

# Entropy Publications Reference List June 2016

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## PEER-REVIEWED ARTICLES

- Abdelmageed, W.M., *et al.* Preoperative paracetamol infusion reduces sevoflurane consumption during thyroidectomy under general anesthesia with spectral entropy monitoring. *Egyptian Journal of Anaesthesia*, **30(2)**, 115–122 (2014)
- Absalom A.R. and Menon D.K. BIS and spectral entropy monitoring during sedation with midazolam/remifentanil and dexmedetomidine/remifentanil. *Crit Care*. **13(2)**, 137 (2009)
- Aho, A. J., *et al.* Comparison of Bispectral Index and Entropy values with electroencephalogram during surgical anaesthesia with sevoflurane. *British Journal of Anaesthesia*, **115(2)**, 258–266 (2015)
- Aho, A. J., *et al.* Elevated BIS and Entropy values after sugammadex or neostigmine: an electroencephalographic or electromyographic phenomenon? *Acta Anaesthesiologica Scandinavica*, **56(4)**, 465–473 (2012).
- Aho, A. J., *et al.* Explaining Entropy responses after a noxious stimulus, with or without neuromuscular blocking agents, by means of the raw electroencephalographic and electromyographic characteristics. *British Journal of Anaesthesia*, **106(1)**, 69–76 (2011).
- Aho, A. J., *et al.* Facial muscle activity, Response Entropy, and State Entropy indices during noxious stimuli in propofol--nitrous oxide or propofol--nitrous oxide--remifentanil anaesthesia without neuromuscular block. *British Journal of Anaesthesia*, **102(2)**, 227–233 (2009).
- Aho, A. J., *et al.* Can electromyographic arousal be detected visually on the Datex-Ohmeda S/5™ Anesthesia Monitor? *Acta Anaesthesiologica Scandinavica*, **57(3)**, 364–372 (2013).
- Aimé, I., *et al.* Effect of age on the comparability of bispectral and state entropy indices during the maintenance of propofol--sufentanil anaesthesia. *British Journal of Anaesthesia*, 457 (2012).
- Aimé, I., *et al.* Does monitoring bispectral index or spectral entropy reduce sevoflurane use? *Anesthesia and Analgesia*, **103(6)**, 1469–1477. (2006).
- Anderson, R. E., *et al.* Entropy during propofol hypnosis, including an episode of wakefulness. *Anaesthesia*, **59(1)**, 52–56 (2004).
- Anderson, R. E., *et al.* Entropy of EEG during anaesthetic induction: a comparative study with propofol or nitrous oxide as sole agent†. *British Journal of Anaesthesia*, **92(2)**, 167–170 (2004).
- Arnold, G., *et al.* BIS and Entropy in the elderly. *Anaesthesia*, **62(9)**, 907–912 (2007).
- Arutiunian, O. M., *et al.* [Role of entropy-based neuromonitoring during cardiac surgery]. *Anesteziol Reanimatol*, **5**, 78–82 (2010) Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/21395148>
- Bajwa, S. J. S., *et al.* Influence of esmolol on requirement of inhalational agent using entropy and assessment of its effect on immediate postoperative pain score. *Indian Journal of Anaesthesia* **56(6)**, 535 (2012).
- Balci, C., *et al.* Comparison of entropy and bispectral index during propofol and fentanyl sedation in monitored anaesthesia care. *Journal of International Medical Research* **37(5)**, 1336–1342 (2009).
- Barnard, J. P., *et al.* Can anaesthetists be taught to interpret the effects of general anaesthesia on the electroencephalogram? Comparison of performance with the BIS and spectral entropy. *British Journal of Anaesthesia* **99(4)**, 532–537 (2007).
- Baughman, V. L., *et al.* Recovery from paralysis with succinylcholine increased Response entropy and EMG but not State entropy. *Journal of Clinical Monitoring and Computing* **19(3)**, 201–205 (2005).
- Baulig, W., *et al.* Comparison of spectral entropy and bispectral index electroencephalography in coronary artery bypass graft surgery. *Journal of Cardiothoracic and Vascular Anesthesia* **24(4)**, 544–549 (2010)
- Bein, B. Entropy. *Best Practice & Research Clinical Anaesthesiology*, **20(1)**, 101–109 (2006).
- Bharne, S., *et al.* Comparison of intravenous labetalol and bupivacaine scalp block on the hemodynamic and entropy changes following skull pin application: A randomized, open label clinical trial. *Asian Journal of Neurosurgery* **11(1)**, 60 (2016).
- Bhaskara, B., *et al.* Effect of breastfeeding on hemodynamics and consumption of propofol and sevoflurane: A state entropy guided comparative study. *Indian Journal of Anaesthesia* **60(3)**, 180 (2016).
- Bonhomme, V., *et al.* Correlation and agreement between bispectral index and state entropy of the electroencephalogram during propofol anaesthesia. *British Journal of Anaesthesia*, **97(3)**, 340–346 (2006).

- Bruhn, J., *et al.* Depth of anaesthesia monitoring: what's available, what's validated and what's next? *British Journal of Anaesthesia*, **97(1)**, 85–94 (2006).
- Chakrabarti, D., *et al.* ECG contamination of EEG signals: effect on entropy. *Journal of Clinical Monitoring and Computing*, 1–4 (2015).
- Chazot, T., *et al.* Detection of gas embolism by bispectral index and entropy monitoring in two cases. *Anesthesiology*, **101(4)**, 1053–1054 (2004).
- Choi, S. R., *et al.* Spectral entropy monitoring allowed lower sevoflurane concentration and faster recovery in children. *Acta Anaesthesiologica Scandinavica*, **54(7)**, 859–862 (2010).
- Davidson, A. J., *et al.* Performance of entropy and Bispectral Index as measures of anaesthesia effect in children of different ages. *British Journal of Anaesthesia*, **95(5)**, 674–679 (2005).
- Davidson, A. J., *et al.* Entropy and bispectral index during anaesthesia in children. *Anaesthesia and Intensive Care*, **32(4)**, 485 (2004).
- Davidson, A. J. *et al.* Measuring anesthesia in children using the EEG. *Pediatric Anesthesia*, **16(4)**, 374–387 (2006).
- Davidson, A. J. *et al.* Monitoring the anaesthetic depth in children--an update. *Current Opinion in Anesthesiology*, **20(3)**, 236–243 (2007).
- Duncan, D., *et al.* A comparison of bispectral index and entropy monitoring, in patients undergoing embolization of cerebral artery aneurysms after subarachnoid haemorrhage. *British Journal of Anaesthesia*, **96(5)**, 590–596 (2006).
- El Hor, T., *et al.* Impact of entropy monitoring on volatile anesthetic uptake. *Anesthesiology*, **118(4)**, 868–873 (2013).
- Ellerkmann, R. K., *et al.* Spectral entropy and bispectral index as measures of the electroencephalographic effects of sevoflurane. *Anesthesiology*, **101(6)**, 1275–1282 (2004).
- Ellerkmann, R. K., *et al.* Spectral entropy and bispectral index as measures of the electroencephalographic effects of propofol. *Anesthesia & Analgesia*, **102(5)**, 1456–1462 (2006).
- Enlund, M., *et al.* A comparison of auditory evoked potentials and spectral EEG in the ability to detect marked sevoflurane concentration alterations and clinical events. *Uppsala Journal of Medical Sciences*, **112(2)**, 221–229 (2007).
- Feld, J., *et al.* Response entropy is more reactive than bispectral index during laparoscopic gastric banding. *Journal of Clinical Monitoring and Computing*, **20(4)**, 229–234 (2006).
- Ferenets, R., *et al.* Behavior of Entropy/Complexity Measures of the Electroencephalogram during Propofol-induced Sedation Dose-dependent Effects of Remifentanyl. *Anesthesiology*, **106(4)**, 696–706 (2007).
- Gao, J. D., *et al.* Evaluation of entropy for monitoring the depth of anesthesia compared with bispectral index: a multicenter clinical trial. *Chinese Medical Journal*, **125(8)**, 1389–1392 (2012).
- Ghodki, P. S., *et al.* Dexmedetomidine as an anesthetic adjuvant in laparoscopic surgery: An observational study using entropy monitoring. *Journal of Anaesthesiology Clinical Pharmacology*, **28(3)**, 334 (2012).
- Gjerstad, A. C., *et al.* Comparison of skin conductance with entropy during intubation, tetanic stimulation and emergence from general anaesthesia. *Acta Anaesthesiologica Scandinavica*, **51(1)**, 8–15 (2007).
- Gjerstad, A. C., *et al.* Skin conductance or entropy for detection of non-noxious stimulation during different clinical levels of sedation. *Acta Anaesthesiologica Scandinavica*, **51(1)**, 1–7 (2007).
- Gruenewald, M., *et al.* M-Entropy guidance vs standard practice during propofol-remifentanyl anaesthesia: a randomised controlled trial\*. *Anaesthesia*, **62(12)**, 1224–1229 (2007).
- Guerrero, J. L., *et al.* Response entropy changes after noxious stimulus. *Journal of Clinical Monitoring and Computing*, **26(3)**, 171–175 (2012).
- Hadzidiakos, D., *et al.* Subjective assessment of depth of anaesthesia by experienced and inexperienced anaesthetists. *European Journal of Anaesthesiology*, **23(04)**, 292–299 (2006).
- Haenggi, M., *et al.* Entropy and bispectral index for assessment of sedation, analgesia and the effects of unpleasant stimuli in critically ill patients: an observational study. *Critical Care*, **12(5)**, R119 (2008).

