HAUTE AUTORITÉ DE SANTÉ

The legally binding text is the original French version

TRANSPARENCY COMMITTEE

Opinion

1 October 2008

LENOXe 100 % (v/v), medicinal gas, liquefied, for inhalation
Aluminium cylinder of 10 L (CIP code: 571 467-8)

Applicant: AIR LIQUIDE SANTE FRANCE

Xenon 100 %

List I

ATC Class: B01AE07

Date of marketing authorisation (MA) (mutual recognition): 1 October 2007

Reason for request: Inclusion on the list of medicinal products approved for use by hospitals.

Medical and Economic Evaluation and Public Health Directorate

1 CHARACTERISTICS OF THE MEDICINAL PRODUCT

1.1. Active ingredient

Xenon 100%

1 litre of gas under standard conditions (1.013 bar, 15℃) contains 1 litre of xenon 100% (v/v).

1.2. Indication

Maintenance of narcosis in combination with opioids as part of balanced anaesthesia in adults of ASA class I-II[1].

1.3. Dosage

LENOXe 100% (v/v) should be administered only under the supervision of an anaesthetist. Adequate apparatus for anaesthesia and ventilation, including resuscitation, must be available during administration. Quantitative determination of the inhaled oxygen concentration during administration is obligatory.

Premedication

Premedication should be determined according to the individual needs of the patient. Anticholinergics such as atropine, can be administered.

Induction

Xenon is not intended for induction of anaesthesia. Intravenous anaesthesia induction is preferred.

Maintenance

Adults

Concentrations ranging from 51 to 69% (v/v) of xenon in the inhaled air are recommended in general anaesthesia depending on the individual requirement of the patient, the specific intervention and the dosage of the supplementary anaesthetic. Muscle relaxants can be given if additional relaxation is required.

The MAC_{50} (Minimal Alveolar Concentration which suppresses a defensive reaction to a pain stimulus in 50% of patients) is approximately 60 ± 5% (v/v)[2].

In combination with fentanyl dosages ranging from 0.05 mg to 1.0 mg were used. In combination with alfentanil, doses of 50 µg/kg to 100 µg/kg. In combination with remifentanil, doses of 0.2 µg/kg/min to 0.5 µg/kg/min were used.

Due to limited clinical experience and lack of available clinical data, a concomitant administration of volatile anaesthetics is not recommended at this time.

Elderly

The MAC_{50} value of xenon in the elderly differs in men and women. A MAC_{50} of 69.3% (v/v) is described for men and a MAC_{50} of 51.5% (v/v) for women (in 30% oxygen).

[1] Cf. appendix

[2] Studies performed using 1 MAC (Minimal Alveolar Concentration) xenon in combination with sufentanil 10µg boli as required.

Termination of anaesthesia

At the end of the anaesthesia, xenon administration is stopped. Despite less hypoxic dilution with xenon than with nitrous oxide, inspired oxygen concentration should be increased to 100 %.

Method of administration

Xenon must be administered only with the addition of at least 30% oxygen.

Administration by inhalation

Xenon is to be administered only by means of conventional anaesthetic apparatus calibrated specifically for xenon. The duration of xenon anaesthesia is dependent upon the type of surgical intervention.

The administration technique must ensure the avoidance of administration of pure xenon (or a mixture with a too high (toxic) partial pressure of the inert gas) in order to maintain a large enough inspired oxygen concentration. Due to accumulation of nitrogen when using xenon in a closed-circuit anaesthesia machine and to ensure adequate oxygenation, it is recommended to flush the closed system with fresh oxygen-xenon when the xenon concentration decreases to less than 60%. In patients requiring more than 30-35% oxygen to maintain adequate hemoglobin saturation, the accumulation of nitrogen and the needed oxygen concentration will reduce the xenon concentration to significantly less than 1 MAC.

2 SIMILAR MEDICINAL PRODUCTS

2.1. ATC Classification (2005)

N : Nervous system
N01 : Anaesthetics
N01A : General anaesthetics
N01AX : Other general anaesthetics
N01AX15: Xenon

2.2. Medicines in the same therapeutic category

These are volatile general anaesthetics.

