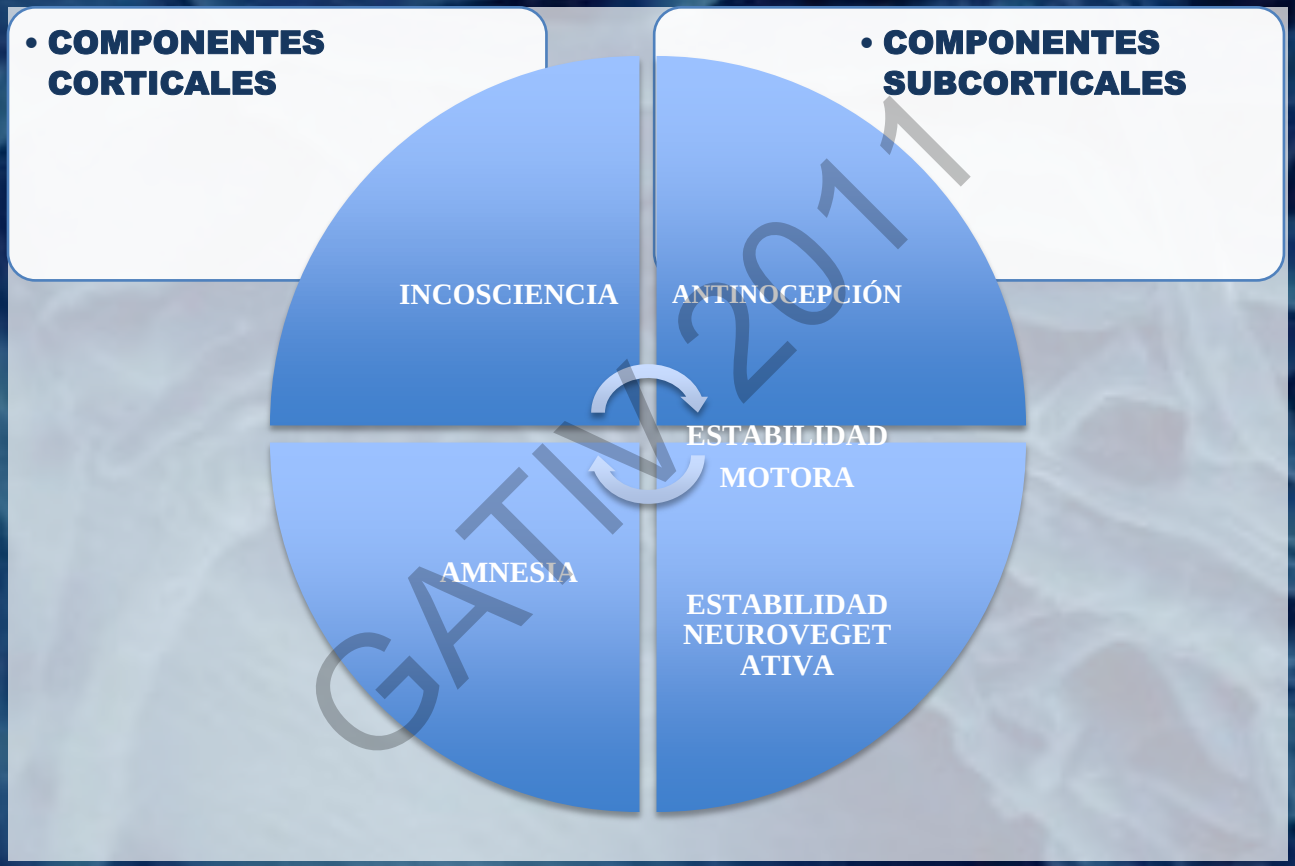
IV WORK SHOP GATIV 2011

Xanit Internacional Hospital

MONITORIZACIÓN DE LA PROFUNDIDAD ANESTÉSICA

Dr. Juan Luis Valverde Junguito

CONCEPTO DE ANESTESIA



MANTENIMIENTO DE LA HOMESTASIS INTERNA

HISTORIA

1847 PLOMBEY

INTOXICACIÓN

EXCITACIÓN

NARCOSIS

1937 GUEDEL

SOMNOLENCIA

AGITACION PSICOMOTRIZ

HIPNOSIS

COMA

1942

INFORMES SOBRE EL DESPERTAR INTRAOPERATORIO

1954

ARTUSIO

DIVIDE EL PRIMER ESTADIO DE GUEDEL

VARIANDO EN LOS GRADOS DE AMNESIA

1957

WOODBRIGE

BLOQUEO SENSORIAL

BLOQUEO MOTOR

BLOQUEO REFLEJO RESPIRATORIO, CARDIOVASCULAR Y GASTROINTESTINAL

BLOQUEO MENTAL, SUEÑO E INCOSCIENCIA

PROFUNDIDAD ANESTÉSICA

- **Definición controvertida.**
- **Balance entre dosis anestésicos y estímulo quirúrgico.**
- **Objetivos:**

  Dosis suficiente para mantener inconsciencia.

  No comprometer órganos vitales

SISTEMAS DE MONITORIZACIÓN

CONCIENCIA

RESPUESTAS AUTONOMICAS

ANALGESIA

RELAJACION MUSCULAR

VIDEOALGESIGRAPH

HEMODINÁMICA

SSI

EEG

BIS

ENTROPIA

NARCOTREND

PATIENT STATE INDEX

Indice AEP-ARX-Index (AAI) PEALM

SEDLINE MONITOR

VENTAJAS DE LA MONITORIZACIÓN DE LA HIPNOSIS

Pick up thePieces

Depth of Anesthesia and Long-term Mortality

Anesthesiology 2011; 114: 485–7

Without attempting to address why the anesthesia community has remained skeptical of brain-function monitoring, the most controversial question remains whether there is a possible causal, rather than purely statistical, association between deep anesthesia and long-term outcomes

Can we now be confident that “deep anesthesia,” as indicated by electroencephalogram monitors, is just a marker of a poor preoperative condition and not in itself harmful? Unfortunately, wecannot.

MONITORIZACIÓN ELECTROFISIOLÓGICA DE LOS EFECTOS DE LOS AGENTES ANESTÉSICOS

MONITORES EEG CUANTITATIVOS

- BIS
- NARCOTREND
- ENTROPÍA
- SEDLINE MONITOR
- PATIENT STATE INDEX

MONITORES BASADOS EN POTENCIALES EVOCADOS

- POTENCIALES EVOCADOS AUDITIVOS DE LATENCIA MEDIA. Indice AEP-ARX-Index (AAI)

MONITORES BASADOS EN ANALGESIA

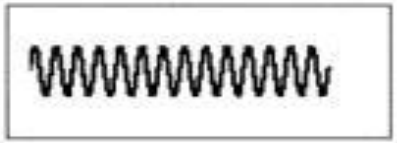
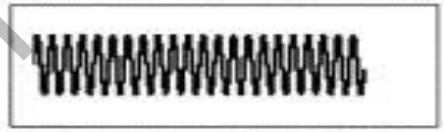
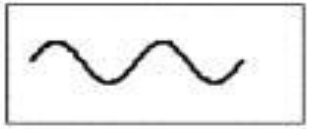
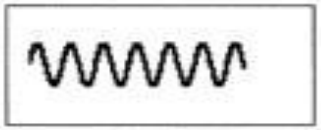
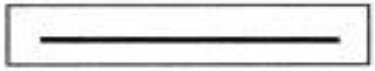
- INDICE DE ESTRÉS QUIRÚRGICO
- VIDEOALGESIGRAPH