- Haenggi, M., *et al.* Auditory event-related potentials, bispectral index, and entropy for the discrimination of different levels of sedation in intensive care unit patients. *Anesthesia & Analgesia*, **109(3)**, 807–816 (2009).
- Haenggi, M., *et al.* Intra-and inter-individual variation of BIS-index and Entropy during controlled sedation with midazolam/remifentanil and dexmedetomidine/remifentanil in healthy volunteers: an interventional study. *Crit Care*, **13(1)**, R20 (2009).
- Hahn, J.-O., *et al.* Two-stage vs mixed-effect approach to pharmacodynamic modeling of propofol in children using state entropy. *Pediatric Anesthesia*, **21(6)**, 691–698 (2011).
- Hans, P., *et al.* Effects of nitrous oxide on spectral entropy of the EEG during surgery under balanced anaesthesia with sufentanil and sevoflurane. *Acta Anaesthesiol Belg*, **56(1)**, 37–43 (2005).
- Hans, P., *et al.* Comparative effects of ketamine on Bispectral Index and spectral entropy of the electroencephalogram under sevoflurane anaesthesia. *British Journal of Anaesthesia*, **94(3)**, 336–340 (2005).
- Hans, P., *et al.* Effect of an intubation dose of rocuronium on Spectral Entropy and Bispectral Index™ responses to laryngoscopy during propofol anaesthesia. *British Journal of Anaesthesia*, **97(6)**, 842–847 (2006).
- Harsoor, S. S., *et al.* Effect of intraoperative Dexmedetomidine infusion on Sevoflurane requirement and blood glucose levels during entropy-guided general anesthesia. *Journal of Anaesthesiology, Clinical Pharmacology*, **30(1)**, 25 (2014).
- Hernández-Gancedo, C., *et al.* Comparing Entropy and the Bispectral index with the Ramsay score in sedated ICU patients. *Journal of Clinical Monitoring and Computing*, **21(5)**, 295–302 (2007).
- Höcker, J., *et al.* Differences between bispectral index and spectral entropy during xenon anaesthesia: a comparison with propofol anaesthesia. *Anaesthesia*, **65(6)**, 595–600 (2010).
- Iannuzzi, M., *et al.* Relationship between bispectral index, electroencephalographic state entropy and effect-site EC50 for propofol at different clinical endpoints. *British Journal of Anaesthesia*, **94(4)**, 492–495 (2005).
- Ikeda, T., *et al.* Influence of hypobaric hypoxia on bispectral index and spectral entropy in volunteers. *Acta Anaesthesiologica Scandinavica*, **53(7)**, 891–894 (2009).
- Jagia, M., *et al.* Comparative Evaluation of Spectral Entropy and Bispectral Index during Propofol/Thiopentone Anaesthesia in Patients with Supratentorial Tumours-A Preliminary Study. *Indian Journal of Anesthesia*, **52(2)**, 175 (2008).
- Jiang, A., *et al.* The Effects of Different Methods of Anaesthesia for Laparoscopic Radical Gastrectomy with Monitoring of Entropy. *Anticancer Research*, **36(3)**, 1305–1308 (2016).
- Kaskinoro, K., *et al.* Wide inter-individual variability of bispectral index and spectral entropy at loss of consciousness during increasing concentrations of dexmedetomidine, propofol, and sevoflurane. *British Journal of Anaesthesia*, **107(4)**, 573–80 (2011).
- Kawaguchi, M., *et al.* Rocuronium dose-dependently suppresses the spectral entropy response to tracheal intubation during propofol anaesthesia. *British Journal of Anaesthesia*, **102(5)**, 667–672 (2009).
- Kawaguchi, M., *et al.* Effect of landiolol on bispectral index and spectral entropy responses to tracheal intubation during propofol anaesthesia. *British Journal of Anaesthesia*, **101(2)**, 273–278 (2008).
- Khan, J., *et al.* Entropy as an indicator of cerebral perfusion in patients with increased intracranial pressure. *Journal of Anaesthesiology, Clinical Pharmacology*, **30(3)**, 409 (2014).
- Khosravi, S., *et al.* A monitor-decoupled pharmacodynamic model of propofol in children using state entropy as clinical endpoint. *Biomedical Engineering, IEEE Transactions on*, **59(3)**, 736–743 (2012).
- Kim, H., *et al.* Transcranial electrical stimulations given for motor-evoked potentials as the cause for elevated bispectral index and entropy during spine surgery. *Journal of Neurosurgical Anesthesiology*, **25(2)**, 217–219 (2013).
- Kim, H.-M., *et al.* Effects of etomidate on bispectral index scale and spectral entropy during induction of anesthesia by means of the raw electroencephalographic and electromyographic characteristics. *Korean Journal of Anesthesiology*, **62(3)**, 230–233 (2012).
- Kim, Y. H., *et al.* Effect of preoperative anxiety on spectral entropy during induction with propofol. *Korean Journal of Anesthesiology*, **65(2)**, 108–113 (2013).
- Klockars, J. G. M., *et al.* Spectral entropy as a measure of hypnosis and hypnotic drug effect of total intravenous anesthesia in children during slow induction and maintenance. *Anesthesiology*, **116(2)**, 340–351 (2012).

- Klockars, J. G. M., *et al.* Spectral entropy as a measure of hypnosis in children. *Anesthesiology*, **104(4)**, 708–717 (2006).
- Kokki, H., *et al.* Regular tramadol use does not affect the propofol dose requirement for induction of anaesthesia. *European Journal of Anaesthesiology*, **24(09)**, 776–781 (2007).
- Kotur, P. F. Editorial: Entropy – A new measure of anaesthetic depth. *Indian Journal of Anaesthesia*, **48(3)**, 170–171. (2004). Retrieved from <http://medind.nic.in/iadt/t04/i3/iadt04i3p170.pdf>
- Kreuzer, M., *et al.* Time delay of monitors of the hypnotic component of anesthesia: analysis of state entropy and index of consciousness. *Anesthesia & Analgesia*, **115(2)**, 315–319 (2012).
- Kwon, M.-Y., *et al.* Spectral entropy for assessing the depth of propofol sedation. *Korean Journal of Anesthesiology*, **62(3)**, 234–239 (2012).
- Laitio, R. M., *et al.* Bispectral index, entropy, and quantitative electroencephalogram during single-agent xenon anesthesia. *Anesthesiology*, **108(1)**, 63–70 (2008).
- Lee, J. Y., *et al.* The effect of spectral entropy monitoring on propofol use and recovery in children. *Anesthesia and Pain Medicine*, **9(2)**, 138–143 (2014).
- Lefoll-Masson, C., *et al.* The comparability of bispectral index and state entropy index during maintenance of sufentanil-sevoflurane-nitrous oxide anesthesia. *Anesthesia & Analgesia*, **105(5)**, 1319–1325 (2007).
- Lehmann, A., *et al.* Bispectral index and electroencephalographic entropy in patients undergoing aortocoronary bypass grafting. *European Journal of Anaesthesiology*, **24(09)**, 751–760 (2007).
- Li, D., *et al.* Multiscale permutation entropy analysis of EEG recordings during sevoflurane anesthesia. *Journal of Neural Engineering*, **7(4)** (2010).
- Liu, N., *et al.* The influence of a muscle relaxant bolus on bispectral and datex-ohmeda entropy values during propofol-remifentanil induced loss of consciousness. *Anesthesia & Analgesia*, **101(6)**, 1713–1718 (2005).
- Liu, N., *et al.* Feasibility of closed-loop titration of propofol and remifentanil guided by the spectral M-Entropy monitor. *Anesthesiology*, **116(2)**, 286–295 (2012).
- Lysakowski, C., *et al.* Bispectral and spectral entropy indices at propofol-induced loss of consciousness in young and elderly patients. *British Journal of Anaesthesia*, **aep162** (2009).
- Mahon, P., *et al.* Behaviour of spectral entropy, spectral edge frequency 90%, and alpha and beta power parameters during low-dose propofol infusion. *British Journal of Anaesthesia*, **101(2)**, 213–221 (2008).
- Mahon, P., *et al.* Can state or response entropy be used as a measure of sleep depth? *Anaesthesia*, **63(12)**, 1309–1313 (2008).
- Mahon, P., *et al.* Spectral entropy as a monitor of depth of propofol induced sedation. *Journal of Clinical Monitoring and Computing*, **22(2)**, 87–93 (2008).
- Maksimow, A., *et al.* Correlation of EEG spectral entropy with regional cerebral blood flow during sevoflurane and propofol anaesthesia\*. *Anaesthesia*, **60(9)**, 862–869 (2005).
- Maksimow, A., *et al.* Assessing the depth of dexmedetomidine-induced sedation with electroencephalogram (EEG)-based spectral entropy. *Acta Anaesthesiologica Scandinavica*, **51(1)**, 22–30 (2007).
- Maksimow, A., *et al.* Increase in high frequency EEG activity explains the poor performance of EEG spectral entropy monitor during S-ketamine anesthesia. *Clinical Neurophysiology*, **117(8)**, 1660–8 (2006).
- Martorano, P., *et al.* Spectral entropy assessment with auditory evoked potential in neuroanesthesia. *Clinical Neurophysiology*, **118(3)**, 505–512 (2007).
- Martorano, P. P., *et al.* Bispectral index and spectral entropy in neuroanesthesia. *Journal of Neurosurgical Anesthesiology*, **18(3)**, 205–210 (2006).
- Mathews, D. M., *et al.* Feasibility study for the administration of remifentanil based on the difference between response entropy and state entropy†. *British Journal of Anaesthesia*, **98(6)**, 785–791 (2007).
- McKay, I. D. H., *et al.* Pharmacokinetic-pharmacodynamic modeling the hypnotic effect of sevoflurane using the spectral entropy of the electroencephalogram. *Anesthesia & Analgesia*, **102(1)**, 91–97 (2006).

- Meybohm, P., *et al.* Correlation and agreement between the bispectral index vs. state entropy during hypothermic cardiopulmonary bypass. *Acta Anaesthesiologica Scandinavica*, **54(2)**, 169–175 (2010).
- Moller, D. H., *et al.* Spectral entropy predicts auditory recall in volunteers. *Anesthesia & Analgesia*, **106(3)**, 873–879 (2008).
- Mowafi, H. A. Spectral entropy as an objective measure of sedation state in midazolam-premedicated patients. *Saudi Journal of Anaesthesia*, **6(2)**, 131 (2012).
- Musialowicz, T., *et al.* Comparison of Spectral Entropy and BIS VISTATM monitor during general anesthesia for cardiac surgery. *Journal of Clinical Monitoring and Computing*, **25(2)**, 95–103 (2011).
- Nishiyama, T., The effects of auditory evoked potential click sounds on bispectral index and entropy. *Anesthesia & Analgesia*, **107(2)**, 545–548 (2008).
- Nunes, R. R., Entropy: A new method of measuring depth of anesthesia. Comparative study with bispectral index during clinical evaluation in tracheal intubation of patients anesthetized with sevoflurane. *Revista Brasileira de Anestesiologia*, **54(3)**, 289–302 (2004).
- Nunes, R. R., *et al.* Spectral entropy: a new method for anesthetic adequacy. *Revista Brasileira de Anestesiologia*, **54(3)**, 404–422 (2004).
- Ozcan, M. S., *et al.* Does nitrous oxide affect bispectral index and state entropy when added to a propofol versus sevoflurane anesthetic? *Journal of Neurosurgical Anesthesiology*, **22(4)**, 309–315 (2010).
- Paisansathan, C., *et al.* Signal persistence of bispectral index and state entropy during surgical procedure under sedation. *The Scientific World Journal*, 5 pages (2012).
- Patel, C. R., *et al.* The effect of dexmedetomidine continuous infusion as an adjuvant to general anesthesia on sevoflurane requirements: a study based on entropy analysis. *Journal of Anaesthesiology Clinical Pharmacology*, **29(3)**, 318 (2013).
- Peeters, E., Automated EEG entropy measurements in coma, vegetative state/unresponsive wakefulness syndrome and minimally conscious state. *Functional Neurology*, **26(1)**, 25 (2011).
- Pilge, S., *et al.* Differences between state entropy and bispectral index during analysis of identical electroencephalogram signals: A comparison with two randomised anaesthetic techniques. *European Journal of Anaesthesiology (EJA)*, **32(5)**, 354–365 (2015).
- Prabhakar, H., *et al.* Isoflurane and sevoflurane decrease entropy indices more than halothane at equal MAC values. *Journal of Anesthesia*, **23(1)**, 154–157 (2009).
- Prabhakar, H., *et al.* EEG entropy values during isoflurane, sevoflurane and halothane anesthesia with and without nitrous oxide. *Journal of Neurosurgical Anesthesiology*, **21(2)**, 108–111 (2009).
- Puttappa, A., *et al.* Large increases in both response and state entropy to awake values antagonized with administration of incremental rocuronium. *British Journal of Anaesthesia*, **115(6)**, 934–935 (2015).
- Rantanen, M., *et al.* Novel multiparameter approach for measurement of nociception at skin incision during general anaesthesia. *British Journal of Anaesthesia*, **96(3)**, 367–376 (2006).
- Rao, A. K., *et al.* Comparison of electroencephalogram entropy versus loss of verbal response to determine the requirement of propofol for induction of general anaesthesia. *Indian Journal of Anaesthesia*, **59(6)**, 348 (2015).
- Reviron, P., *et al.* [Interest of entropy monitoring during low-grade cerebral aneurysm embolisation]. In *Annales francaises d'anesthesie et de reanimation* **27**, 106–107 (2008).
- Riad, W., *et al.* Monitoring with EEG entropy decreases propofol requirement and maintains cardiovascular stability during induction of anaesthesia in elderly patients. *European Journal of Anaesthesiology*, **24(08)**, 684–688 (2007).
- Rinaldi, S., *et al.* State entropy and bispectral index: correlation with end tidal sevoflurane concentrations. *Minerva Anestesiologica*, **73(1-2)**, 39–48 (2006).
- Schmidt, G. N., *et al.* Comparative evaluation of the Datex-Ohmeda S/5 Entropy Module and the Bispectral Index monitor during propofol--remifentanil anesthesia. *Anesthesiology*, **101(6)**, 1283–1290 (2004).
- Schultz, A., *et al.* Comparison of Narcotrend Index, Bispectral Index, spectral and entropy parameters during induction of propofol-remifentanil anaesthesia. *Journal of Clinical Monitoring and Computing*, **22(2)**, 103–111 (2008).

