase, M., Miyati, T., Kasai, H., Demura, K., Osawa, T., Hara, M., Shibamoto, Y., Yamada, K.:</i> Noninvasive estimation of intracranial compliance in idiopathic NPH using MRI | 115 |
| <i>Al-Zain, F.T., Rademacher, G., Meier, U., Mutze, S., Lemcke, J.:</i> The role of cerebrospinal fluid flow study using phase contrast MR imaging in diagnosing idiopathic normal pressure hydrocephalus | 119 |
| <i>Meier, U., Lemcke, J., Al-Zain, F.:</i> Course of disease in patients with idiopathic normal pressure hydrocephalus (iNPH): a follow-up study 3, 4 and 5 years following shunt implantation. | 125 |
| <i>Poon, W.S., Ng, S.C.P., Wong, G.K.C., Wong, L.Y.C., Chan, M.T.V.:</i> Chronic hydrocephalus that requires shunting in aneurysmal subarachnoid haemorrhage [a-SAH]: its impact on clinical outcome. | 129 |
| <i>Hu, X., Xu, P., Lee, D.J., Paul, V., Bergsneider, M.:</i> Morphological changes of intracranial pressure pulses are correlated with acute dilatation of ventricles | 131 |
| <i>Czosnyka, Z., Keong, N., Kim, D.J., Radolovich, D., Smielewski, P., Lavinio, A., Schmidt, E.A., Momjian, S., Owler, B., Pickard, J.D., Czosnyka, M.:</i> Pulse amplitude of intracranial pressure waveform in hydrocephalus | 137 |
| <i>Meier, U., Lemcke, J.:</i> The influence of co-morbidity on the postoperative outcomes of patients with idiopathic normal pressure hydrocephalus (iNPH) | 141 |
| <i>Smielewski, P., Lavinio, A., Timofeev, I., Radolovich, D., Perkes, I., Pickard, J.D., Czosnyka, M.:</i> ICM+, a flexible platform for investigations of cerebrospinal dynamics in clinical practice | 145 |
| <i>Shima, K., Ishihara, S., Tomura, S.:</i> Pathophysiology and diagnosis of spontaneous intracranial hypotension. | 153 |

PART 3:

Advanced neuromonitoring

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <i>Nakagawa, A., Fujimura, M., Arafune, T., Suzuki, H., Sakuma, I., Tominaga, T.:</i> Intraoperative infrared brain surface blood flow monitoring during superficial temporal artery–middle cerebral artery anastomosis in a patient with moyamoya disease: clinical implication of the gradation value in postoperative clinical course – A case report. | 159 |
| <i>Ragauskas, A., Daubaris, G., Petkus, V., Sliteris, R., Raisutis, R., Piper, I., Rocka, S., Jarzemskas, E., Matijosaitis, V.:</i> Clinical study of craniospinal compliance non-invasive monitoring method | 165 |
| <i>Puppo, C., Fariña, G., López Franco, L., Caragna, E., Biestro, A.:</i> Cerebral CO ₂ reactivity in severe head injury. A transcranial Doppler study. | 171 |
| <i>Shiogai, T., Ikeda, K., Morisaka, A., Nagakane, Y., Mizuno, T., Nakagawa, M., Furuhata, H.:</i> Acetazolamide vasoreactivity evaluated by transcranial power harmonic imaging and Doppler sonography | 177 |