BISPECTRAL INDEX

Es un índice derivado empíricamente que es dependiente de la medida de la “coherencia” entre los componentes de la Electroencefalografía cuantitativa

El biespectro mide la correlación de fase de las ondas obtenidas por el análisis de Fourier entre las distintas frecuencias

El número BIS se obtiene de la suma ponderada de cuatro subparámetros: Burst Supression Ratio, Quazi Supression, Relative Beta Ratio y SynchFastSlow

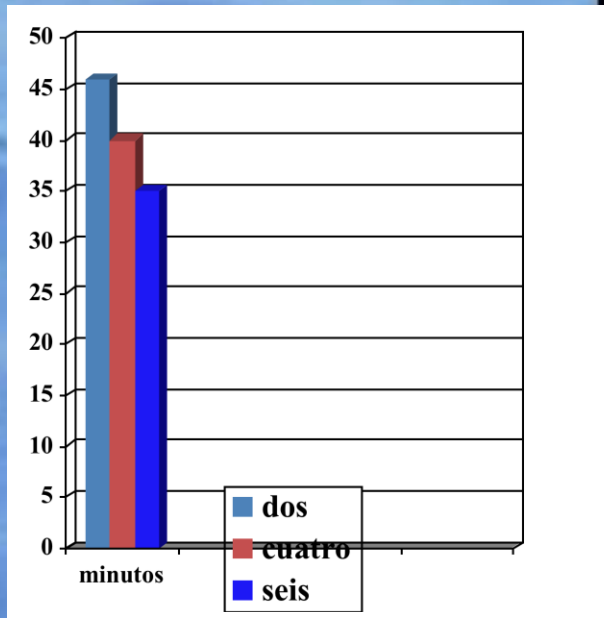
Hypnotic state	Electroencephalographic changes	
Relaxation with eyes closed	α waves predominance	 alpha α waves (7.5-12.5 Hz)
Light anesthesia	Increase in β power Decrease in α waves	 beta β waves (12.5-30 Hz)
Deepening of anesthesia	Increase in slow wave activity (delta δ and theta θ waves) Decrease in α and β waves	 delta δ waves (1.5-3.5 Hz)  theta θ waves (3.5-7.5 Hz)
Cortical Silence	Burst Suppression	 Isoelectricity

CAMBIOS PARADÓJICOS CON ANESTÉSICOS

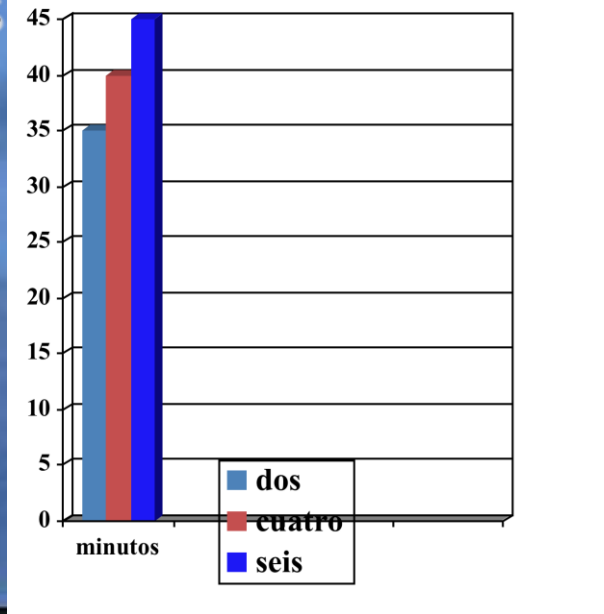
ÓXIDO NITROSO

- Disminución del BIS, 6 min. tras cese.
- Paroxismos θ, δ al discontinuar N2O.
- Semejante a profundidad anestésica.
- Leves efectos corticales.
- Efecto en vías NA.

BIS



BIS



KETAMINA

Incrementa β y reduce δ.

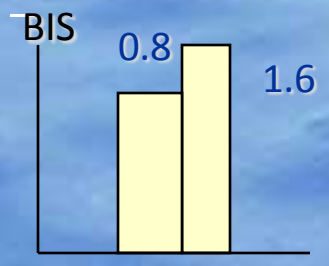
BIS aumenta tras su administración

CAMBIOS PARADÓJICOS CON ANESTÉSICOS

ANESTÉSICOS INHALATORIOS

Incremento del BIS al pasar de 0.8% a 1.6%.

Reacción de excitación paradójica.(α, β)



ISOFLUORANO

PROPOFOL

Intervalo ciego del BIS (35-40), con una menor sensibilidad a las concentraciones de propofol.

INTERVALO CIEGO

OPIOIDES

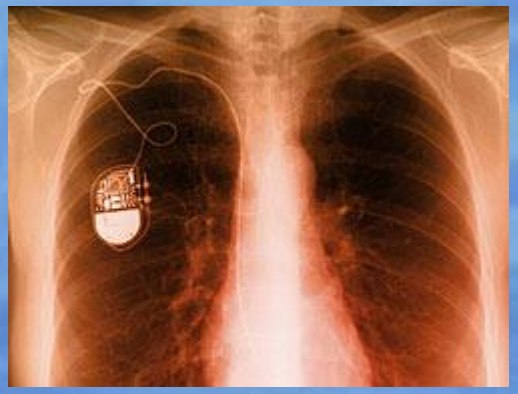
Escasos efectos corticales.

Actúan en locus cerúleus y vías NA.

Acción aditiva de propofol y mórficos

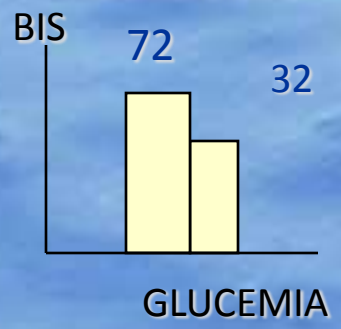
SINERGIA

INTERFERENCIAS ELÉCTRICAS



CONDICIONES CLÍNICAS

HIPOGLUCEMIA
Disminuye los valores del BIS.



HIPOVOLEMIA . PARADA

Disminución del BIS al descender TA.
Aumento del BIS tras reanimación.
Precede el cambio hemodinámico

"BIS PRODROMAL"

ISQUEMIA CEREBRAL
Disminución del BIS

CLAMPAJE CAROTÍDEO

HIPOTERMIA (CEC)

Descenso del BIS por aumento de solubilidad de A. inhalatorios.

Incremento de propofol sérico

ENTROPÍA ESPECTRAL

Realiza un análisis del EEG,indicador de la actividad cortical.
Uso ligado al cambio en el comportamiento eléctrico
del córtex en la transición a la inconsciencia, del caos a la regularidad

Profundizar en el plano hipnótico disminuye la complejidad y la frecuencia del EEG.
Buena correlación con el estado de conciencia.