- *Halogenated hydrocarbons*:
  - Isoflurane
    - -AERRANE solution for inhalation
    - -FORENE solution for inhalation
    - -ISOFLURANE BELAMONT solution for inhalation
  - Halothane-HALOTHANE BELAMONT volatile liquid for inhalation
  - Sevoflurane
    - -SEVOFLURANE BAXTER volatile liquid for inhalation, 1ml/ml
    - -SEVORANE volatile liquid for inhalation
  - Desflurane-SUPRANE solution for inhalation

- *Other anaesthetics*

o Nitrous oxide
  -MEDICINAL NITROUS OXIDE AGA MEDICAL gas for inhalation
  -MEDICINAL NITROUS OXIDE AIR LIQUIDE SANTE France gas for inhalation

o Oxygen, nitrous oxide
  -MEDICAL NITROUS OXIDE OXYGEN ALS gas for inhalation
  -MEDIMIX gas for inhalation
  -KALINOX gas for inhalation

2.3. Medicines with a similar therapeutic aim

These are injectable general anaesthetics.

- *Barbiturates, plain*:

o Thiopental sodium -PENTOTHAL 1g

- *Opioid anaesthetics:*

o Fentanyl citrate
  -FENTANYL DAKOTA PHARM 0.1 mg/2 ml and 0.5 mg/10 ml
  -FENTANYL MERCK 100 µg/2 ml and 500 µg/10 ml
  -FENTANYL PANPHARMA 0.1 mg/2 ml and 0.5 mg/10 ml IV/epidural
  -FENTANYL RENAUDIN 0.05 mg/ml IV and epidural
  -FENTANYL JANSSEN 0.1 mg/2 ml and 0.5 mg/10 ml

o Sufentanil citrate
  -SUFENTA 10 µg/2 ml and 250 µg/5 ml v50 µg/10ml IV and epidural
  -SUFENTANIL AGUETTANT 50 µg/ml IV and epidural and 5 µg/ml
  -SUFENTANIL MERCK 50 µg/ml and 5 µg/ml IV/epidural
  -SUFENTANIL PANPHARMA 50 µg/ml and 5 µg/ml IV/epidural
  -SUFENTANIL RENAUDIN 50 µg/ml and 5 µg/ml IV or epidural

o Alfentanil hydrochloride-RAPIFEN 1 mg/2 ml and 5 mg/10 ml

o Remifentanil hydrochloride-ULTIVA 1mg, 2 mg, 5 mg

- *Other general anaesthetics*

o Propofol
  -DIPRIVAN 2%, 200 mg/20 ml, 500 mg/50 ml
  -PROPOFOL DAKOTA PHARM 10 mg/ml
  -PROPOFOL FRESENIUS 1%
  -PROPOFOL LIPURO 1%
  -PROPOFOL MERCK 20 mg/ml

o Etomidate -ETOMIDATE LIPURO 20 mg/10 ml

o Sodium oxybate -GAMMA OH 20 %

o Etomidate -HYPNOMIDATE 2 mg/ml

o Ketamine hydrochloride-KETAMINE PANPHARMA 100 mg/ml, 250 mg/5ml, 50 mg/5 ml

3 ANALYSIS OF AVAILABLE DATA

The LENOXe application dossier contains data from 4 randomised, controlled, comparative trials:
- Randomised studies *versus* (isoflurane±N_2O) (MG-Xe-01/98 and MG-Xe-01/99), that led to the granting of the marketing authorisation
- 2 other randomised studies; one *versus* isoflurane+N_2O and the other *versus* desflurane.

3.1. Efficacy

Two randomised clinical studies, that led to the granting of marketing authorisation, confirmed the efficacy and safety of xenon anaesthesia:

- Study MG-Xe-01/98[3]:
Objective: comparison of the efficacy and safety of xenon (60 ± 5% with oxygen) *versus* isoflurane (60 ± 5% N_2O with oxygen) in elective, maintenance anaesthesia for not more than 2 hours.

Design: single-blind, randomised controlled study. The treatment regimen was as follows:

Induction of anaesthesia in the 2 groups:

- Propofol 1-2mg/kg to 5mg/kg
- Sufentanil 0.4 µg/kg
- Cisatracurium 0.1-0.2 mg/kg

Maintenance:

Group A:

- Isoflurane (end tidal 0.5 vol %)
- N_2O (60 ± 5%)
- O_2 (≥ 30%)
- Sufentanil indicated according to clinical condition: 10µg bolus

Group B:

- Xenon (60± 5%)
- O_2 (≥ 30)
- Sufentanil indicated according to clinical condition: 10µg bolus

A closed-circuit anaesthesia machine was used. Patients were followed up for 24 hours after surgery.

Inclusion criteria: Adult ASA I-III patients; duration of inhaled anaesthesia ≥ 2 h.