- Seitsonen, E. R. J., *et al.* EEG spectral entropy, heart rate, photoplethysmography and motor responses to skin incision during sevoflurane anaesthesia. *Acta Anaesthesiologica Scandinavica*, **49(3)**, 284–292 (2005).
- Shah, S. B., *et al.* Comparison of hemodynamic effects of intravenous etomidate versus propofol during induction and intubation using entropy guided hypnosis levels. *Journal of Anaesthesiology, Clinical Pharmacology*, **31(2)**, 180 (2015).
- Shalhaf, R., *et al.* Measuring the effects of sevoflurane on electroencephalogram using sample entropy. *Acta Anaesthesiologica Scandinavica*, **56(7)**, 880–889 (2012).
- Sharma, R., *et al.* Monitoring the depth of anaesthesia using the new modified entropy sensors during supratentorial craniotomy: Our experience. *Journal of Neuroanaesthesiology and Critical Care*, **2(1)**, 28 (2015).
- Shepherd, J., *et al.* Clinical effectiveness and cost-effectiveness of depth of anaesthesia monitoring (E-Entropy, Bispectral Index and Narcotrend): a systematic review and economic evaluation. *Health Technology Assessment (Winchester, England)*, **17(34)**, 1–264 (2013).
- Sleigh, J. W., *et al.* Editorial I Entropy is blind to nitrous oxide. Can we see why? *British Journal of Anaesthesia*, **92(2)**, 159–161 (2004).
- Smith, F. J., *et al.* Entropy of the electroencephalogram as applied in the M-Entropy S/5TM Module (GE Healthcare) during increases in nitrous oxide and constant sevoflurane concentrations. *Southern African Journal of Anaesthesia and Analgesia*, **16(4)** (2010).
- Soto, R. G., *et al.* The effect of addition of nitrous oxide to a sevoflurane anesthetic on BIS, PSI, and entropy. *Journal of Clinical Monitoring and Computing*, **20(3)**, 145–150 (2006).
- Soto, R., *et al.* A comparison of bispectral index and entropy, or how to misinterpret both. *Anesthesia & Analgesia*, **100(4)**, 1059–1061 (2005).
- Strandberg, L., *et al.* Electroencephalogram-based indexes indicate the drug effect of the brain, not the (un) consciousness itself. *Anesthesia & Analgesia*, **106(5)**, 1585–1586 (2008).
- Struys, M., *et al.* Changes in a surgical stress index in response to standardized pain stimuli during propofol–remifentanyl infusion. *British Journal of Anaesthesia*, **99(3)**, 359–367 (2007).
- Särkelä, M. O. K., *et al.* Automatic analysis and monitoring of burst suppression in anesthesia. *Journal of Clinical Monitoring and Computing*, **17(2)**, 125–34 (2002).  
Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/12212991>
- Takamatsu, I., *et al.* Entropy indices vs the bispectral index<sup>TM</sup> for estimating nociception during sevoflurane anaesthesia. *British Journal of Anaesthesia*, **96(5)**, 620–626 (2006).
- Talawar, P., *et al.* Entropy monitoring decreases isoflurane concentration and recovery time in pediatric day care surgery—a randomized controlled trial. *Pediatric Anesthesia*, **20(12)**, 1105–1110 (2010).
- Vakkuri, A., *et al.* Time-frequency balanced spectral entropy as a measure of anesthetic drug effect in central nervous system during sevoflurane, propofol, and thiopental anesthesia. *Acta Anaesthesiologica Scandinavica*, **48(2)**, 145–153 (2004).
- Vakkuri, A., *et al.* Spectral entropy monitoring is associated with reduced propofol use and faster emergence in propofol–nitrous oxide–alfentanil anesthesia. *Anesthesiology*, **103(2)**, 274–279 (2005).
- Valjus, M., *et al.* Response Entropy<sup>TM</sup> is not more sensitive than State Entropy<sup>TM</sup> in distinguishing the use of esmolol instead of remifentanyl in patients undergoing gynaecological laparoscopy. *Acta Anaesthesiologica Scandinavica*, **50(1)**, 32–39 (2006).
- Walsh, T. S., *et al.* An assessment of the validity of spectral entropy as a measure of sedation state in mechanically ventilated critically ill patients. *Intensive Care Medicine*, **34(2)**, 308–315 (2008).
- Vanluchene, A. L. G., *et al.* Spectral entropy measurement of patient responsiveness during propofol and remifentanyl. A comparison with the bispectral index. *British Journal of Anaesthesia*, **93(5)**, 645–654 (2004).
- Vanluchene, A. L. G., *et al.* Spectral Entropy as an Electroencephalographic Measure of Anesthetic Drug Effect A Comparison with Bispectral Index and Processed Midlatency Auditory Evoked Response. *Anesthesiology*, **101(1)**, 34–42 (2004).
- Varma, P., *et al.* Comparison of subarachnoid block with bupivacaine and bupivacaine with fentanyl on entropy and sedation: A prospective randomized double-blind study. *Journal of Anaesthesiology, Clinical Pharmacology*, **30(4)**, 543 (2014).

- Vassiliadis, M., *et al.* Awareness despite low spectral entropy values. *Anesthesia & Analgesia*, **105(2)**, 535 (2007).
- Weil, G., *et al.* Does spectral entropy reflect the response to intubation or incision during propofol-remifentanil anesthesia? *Anesthesia & Analgesia*, **106(1)**, 152–159 (2008).
- Wennervirta, J. E., *et al.* Hypothermia-treated cardiac arrest patients with good neurological outcome differ early in quantitative variables of EEG suppression and epileptiform activity\*. *Critical Care Medicine*, **37(8)**, 2427–2435 (2009).
- Wennervirta, J., *et al.* Entropy is more resistant to artifacts than bispectral index in brain-dead organ donors. *Intensive Care Medicine*, **33(1)**, 133–136 (2007).
- Vereecke, H. E. M., *et al.* The effects of ketamine and rocuronium on the A-Line{®} auditory evoked potential Index, Bispectral Index, and spectral entropy monitor during steady state propofol and remifentanil anesthesia. *Anesthesiology*, **105(6)**, 1122–1134 (2006).
- Wheeler, P., *et al.* Response entropy increases during painful stimulation. *Journal of Neurosurgical Anesthesiology*, **17(2)**, 86–90 (2005).
- White, P. F., *et al.* A comparison of state and response entropy versus bispectral index values during the perioperative period. *Anesthesia & Analgesia*, **102(1)**, 160–167 (2006).
- Viertiö-Oja, H., *et al.* Description of the Entropy algorithm as applied in the Datex-Ohmeda S/5 Entropy Module. *Acta Anaesthesiologica Scandinavica*, **48(2)**, 154–61 (2004).  
Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/14995936>
- Wu, S.-C., *et al.* Use of spectral entropy monitoring in reducing the quantity of sevoflurane as sole inhalational anesthetic and in decreasing the need for antihypertensive drugs in total knee replacement surgery. *Acta Anaesthesiologica Taiwanica*, **46(3)**, 106–111 (2008).
- Xue, Z. J., *et al.* [Efficacy of entropy index in monitoring nociceptive stimulus in patients undergoing propofol-remifentanil general anesthesia]. *Zhongguo Yi Xue Ke Xue Yuan Xue Bao. Acta Academiae Medicinae Sinicae*, **36(1)**, 68–72 (2014).
- Yen, Y.-H., *et al.* Sex differences in conscious sedation during upper gastrointestinal panendoscopic examination. *Journal of the Formosan Medical Association*, **110(1)**, 44–49 (2011).
- Yli-Hankala, A., Awareness despite low spectral entropy values. *Anesthesia & Analgesia*, **106(5)**, 1585 (2008).

## ARTICLES CATEGORIZED

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## Bypass surgery

Baulig, W., *et al.* Comparison of spectral entropy and bispectral index electroencephalography in coronary artery bypass graft surgery. *Journal of Cardiothoracic and Vascular Anesthesia*, **24(4)**, 544–549 (2010).

Lehmann, A., *et al.* Bispectral index and electroencephalographic entropy in patients undergoing aortocoronary bypass grafting. *European Journal of Anaesthesiology*, **24(09)**, 751–760 (2007).

Meybohm, P., *et al.* Correlation and agreement between the bispectral index vs. state entropy during hypothermic cardiopulmonary bypass. *Acta Anaesthesiologica Scandinavica*, **54(2)**, 169–175 (2010).

## Cardiac surgery

Arutiunian, O. M., *et al.* [Role of entropy-based neuromonitoring during cardiac surgery]. *Anesteziol Reanimatol*, **5**, 78–82 (2010). Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/21395148>

Musialowicz, T., *et al.* Comparison of Spectral Entropy and BIS VISTATM monitor during general anesthesia for cardiac surgery. *Journal of Clinical Monitoring and Computing*, **25(2)**, 95–103 (2011).

## Critical care

Haenggi, M., *et al.* Entropy and bispectral index for assessment of sedation, analgesia and the effects of unpleasant stimuli in critically ill patients: an observational study. *Critical Care*, **12(5)**, R119 (2008).

Haenggi, M., *et al.* Auditory event-related potentials, bispectral index, and entropy for the discrimination of different levels of sedation in intensive care unit patients. *Anesthesia & Analgesia*, **109(3)**, 807–816 (2009).

Hernández-Gancedo, C., *et al.* Comparing Entropy and the Bispectral index with the Ramsay score in sedated ICU patients. *Journal of Clinical Monitoring and Computing*, **21(5)**, 295–302 (2007).

Peeters, E., *et al.* Automated EEG entropy measurements in coma, vegetative state/unresponsive wakefulness syndrome and minimally conscious state. *Functional Neurology*, **26(1)**, 25 (2011).

Walsh, T. S., *et al.* An assessment of the validity of spectral entropy as a measure of sedation state in mechanically ventilated critically ill patients. *Intensive Care Medicine*, **34(2)**, 308–315 (2008).

Wennervirta, J. E., *et al.* Hypothermia-treated cardiac arrest patients with good neurological outcome differ early in quantitative variables of EEG suppression and epileptiform activity\*. *Critical Care Medicine*, **37(8)**, 2427–2435 (2009).

## Desflurane

Vakkuri, A., *et al.* Time-frequency balanced spectral entropy as a measure of anesthetic drug effect in central nervous system during sevoflurane, propofol, and thiopental anesthesia. *Acta Anaesthesiologica Scandinavica*, **48(2)**, 145–153 (2004).

White, P. F., *et al.* A comparison of state and response entropy versus bispectral index values during the perioperative period. *Anesthesia & Analgesia*, **102(1)**, 160–167 (2006).

## Dexmedetomidine

Ghodki, P. S., *et al.* Dexmedetomidine as an anesthetic adjuvant in laparoscopic surgery: An observational study using entropy monitoring. *Journal of Anaesthesiology Clinical Pharmacology*, **28(3)**, 334 (2012).

Haenggi, M., *et al.* Intra- and inter-individual variation of BIS-index and Entropy during controlled sedation with midazolam/remifentanyl and dexmedetomidine/remifentanyl in healthy volunteers: an interventional study. *Crit Care*, **13(1)**, R20. (2009).

Harsoor, S. S., *et al.* Effect of intraoperative Dexmedetomidine infusion on Sevoflurane requirement and blood glucose levels during entropy-guided general anesthesia. *Journal of Anaesthesiology, Clinical Pharmacology*, **30(1)**, 25 (2014).