Proporcional a la irregularidad de la señal EEG.
Sensor con tres electrodos (F,T)

ENTROPÍA ESPECTRAL

Se calculan dos índices:

ENTROPÍA DE ESTADO (SE):
Corresponde a la parte del espectro dominada por EEG

PROCESAMIENTO CORTICAL (0-91)

ENTROPÍA DE RESPUESTA (RE):
Representa la actividad EMG facial. Su cálculo incluye las frecuencias del EEG hasta los 47 Hz con el objetivo de reflejar la actividad de los músculos faciales y lograr una respuesta más rápida

NIVEL DE ACTIVIDAD RETICULAR

CALIDAD ANALGÉSICA

(0 100)

ENTROPÍA ESPECTRAL

EEG spectral entropy, heart rate, photoplethysmography and motor responses to skin incision during sevoflurane Anaesthesia

E.R.J. Seitsonen

Acta Anesthesiologica Scandinaba 2005;49:284-292

POTENCIALES EVOCADOS AUDITIVOS DE LATENCIA MEDIA

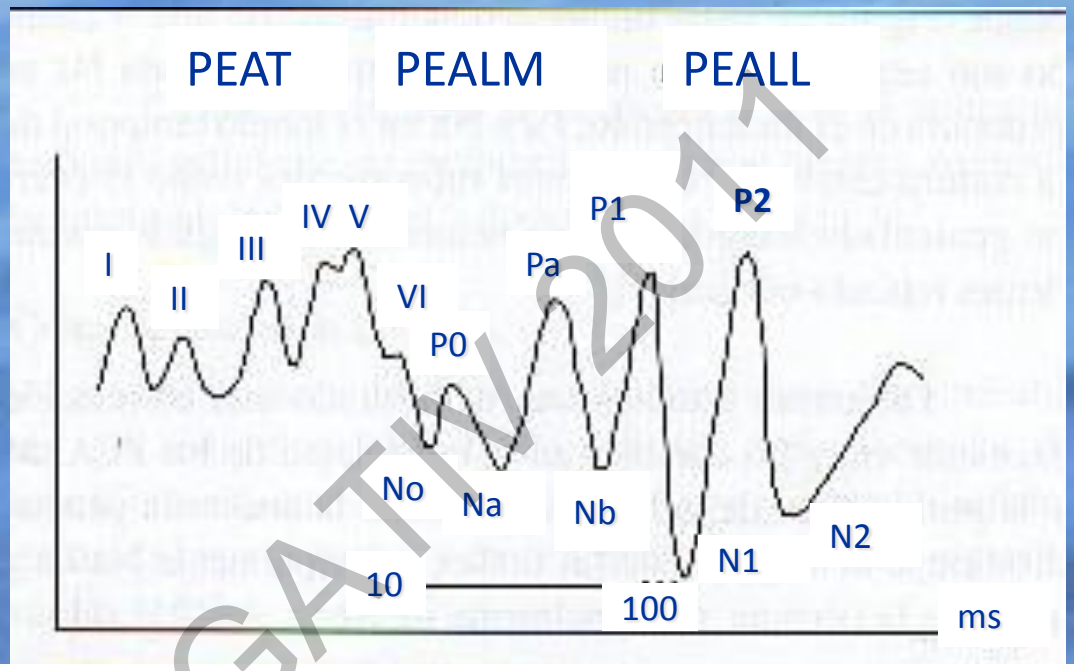
Son la respuesta electrofisiológicas del sistema nervioso a un estímulo acústico (EA) que se transmite por las vías auditivas desde la cóclea hasta la corteza cerebral.

Los PEALM son los únicos que se han demostrado más útiles para evaluar la profundidad de la hipnosis.

Dependiendo del tiempo transcurrido desde la producción del estímulo hasta obtener las las respuestas, los PEA pueden ser:

PEA de tronco encefálico (PEAT). 10 primeros ms.
PEA de latencia media (PEALM), 10-100ms del EA
PEA de latencia larga (PEALL), tras 100 ms

POTENCIALES EVOCADOS AUDITIVOS DE LATENCIA MEDIA



PEAT: Potenciales evocados auditivos de tronco
PEALM: Potenciales evocados auditivos de latencia media
PEALL: Potenciales evocados auditivos de latencia larga

Los componentes de los PEALM a 40 Hz, reflejan el estado consciente
Transmisión a través del Tálamo a córtex auditivo

POTENCIALES EVOCADOS AUDITIVOS DE LATENCIA MEDIA

El índice AEP-ARX-Index (AAI) definido por Jensen y col calcula la sumatoria de las diferencias absolutas de los cambios en la latencia y amplitud de los PEA en una ventana entre 20 y 80 ms después del estímulo auditivo

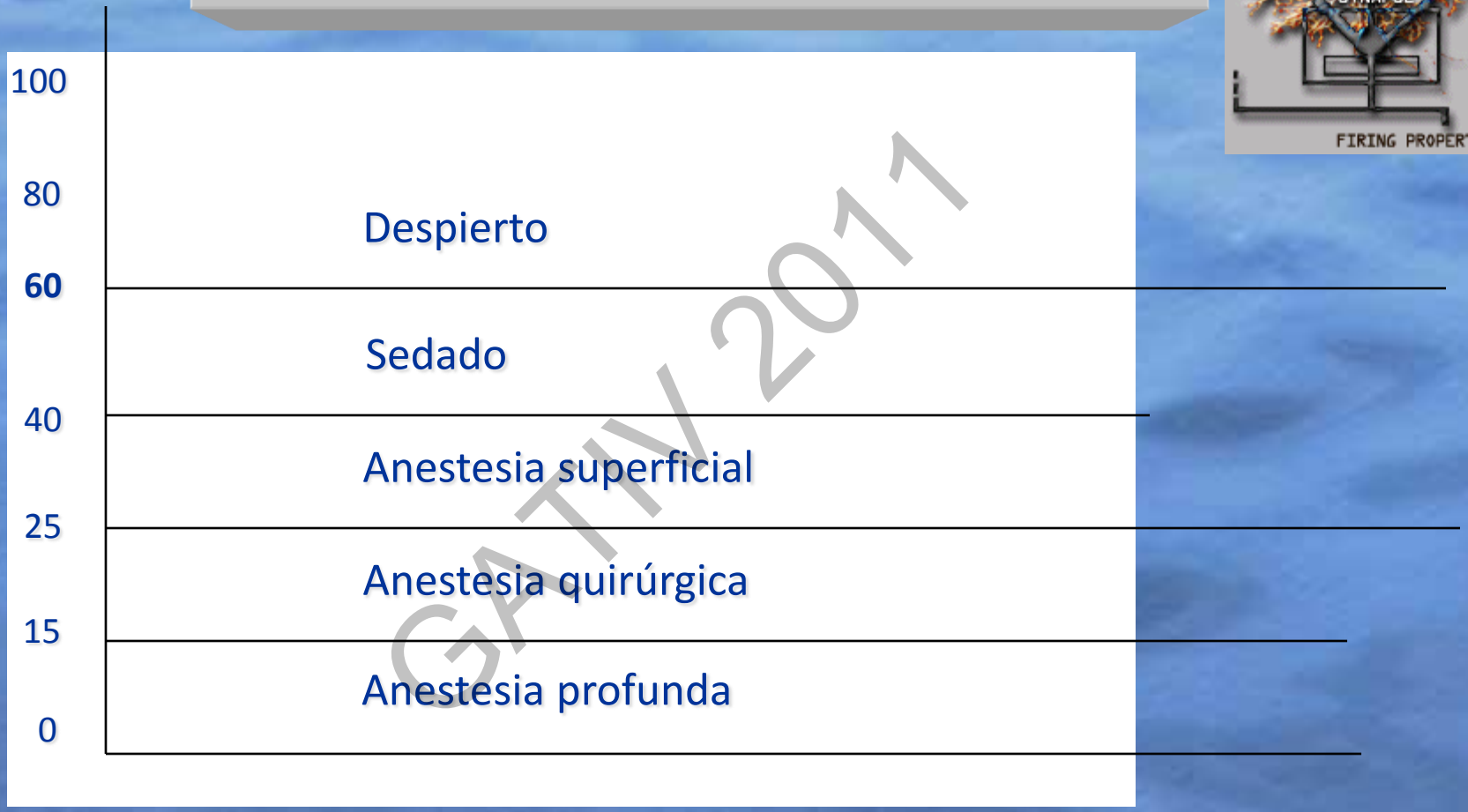
Resultados en tiempo real (6-10 seg).

