AN-1304-004
EFFECTS OF XENON ANESTHESIA ON CEREBRAL BLOOD FLOW IN NEUROSURGICAL PATIENTS WITHOUT INTRACRANIAL HYPERTENSION
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Among anesthetic agents used in neurosurgery xenon appears to be the most advantageous. It preserves arterial blood pressure, assures rapid recovery and neuroprotection. But the data is lacking on xenon effect upon cerebral blood flow under anesthetic conditions. We measured flow velocity in middle cerebral artery in neurosurgical patients without intracranial hypertension during closed circuit xenon anesthesia comparing propofol and xenon effect in the same patients. In our study xenon didn’t seem to induce clinically relevant changes in cerebral blood flow and preserved cerebral vascular reactivity thus proving its safety in patients without intracranial hypertension.
Key words: xenon anesthesia, cerebral blood flow, cerebral blood flow velocity, cerebral autoregulation.

AN-1304-009
PREVENTION OF COGNITIVE DISORDERS IN POSTOPERATIVE PERIOD AFTER CAROTID ENDARTERECTOMY
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238 patients with atherosclerosis of carotid arteries after reconstructive operations under different types of anesthesia were enrolled in the study. Neuropsychological survey with Montreal cognitive assessment scale, frontal assessment battery and clock drawing test was performed in dynamics. Minimal cognitive dysfunction was mentioned in patients with symptomatic and asymptomatic stenosis after combined anesthesia with regional anesthesia. Postoperative cognitive dysfunction was developed after sevoflurane and propofol anesthesia in patients with asymptomatic stenosis. After inhalation anesthesia it was more severe. Prevention of postoperative cognitive dysfunction with ceraxon was clinically effective. This therapy can facilitate mental functions recovery and improve quality of life.
Key words: propofol, sevoflurane, combined anesthesia, regional anesthesia, carotid endarterectomy, postoperative cognitive dysfunction, ceraxon.

AN-1304-014
MASS-SPECTROMETRIC CONTROL OF COMPOUND A DURING MINIMAL FLOW ANESTHESIA AND ITS INFLUENCE ON LIVER AND KIDNEYS FUNCTIONS
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The article contains results of mass-spectrometric control of sevoflurane and compound A concentrations during inhalation anesthesia with minimal flow (0.5 l/min) and its influence on liver and kidney function. 40 patients (ASA-I-II) were included in the study. Transsphenoidal pituitary adenomectomy was performed in all cases. Patients didn’t have any signs of liver or kidneys disfunctions preoperatively. We used quadrupole mass spectrometer "Prisma Plus» (Pfeiffer vacuum, Germany) to determine the real time concentration of sevoflurane and compound A. Intensity of m/z = 131 peak sevoflurane and m/z = 128 peak compound A were registered. Laboratory blood tests to assess liver and kidney function were carried out before anesthesia, after anesthesia, and on the 1st day after anesthesia. They included: AST, ALT, total bilirubin, total protein, urea, creatinine. Quantitative analysis of the compound A and blood test before and after anesthesia showed only a tendency to increase biochemical markers levels within normal range, except small, but significant, AST elevation and total protein reduction in postoperative period. We concluded that maximal registered level of compound A (275 ppm/h) during minimal flow anesthesia didn’t associate with significant liver and kidneys injury in healthy patients.
Key words: anesthesia, sevoflurane, compound A, mass-spectrometry, minimal flow.

AN-1304-018
PATIENT POSITIONING ON THE OPERATING TABLE IN NEUROSURGERY: SITTING OR LYING
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Efficacy and safety of microvascular decompression of trigeminal nerve depending on the position on the operating table were assessed in 200 neurosurgical patients in retrospective observational study. It was shown that effi cacy doesn’t depend on positioning. Lying position eliminates probability of such complications as postural hypotension, hypotension during surgery, tension pneumocephalus and peripheral nerves injury. Sitting position increases risk of air venous embolism by 25 times. Lying position increases risk
of postoperative nasal liquorhea by 4 times, but eliminates risk of postoperative paresis of trigeminal nerve. It is also decreases risk of corneal reflex reduction by 3 times, hyperpathia by 2 times and paresthesias by 5 times, but increases probability of postoperative hyperesthesia by 4 times. Microvascular decompression of trigeminal nerve in lying position is safer than similar operation in sitting position.