Exclusion criteria: surgical emergency, woman of child-bearing age, pregnancy, breast-feeding, increased intracranial pressure, chronic alcoholism or drug abuse, oxygen saturation below 90%, myocardial infarction less than 6 months ago, stroke less than 12 months ago, hepatic or renal impairment, heart failure or adrenal insufficiency, IDDM, legal incapacity.

[3] Published study: Rossaint R, Reyle-Hahn M, Schulte am Esch J, Scholz J, Scherpereel P, Vallet B, Giunta F, Del Turco M, Erdmann W, Tenbrinck R, Hammerle AF, Nagele P, Xenon Study Group: *Multicenter randomized comparison of the efficacy and safety of xenon and isoflurane in patients undergoing elective surgery. Anesthesiology* 2003; 98:6–13.

Endpoints:
The recovery index RI[4] was chosen as primary endpoint. It was calculated with the following formula:

$$\mathbf{RI=}\ \frac{1 + \text{Aldrete score}^{5}\ 5\ \text{minutes after extubation}}{(2 \times \text{extubation time}) + \text{time to open eyes}}$$

The extubation time and time to open eyes at the end of surgery were evaluated as secondary endpoints.

Results: 224 patients were enrolled in this trial: 112 in each group. The mean recovery index was 0.76 ± 0.35 min^{-1} in the xenon group and 0.43± 0.28 min^{-1} in the isoflurane + N_2O group, p<0.0001. In practice, and due to the composite nature of the endpoint, it is difficult to quantify the effect of xenon on the efficacy endpoint.
The mean extubation time was 5.6 min+/-2.64 in the xenon group and 9.9 min+/-5.9 in the isoflurane group. The mean time to open the eyes was 4.6 min+/-2.1 in the xenon group and 8.3 min+/-5.4 in the isoflurane group.

- Study MG-Xe-01/99[6]:

Objective: comparison of the efficacy and safety of xenon *versus* isoflurane on recovery and cardiac performance, in maintenance anaesthesia.

Design: Single-blind, randomised controlled study.
The treatment regimen was as follows:
Patients were premedicated with midazolam where necessary.
Induction in the 2 groups:

- Etomidate 0.15-0.4 mg/kg then infusion of etomidate with 0.1-0.8 mg/kg/h
  Sufentanil 0.3-0.5 µg/kg
- Cisatracurium 0.1-0.2 mg/kg

Maintenance:

Group A:

- Isoflurane
- O_2 (≥30%)
- Sufentanil indicated according to clinical status: 10µg bolus

Group B:

- Xenon (60±5%)
- O_2 (≥30%)
- Sufentanil indicated according to clinical status: 10µg bolus

Patients were monitored for 24 hours after surgery.

Inclusion criteria: ASA I-II adult patients with no history of heart disease.

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[4] Dupont J, Tavernier B, Ghosez Y, Durinck L, Thevenot A, Moktadir-Chalons N, Ruyffelaere-Moises L, Declerck N, Scherpereel P. Recovery after anaesthesia for pulmonary surgery: desflurane, sevoflurane and isoflurane. Br J Anaesth. 1999;82(3):355-9.

[5] Definition of Aldrete score: cf. Appendix Aldrete JA (1995) The post-anesthesia recovery score revised. J. Clin Anesth 7:89-91.

[6] Published study: Wappler, F. et al. Multicenter Randomized Comparison of Xenon and Isoflurane on Left Ventricular Function in Patients Undergoing Elective Surgery. Anesthesiology. 2007 Mar;106 (3):463-471.

Endpoints:
Primary endpoints were:
- Recovery index
- Myocardial contractility evaluated by trans-oesophageal ultrasound: Left ventricular end-systolic wall stress (LVESWS) and Velocity of circumferential fibre shortening velocity with corrected heart rate (Vcfc).

The extubation time and the time to open eyes at the end of surgery were evaluated as secondary endpoints.

Results: 259 patients were included. One hundred and thirty-one patients received xenon and 128 isoflurane. One patient was excluded after withdrawal of consent. Seven patients were withdrawn from the trial. The mean recovery index was 0.56 ±0.39 min^{-1} in the xenon group and 0.14 ± 0.09 min^{-1} in the isoflurane group p<0.0001.

The relative change in LVESWS compared to baseline was -13.6% ±21.8 in the isoflurane group and 0.2% ± 26.6 in the xenon group, p<0.0001. The relative change in the Vcfc index compared to baseline was -8.4% ± 14.8 in the isoflurane group and 1.5% ± 17.3 in the xenon group, p<0.0001. The LVESWS and Vcfc scores are composite, intermediate endpoints making it difficult to obtain a concrete interpretation of the results.