Valores de 100. Paciente despierto
Valor de 0. EEG plano

Buena discriminación del AAI entre estado consciente y anestesia.

POTENCIALES EVOCADOS AUDITIVOS DE LATENCIA MEDIA

POTENCIALES EVOCADOS AUDITIVOS DE LATENCIA MEDIA



POTENCIALES EVOCADOS AUDITIVOS DE LATENCIA MEDIA

High-frequency Components of Auditory Evoked Potentials Are Detected in Responsive but Not in Unconscious Patients

Bertram Scheller, M.D.,M.Sc.,

Anesthesiology, V 103, No 5, Nov 2008

Detection of Consciousness by Electroencephalogram and Auditory Evoked Potentials

Gerhard Scheneider, MD

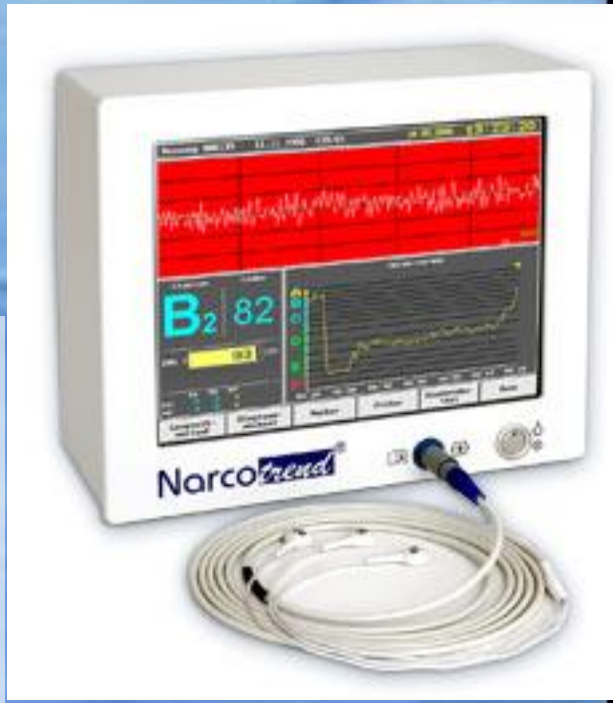
Anesthesiology, V 103, No 5, Nov 2005

Upsala J Med Sci 112 (2): 221–229, 2007

A Comparison of Auditory Evoked Potentials and Spectral EEG in the Ability to Detect Marked Sevoflurane Concentration Alterations and Clinical Events

Conclusions. The Spectral EEG monitor performed significantly better, with a larger number of events detected, compared with the AAI-monitor. However, at the best half the number of events was detected. An anaesthetic ceiling effect might to some part explain this finding. Notwithstanding, continuous anaesthetic depth monitoring may add information to low sensitive semi-continuous standard autonomic monitoring.

NARCOTREND



TheNarcotrend in the compact version (Narcotrend-Compact) records, displays andstoresone- andtwo-channelEEGs.

For a routinemeasurementthreeelectrodes are attachedtothepatient`sforehead. These are connectedtotheNarcotrend-Compact. Therethe EEG signalisamplifiedanddigitised, andthenpassesthrough a special software for EEG analysis. Duringtherecording, the software automaticallyanalysesthepatient`sdepthofanaesthesia/sedation.

Using a multitudeofparameterscalculatedfromthe EEG andapplyingmultivariatestatisticalmethods, the EEG isclassifiedautomaticallyintooneofthestageson a scalefrom A (awake) to F (verydeephypnosis). Additionally, as a refinementofthescalefrom A to F, an EEG index (100 =

THE CEREBRAL STATE MONITOR

The Cerebral State Monitor™ (CSM) sets a newstandardforspontaneous EEG monitoringofthelevelofconsciousness (LOC) ordepthofanesthesia.
Italso sets a newstandardforthecostof monitor andsensor(s) withthestrategytohave more patientsmonitored.
Thistruepoint-of-careassessmentof LOC providesthecaregiver personal insightandthecomfortto know withonetouch.

THE CEREBRAL STATE MONITOR

Cerebral state monitor, a newsmallhandheld EEG monitor fordeterminingdepthofanaesthesia: a clinicalcomparisonwiththebispectralindexduringday-surgeryR. E. Anderson [a1]and J. G. Jakobsson [a2c1a1]

The cerebral state index (CSI™) derived from a new small handheld electroencephalogram monitor was studied during routine day surgical anaesthesia titrated according to the bispectral index (BIS™).

The objective was to determine the degree of agreement between the two monitors.

Conclusions: When used for day-surgery anaesthesia without muscle relaxation, CSI and BIS show similar patterns and numerical values but with the incidence of occasionally large discrepancies between pair-wise readings. Which monitor is the more dependable remains to be established and cannot be implied from this initial explorative study.