Key words: posterior fossa surgery, sitting position, lying position, intraoperative complications.

AN-1304-026
MORPHOLOGICAL CHANGES IN THE LUMBAR DORSAL ROOT GANGLION OF THE DOMESTIC PORCINE AFTER PULSED RADIOFREQUENCY
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Pulsed radiofrequency (PRF) is a percutaneous minimal invasive procedure that can be used when conservative pain therapy methods have been ineffective. The effectiveness of PRF was demonstrated in various good quality randomized controlled studies, but mechanisms of action are still unclear. The aim of our study is to analyse the histological effects of PRF on the domestic porcine dorsal root ganglion (DRG), and evaluate the expression of biomarkers in gangliocytes. 3 domestic porcines were investigated. Under general anaesthesia and X-ray control, DRG PRF was performed. Four lumbar DRGs (L1, L2, L3, L4) were randomly treated. The opposite side DRGs was used as control. One month after the procedure the animal was euthanized. The lumbar region of the spine was placed in 10% formaldehyde for a month. After this fixation DRG samples were prepared for slide analysis. They were embedded in paraffin in order to obtain 3μm thick sections, which were then cut by microtome and collected on slide glasses. Using standard immunohistochemical 26 reactions, the materials were tinted to define biomarkers NF, GFAP, Hsp-70 expression and apoptosis by TUNEL kit. The number of cells with NF (26,0 ± 3,0 vs 16,1 ± 3,3; p<0,05), GFAP (12,0 ± 1,3 vs 3,2 ± 0,9; p<0,05) and Hsp-70 (10,0 ± 1,6 vs 4,2 ± 1,0; p<0,05) expression, were larger in the PRF side comparing with the control side. Additionally, glial cells in spinal ganglia of both sides demonstrated immunoreactivity. The instances of apoptosis were not significantly different, in statistical terms, between the control and experimental sides (18,0 ± 4,0 vs 20,0 ± 4,0; p=0,35). PRF in spinal gangliocytes of lumbar region increases neural tissue cytoskeleton factors like NF and GFAP suggesting about active regeneration processes into the cells 1 month after the procedure. Spinal gangliocytes one month after PRF treatment notably increases Hsp-70 expression suggesting about activation of cellular activity and inhibitory role reducing of oxidative stress. Similar number of apoptotic cells in spinal ganglia of lumbar region after PRF and control side suggests about inhibitory role of PRF on programmed cell death and stimulation of cell survival.

Key words: pulsed radiofrequency, morphology, dorsal ganglion root, growth factors-apoptosis, stress markers.

AN-1304-031
CEREBRAL AND EXTRACEREBRAL INSUFFICIENCY IN PATIENTS WITH POOR PROGNOSIS OF SURGICAL TREATMENT OF HEMORRHAGIC STROKE.
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Objective of the study was to investigate cerebral and extracerebral insufficiency in survived and died patients after surgical treatment of hemorrhagic stroke for outcome prognosis and decision making on postoperative intensive care. The study included 224 patients after transcranial surgery for hemorrhagic stroke. 119 patients survived and 105 patients died. SOFA scale and SIRS criteria were used to assess severity of the patients state. Hemorrhagic stroke before the operation was accompanied with cerebral insufficiency (Glasgow Coma Scale . 9) in 19% of patients. Lungs and kidneys dysfunction (SOFA = 1-2) were common. In the early postoperative period 54% of patients had cerebral insufficiency and 36% - organ dysfunction. Acute cerebral insufficiency was closely associated with systemic inflammatory response. Severity of organs (heart, lungs, kidneys) failure and SIRS correlated with GCS score in early postoperative period. There was close correlation between MODS and SIRS scores in survived patients and there wasn’t such phenomenon in died patients. This indicates leading role of CNS in homeostasis regulation. SOFA scale using for express diagnosis of perioperative complications is useful for providing adequate intensive therapy.