Kaskinoro, K., *et al.* Wide inter-individual variability of bispectral index and spectral entropy at loss of consciousness during increasing concentrations of dexmedetomidine, propofol, and sevoflurane. *British Journal of Anaesthesia*, **107(4)**, 573–80 (2011).

Maksimow, A., *et al.* Assessing the depth of dexmedetomidine-induced sedation with electroencephalogram (EEG)-based spectral entropy. *Acta Anaesthesiologica Scandinavica*, **51(1)**, 22–30 (2007).

Patel, C. R., *et al.* The effect of dexmedetomidine continuous infusion as an adjuvant to general anesthesia on sevoflurane requirements: a study based on entropy analysis. *Journal of Anaesthesiology Clinical Pharmacology*, **29(3)**, 318 (2013).

### Elderly patient

Aimé, I., *et al.* Effect of age on the comparability of bispectral and state entropy indices during the maintenance of propofol--sufentanil anaesthesia. *British Journal of Anaesthesia*, **aer457** (2012).

Arnold, G., *et al.* BIS and Entropy in the elderly. *Anaesthesia*, **62(9)**, 907–912 (2007).

Lysakowski, C., *et al.* Bispectral and spectral entropy indices at propofol-induced loss of consciousness in young and elderly patients. *British Journal of Anaesthesia*, **aep162** (2009).

Riad, W., *et al.* Monitoring with EEG entropy decreases propofol requirement and maintains cardiovascular stability during induction of anaesthesia in elderly patients. *European Journal of Anaesthesiology*, **24(08)**, 684–688 (2007).

### Etomidate

Kim, H.-M., *et al.* Effects of etomidate on bispectral index scale and spectral entropy during induction of anesthesia by means of the raw electroencephalographic and electromyographic characteristics. *Korean Journal of Anesthesiology*, **62(3)**, 230–233 (2012).

Shah, S. B., *et al.* Comparison of hemodynamic effects of intravenous etomidate versus propofol during induction and intubation using entropy guided hypnosis levels. *Journal of Anaesthesiology, Clinical Pharmacology*, **31(2)**, 180 (2015).

### Halothane

\*Prabhakar, H., *et al.* Isoflurane and sevoflurane decrease entropy indices more than halothane at equal MAC values. *Journal of Anesthesia*, **23(1)**, 154–157 (2009).

\*Prabhakar, H., *et al.* EEG entropy values during isoflurane, sevoflurane and halothane anesthesia with and without nitrous oxide. *Journal of Neurosurgical Anesthesiology*, **21(2)**, 108–111. (2009).

### Isoflurane

Prabhakar, H., *et al.* Isoflurane and sevoflurane decrease entropy indices more than halothane at equal MAC values. *Journal of Anesthesia*, **23(1)**, 154–157 (2009).

Prabhakar, H., *et al.* EEG entropy values during isoflurane, sevoflurane and halothane anesthesia with and without nitrous oxide. *Journal of Neurosurgical Anesthesiology*, **21(2)**, 108–111 (2009).

Talawar, P., *et al.* Entropy monitoring decreases isoflurane concentration and recovery time in pediatric day care surgery—a randomized controlled trial. *Pediatric Anesthesia*, **20(12)**, 1105–1110 (2010).

### Ketamine

Hans, P., *et al.* Comparative effects of ketamine on Bispectral Index and spectral entropy of the electroencephalogram under sevoflurane anaesthesia. *British Journal of Anaesthesia*, **94(3)**, 336–340 (2005).

Maksimow, A., *et al.* Increase in high frequency EEG activity explains the poor performance of EEG spectral entropy monitor during S-ketamine anesthesia. *Clinical Neurophysiology*, **117(8)**, 1660–8 (2006).

Vereecke, H. E. M., *et al.* The effects of ketamine and rocuronium on the A-Line® auditory evoked potential Index, Bispectral Index, and spectral entropy monitor during steady state propofol and remifentanil anesthesia. *Anesthesiology*, **105(6)**, 1122–1134 (2006).

## Midazolam

Haenggi, M., *et al.* Intra- and inter-individual variation of BIS-index and Entropy during controlled sedation with midazolam/remifentanyl and dexmedetomidine/remifentanyl in healthy volunteers: an interventional study. *Crit Care*, **13(1)**, R20 (2009).

Mowafi, H. A., Spectral entropy as an objective measure of sedation state in midazolam-premedicated patients. *Saudi Journal of Anaesthesia*, **6(2)**, 131 (2012).

## Neuroanesthesia

Bharne, S., *et al.* Comparison of intravenous labetalol and bupivacaine scalp block on the hemodynamic and entropy changes following skull pin application: A randomized, open label clinical trial. *Asian Journal of Neurosurgery*, **11(1)**, 60 (2016).

Duncan, D., *et al.* A comparison of bispectral index and entropy monitoring, in patients undergoing embolization of cerebral artery aneurysms after subarachnoid haemorrhage. *British Journal of Anaesthesia*, **96(5)**, 590–596 (2006).

Jagia, M., *et al.* Comparative Evaluation of Spectral Entropy and Bispectral Index during Propofol/Thiopentone Anaesthesia in Patients with Supratentorial Tumours—A Preliminary Study. *Indian Journal of Anesthesia*, **52(2)**, 175 (2008).

Khan, J., *et al.* Entropy as an indicator of cerebral perfusion in patients with increased intracranial pressure. *Journal of Anaesthesiology, Clinical Pharmacology*, **30(3)**, 409 (2014).

Martorano, P., *et al.* Spectral entropy assessment with auditory evoked potential in neuroanesthesia. *Clinical Neurophysiology*, **118(3)**, 505–512 (2007).

Martorano, P. P., *et al.* Bispectral index and spectral entropy in neuroanesthesia. *Journal of Neurosurgical Anesthesiology*, **18(3)**, 205–210 (2006).

Reviron, P., *et al.* [Interest of entropy monitoring during low-grade cerebral aneurysm embolisation]. In *Annales francaises d'anesthesie et de reanimation* **27**, 106–107 (2008).

## Neuromuscular blocking agents

Aho, A. J., *et al.* Elevated BIS and Entropy values after sugammadex or neostigmine: an electroencephalographic or electromyographic phenomenon? *Acta Anaesthesiologica Scandinavica*, **56(4)**, 465–473 (2012).

Aho, A. J., *et al.* Explaining Entropy responses after a noxious stimulus, with or without neuromuscular blocking agents, by means of the raw electroencephalographic and electromyographic characteristics. *British Journal of Anaesthesia*, **106(1)**, 69–76 (2011).

Baughman, V. L., *et al.* Recovery from paralysis with succinylcholine increased Response entropy and EMG but not State entropy. *Journal of Clinical Monitoring and Computing*, **19(3)**, 201–205 (2005).

Hans, P., *et al.* Effect of an intubation dose of rocuronium on Spectral Entropy and Bispectral Index™ responses to laryngoscopy during propofol anaesthesia. *British Journal of Anaesthesia*, **97(6)**, 842–847 (2006).

Kawaguchi, M., *et al.* Rocuronium dose-dependently suppresses the spectral entropy response to tracheal intubation during propofol anaesthesia. *British Journal of Anaesthesia*, **102(5)**, 667–672 (2009).

Liu, N., *et al.* The influence of a muscle relaxant bolus on bispectral and datex-ohmeda entropy values during propofol-remifentanyl induced loss of consciousness. *Anesthesia & Analgesia*, **101(6)**, 1713–1718 (2005).

Puttappa, A., *et al.* Large increases in both response and state entropy to awake values antagonized with administration of incremental rocuronium. *British Journal of Anaesthesia*, **115(6)**, 934–935 (2015).

Vereecke, H. E. M., *et al.* The effects of ketamine and rocuronium on the A-Line® auditory evoked potential Index, Bispectral Index, and spectral entropy monitor during steady state propofol and remifentanyl anesthesia. *Anesthesiology*, **105(6)**, 1122–1134 (2006).

## Nitrous oxide

Aho, A. J., *et al.* Facial muscle activity, Response Entropy, and State Entropy indices during noxious stimuli in propofol--nitrous oxide or propofol--nitrous oxide--remifentanil anaesthesia without neuromuscular block. *British Journal of Anaesthesia*, **102(2)**, 227–233 (2009).

Anderson, R. E., *et al.* Entropy of EEG during anaesthetic induction: a comparative study with propofol or nitrous oxide as sole agent†. *British Journal of Anaesthesia*, **92(2)**, 167–170 (2004).

Hans, P., *et al.* Effects of nitrous oxide on spectral entropy of the EEG during surgery under balanced anaesthesia with sufentanil and sevoflurane. *Acta Anaesthesiol Belg*, **56(1)**, 37–43. (2005).

Lefoll-Masson, C., *et al.* The comparability of bispectral index and state entropy index during maintenance of sufentanil-sevoflurane-nitrous oxide anesthesia. *Anesthesia & Analgesia*, **105(5)**, 1319–1325 (2007).

Ozcan, M. S., *et al.* Does nitrous oxide affect bispectral index and state entropy when added to a propofol versus sevoflurane anesthetic? *Journal of Neurosurgical Anesthesiology*, **22(4)**, 309–315 (2010).

Prabhakar, H., *et al.* EEG entropy values during isoflurane, sevoflurane and halothane anesthesia with and without nitrous oxide. *Journal of Neurosurgical Anesthesiology*, **21(2)**, 108–111 (2009).

Sleigh, J. W., *et al.* Editorial | Entropy is blind to nitrous oxide. Can we see why? *British Journal of Anaesthesia*, **92(2)**, 159–161 (2004).

Smith, F. J., *et al.* Entropy of the electroencephalogram as applied in the M-Entropy S/5TM Module (GE Healthcare) during increases in nitrous oxide and constant sevoflurane concentrations. *Southern African Journal of Anaesthesia and Analgesia*, **16(4)** (2010).

Soto, R. G., *et al.* The effect of addition of nitrous oxide to a sevoflurane anesthetic on BIS, PSI, and entropy. *Journal of Clinical Monitoring and Computing*, **20(3)**, 145–150 (2006).

Vakkuri, A., *et al.* Spectral entropy monitoring is associated with reduced propofol use and faster emergence in propofol--nitrous oxide--alfentanil anesthesia. *Anesthesiology*, **103(2)**, 274–279 (2005).

## Noxious stimulus

Aho, A. J., *et al.* Explaining Entropy responses after a noxious stimulus, with or without neuromuscular blocking agents, by means of the raw electroencephalographic and electromyographic characteristics. *British Journal of Anaesthesia*, **106(1)**, 69–76 (2011).

Aho, A. J., *et al.* Facial muscle activity, Response Entropy, and State Entropy indices during noxious stimuli in propofol--nitrous oxide or propofol--nitrous oxide--remifentanil anaesthesia without neuromuscular block. *British Journal of Anaesthesia*, **102(2)**, 227–233 (2009).

Gjerstad, A. C., *et al.* Comparison of skin conductance with entropy during intubation, tetanic stimulation and emergence from general anaesthesia. *Acta Anaesthesiologica Scandinavica*, **51(1)**, 8–15 (2007).

Guerrero, J. L., *et al.* Response entropy changes after noxious stimulus. *Journal of Clinical Monitoring and Computing*, **26(3)**, 171–175 (2012).

Hans, P., *et al.* Effect of an intubation dose of rocuronium on Spectral Entropy and Bispectral Index™ responses to laryngoscopy during propofol anaesthesia. *British Journal of Anaesthesia*, **97(6)**, 842–847 (2006).

Kawaguchi, M., *et al.* Rocuronium dose-dependently suppresses the spectral entropy response to tracheal intubation during propofol anaesthesia. *British Journal of Anaesthesia*, **102(5)**, 667–672 (2009).

Kawaguchi, M., *et al.* Effect of landiolol on bispectral index and spectral entropy responses to tracheal intubation during propofol anaesthesia. *British Journal of Anaesthesia*, **101(2)**, 273–278 (2008).