European Journal ofAnesthesiology 2006; 23:208-213

British Journal ofAnaesthesia 92 (3): 393±9 (2004)

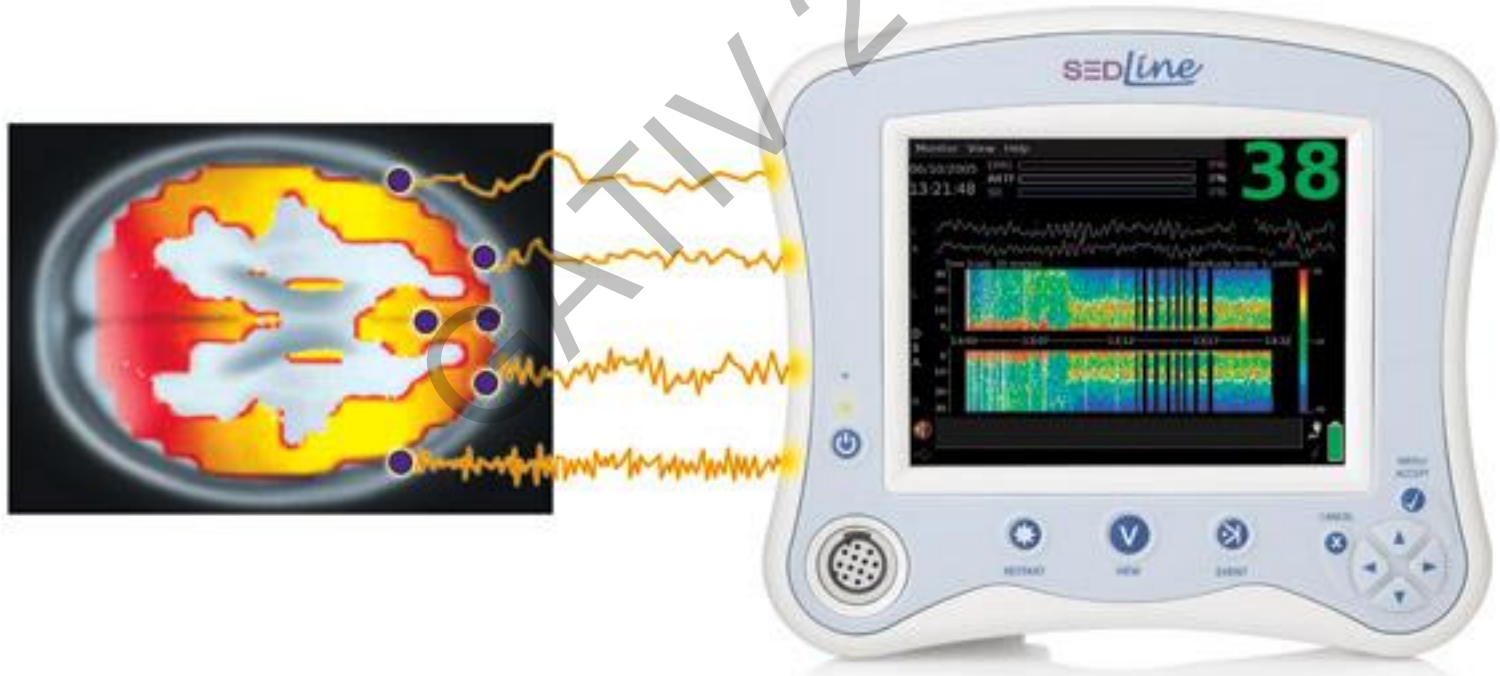
ThePatient State Index as anindicatorofthelevelofhypnosisunder general anaesthesiaL.

S. Prichep1 2*, L. D. Gugino3, E. R. John1 2, R. J. Chabot1, B. Howard1, H. Merkin1, M. L. Tom1, S. Wolter4, L. Rausch1

Background. Thisretrospectivestudy describes the performance ofthePatient State Index (PSI), understandardclinicalpracticeconditions. The PSI iscomprisedofquantitativefeaturesofthe EEG (QEEG) that display cleardifferencesbetweenhypnoticstates, butconsistencyacrossanaestheticagentswithinthestate.

SEDLINE MONITOR

A More Complete Picture StartsWith More Complete DataSEDLine, an EEG-basedbrainfunction monitor, expandsthescopeof real-time data andimprovesthemanagementofananesthetic case by enabling more individualizedtitration



SEDLINE MONITOR

KeyFeatures/Benefits:

- **Access to 4-channel EEG Data EnhancesMonitoring - Yields more robust data for a *single integratedalgorithm***

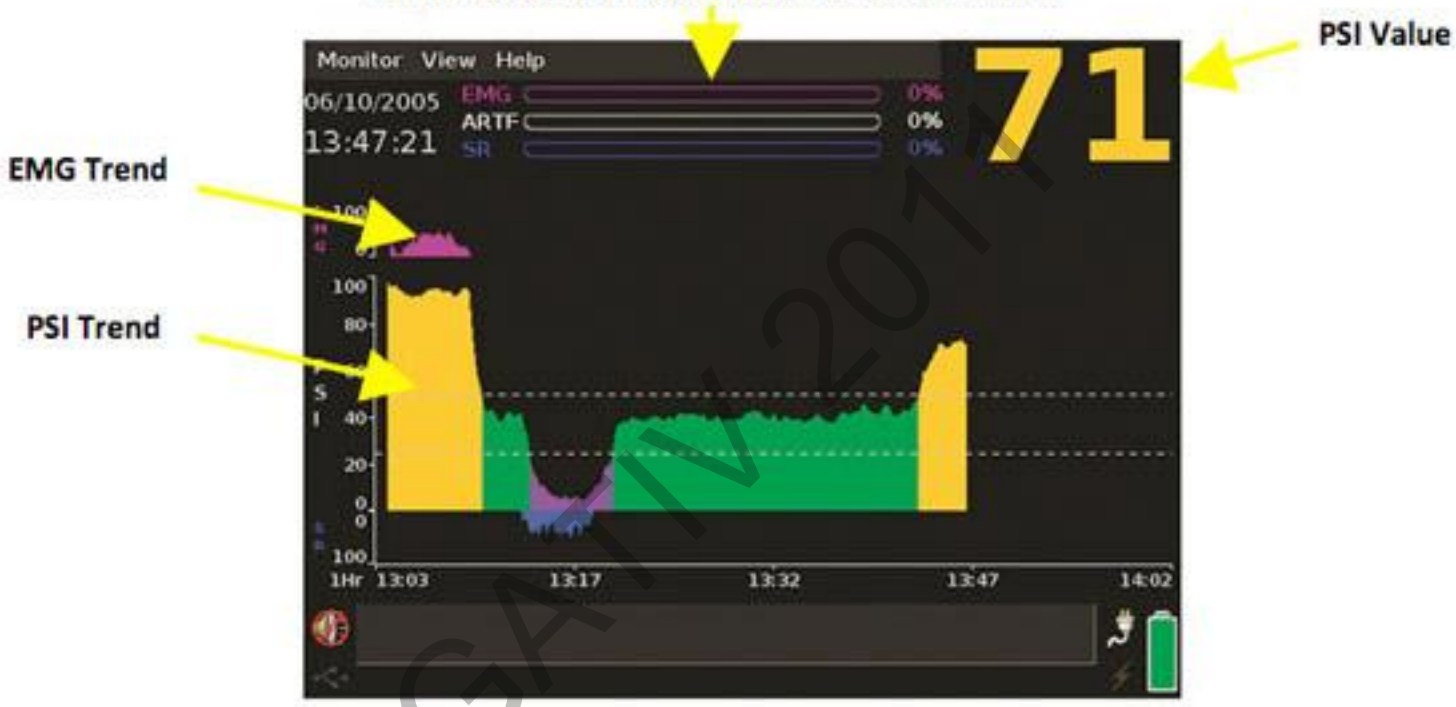
- ***Patient State Index (PSI) ProvidesRapidAssessment - Color-codednumericvaluesclearlyindicatelevelofsedation/anesthesia tofacilitaterapidassessment***