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <i>Warnat, J., Liebsch, G., Stoerr, E.-M., Brawanski, A., Woertgen, C.:</i> A new semi-invasive method for two dimensional pO_2 measurements of cortical structures | 185 |
| <i>Vink, R., Bahtia, K.D., Reilly, P.L.:</i> The relationship between intracranial pressure and brain oxygenation following traumatic brain injury in sheep | 189 |
| <i>Koizumi, H., Fujisawa, H., Nomura, S., Kato, S., Kajiwara, K., Fujii, M., Suzuki, M.:</i> Dual microdialysis probe monitoring for patients with traumatic brain injury | 193 |
| <i>Haitsma, I., Rosenthal, G., Morabito, D., Rollins, M., Maas, A.I.R., Manley, G.T.:</i> In vitro comparison of two generations of Licox and Neurotrend catheters. | 197 |
| <i>Nakamura, T., Kuroda, Y., Torigoe, N., Abe, Y., Yamashita, S., Kawakita, K., Kawai, N., Tamiya, T., Itano, T., Nagao, S.:</i> Cerebral metabolism monitoring during hypothermia following resuscitation from cardiopulmonary arrest | 203 |
| <i>Carpenter, K.L.H., Timofeev, I., Al-Rawi, P.G., Menon, D.K., Pickard, J.D., Hutchinson, P.J.:</i> Nitric oxide in acute brain injury: a pilot study of NO_x concentrations in human brain microdialysates and their relationship with energy metabolism | 207 |

PART 4:**Biomedical informatics**

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <i>Shaw, M., Piper, I., Chambers, I., Citerio, G., Enblad, P., Gregson, B., Howells, T., Kiening, K., Mattern, J., Nilsson, P., Ragauskas, A., Sahuquillo, J., Yau, Y., on behalf of the BrainIT Group (www.brainit.org):</i> The brain monitoring with Information Technology (BrainIT) collaborative network: data validation results. | 217 |
| <i>Chambers, I., Gregson, B., Citerio, G., Enblad, P., Howells, T., Kiening, K., Mattern, J., Nilsson, P., Piper, I., Ragauskas, A., Sahuquillo, J., Yau, Y.H., on behalf of the BrainIT Group:</i> BrainIT collaborative network: analyses from a high time-resolution dataset of head injured patients. | 223 |
| <i>Shaw, M., Piper, I.:</i> Pilot application of fractal characterisation and its response to change on physiological wave forms | 229 |

PART 5:**Neuroimaging**

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <i>Firsching, R., Roehl, F.-W., Woischneck, D.-H., John, N., Skalej, M.:</i> The predictive value of ICP as compared to magnetic resonance imaging in comatose patients after head injury | 237 |
| <i>Kawai, N., Nakamura, T., Tamiya, T., Nagao, S.:</i> Metabolic disturbance without brain ischemia in traumatic brain injury: A positron emission tomography study. | 241 |
| <i>Newcombe, V.F.J., Williams, G.B., Nortje, J., Bradley, P.G., Chatfield, D.A., Outtrim, J.G., Harding, S.G., Coles, J.P., Maiya, B., Gillard, J.H., Hutchinson, P.J., Pickard, J.D., Carpenter, T.A., Menon, D.K.:</i> Concordant biology underlies discordant imaging findings: diffusivity behaves differently in grey and white matter post acute neurotrauma | 247 |
| <i>Wolf, S., Kuckertz, N., Bauer, M., Schürer, L., Lumenta, C.:</i> Qualitative aspects of cranial CT perfusion scanning in a mixed neurosurgical patient collective. | 253 |
| <i>Depreitere, B., Aviv, R., Symons, S., Schwartz, M., Coudyzer, W., Wilms, G., Marchal, G.:</i> Study of perfusion in and around cerebral contusions by means of computed tomography | 259 |
| <i>Piechnik, S.K., Summers, P.E., Jezzard, P., Byrne, J.V.:</i> Magnetic resonance measurement of blood and CSF flow rates with phase contrast - normal values, repeatability and CO_2 reactivity | 263 |

PART 6:**ICP: Brain compliance, biophysics, and biomechanics**

| | |
|------------------------------------------------------------------------------------------------------------------------|-----|
| <i>Stiver, S.I., Wintermark, M., Manley, G.T.:</i> Motor trephine syndrome: A mechanistic hypothesis | 273 |
| <i>Gao, C.P., Ang B.T.:</i> Biomechanical modeling of decompressive craniectomy in traumatic brain injury | 279 |