Nunes, R. R., Entropy: A new method of measuring depth of anesthesia. Comparative study with bispectral index during clinical evaluation in tracheal intubation of patients anesthetized with sevoflurane. *Revista Brasileira de Anestesiologia*, **54(3)**, 289–302 (2004).

- Rantanen, M., *et al.* Novel multiparameter approach for measurement of nociception at skin incision during general anaesthesia. *British Journal of Anaesthesia*, **96(3)**, 367–376 (2006).
- Seitsonen, E. R. J., *et al.* EEG spectral entropy, heart rate, photoplethysmography and motor responses to skin incision during sevoflurane anaesthesia. *Acta Anaesthesiologica Scandinavica*, **49(3)**, 284–292 (2005).
- Struys, M., *et al.* Changes in a surgical stress index in response to standardized pain stimuli during propofol--remifentanil infusion. *British Journal of Anaesthesia*, **99(3)**, 359–367 (2007).
- Takamatsu, I., *et al.* Entropy indices vs the bispectral index™ for estimating nociception during sevoflurane anaesthesia. *British Journal of Anaesthesia*, **96(5)**, 620–626 (2006).
- Weil, G., *et al.* Does spectral entropy reflect the response to intubation or incision during propofol-remifentanil anesthesia? *Anesthesia & Analgesia*, **106(1)**, 152–159 (2008).
- Wheeler, P., *et al.* Response entropy increases during painful stimulation. *Journal of Neurosurgical Anesthesiology*, **17(2)**, 86–90 (2005).
- Xue, Z. J., *et al.* [Efficacy of entropy index in monitoring nociceptive stimulus in patients undergoing propofol-remifentanil general anesthesia]. *Zhongguo Yi Xue Ke Xue Yuan Xue Bao. Acta Academiae Medicinae Sinicae*, **36(1)**, 68–72 (2014).

## Opioid

- Aho, A. J., *et al.* Facial muscle activity, Response Entropy, and State Entropy indices during noxious stimuli in propofol--nitrous oxide or propofol--nitrous oxide--remifentanil anaesthesia without neuromuscular block. *British Journal of Anaesthesia*, **102(2)**, 227–233 (2009).
- Aimé, I., *et al.* Effect of age on the comparability of bispectral and state entropy indices during the maintenance of propofol--sufentanil anaesthesia. *British Journal of Anaesthesia*, **aer457**. (2012).
- Balci, C., *et al.* Comparison of entropy and bispectral index during propofol and fentanyl sedation in monitored anaesthesia care. *Journal of International Medical Research* **37(5)**, 1336–1342 (2009).
- Gruenewald, M., *et al.* M-Entropy guidance vs standard practice during propofol-remifentanil anaesthesia: a randomised controlled trial\*. *Anaesthesia*, **62(12)**, 1224–1229 (2007).
- Haenggi, M., *et al.* Intra- and inter-individual variation of BIS-index and Entropy during controlled sedation with midazolam/remifentanil and dexmedetomidine/remifentanil in healthy volunteers: an interventional study. *Crit Care*, **13(1)**, R20 (2009).
- Hans, P., *et al.* Effects of nitrous oxide on spectral entropy of the EEG during surgery under balanced anaesthesia with sufentanil and sevoflurane. *Acta Anaesthesiol Belg*, **56(1)**, 37–43 (2005).
- Kokki, H., *et al.* Regular tramadol use does not affect the propofol dose requirement for induction of anaesthesia. *European Journal of Anaesthesiology*, **24(09)**, 776–781 (2007).
- Lefoll-Masson, C., *et al.* The comparability of bispectral index and state entropy index during maintenance of sufentanil-sevoflurane-nitrous oxide anesthesia. *Anesthesia & Analgesia*, **105(5)**, 1319–1325 (2007).
- Liu, N., *et al.* The influence of a muscle relaxant bolus on bispectral and datex-ohmeda entropy values during propofol-remifentanil induced loss of consciousness. *Anesthesia & Analgesia*, **101(6)**, 1713–1718 (2005).
- Liu, N., *et al.* Feasibility of closed-loop titration of propofol and remifentanil guided by the spectral M-Entropy monitor. *Anesthesiology*, **116(2)**, 286–295 (2012).
- Mathews, D. M., *et al.* Feasibility study for the administration of remifentanil based on the difference between response entropy and state entropy†. *British Journal of Anaesthesia*, **98(6)**, 785–791 (2007).
- Schmidt, G. N., *et al.* Comparative evaluation of the Datex-Ohmeda S/5 Entropy Module and the Bispectral Index® monitor during propofol--remifentanil anesthesia. *Anesthesiology*, **101(6)**, 1283–1290 (2004).
- Schultz, A., *et al.* Comparison of Narcotrend Index, Bispectral Index, spectral and entropy parameters during induction of propofol-remifentanil anaesthesia. *Journal of Clinical Monitoring and Computing*, **22(2)**, 103–111 (2008).
- Struys, M., *et al.* Changes in a surgical stress index in response to standardized pain stimuli during propofol--remifentanil infusion. *British Journal of Anaesthesia*, **99(3)**, 359–367 (2007).

Vakkuri, A., *et al.* Spectral entropy monitoring is associated with reduced propofol use and faster emergence in propofol--nitrous oxide--alfentanil anesthesia. *Anesthesiology*, **103(2)**, 274–279 (2005).

Valjus, M., *et al.* Response Entropy™ is not more sensitive than State Entropy™ in distinguishing the use of esmolol instead of remifentanil in patients undergoing gynaecological laparoscopy. *Acta Anaesthesiologica Scandinavica*, **50(1)**, 32–39 (2006).

Vanluchene, A. L. G., *et al.* Spectral entropy measurement of patient responsiveness during propofol and remifentanil. A comparison with the bispectral index. *British Journal of Anaesthesia*, **93(5)**, 645–654 (2004).

Vereecke, H. E. M., *et al.* The effects of ketamine and rocuronium on the A-Line® auditory evoked potential Index, Bispectral Index, and spectral entropy monitor during steady state propofol and remifentanil anesthesia. *Anesthesiology*, **105(6)**, 1122–1134 (2006).

Weil, G., *et al.* Does spectral entropy reflect the response to intubation or incision during propofol-remifentanil anesthesia? *Anesthesia & Analgesia*, **106(1)**, 152–159 (2008).

Xue, Z. J., *et al.* [Efficacy of entropy index in monitoring nociceptive stimulus in patients undergoing propofol-remifentanil general anesthesia]. *Zhongguo Yi Xue Ke Xue Yuan Xue Bao. Acta Academiae Medicinae Sinicae*, **36(1)**, 68–72 (2014).

## Outcome

Aimé, I., *et al.* Does monitoring bispectral index or spectral entropy reduce sevoflurane use? *Anesthesia and Analgesia*, **103(6)**, 1469–1477 (2006).

Choi, S. R., *et al.* Spectral entropy monitoring allowed lower sevoflurane concentration and faster recovery in children. *Acta Anaesthesiologica Scandinavica*, **54(7)**, 859–862 (2010).

El Hor, T., *et al.* Impact of entropy monitoring on volatile anesthetic uptake. *Anesthesiology*, **118(4)**, 868–873 (2013).

Riad, W., *et al.* Monitoring with EEG entropy decreases propofol requirement and maintains cardiovascular stability during induction of anaesthesia in elderly patients. *European Journal of Anaesthesiology*, **24(08)**, 684–688 (2007).

Shepherd, J., *et al.* Clinical effectiveness and cost-effectiveness of depth of anaesthesia monitoring (E-Entropy, Bispectral Index and Narcotrend): a systematic review and economic evaluation. *Health Technology Assessment (Winchester, England)*, **17(34)**, 1–264 (2013).

Talawar, P., *et al.* Entropy monitoring decreases isoflurane concentration and recovery time in pediatric day care surgery—a randomized controlled trial. *Pediatric Anesthesia*, **20(12)**, 1105–1110 (2010).

Vakkuri, A., *et al.* Spectral entropy monitoring is associated with reduced propofol use and faster emergence in propofol--nitrous oxide--alfentanil anesthesia. *Anesthesiology*, **103(2)**, 274–279 (2005).

Wu, S.-C., *et al.* Use of spectral entropy monitoring in reducing the quantity of sevoflurane as sole inhalational anesthetic and in decreasing the need for antihypertensive drugs in total knee replacement surgery. *Acta Anaesthesiologica Taiwanica*, **46(3)**, 106–111 (2008).

## Pediatrics

Choi, S. R., *et al.* (2010). Spectral entropy monitoring allowed lower sevoflurane concentration and faster recovery in children. *Acta Anaesthesiologica Scandinavica*, **54(7)**, 859–862.

Davidson, A. J., *et al.* Performance of entropy and Bispectral Index as measures of anaesthesia effect in children of different ages. *British Journal of Anaesthesia*, **95(5)**, 674–679. (2005).

Davidson, A. J., *et al.* Entropy and bispectral index during anaesthesia in children. *Anaesthesia and Intensive Care*, **32(4)**, 485 (2004).

Davidson, A. J., *et al.* Measuring anaesthesia in children using the EEG. *Pediatric Anesthesia*, **16(4)**, 374–387 (2006).

Davidson, A. J., Monitoring the anaesthetic depth in children—an update. *Current Opinion in Anesthesiology*, **20(3)**, 236–243 (2007).

Hahn, J.-O., *et al.* Two-stage vs mixed-effect approach to pharmacodynamic modeling of propofol in children using state entropy. *Pediatric Anesthesia*, **21(6)**, 691–698 (2011).

Khosravi, S., *et al.* A monitor-decoupled pharmacodynamic model of propofol in children using state entropy as clinical endpoint. *Biomedical Engineering, IEEE Transactions on*, **59(3)**, 736–743 (2012).

Klockars, J. G. M., *et al.* Spectral entropy as a measure of hypnosis and hypnotic drug effect of total intravenous anesthesia in children during slow induction and maintenance. *Anesthesiology*, **116(2)**, 340–351 (2012).

Klockars, J. G. M., *et al.* Spectral entropy as a measure of hypnosis in children. *Anesthesiology*, **104(4)**, 708–717 (2006).

Lee, J. Y., *et al.* The effect of spectral entropy monitoring on propofol use and recovery in children. *Anesthesia and Pain Medicine*, **9(2)**, 138–143 (2014)

Lysakowski, C., *et al.* Bispectral and spectral entropy indices at propofol-induced loss of consciousness in young and elderly patients. *British Journal of Anaesthesia*, **aep162** (2009).

Talawar, P., *et al.* Entropy monitoring decreases isoflurane concentration and recovery time in pediatric day care surgery—a randomized controlled trial. *Pediatric Anesthesia*, **20(12)**, 1105–1110 (2010).

## Propofol

Aho, A. J., *et al.* Facial muscle activity, Response Entropy, and State Entropy indices during noxious stimuli in propofol–nitrous oxide or propofol–nitrous oxide–remifentanyl anaesthesia without neuromuscular block. *British Journal of Anaesthesia*, **102(2)**, 227–233 (2009).

Aimé, I., *et al.* Effect of age on the comparability of bispectral and state entropy indices during the maintenance of propofol–sufentanil anaesthesia. *British Journal of Anaesthesia*, **aer457** (2012).

Anderson, R. E., *et al.* Entropy during propofol hypnosis, including an episode of wakefulness. *Anaesthesia*, **59(1)**, 52–56. (2004).

Anderson, R. E., *et al.* Entropy of EEG during anaesthetic induction: a comparative study with propofol or nitrous oxide as sole agent†. *British Journal of Anaesthesia*, **92(2)**, 167–170. (2004).

Balci, C., *et al.* Comparison of entropy and bispectral index during propofol and fentanyl sedation in monitored anaesthesia care. *Journal of International Medical Research*, **37(5)**, 1336–1342. (2009).