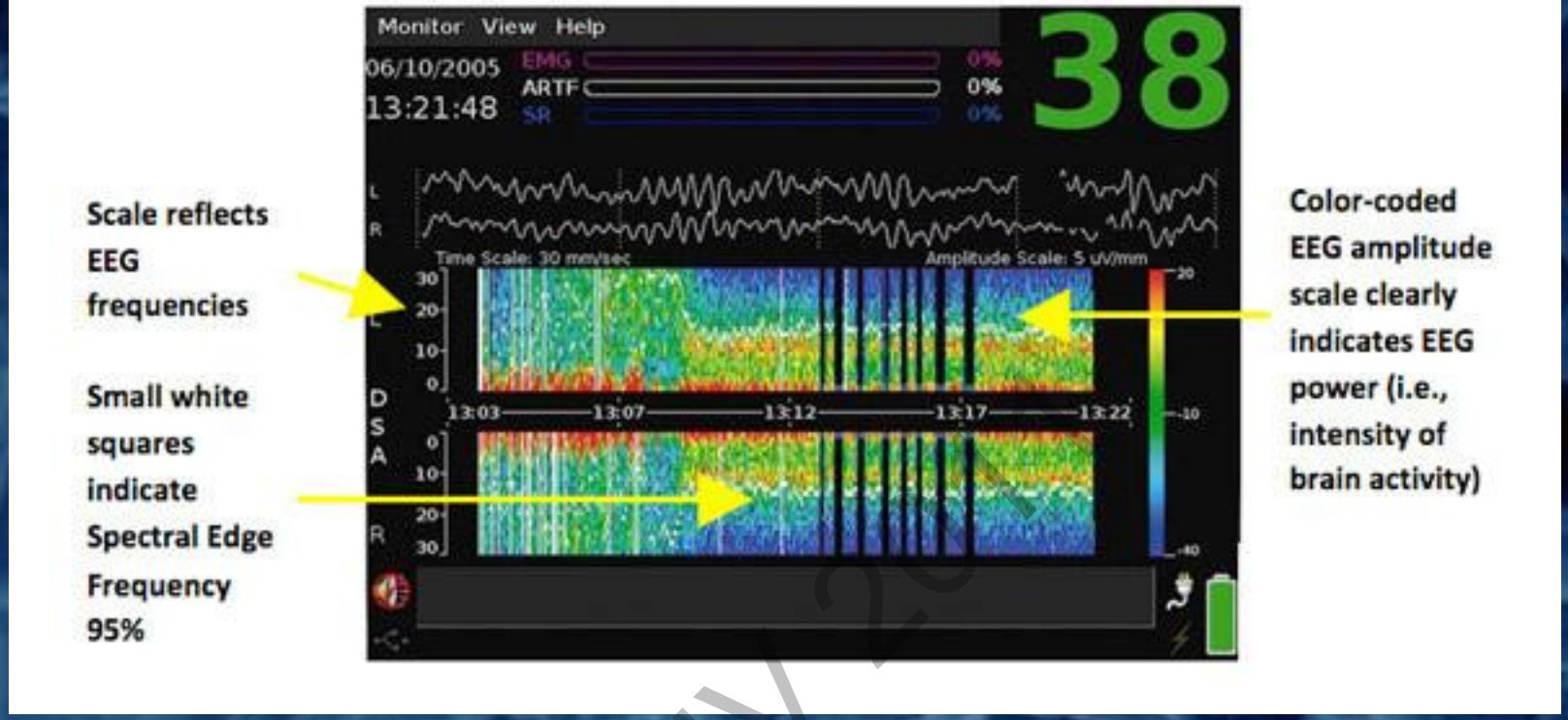
- ***DensitySpectral Array (DSA) FacilitatesEarly Response - Easy-to-interpret, highresolutiongraphicofbi-hemisphericactivityenablesimmediatedetectionofasymmetrical activity***

- ***SEDLinePatient Module - Data acquisitiontechnologydesignedtoprovide superior resistancetoelectrosurgery***

Additional information available to assess signals:

Electromyograph, Artifact Indicator, Suppression





> DSA Display - Providesadditionalinformationonbrainactivity in a simple-to-understandformat.• DSA allowsyoutoassess EEG informationfrommultiplelocations in bothhemispheresofthebrain•Facilitates real-time detectionofasymmetricalactivityenablingearlyresponse•Asymmetricalactivity may be caused by decreasedperfusiontoone hemisphere2• Benefitspatientsundergoingprocedures in whichthecirculationofonehemisphere may be compromised (e.g., carotidendarterectomy)

SURGICAL STRESS INDEX

Thesurgical stress index (SSI) iscomputedfrom finger photoplethysmographicwaveform amplitudes and pulse-to-pulse intervals

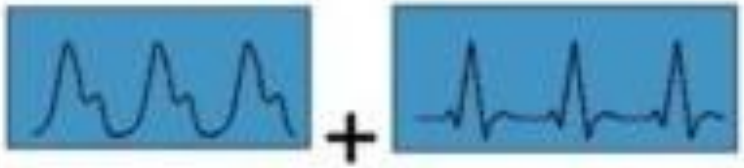
Surgical stress index as a measureofnociception/antinociception balance during general anesthesia

. WENNERVIRTA[1], M. HYNYNEN[2], A.-M. KOIVUSALO[1], K. UUTELA[3], M. HUIKU[3], A. VAKKURI[4]

Acta AnaesthesiologicaScandinavicaVolume 52, Issue 8, pages 1038–1045, September 2008

In detectingnociceptivestimuli, SSI hadbetter performance thanheartrate, BP, or response entropy.

Surgical Stress Index (SSI)



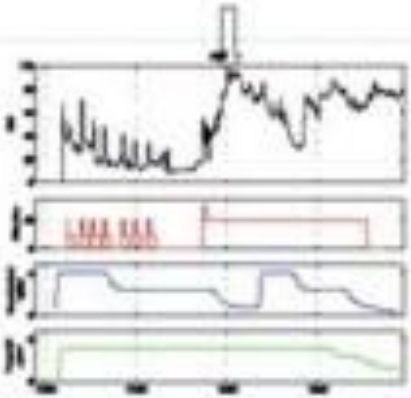
+ Normalisation = SSI

Plethysmogram Amplitude Heart rate

+

+

=



- First objective measure of adequacy of analgesia
  - Algorithm developed in close collaboration between GE Healthcare and VTT
- Clinical testing going on
- Best scientific presentation (Operatiiviset päivät, 2005, Hki)
- 3. place in Innovation 2004 competition (Innovaatiosäätiön Innovaatiokilpailu 2004)
- World wide release in AMCA2005, Switzerland

British Journal of Anaesthesia 98 (4): 447–55 (2007)
doi:10.1093/bja/aem004 Advance Access publication February 28, 2007

BJA

CLINICAL PRACTICE

Assessment of surgical stress during general anaesthesia

M. Huiku[1*†], K. Uutela[1†], M. van Gils[2], I. Korhonen[2], M. Kymäläinen[1†], P. Meriläinen[1†], M. Paloheimo[1 3†], M. Rantanen[4†], P. Takala[1†], H. Viertiö-Oja[1†] and A. Yli-Hankala[4 5†]

Conclusions. SSI reacts to surgical nociceptive stimuli and analgesic drug concentration changes during propofol–remifentanil anaesthesia. Further validation studies of SSI are needed to elucidate its usefulness during other anaesthetic and surgical conditions.