Key words: hemorrhagic stroke, cerebral insufficiency, systemic inflammatory response syndrome, organ failure, multiple organ failure.

AN-1304-037
PERFUSION-METABOLIC INTERACTION IN ACUTE CEREBRAL INSUFFICIENCY. ACIPS STUDY PART I. CEREBRAL BLOOD FLOW EVALUATION.
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Basic physiological position that metabolic requirements of brain determine perfusion characteristics of cerebral blood flow underlies the definition of syndrome of acute cerebral insufficiency. So there is a perfusion-metabolic interaction (PMI) in brain tissue at every moment. Based on this paradigm we should synchronize measurement of these components in intensive care practice. The goal of ACIPS study (Acute Cerebral Injury Protection System) is creating methodology of monitoring PMI and treatment algorithm based on this monitoring. In this article we present data that volume cerebral blood flow can be assessed by summing volume blood flows on brachiocephalic vessels measured with triplex ultrasound. Such results are comparable with CT-perfusion results. Both methods can be used interchangeably if difference in -0.6 — 11.8 ml/kg/min isn’t clinical significant.

Key words: acute cerebral insufficiency, neuromonitoring, perfusion-metabolic conjugation, ultrasound, cerebral blood flow.

AN-1304-042
DYNAMICS OF INTRACRANIAL PRESSURE IN PATIENTS WITH MASSIVE ISCHEMIC STROKE AFTER DECOMPRESSIVE CRANIOTOMY
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The goal of the study was assessment of the value of ICP monitoring in patients with massive ischemic stroke after decompressive craniotomy. 12 patients with massive ischemic stroke were performed ICP monitoring after decompressive craniotomy. We identified 3 types of ICP dynamics: a) normal ICP, which no need to treat; b) ICP elevation to 20 mm Hg and more in postoperative period, which can be treated by nonsurgical therapy; c) refractory to therapy ICP elevation to 20 mm Hg and more with development of intracranial hypertension. We consider that ICP monitoring in patients with massive ischemic stroke after decompressive craniotomy can be useful for optimization of the therapy and correction of intracranial hypertension.

Key words: massive ischemic stroke, intracranial pressure, ICP, decompressive craniotomy.

AN-1304-044
ICP PLATEAU WAVES IN PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY
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The goal of the study was to assess frequency of plato waves, their influence on outcomes and define factors leading to plato waves. Ninety eight patients with severe traumatic brain injury (TBI) were included. Blood pressure (BP), intracranial pressure (ICP), cerebral perfusion pressure (CPP) and pressure reactivity index (Prx) were registered. Age was 34 ± 13.6. There were 73 male and 25 female. Glasgow Coma Scale (GCS) was 6 ± 1.4. Plato waves developed in 24 patients (group 1), 74 patients (group 2) did not have plato waves. Median of plato waves in the 1st group was 7 [3.5;7]. They developed on 3rd [2;4.5] day. Maximum level of ICP during plato waves was 47.5 [40;53] mmHg, its duration was 8.5 [7;27] minutes. In the group 1 Prx was significantly lower during first day, than in the group 2. Duration of ICP monitoring was longer in the group 1 due to presence of plato waves in these patients. CPP did not differ in groups, because CPP was strictly controlled. Patients of the group 1 had preserved autoregulation and less severe trauma (predominance of closed trauma and Marshall I, II type of brain damage). Plato waves did not predict bad outcomes.

Key words: ICP monitoring; plato waves, traumatic brain injury.

AN-1304-050
CITICOLINE AS COMPONENT OF THE THERAPY OF POSTOPERATIVE DELIRIUM IN NEUROSURGICAL PATIENTS.
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Delirium is a clinical sign of acute cerebral dysfunction. It is characterized by consciousness alterations with attention impairment and mental disorganization. Frequency of delirium is 40-80% in general intensive care and more in patients in neurointensive care unit. We tried to assess citicoline (Ceraxon©, Nycomed) safety and efficacy in treatment of postoperative delirium in patients with tumors of chiasm-sellar area of brain. 12 patients were included in citicoline group and 8 — in control group. In both group combined type of delirium was common: 83.3% and 75%, accordingly. Citicoline didn’t influence on delirium duration. Median of duration of mechanical ventilation was 1.5 and 6 days; mean and standard deviation were 10.5±15.4 and 17.5±27.9 days. Median of length of stay in ICU was 7 and 9.5 days; mean and standard deviation were 25.4±33.1 and 14.9±15.1 days. These results show that citicoline didn’t influence on duration of mechanical ventilation and length of stay in ICU. Outcomes were similar in both groups, but frequency of full functional
state recovery in citicoline group was significantly higher: 5 (41.7%) to 2 (25%) in control group (p<0.05). We consider that citicoline therapy is safe for patients with tumors of chiasm-sellar area and lead to increasing of frequency of full functional state recovery.