Bonhomme, V., *et al.* Correlation and agreement between bispectral index and state entropy of the electroencephalogram during propofol anaesthesia. *British Journal of Anaesthesia*, **97(3)**, 340–346 (2006).

Ellerkmann, R. K., *et al.* Spectral entropy and bispectral index as measures of the electroencephalographic effects of propofol. *Anesthesia & Analgesia*, **102(5)**, 1456–1462 (2006).

Gruenewald, M., *et al.* M-Entropy guidance vs standard practice during propofol–remifentanyl anaesthesia: a randomised controlled trial\*. *Anaesthesia*, **62(12)**, 1224–1229. (2007).

Hans, P., *et al.* Effect of an intubation dose of rocuronium on Spectral Entropy and Bispectral Index™ responses to laryngoscopy during propofol anaesthesia. *British Journal of Anaesthesia*, **97(6)**, 842–847 (2006).

Höcker, J., *et al.* Differences between bispectral index and spectral entropy during xenon anaesthesia: a comparison with propofol anaesthesia. *Anaesthesia*, **65(6)**, 595–600 (2010).

Iannuzzi, M., *et al.* Relationship between bispectral index, electroencephalographic state entropy and effect-site EC50 for propofol at different clinical endpoints. *British Journal of Anaesthesia*, **94(4)**, 492–495 (2005).

Jagia, M., *et al.* Comparative Evaluation of Spectral Entropy and Bispectral Index during Propofol/Thiopentone Anaesthesia in Patients with Supratentorial Tumours—A Preliminary Study. *Indian Journal of Anesthesia*, **52(2)**, 175 (2008).

Kaskinoro, K., *et al.* Wide inter-individual variability of bispectral index and spectral entropy at loss of consciousness during increasing concentrations of dexmedetomidine, propofol, and sevoflurane. *British Journal of Anaesthesia*, **107(4)**, 573–80 (2011).

Kawaguchi, M., *et al.* Rocuronium dose-dependently suppresses the spectral entropy response to tracheal intubation during propofol anaesthesia. *British Journal of Anaesthesia*, **102(5)**, 667–672 (2009).

- Kawaguchi, M., *et al.* Effect of landiolol on bispectral index and spectral entropy responses to tracheal intubation during propofol anaesthesia. *British Journal of Anaesthesia*, **101(2)**, 273–278 (2008).
- Khosravi, S., *et al.* A monitor-decoupled pharmacodynamic model of propofol in children using state entropy as clinical endpoint. *Biomedical Engineering, IEEE Transactions on*, **59(3)**, 736–743 (2012).
- Kim, Y. H., *et al.* Effect of preoperative anxiety on spectral entropy during induction with propofol. *Korean Journal of Anesthesiology*, **65(2)**, 108–113 (2013).
- Kokki, H., *et al.* Regular tramadol use does not affect the propofol dose requirement for induction of anaesthesia. *European Journal of Anaesthesiology*, **24(09)**, 776–781. (2007).
- Kwon, M.-Y., *et al.* Spectral entropy for assessing the depth of propofol sedation. *Korean Journal of Anesthesiology*, **62(3)**, 234–239 (2012).
- Lee, J. Y., *et al.* The effect of spectral entropy monitoring on propofol use and recovery in children. *Anesthesia and Pain Medicine*, **9(2)**, 138–143. (2014)
- Liu, N., *et al.* The influence of a muscle relaxant bolus on bispectral and datex-ohmeda entropy values during propofol-remifentanil induced loss of consciousness. *Anesthesia & Analgesia*, **101(6)**, 1713–1718 (2005).
- Liu, N., *et al.* Feasibility of closed-loop titration of propofol and remifentanil guided by the spectral M-Entropy monitor. *Anesthesiology*, **116(2)**, 286–295 (2012).
- Lysakowski, C., *et al.* Bispectral and spectral entropy indices at propofol-induced loss of consciousness in young and elderly patients. *British Journal of Anaesthesia*, **aep162** (2009).
- Mahon, P., *et al.* Behaviour of spectral entropy, spectral edge frequency 90%, and alpha and beta power parameters during low-dose propofol infusion. *British Journal of Anaesthesia*, **101(2)**, 213–221 (2008).
- Mahon, P., *et al.* Spectral entropy as a monitor of depth of propofol induced sedation. *Journal of Clinical Monitoring and Computing*, **22(2)**, 87–93 (2008).
- Maksimow, A., *et al.* Correlation of EEG spectral entropy with regional cerebral blood flow during sevoflurane and propofol anaesthesia\*. *Anaesthesia*, **60(9)**, 862–869 (2005).
- Rao, A. K., *et al.* Comparison of electroencephalogram entropy versus loss of verbal response to determine the requirement of propofol for induction of general anaesthesia. *Indian Journal of Anaesthesia*, **59(6)**, 348 (2015).
- Riad, W., *et al.* Monitoring with EEG entropy decreases propofol requirement and maintains cardiovascular stability during induction of anaesthesia in elderly patients. *European Journal of Anaesthesiology*, **24(08)**, 684–688 (2007).
- Schmidt, G. N., *et al.* Comparative evaluation of the Datex-Ohmeda S/5 Entropy Module and the Bispectral Index monitor during propofol–remifentanil anesthesia. *Anesthesiology*, **101(6)**, 1283–1290 (2004).
- Schultz, A., *et al.* Comparison of Narcotrend Index, Bispectral Index, spectral and entropy parameters during induction of propofol-remifentanil anaesthesia. *Journal of Clinical Monitoring and Computing*, **22(2)**, 103–111 (2008).
- Shah, S. B., *et al.* Comparison of hemodynamic effects of intravenous etomidate versus propofol during induction and intubation using entropy guided hypnosis levels. *Journal of Anaesthesiology, Clinical Pharmacology*, **31(2)**, 180 (2015).
- Struys, M., *et al.* Changes in a surgical stress index in response to standardized pain stimuli during propofol--remifentanil infusion. *British Journal of Anaesthesia*, **99(3)**, 359–367 (2007).
- Vakkuri, A., *et al.* Time-frequency balanced spectral entropy as a measure of anesthetic drug effect in central nervous system during sevoflurane, propofol, and thiopental anesthesia. *Acta Anaesthesiologica Scandinavica*, **48(2)**, 145–153 (2004).
- Vakkuri, A., *et al.* Spectral entropy monitoring is associated with reduced propofol use and faster emergence in propofol--nitrous oxide--alfentanil anesthesia. *Anesthesiology*, **103(2)**, 274–279 (2005).
- Vanluchene, A. L. G., *et al.* Spectral entropy measurement of patient responsiveness during propofol and remifentanil. A comparison with the bispectral index. *British Journal of Anaesthesia*, **93(5)**, 645–654 (2004).
- Vanluchene, A. L. G., *et al.* Spectral Entropy as an Electroencephalographic Measure of Anesthetic Drug Effect A Comparison with Bispectral Index and Processed Midlatency Auditory Evoked Response. *Anesthesiology*, **101(1)**, 34–42 (2004).

Vereecke, H. E. M., *et al.* The effects of ketamine and rocuronium on the A-Line{®} auditory evoked potential Index, Bispectral Index, and spectral entropy monitor during steady state propofol and remifentanil anesthesia. *Anesthesiology*, **105(6)**, 1122–1134 (2006).

Weil, G., *et al.* Does spectral entropy reflect the response to intubation or incision during propofol-remifentanil anesthesia? *Anesthesia & Analgesia*, **106(1)**, 152–159 (2008).

Xue, Z. J., *et al.* [Efficacy of entropy index in monitoring nociceptive stimulus in patients undergoing propofol-remifentanil general anesthesia]. *Zhongguo Yi Xue Ke Xue Yuan Xue Bao. Acta Academiae Medicinae Sinicae*, **36(1)**, 68–72 (2014).

## Sevoflurane

Abdelmageed, W. M., *et al.* Preoperative paracetamol infusion reduces sevoflurane consumption during thyroidectomy under general anesthesia with spectral entropy monitoring. *Egyptian Journal of Anaesthesia*, **30(2)**, 115–122 (2014).

Aho, A. J., *et al.* Comparison of Bispectral Index and Entropy values with electroencephalogram during surgical anaesthesia with sevoflurane. *British Journal of Anaesthesia*, **115(2)**, 258–266 (2015).

Aimé, I., *et al.* Does monitoring bispectral index or spectral entropy reduce sevoflurane use? *Anesthesia and Analgesia*, **103(6)**, 1469–1477 (2006). <http://doi.org/10.1213/01.ane.0000246838.93153.23>

Choi, S. R., *et al.* Spectral entropy monitoring allowed lower sevoflurane concentration and faster recovery in children. *Acta Anaesthesiologica Scandinavica*, **54(7)**, 859–862 (2010).

Ellerkmann, R. K., *et al.* Spectral entropy and bispectral index as measures of the electroencephalographic effects of sevoflurane. *Anesthesiology*, **101(6)**, 1275–1282 (2004).

Enlund, M., *et al.* A comparison of auditory evoked potentials and spectral EEG in the ability to detect marked sevoflurane concentration alterations and clinical events. *Uppsala Journal of Medical Sciences*, **112(2)**, 221–229 (2007).

Hans, P., *et al.* Effects of nitrous oxide on spectral entropy of the EEG during surgery under balanced anaesthesia with sufentanil and sevoflurane. *Acta Anaesthesiol Belg*, **56(1)**, 37–43 (2005).

Hans, P., *et al.* Comparative effects of ketamine on Bispectral Index and spectral entropy of the electroencephalogram under sevoflurane anaesthesia. *British Journal of Anaesthesia*, **94(3)**, 336–340 (2005).

Harsoor, S. S., *et al.* Effect of intraoperative Dexmedetomidine infusion on Sevoflurane requirement and blood glucose levels during entropy-guided general anesthesia. *Journal of Anaesthesiology, Clinical Pharmacology*, **30(1)**, 25 (2014).

Kaskinoro, K., *et al.* Wide inter-individual variability of bispectral index and spectral entropy at loss of consciousness during increasing concentrations of dexmedetomidine, propofol, and sevoflurane. *British Journal of Anaesthesia*, **107(4)**, 573–80 (2011).

Lefoll-Masson, C., *et al.* The comparability of bispectral index and state entropy index during maintenance of sufentanil-sevoflurane-nitrous oxide anesthesia. *Anesthesia & Analgesia*, **105(5)**, 1319–1325 (2007).

Li, D., *et al.* Multiscale permutation entropy analysis of EEG recordings during sevoflurane anesthesia. *Journal of Neural Engineering*, **7(4)** (2010).

Maksimow, A., *et al.* Correlation of EEG spectral entropy with regional cerebral blood flow during sevoflurane and propofol anaesthesia\*. *Anaesthesia*, **60(9)**, 862–869 (2005).

McKay, I. D. H., *et al.* Pharmacokinetic-pharmacodynamic modeling the hypnotic effect of sevoflurane using the spectral entropy of the electroencephalogram. *Anesthesia & Analgesia*, **102(1)**, 91–97 (2006).

Nunes, R. R., Entropy: A new method of measuring depth of anesthesia. Comparative study with bispectral index during clinical evaluation in tracheal intubation of patients anesthetized with sevoflurane. *Revista Brasileira de Anestesiologia*, **54(3)**, 289–302 (2004).

Ozcan, M. S., *et al.* Does nitrous oxide affect bispectral index and state entropy when added to a propofol versus sevoflurane anesthetic? *Journal of Neurosurgical Anesthesiology*, **22(4)**, 309–315 (2010).

Patel, C. R., *et al.* The effect of dexmedetomidine continuous infusion as an adjuvant to general anesthesia on sevoflurane requirements: a study based on entropy analysis. *Journal of Anaesthesiology Clinical Pharmacology*, **29(3)**, 318 (2013).