British Journal of Anaesthesia 103 (4): 586–93 (2009)
doi:10.1093/bja/aep206 Advance Access publication July 31, 2009

BJA

Influence of different remifentanil concentrations on the performance of the surgical stress index to detect a standardized painful stimulus during sevoflurane anaesthesia

M. Gruenewald*, P. Meybohm, C. Ilies, J. Höcker, R. Hanss, J. Scholz and B. Bein

Conclusions. The SSI response to tetanic stimulation was dependent on the remifentanil concentration.

British Journal of Anaesthesia 98 (4): 456–61 (2007)
doi:10.1093/bja/aem035 Advance Access publication March 9, 2007

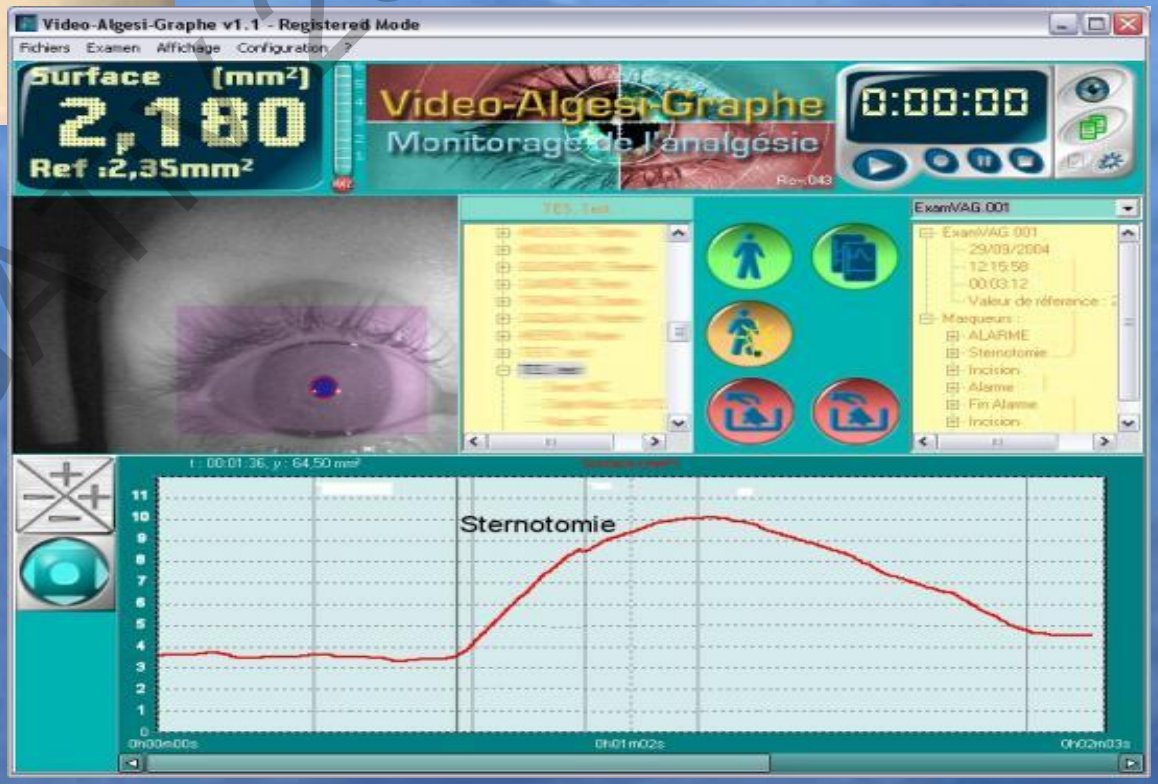
BJA

Surgical stress index reflects surgical stress in gynaecological laparoscopic day-case surgery†

J. Ahonen[1]*, R. Jokela[1], K. Uutela[2] and M. Huiku[2]

Conclusion. SSI was higher in patients receiving esmolol. The index seems to reflect the level of surgical stress and may help guide the use of opioids during general anaesthesia.

VIDEOALGESIGRAPH



VIDEOALGESIGRAPH

- Estímulo doloroso dilata la pupila
- La medida del diámetro pupilar proporciona una medida de la intensidad del dolor
- Limitaciones
  - Efectos sobre PRD: antagonistas dopaminérgicos, opioides
- PRD más sensible al estímulo doloroso que la variaciones de FC y PA

British Journal of Anaesthesia 91 (3): 347–52 (2003)
DOI: 10.1093/bja/aeg178
BJA

Effect site concentrations of remifentanil and pupil response to noxious stimulation

Bispectral index monitoring to prevent awareness during anaesthesia: the B-Aware randomised controlled trial

*P S Myles, K Leslie, J McNeil, A Forbes, M T V Chan, for the B-Aware trial group**

Summary

Background Awareness is an uncommon complication of anaesthesia, affecting 0·1–0·2% of all surgical patients. Bispectral index (BIS) monitoring measures the depth of anaesthesia and facilitates anaesthetic titration. In this trial we determined whether BIS-guided anaesthesia reduced the incidence of awareness during surgery in adults.

Methods We did a prospective, randomised, double-blind, multicentre trial. Adult patients at high risk of awareness were randomly allocated to BIS-guided anaesthesia or routine care. Patients were assessed by a blinded observer for awareness at 2–6 h, 24–36 h, and 30 days after surgery. An independent committee, blinded to group identity, assessed every report of awareness. The primary outcome measure was confirmed awareness under anaesthesia at any time.

Findings Of 2463 eligible and consenting patients, 1225 were assigned to the BIS group and 1238 to the routine care group. There were two reports of awareness in the BIS-guided group and 11 reports in the routine care group (p=0·022). BIS-guided anaesthesia reduced the risk of awareness by 82% (95% CI 17–98%).

Interpretation BIS-guided anaesthesia reduces the risk of awareness in at-risk adult surgical patients undergoing relaxant general anaesthesia. With a cost of routine BIS monitoring at US$16 per use in Australia and a number needed to treat of 138, the cost of preventing one case of awareness in high-risk patients is about $2200.