Key words: delirium, tumors of chiasm-sellar area, complicated postoperative period, citicoline.

AN-1304-054
INFLUENCE OF CEREBRAL PERFUSION PRESSURE AND CARDIAC OUTPUT ON BRAIN OXYGENATION AND METABOLISM
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The article contains results of examination of correlation between systemic hemodynamic and brain oxygenation and metabolism in patients with intracranial hemorrhage. Cardiac index (CI) and cerebral perfusion pressure (CPP) levels were compared to brain oxygenation and metabolism in 8 patients with intracranial hemorrhage (137 measurements). CI alterations didn’t influence on PbrO2, glucose level or lactate/pyruvate ratio in the brain interstitial fluid in patients with traumatic brain injury. CPP elevation led to cerebral metabolism improvement. Optimal metabolic state was mentioned in CPP > 80 mm Hg. CPP elevation led to PbrO2 increasing in patients with subarachnoid hemorrhage due to aneurism rupture. This phenomenon can be explained by damage mechanisms of cerebral blood flow autoregulation. In these cases CI elevation was accompanied by worsening of aerobic metabolism in theoretically intact regions and improving it in injured brain regions.

Key words: cerebral blood flow autoregulation, cerebral perfusion pressure, cardiac output, brain oxygenation, cerebral metabolism, traumatic brain injury, subarachnoid hemorrhage, lactate/pyruvate ratio.

AN-1304-059
PROGNOSTIC VALUE OF D-DIMER LEVEL IN NEUROSURGICAL PATIENTS BEFORE ELECTIVE HOSPITALIZATION
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Deep vein thrombosis and pulmonary embolism in postoperative period are very dangerous complications for patient with any surgical pathology. Frequency of deep vein thrombosis in neurosurgical patient can be up to 25-30%. D-dimer level is considered as one of the most reliable indicator of thrombosis. We measured D-dimer level before hospitalization for elective surgery in 4052 patients with different neurosurgical pathology. It was found clear correlation with elevated D-dimer level and frequency of ultrasound signs of thrombosis. In patients with simultaneous presence of elevated D-dimer level and external signs of varicose veins diagnosis was confirmed by ultrasound in every cases. We consider that D-dimer can be reliable screening method for assessment the risk of thrombosis in neurosurgical patients in preoperative period.

Key words: D-dimer, deep vein thrombosis, risk assessment, neurosurgery.

AN-1304-063
ENDOSCOPIC DIAGNOSIS, TREATMENT AND PREVENTION OF INTUBATION RELATED INJURIES OF LARYNX AND TRACHEA IN NEUROSURGICAL PATIENTS
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The goal of the study was to assess of efficacy of endoscopic diagnosis, prevention and treatment of intubation related larynx and tracheal injuries in patients with acute neurosurgical pathology and prolonged mechanical ventilation. 199 patients with different neurosurgical pathology were enrolled in the study group. Mean age was 50±14. Control group consisted of 399 patient. Mean age was 43±12. Clinical state of patient from both group were similar. Endoscopic method in the study group included revision of airways via nasal route with tracheostomy tube inserted. Larynx and tracheal injuries by endoscopy were identified in 42 patients (33.6%) in the study group and in 12 patients (7.6) in the control group. Such injuries weren’t mentioned in 83 patients in study group and in 146 patients of the control group. Tracheal stenosis was developed in the study group in 0.8% of patients, which is by 7.9 times lower than in the control group (6.3%). We consider that this result was achieved due to our approach to treatment and prevention of tracheal stenosis.