Prabhakar, H., *et al.* Isoflurane and sevoflurane decrease entropy indices more than halothane at equal MAC values. *Journal of Anesthesia*, **23(1)**, 154–157 (2009).

Prabhakar, H., *et al.* EEG entropy values during isoflurane, sevoflurane and halothane anesthesia with and without nitrous oxide. *Journal of Neurosurgical Anesthesiology*, **21(2)**, 108–111 (2009).

Rinaldi, S., *et al.* State entropy and bispectral index: correlation with end tidal sevoflurane concentrations. *Minerva Anestesiologica*, **73(1-2)**, 39–48 (2006).

Seitsonen, E. R. J., *et al.* EEG spectral entropy, heart rate, photoplethysmography and motor responses to skin incision during sevoflurane anaesthesia. *Acta Anaesthesiologica Scandinavica*, **49(3)**, 284–292 (2005).

Shalhaf, R., *et al.* Measuring the effects of sevoflurane on electroencephalogram using sample entropy. *Acta Anaesthesiologica Scandinavica*, **56(7)**, 880–889 (2012).

Smith, F. J., *et al.* Entropy of the electroencephalogram as applied in the M-Entropy S/5TM Module (GE Healthcare) during increases in nitrous oxide and constant sevoflurane concentrations. *Southern African Journal of Anaesthesia and Analgesia*, **16(4)** (2010).

Takamatsu, I., *et al.* Entropy indices vs the bispectral index<sup>TM</sup> for estimating nociception during sevoflurane anaesthesia. *British Journal of Anaesthesia*, **96(5)**, 620–626 (2006).

Vakkuri, A., *et al.* Time-frequency balanced spectral entropy as a measure of anesthetic drug effect in central nervous system during sevoflurane, propofol, and thiopental anesthesia. *Acta Anaesthesiologica Scandinavica*, **48(2)**, 145–153 (2004).

Wu, S.-C., *et al.* Use of spectral entropy monitoring in reducing the quantity of sevoflurane as sole inhalational anesthetic and in decreasing the need for antihypertensive drugs in total knee replacement surgery. *Acta Anaesthesiologica Taiwanica*, **46(3)**, 106–111 (2008).

Yassen, K., *et al.* Entropy Monitoring Effect in Hepatic Cirrhotic Patients Undergoing Major Liver Resection on Sevoflurane Consumption and Hemodynamics. A Randomized Controlled Study. *J Anesth Crit Care Open Access 2016*, **5(3)**: 00185

## Thiopental

Jagia, M., *et al.* Comparative Evaluation of Spectral Entropy and Bispectral Index during Propofol/Thiopentone Anaesthesia in Patients with Supratentorial Tumours-A Preliminary Study. *Indian Journal of Anesthesia*, **52(2)**, 175 (2008).

Vakkuri, A., *et al.* Time-frequency balanced spectral entropy as a measure of anesthetic drug effect in central nervous system during sevoflurane, propofol, and thiopental anesthesia. *Acta Anaesthesiologica Scandinavica*, **48(2)**, 145–153 (2004).

## Xenon

Höcker, J., *et al.* Differences between bispectral index and spectral entropy during xenon anaesthesia: a comparison with propofol anaesthesia. *Anaesthesia*, **65(6)**, 595–600 (2010).

Laitio, R. M., *et al.* Bispectral index, entropy, and quantitative electroencephalogram during single-agent xenon anesthesia. *Anesthesiology*, **108(1)**, 63–70 (2008).

## ABSTRACTS

- Aimé I. *et al.* Bispectral Index (BIS), State Entropy (SE) and Response Entropy (RE) are poorly related to end-tidal sevoflurane (et Sevo) concentrations. *ASA Annual Meeting Abstracts* A-802 (2005).<http://www.asaabstracts.com/strands/asaabstracts/search.html>
- Aimé I. *et al.* Comparison of Bispectral Index (BIS) and State Entropy (SE) during routine anesthetic procedures. *ASA Annual Meeting Abstracts* A-826 (2005).
- Alsina E. *et al.* Hypnosis and analgesia evaluation using entropy monitor. *European Journal Of Anaesthesiology, Euroanesthesia* (2003); *Abstracts and Programme* **23(30)**, A-96 (2003).
- Alsina E. *et al.* Ability of the Bispectral Index and Entropy to measure the anesthetic depth during midazolam and fentanyl anesthesia. *ASA Annual Meeting Abstracts* A-335 (2004).
- Arnaout L. *et al.* A comparative study between Bispectral Index and Spectral Entropy indices in children anesthetised with sevoflurane. *ASA Annual Meeting Abstracts* A-1496 (2004).
- Bein B. *et al.* Influence of mild hypothermia on State and Response Entropy and Bispectral Index (BISXP™) values during cardiopulmonary bypass. *ASA Annual Meeting Abstracts* A-327 (2003).
- Bein B. *et al.* A Comparison of State and Response Entropy and BIS values during induction of anesthesia and mild hypothermic cardiopulmonary bypass. *Journal of Neurosurgical Anesthesiology* **15(4)**, A79 (2003).
- Bischoff P. *et al.* Datex-Ohmeda S/5 Entropy™ Module and the Bispectral Index during different states of a propofol/ remifentanyl anesthesia. *ASA Annual Meeting Abstracts* A-312 (2004).
- Bonhomme V. *et al.* Agreement between Bispectral Index and State Entropy in paralyzed and non paralyzed patients. *ASA Annual Meeting Abstracts*, A-1554 (2006).
- Bonhomme V. *et al.* Effect of intravenous lidocaine on EEG Spectral Entropy and haemodynamic response to laryngoscopy and tracheal intubation: preliminary results. *European Journal Of Anaesthesiology, Euroanesthesia* (2005); *Abstracts and Programme* **22(34)**, A-90 (2005).
- Bouillon T. W. *et al.* The relationship between endtidal sevoflurane concentrations and Spectral Entropy/Bispectral Index. *ASA Annual Meeting Abstracts* A-498 (2004).
- Bouillon T. *et al.* The effect of surgical stimulation on the relationship between endtidal sevoflurane concentration and Spectral Entropy/Bispectral Index. *ASA Annual Meeting Abstracts* A-765 (2005).
- Bretschneider M. *et al.* Influence of high frequency noise above 55 Hz onto depth of anesthesia monitors. *ASA Annual Meeting Abstracts* A-1291 (2008) / *Anesthesiology* **109**, A1299 (2008).
- Bruhn J. *et al.* Spectral Entropy and Bispectral Index as measures of the EEG effects of propofol. *ASA Annual Meeting Abstracts* A-346 (2004).
- Caliebe D. *et al.* A Comparison of State and Response Entropy and Bispectral (BISXP™) Index™ Values during Induction of Anesthesia. *ASA Annual Meeting Abstracts* A-286 (2003).
- Caliebe D. *et al.* A comparison of state and Response Entropy and Bispectral Index values during induction of anaesthesia and mild hypothermic cardiopulmonary bypass. *European Journal Of Anaesthesiology, Euroanesthesia* (2004); *Abstracts and Programme* **21(32)**, A-142 (2004).
- Castro A. *et al.* Modeling Hypnotic and Analgesic Dynamic Interaction – State Entropy and Auditory Evoked Potentials. *ASA Annual Meeting Abstracts* A-19 (2007)/ *Anesthesiology* **107**, A19 (2007).
- Castro A. *et al.* Anesthesia Assessed by BIS Results in Less Time above Adequate Values Than with AEP and Entropy. *ASA Annual Meeting Abstracts* A-1878 (2007)/ *Anesthesiology* **107**, A1878 (2007)
- Castro A. *et al.* Propofol versus sevoflurane general anaesthesia: influence on the State Entropy variability. *Euroanesthesia* 3AP2-9 (2007).
- Castro A. *et al.* A new simulation software for the State Entropy using propofol and remifentanyl effect-site concentrations steering. *Euroanesthesia* 3AP7-6 (2008)/ *Eur J Anaesthesiol* **25(44)**, 3AP7-6 (2008).
- Castro A. *et al.* Maximum Effect with BIS and Entropy Indices during Induction – Discrepancy between Values. *ASA Annual Meeting Abstracts* A-79 (2007) / *Anesthesiology* **107**, A79 (2007).

- Castro A. *et al.* Loss of Consciousness with BIS, Entropy and AEP – Time to Maximum Effect. *ASA Annual Meeting Abstracts A-1879* (2007).
- Coluzzi F. *et al.* Spectral Entropy monitoring during sedation for endourological procedures. *13th World Congress of Anaesthesiologists P0104*, (2004). <http://www.wca2004.com/programme/pdf/P0104.pdf>
- Dierckens E. *et al.* Is Entropy a monitor for the guidance of intraoperative analgesia? *European Journal Of Anaesthesiology, Euroanesthesia* (2005); *Abstracts and Programme 22(34)*, A-91 (2005).
- Ellerkmann R. *et al.* Spectral Entropy and Bispectral Index as guidance for propofol-remifentani anaesthesia in combination with regional anaesthesia compared with a standard clinical practice group. *Euroanesthesia 3AP3-3* (2007).
- Galarioni V. *et al.* Sevoflurane titration by using Spectral Entropy or Bispectral Index: effects on recovery time. *European Journal Of Anaesthesiology, Euroanesthesia* (2005); *Abstracts and Programme 22(34)*, A-93 (2005).
- Guerrero J. L. *et al.* Response Entropy changes after nociceptive stimulus during general anesthesia. *European Journal Of Anaesthesiology, Euroanesthesia* (2005); *Abstracts and Programme 22(34)*, A-96 (2005).
- Hanart C. *et al.* EEG Spectral Entropy During Anaesthesia in Children: Effects of Nitrous Oxide. *Euroanesthesia 10AP1-2* (2007).
- Hartwich V. *et al.* Prediction Probability of Spectral Entropy, Bispectral Index and Endtidal Sevoflurane Concentration for Reaction to Painful Stimulation. *ASA Annual Meeting Abstracts A-497* (2004).
- Hernandez-Gancedo C. *et al.* Is there cortical electrical activity after cardiac arrest? Apparent contradictory results between BIS and ENTROPY. *European Journal Of Anaesthesiology, Euroanesthesia* (2004); *Abstracts and Programme 21(32)*, A-134 (2004).
- Hernandez-Gancedo C. *et al.* Use of ENTROPY to assess depth of sedation in postoperative patients. *European Journal Of Anaesthesiology, Euroanesthesia* (2004); *Abstracts and Programme 21(32)*, A-139 (2004).
- Hoffman W. E. *et al.* The Role of Facial EMG and Entropy in Evaluating Adequacy of Anesthesia. *ASA Annual Meeting Abstracts A-336* (2004).
- Hoffman W. *et al.* Evaluating Dexmedetomidine as an Alternative to Fentanyl Anesthesia with Response Entropy as a Guide to Anesthetic Delivery. *ASA Annual Meeting Abstracts A-799* (2005).
- Hocker, J. *et al.* A Comparison of State and Response Entropy with Bispectral Index during Desflurane Anesthesia. *ASA Annual Meeting Abstracts A-1552* (2006).
- Ikeda T. *et al.* Influence of Hypobaric Hypoxia on Bispectral Index and Spectral Entropy in Volunteers. *ASA Annual Meeting Abstracts A-60* (2007).
- Izumi N. and Rikako S. Effects of Sedation Doses of Dexmedetomidine and Propofol on EEG and Cardiorespiratory Changes. *WCA, Abstracts* (2008).
- Komatsu T. *et al.* A Comparison of State and Response Entropy of Electroencephalogram with Changes in Entropy of Heart Rate Variability during Induction of Anesthesia. *ASA Annual Meeting Abstracts A-530* (2004).
- Krstevski Z. *et al.* Entropy monitoring during tiva anaesthesia. *WCA, Abstracts* (2008).
- Lambert P. *et al.* Analysis of Bispectral Index, State and Response Entropy values upon emergence from anesthesia in patients anaesthetized with propofol or sevoflurane. *European Journal Of Anaesthesiology, Euroanesthesia* (2004); *Abstracts and Programme 21(32)*, A-120 (2004).
- Leclercq S. *et al.* EEG Spectral Entropy During Anaesthesia in Children: Halothane versus Sevoflurane. *Euroanesthesia 10AP1-1* (2007).
- Leclercq S. *et al.* EEG Spectral Entropy During Sevoflurane Anaesthesia in Children: Influence of Age. *Euroanesthesia 10AP1-3* (2007).
- Liu J. and Yue Y. Effects of remifentani and rocuronium on RE, SE, BIS values with and without stimuli. *Euroanesthesia 3AP3-2* (2007).
- Liu N. *et al.* Closed-Loop Titration of Propofol and Remifentani Guided by Spectral Entropy: A Controlled Study. *ASA Annual Meeting Abstracts A-1881* (2007).
- Lysakowski C. *et al.* Advanced age and the use of simplified EEG monitors: Part II of a cohort study comparing young and elderly patients. *Euroanesthesia 3AP7-1* (2008) / *Eur J Anaesthesiol 25(44)*, 3AP7-7 (2008).
- Massó E. *et al.* Comparison of the Index of Consciousness with the Entropy Indices during Sevoflurane Anaesthesia. *ASA Annual Meeting Abstracts A-1291* (2008) / *Anesthesiology 109*, A1291 (2008).