Lancet 2004; **363:** 1757–63
See Commentary page 1747

*Participating members listed at end of paper

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Correspondence to: Dr Paul S Myles, Department of Anaesthesia and Pain Management, The Alfred Hospital, PO Box 315, Melbourne, Victoria 3004, Australia
(e-mail: p.myles@alfred.org.au)

Introduction

Anaesthesia can be defined as a state of drug-induced unconsciousness in which the patient neither perceives nor recalls noxious stimulation.[1] Awareness is the postoperative recollection of events occurring during general anaesthesia. The incidence of awareness is 0·1–0·2% in the general surgical population,[2,3] but is greater during cardiac surgery, caesarean section, and trauma surgery.[4–6]

Awareness is a distressing complication of anaesthesia.[7–10] Affected patients report perception of paralysis, conversations, and surgical manipulations, accompanied by feelings of helplessness, fear, and pain. Some patients have rated it as their worst hospital experience;[7] post-traumatic stress disorder can develop in those who are severely affected.[8–10] However, despite numerous attempts over more than 150 years, the definitive monitor for predicting awareness has not been established.[11]

Clinical signs, such as blood pressure and heart rate, are routinely used by anaesthetists to monitor anaesthetic depth, but such methods are unreliable.[5] Early attempts to monitor anaesthetic depth using the spontaneous[11–14] or evoked[15,16] electroencephalograph were also unsuccessful. The bispectral index (BIS) is a monitor of anaesthetic depth approved by the Food and Drug Administration in the USA. BIS incorporates time-domain, frequency-domain, and bispectral analysis of the electroencephalograph, and is displayed as a dimensionless number between 0 (deep anaesthesia) and 100 (awake),[17] with 40–60 being suitable for surgical anaesthesia.[18] BIS correlates well with hypnotic state and anaesthetic drug concentration,[19–21] and use of BIS can shorten recovery times.[18,22] However, the predictive value of BIS as a monitor for awareness has not previously been assessed in a randomised trial.[11,23,24] We therefore did a large trial to assess whether BIS monitoring decreases the incidence of awareness during relaxant general anaesthesia in routine surgical patients at high risk of awareness.

Methods

Study population

Surgical patients undergoing relaxant general anaesthesia at one of the participating centres (listed at the end of the paper) were eligible if they were aged 18 years or older, and had at least one of these risk factors for awareness: caesarean section, high-risk cardiac surgery (eg, ejection fraction <30%, cardiac index <2·1 L/min per m^2, severe aortic stenosis, pulmonary hypertension, or undergoing off-pump coronary artery bypass graft surgery), acute trauma with hypovolaemia, rigid bronchoscopy, significant impairment of cardiovascular status and expected intraoperative hypotension requiring treatment, severe end-stage lung disease, past history of awareness, anticipated difficult intubation where an awake intubation

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 MARCH 13, 2008 VOL. 358 NO. 11

Anesthesia Awareness and the Bispectral Index

CONCLUSIONS

We did not reproduce the results of previous studies that reported a lower incidence of anesthesia awareness with BIS monitoring, and the use of the BIS protocol was not associated with reduced administration of volatile anesthetic gases. Anesthesia awareness occurred even when BIS values and ETAG concentrations were within the target ranges. Our findings do not support routine BIS monitoring as part of standard practice. (ClinicalTrials.gov number, NCT00281489.)

Association of Perioperative Risk Factors and Cumulative Duration of Low Bispectral Index with Intermediate-term Mortality after Cardiac Surgery in the B-Unaware Trial

Anesthesiology 2010; 112:1116–27

Conclusions: This study found an association between cumulative duration of low BIS and mortality in the setting of cardiac surgery. Notably, this association was independent of both volatile anesthetic concentration and duration of anesthesia, suggesting that intermediate-term mortality after cardiac surgery was not causally related to excessive anesthetic dose.

Bispectral Index Monitoring, Duration of Bispectral Index Below 45, Patient Risk Factors, and Intermediate-term Mortality after Noncardiac Surgery in the B-Unaware Trial

Anesthesiology 2011; 114:545–56

Conclusions: This study found no evidence that either cumulative BIS values below a threshold of 40 or 45 or cumulative inhalational anesthetic dose is injurious to patients. These results do not support the hypothesis that limiting depth of anesthesia either by titration to a specific BIS threshold or by limiting end-tidal volatile agent concentrations will decrease postoperative mortality.

Depthofanesthesia
Christopher D. Kent and Karen B. Domino
CurrentOpinion in Anaesthesiology 2009, 22:782 – 787

Thepresentreviewarticleprovides a summaryoftherecentliteratureevaluatingthetechnologyformonitoringdepthofanesthesiaandpatientoutcomesassociatedwithits use.

Comparisonofmonitors
In anydiscussioninvolvingbrainfunctionmonitors, theelephant in theroomisthat, althoughthere are a numberofdifferentmonitorscommerciallyavailable, the BIS continuestohavethelargest body ofliteratureevaluatingits use

Depthofanesthesia

Christopher D. Kent and Karen B. Domino

CurrentOpinion in Anaesthesiology 2009, 22:782 – 787

Despitedifferentalgorithmsforprocessingandfiltering EMG, theassessmentsofanestheticdepthproduced by manybrainfunctionmonitors are affected by the use of neuromuscular blockingagents.

Thedose– response of EEG parametersandincreasingconcentrationofanestheticagents isnonlinearwith a plateauover a clinicallyrelevantdoserange.

During general anesthesiawithvolatileagentsforpatients at highriskforawareness, BIS monitoringisassociatedwith a lowincidenceofawareness, but no more so thanthe use ofalarmsforlimitsonvolatileagentconcentration.

Thepreviousfindingof a correlationofmortalitywithlowerintra- operative BIS scoresappearsto be correlatedwithpatientcomorbidities, particularlymalignancy.

Processedelectroencephalogram in depthofanesthesiamonitoring

Ben Julian A. Palancaa, George A. Mashourband Michael S. Avidana,

CurrentOpinion in Anaesthesiology 2009, 22:553 – 559

Theycriticallyreviewtheprinciplesunderlying processedelectroencephalogram (EEG) monitorsandrecentstudiesvalidatingtheir use in monitoringanestheticdepth.

Currentprocessed EEG monitors are limited by theircalibrationrangeandtheinterpatientvariability in theirdose–response curves. Thenextgenerationofdepth-of- anesthesiamonitorswillrequire a greaterunderstandingofthetransformationsof cortical and subcortical activityinto EEG signals, theeffectsofanesthetics at a systemslevel, andthe neural correlatesofconsciousness.

CONCLUSIONES

La monitorización de la profundidad anestésica es hoy en día un objetivo fundamental y esencial, en la práctica anestésica diaria

Se logra una individualización de la titulación de fármacos, reduciendo el consumo y según algunos estudios la mortalidad peroperatoria

Disminuye significativamente el riesgo de DIO, aunque no lo elimina por completo, como avalan otros estudios

Importancia de otras monitorizaciones: NIRS

Encuesta de la Sección de Neurociencias.

ENCUESTA DE LA SECCIÓN DE NEUROCIENCIAS DE LA SEDAR

Dra Aldana, miembro de la Sección de Neurociencias de la SEDAR: “Necesitamos que nuestros compañeros anestesiólogos se animen a contestar la encuesta "SOBRE LA EVOLUCIÓN DE LA PRÁCTICA ANESTÉSICA EN RELACIÓN CON EL DESPERTAR INTRAOPERATORIO EN ESPAÑA Y VALORACIÓN DE LA UTILIDAD DEL NIRS INTRAOPERATORIO"".

Os agradeceré que hagais "propaganda" en vuestros servicios, pueden responder tanto adjuntos como residentes.Se rellena facilmente empleando únicamente un par de minutos.Os recuerdo el link:https://www.surveymonkey.com/s/EvolucionPracticaAnestesicaSEDAR2011. Además estos dias tambiéns se puede acceder directamente al link de la encuesta desde la página de inicio de la web de la SEDAR.

GRACIAS

CON LA COLABORACIÓN DE LA DRA EVA ALDANA DÍAZ