Key words: tracheal injuries, fiberoptic bronchoscopy, tracheal stenosis, laser photostimulation, tracheoesophageal fistula.

AN-1304-066
NORMOBARIC HYPOXIA INFLUENCE ON CEREBRAL OXYGENATION, METABOLISM AND OXIDATIVE STRESS IN PATIENTS WITH NONTRAUMATIC SUBARACHNOID HEMORRHAGE DUE TO CEREBRAL ANEURYSMS RUPTURE
A.A. Solodov, S.S. Petrikov, E.V. Klychnikova, E.V. Tazina, V.V. Krylov, M.A. Godkov, L.T. Khamidova N.V. Sklifosovsky Research Institute for Emergency Medicine, Moscow, Russian Federation

The article contains results of examination of correlation between systemic hemodynamic and brain oxygenation and metabolism in patients with intracranial hemorrhage. Cardiac index (CI) and cerebral perfusion pressure (CPP) levels were compared to brain oxygenation and metabolism in 8 patients with intracranial hemorrhage (137 measurements). CI alterations didn’t influence on PbrO2, glucose level or lactate/pyruvate ratio in the brain interstitial fluid in patients with traumatic brain injury. CPP elevation led to cerebral metabolism improvement. Optimal metabolic state was mentioned in CPP > 80 mm Hg. CPP elevation led to PbrO2 increasing in patients with subarachnoid hemorrhage due to aneurism rupture. This phenomenon can be explained by damage mechanisms of cerebral blood flow autoregulation. In these cases CI elevation was accompanied by worsening of aerobic metabolism in theoretically intact regions and improving it in injured brain regions.

Key words: cerebral blood flow autoregulation, cerebral perfusion pressure, cardiac output, brain oxygenation, cerebral metabolism, traumatic brain injury, subarachnoid hemorrhage, lactate/pyruvate ratio.
The development of cerebral vasospasm in subarachnoid hemorrhage (SAH) due to cerebral aneurysms rupture results in cerebral circulation disturbances. Application of normobaric hyperoxia can be an effective way for improving of oxygen delivery to injured brain tissues. The purpose of this study was to assess of normobaric hyperoxia influence on intracranial pressure (ICP), cerebral oxygenation and metabolism, oxidative stress and endogenous factors of vascular regulation in 11 critically ill patients with nontraumatic SAH due to cerebral aneurysms rupture. Increase of FiO2 from 0.3 to 0.5 and 1.0 was accompanied with brain oxygen tension (PbrO2) increase and cerebral extraction ratio for oxygen (O2ER) decrease. Application of normobaric hyperoxia had no effect on ICP, cerebral perfusion pressure, arterial blood pressure and cerebral metabolism. The results obtained from patients with nontraumatic SAH showed an evident increase of oxidative stress which had a significant effect on vascular endothelial function, causing an imbalance in the endogenous regulation of vascular tone. Application of normobaric hyperoxia was not accompanied by an increase of free-radical processes in critically ill patients with nontraumatic SAH due to cerebral aneurysms rupture.

Key words: subarachnoid hemorrhage; cerebral aneurysms rupture; cerebral vasospasm; normobaric hyperoxia; cerebral oxygenation and metabolism; oxidative stress; nitric oxide.

AN-1304-071
CORONARY ARTERY STENTS AND NEUROSURGERY: CHOOSING THE LESSER OF TWO EVILS
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Patients with coronary artery stents are extremely dependent on antiplatelet therapy whose discontinuation may lead to stent thrombosis with major cardiac adverse events. In neurosurgery chronic antiplatelet medications uptake is supposed to be the major factor of postoperative intracranial hematoma associated with poor outcome and high mortality. Thus planning neurosurgical procedure in patients with coronary stents needs a thorough evaluation of all risk factors pondering possible profit and danger. We discuss current recommendations on perioperative management for high risk bleedingsurgery in high risk thrombosis patients emphasizing the role of individual approach and multidisciplinary collaboration.

Key words: postoperative hematoma, neurosurgery; coronary artery stent, stent thrombosis, dual antiplatelet therapy.