- Mathews D. M. *et al.* Closed-Loop Delivery of Remifentanil Based on the Difference between State and Response Entropy. *ASA Annual Meeting Abstracts A-735* (2007).
- Mathews D. M. *et al.* Correlation between the Response Entropy – State Entropy Gradient and BIS-Derived Facial EMG. *ASA Annual Meeting Abstracts A-861* (2006).
- Ozcan M. S. *et al.* Same-Patient Reproducibility of State Entropy: A Comparison of Simultaneous Bilateral Measurements. *ASA Annual Meeting Abstracts A-196* (2008) / *Anesthesiology* **109**, A196 (2008).
- Paprotny S. *et al.* BIS, Entropy Module and Narcotrend May Mainly Detect Linear Random Characteristics of the EEG. *ASA Annual Meeting Abstracts A-1296* (2008) / *Anesthesiology* **109**, A1296 (2008).
- Pilge S. *et al.* Correlation between the BIS and the State Entropy. *ASA Annual Meeting Abstracts A-1292* (2008) / *Anesthesiology* **109**, A1292 (2008).
- Prabhakar H. *et al.* Equi-MAC Values of Volatile Agents Produce Different Entropy Values with Air/Nitrous Oxide. *ASA Annual Meeting Abstracts A-198* (2008) / *Anesthesiology* **109**, A198 (2008).
- Prabhakar H. *et al.* At Equal MAC Values Isoflurane and Sevoflurane Decrease Spectral Entropy Indices More Than Halothane. *ASA Annual Meeting Abstracts A-925* (2008) / *Anesthesiology* **109**, A925 (2008).
- Pilge S. *et al.* Spectral Entropy May Separate Consciousness from Unconsciousness with Both Sevoflurane and Propofol. *ASA Annual Meeting Abstracts A-1033* (2006).
- Pirri S. *et al.* Narcotrend (NT) or entropy (E) monitoring depth of hypnosis. Analysis of two new EEG based monitor during gynaecologic surgery. Our experience. *Euroanesthesia 3AP5-5* (2008) / *Eur J Anaesthesiol* **25(44)**, 3AP5-5 (2008).
- Quan X. *et al.* Bispectral Index and Entropy Responses to Skin Incision under General Anesthesia. *ASA Annual Meeting Abstracts A-75* (2007).
- Quinart A. *et al.* Comparison of Bispectral Index and Spectral Entropy during Induction of Anesthesia with Propofol and Remifentanil. *ASA Annual Meeting Abstracts A-347* (2004).
- Rantanen M. *et al.* Response Entropy, Heart Rate and Photoplethysmography Responses to Long-Lasting Tetanic Stimulus and Skin Incision. *ASA Annual Meeting Abstracts A-559* (2004).
- Rampil I. *et al.* State and Response Entropy Predict Amnesia during Propofol Sedation. *ASA Annual Meeting Abstracts A-1555* (2006).
- Rehberg B. *et al.* Association between subjective assessment of anaesthetic depth and BIS or Spectral Entropy by inexperienced and experienced anaesthesiologists. *European Journal Of Anaesthesiology, Euroanesthesia* (2005); *Abstracts and Programme* **22(34)**, A-92 (2005).
- Romero G. *et al.* Comparative Sensitivity and Specificity of Spectral Entropy and Bispectral Index (BIS) Monitors during Outpatient Anesthesia. *ASA Annual Meeting Abstracts A-331* (2004).
- Romero G. *et al.* Evaluation of Spectral Entropy and Bispectral Index Values during Ambulatory Anesthesia. *ASA Annual Meeting Abstracts A-21* (2004).
- Scheinin H. *et al.* EEG spectral entropy correlates with regional cerebral blood flow during sevoflurane and propofol anesthesia. *European Journal Of Anaesthesiology, Euroanesthesia* (2004); *Abstracts and Programme* **21(32)**, A-405 (2004).
- Song X. *et al.* Reliability of Spectral Entropy Reflecting Analgesia Stimulus. *ASA Annual Meeting Abstracts A-1040* (2006).
- Sung Uk Choi *et al.* Effect of muscle relaxant to spectral entropy during propofol anesthesia. *WCA, Abstracts* (2008).
- Soto R. G. *et al.* Comparison of Bispectral Index and Entropy during general anesthetic induction and emergence. *International Anesthesia Research Society IARS 79th Clinical and Scientific Congress* (March 2005).
- Stapelfeldt C.K. *et al.* Guiding Depth of Xenon Anesthesia: Comparison of Bispectral Index vs. Spectral Entropy. *ASA Annual Meeting Abstracts A-2* (2008) / *Anesthesiology* **109**, A2 (2008).
- Struys M. M. R. F. *et al.* The Ability of BIS™, Spectral Entropy and Predicted Propofol Concentrations To Measure Patient Responsiveness during Anesthesia with Propofol and Remifentanil. *ASA Annual Meeting Abstracts A-346* (2003).
- Tang J. *et al.* Comparison of BIS Index values to State and Response Entropy values during desflurane anesthesia. *International Anesthesia Research Society IARS 79th Clinical and Scientific Congress* (March 2005).
- Tae Kyun Kim *et al.* Nitrous oxide increases the spectral entropy of EEG. *WCA, Abstracts* (2008).

- Tapia B. *et al.* Hypnosis evaluation during induction and recovery: entropy analysis versus BIS. *European Journal Of Anaesthesiology, Euroanesthesia* (2003); *Abstracts and Programme* **23(30)**, A-94 (2003).
- Tesniere A. *et al.* Spectral Entropy during Surgical Stimulation under General Anesthesia with Propofol and Remifentanyl. *ASA Annual Meeting Abstracts* A-342 (2003).
- Tesniere A. *et al.* BIS™ and Spectral Entropy To Predict Loss of Consciousness during Induction and Recovery from Anesthesia with Propofol and Remifentanyl. *ASA Annual Meeting Abstracts* A-329 (2003).
- Tiefenthaler W. *et al.* Auditory Evoked Potentials (AEP) and Entropy monitoring differ in classification of depth of anaesthesia and prediction of accidental movement. *European Journal Of Anaesthesiology, Euroanesthesia* (2004); *Abstracts and Programme* **21(32)**, A-146 (2004).
- Tiren C. *et al.* Depth of anaesthesia: A clinical study comparing Entropy and BIS in cardiac surgery patients during cardiopulmonary bypass. *European Journal Of Anaesthesiology, Euroanesthesia* (2004); *Abstracts and Programme* **21(32)**, A-140 (2004).
- Ueyama H. *et al.* Comparison of Spectral Entropy and BIS during sevoflurane or isoflurane anesthesia. *European Journal Of Anaesthesiology, Euroanesthesia* (2005); *Abstracts and Programme* **22(34)**, A-95 (2005).
- Vakkuri A. *et al.* Comparison of entropy and Bispectral Index of EEG in propofol, sevoflurane and thiopental anaesthesia. *European Journal Of Anaesthesiology, Euroanesthesia* (2003); *Abstracts and Programme* **23(30)**, A-92 (2003).
- Van Rompaey N. *et al.* Influence of Entropy Monitoring on Drug Consumption during and after Long Lasting TCI Anesthesia. *ASA Annual Meeting Abstracts* A-1725 (2007) / *Anesthesiology* **107**, A1725 (2007).
- Van Rompaey *et al.* Spectral entropy reduces propofol consumption during long lasting TCI anaesthesia. *Euroanesthesia* 3AP2-8 (2007).
- Vanags I. *et al.* The use of Entropy in the monitoring of CNS reaction during general anesthesia. *European Journal Of Anaesthesiology, Euroanesthesia* (2005); *Abstracts and Programme* **22(34)**, A-88 (2005).
- Velik-Salchner C. *et al.* Bispectral Index (BIS) and Entropy monitoring differ in classification of depth of anaesthesia. *European Journal Of Anaesthesiology, Euroanesthesia* (2004); *Abstracts and Programme* **21(32)**, A-145 (2004).
- Viertiö-Oja H. *et al.* Monitoring entropy of the composite EEG and FEMG signal during general anesthesia. *Anesthesia & Analgesia, IARS 77th Clinical & Scientific Congress* **96**, 2S: S-135 (2003) <http://www.iars.org/abstracts/abstracts77.shtm>
- Viertiö-Oja H. EEG Entropy: Development, Features and Performance. *Acta Anaesthesiologica Scandinavica* **47(116)**, IA 02 (2003).
- Vila A. *et al.* Entropy: a new anaesthetic depth monitor. Comparative study with BIS in the clinical settings. *European Journal Of Anaesthesiology, Euroanesthesia* (2003); *Abstracts and Programme* **23(30)**, A-91 (2003).
- Villazala R. *et al.* Effects of the electric drill in accuracy of Spectral Entropy in tympanoplasty. *European Journal Of Anaesthesiology, Euroanesthesia* (2005); *Abstracts and Programme* **22(34)**, A-94 (2005).
- Yppärilä H. *et al.* Assessment of sedation level and EEG recovery after major operation by spectral entropy. *Critical Care, 21st International Symposium on Intensive Care and Emergency Medicine* **5(1)**, P193 (2001).
- Wagner F. D. *et al.* Influence of combined drug effect with sevoflurane/remifentanyl and propofol/remifentanyl on predictive probability of Entropy and auditory evoked response. *European Journal Of Anaesthesiology, Euroanesthesia* (2005); *Abstracts and Programme* **22(34)**, A-97 (2005).
- Wheeler P. *et al.* The relation between Stateentropy (SE) and Response Entropy (RE) of the electroencephalogram (EEG) to neuromuscular transmission in patients. *Journal of Neurosurgical Anesthesiology* **15(4)**, A80 (2003).
- White P. F. *et al.* Effect of Recovery from Anesthesia on the Bispectral Index vs Entropy Values: Does the Facial EMG Component after the Entropy Response? *ASA Annual Meeting Abstracts* A-333 (2004).
- Xue Q. *et al.* Prediction Depth of Hypnosis by Entropy during Propofol Anesthesia. *ASA Annual Meeting Abstracts* A-873 (2005).
- Yli-Hankala A. *et al.* EEG Entropy monitoring decreases propofol consumption and shortens early recovery times. *European Journal Of Anaesthesiology, Euroanesthesia* (2003); *Abstracts and Programme* **23(30)**, A-98 (2003).
- Yli-Hankala A. Entropy in a real world. *Acta Anaesthesiologica Scandinavica* **47(116)**, IA 03 (2003)



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