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <i>Pickard, J.D., Czosnyka, Z., Czosnyka, M., Oowler, B., Higgins, J.N.:</i> Coupling of sagittal sinus pressure and cerebrospinal fluid pressure in idiopathic intracranial hypertension - a preliminary report. | 283 |
| <i>Chambers, I.R., Martin, D., Clark, A., Nicklin, A., Mendelow, A.D., Mitchell, P.:</i> The measurement of brain tissue stiffness in-vivo | 287 |
| PART 7: | |
| Stroke, subarachnoid hemorrhage, and intracerebral hematoma | |
| <i>Wang, E., Ho, C.L., Lee, K.K., Ng, I., Ang B.T.:</i> Changes in brain biochemistry and oxygenation in the zone surrounding primary intracerebral hemorrhage | 293 |
| <i>Ang, B.T., Chan, S.P., Lee, K.K., Ng I.:</i> Prediction of early mortality in primary intracerebral hemorrhage in an asian population | 299 |
| <i>Wong, G.K.-C., Ng, S.C.-P., Chan, M.T.-V., Sun, D.T.-F., Lam, W.W.-M., Lam, J.M.-K., Poon, W.S.:</i> Ischemic events after carotid interventions in relationship to baseline cerebrovascular reactivity | 305 |
| <i>Karnchanapandh, K.:</i> Effect of increased intracranial pressure on cerebral vasospasm in SAH. | 307 |
| <i>Chierigato, A., Tanfani, A., Noto, A., Fronza, S., Cocciolo, F., Fainardi, E.:</i> Cerebral blood flow thresholds predicting new hypoattenuation areas due to macrovascular ischemia during the acute phase of severe and complicated aneurysmal subarachnoid hemorrhage. A preliminary study | 311 |
| <i>Qin, Z., Hua, Y., Liu, W., Silbergleit, R., He, Y., Keep, R.F., Hoff, J.T., Xi, G.:</i> Hyperbaric oxygen preconditioning activates ribosomal protein S6 kinases and reduces brain swelling after intracerebral hemorrhage. | 317 |
| <i>Daley, M.L., Narayanan, N., Leffler, C.W., Eide, P.K.:</i> Stroke with subarachnoid hemorrhage: assessment of cerebrovascular pressure regulation and simulated cerebrovascular resistance | 321 |
| <i>Ayer, R.E., Sugawara, T., Zhang, J.H.:</i> Effects of melatonin in early brain injury following subarachnoid hemorrhage | 327 |
| <i>Wong, G.K., Kung, J., Ng, S.C., Zhu, X.L., Poon, W.S.:</i> Decompressive craniectomy for hemispheric infarction: predictive factors for six month rehabilitation outcome | 331 |
| <i>Wang, E., Ho, C.L., Lee, K.K., Ng, I., Ang, B.T.:</i> Effects of temperature changes on cerebral biochemistry in spontaneous intracerebral hematoma | 335 |
| <i>Zanier, E.R., Longhi, L., Fiorini, M., Cracco, L., Bersano, A., Zoerle, T., Branca, V., Monaco, S., Stocchetti, N.:</i> Increased levels of CSF heart-type fatty acid-binding protein and tau protein after aneurysmal subarachnoid hemorrhage. | 339 |
| PART 8: | |
| Experimental studies and models | |
| <i>Zhang, Y., Ang, B.T., Xiao, Z.C., Ng, I.:</i> DNA vaccination against neurite growth inhibitors to enhance functional recovery following traumatic brain injury | 347 |
| <i>Pluta, R., Januszewski, S., Ulamek, M.:</i> Ischemic blood-brain barrier and amyloid in white matter as etiological factors in leukoaraiosis | 353 |
| <i>Jadhav, V., Yamaguchi, M., Obenaus, A., Zhang, J.H.:</i> Matrix metalloproteinase inhibition attenuates brain edema after surgical brain injury | 357 |
| <i>Hua, Y., Tang, L., Keep, R.F., Hoff, J.T., Heth, J., Xi, G., Muraszko, K.M.:</i> Thrombin enhances glioma growth | 363 |
| <i>Lee, S., Jadhav, V., Ayer, R., Rojas, H., Hyong, A., Lekic, T., Stier, G., Martin, R., Zhang, J.H.:</i> The antioxidant effects of melatonin in surgical brain injury in rats. | 367 |
| <i>Kolar, M., Pacht, J., Tomasova, H., Haninec, P.:</i> Dynamics of matrix-metalloproteinase 9 after brain trauma – results of a pilot study. | 373 |

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <i>Thomas, S., Herrmann, B., Samii, M., Brinker, T.:</i> Experimental subarachnoid hemorrhage in the rat: influences of nimodipine. | 377 |
| <i>Longhi, L., Perego, C., Zanier, E.R., Ortolano, F., Bianchi, P., Stocchetti, N., De Simoni, M.G.:</i> Neuroprotective effect of C1-inhibitor following traumatic brain injury in mice | 381 |
| <i>Toyooka, T., Nawashiro, H., Shinomiya, N., Yano, A., Ooigawa, H., Ohsumi, A., Uozumi, Y., Yanagawa, Y., Matsuo, H., Shima, K.:</i> Up-regulation of L type amino acid transporter 1 after spinal cord injury in rats. | 385 |
| <i>Goodman, J.C., Cherian, L., Robertson, C.S.:</i> Cortical expression of prolactin (PRL), growth hormone (GH) and adrenocorticotrophic hormone (ACTH) is not increased in experimental traumatic brain injury. | 389 |
| <i>Sugawara T., Jadhav, V., Ayer, R., Zhang, J.:</i> Simvastatin attenuates cerebral vasospasm and improves outcomes by upregulation of PI3K/Akt pathway in a rat model of subarachnoid hemorrhage | 391 |
| <i>Chen, W., Jadhav, V., Tang, J., Zhang, J.H.:</i> HIF-1 alpha inhibition ameliorates neonatal brain damage after hypoxic-ischemic injury | 395 |
| <i>Lee, S., Jadhav, V., Lekic, T., Hyong, A., Allard, M., Stier, G., Martin, R., Zhang, J.:</i> Simvastatin treatment in surgically induced brain injury in rats. | 401 |
| <i>Lee, S., Stier, G., Marcantonio, S., Lekic, T., Allard, M., Martin, R., Zhang, J.:</i> 3% Hypertonic saline following subarachnoid hemorrhage in rats | 405 |
| <i>Longhi, L., Ortolano, F., Zanier, E.R., Perego, C., Stocchetti, N., De Simoni, M.G.:</i> Effect of traumatic brain injury on cognitive function in mice lacking p55 and p75 tumor necrosis factor receptors | 409 |
| <i>Vilalta, A., Sahuquillo, J., Poca, M.A., De Los Rios, J., Cuadrado, E., Ortega-Aznar, A., Riveiro, M., Montaner, J.:</i> Brain contusions induce a strong local overexpression of MMP-9. Results of a pilot study | 415 |
| <i>Nakagawa, A., Fujimura, M., Kato, K., Okuyama, H., Hashimoto, T., Takayama, K., Tominaga, T.:</i> Shock wave-induced brain injury in rat: Novel traumatic brain injury animal model | 421 |
| <i>Taya, K., Gulsen, S., Okuno, K., Prieto, R., Marmarou, C.R., Marmarou, A.:</i> Modulation of AQP4 expression by the selective V1a receptor antagonist, SR49059, decreases trauma-induced brain edema | 425 |
| <i>Okuno, K., Taya, K., Marmarou, C.R., Ozisik, P., Fazzina, G., Kleindienst, A., Gulsen, S., Marmarou, A.:</i> The modulation of aquaporin-4 by using PKC-activator (phorbol myristate acetate) and V1a receptor antagonist (SR49059) following middle cerebral artery occlusion/reperfusion in the rat. | 431 |
| <i>Goodman, J.C., Van, M., Gopinath, S.P., Robertson, C.S.:</i> Pro-inflammatory and pro-apoptotic elements of the neuroinflammatory response are activated in traumatic brain injury | 437 |
| <i>Voigt, C., Förschler, A., Jaeger, M., Meixensberger, J., Küppers-Tiedt, L., Schuhmann, M.U.:</i> Protective effect of hyperbaric oxygen therapy on experimental brain contusions | 441 |
| Author index | 447 |
| Index of keywords | 451 |