The mean extubation time was 8.5 min+/-10.8 in the xenon group and 25.1 min+/-13.05 in the isoflurane group.
The mean time to open the eyes was 6.6 min+/-4.7 in the xenon group and 23.8 min+/-min±11.8 in the isoflurane group.

- **Randomised study *versus* isoflurane + N_2O**[7]:

Objective: to evaluate the efficacy and safety of general anaesthesia with xenon *versus* isoflurane + N_2O.

Dispensed treatments:
-Inhaled xenon group (60±5%)
-Isoflurane group, at the concentration of 0.6-0.9 vol% + (0_2+N_20)

Primary efficacy endpoints were measurements of cognitive function (SKT test[8]: Syndrom-Kurztest or *Syndrome Short Test*), recovery time, recovery index, postoperative alertness, Aldrete score, haemodynamic parameters with no endpoint hierarchy.

Inclusion criteria: ASA I-II patients aged over 18 years, undergoing elective surgical procedures, i.e. visceral and soft tissue surgery, knee arthroscopy, liposuction, breast enlargement, breast reduction.

Efficacy results
Forty patients were included in each of the 2 groups.
- Aldrete score results

The post-surgical Aldrete score was higher in the xenon group than in the isoflurane group at 5 min (p<0.001), 15 min (p<0.05), 30 min and 45 min (p<0.01).

[7] *Randomised interindividual comparison of the psychocognitive functions in the post-surgery wake-up-phase between isoflurane and Xenon with patients with the risk classification ASA I to II with elective anaesthesias* (unpublished)
[8] Lehfeld H, Erzigkeit H. The SKT—A *Short Cognitive Performance Test for Assessing Deficits of Memory and Attention. International Psychogeriatrics,* 1997;9:115-21

The Aldrete score was increased in the 2 groups but the maximum was reached earlier in the xenon group (15 min) than in the isoflurane group (60 min).

- Recovery index results

The recovery index was 0.73 ± 0.38 min^{-1} in the xenon group and 0.43 ± 0.28 min^{-1} in the isoflurane group.
The recovery index was better in the xenon group after short operations such as arthroscopy (1.4 min^{-1}). The recovery index after liposuction (long operation) was lower (0.71 min^{-1}) in the xenon group.

- SKT score results

The SKT score 3 hours after surgery was lower in the xenon group compared to the isoflurane group ($p<0.05$) but no numerical data were presented in the study report.

- Randomised study of xenon *versus* desflurane on cognitive function in subjects aged between 65 and 75 years[9]: 37 ASA I-III patients aged from 65 to 75 years underwent elective surgery lasting from 60 to 180 minutes. One group received xenon (n=18) and another group (n=20) received desflurane. The primary endpoint was the TAP score (*Test for Attentional Performance*), a composite test of attention, alertness and working memory. After evaluating the baseline status 12-24 H before the operation, patients were followed up at 6-12 H and 66-72 H after the operation. There was no statistically significant difference between the two groups for the TAP test score.

3.2. Safety

In study MG-Xe-01/98, 5 of the 224 patients had serious adverse events, 3 in the isoflurane group (1 ventilatory dysfunction, 1 pulmonary embolism, 1 asystole) and 2 in the xenon group (1 renal dysfunction and 1 gas embolism). No death occurred during the study. Postoperative respiratory and haemodynamic parameters were similar in the 2 groups. In the xenon group, there were 105 cases of nausea, vomiting and PONV (*Post-Operative Nausea and Vomiting*) and 19 cases of hypertension. In the isoflurane group, there were 74 hypertension and 49 PONV events.
In study Mg-Xe-01/99. the number of patients with one or more adverse event was 95 (73.6%) in the xenon group and 89 (70.1%) in the isoflurane group. The number of adverse events per patient was 1 to 6 in the xenon group and 1 to 7 in the isoflurane group. Seventy-five and 43 patients had PONV in the xenon and isoflurane groups respectively. The frequency of arterial hypertension was higher in the xenon group than in the isoflurane group (19 *versus* 6). However, there were 74 cases of hypotension in the isoflurane group. No death occurred during the trial. There was one serious adverse event in the xenon group (reduction of oxygen saturation).

No adverse event was observed in the study entitled "*Randomised interindividual comparison of the psychocognitive functions in the post-surgery wake-up-phase between isoflurane and Xenon with patients with the risk classification ASA I to II with elective anaesthesias"*.

[9] Coburn M, Baumert JH, Roertgen D, Thiel V, Fries M, Hein M, Kunitz O, Fimm B, Rossaint R. Emergence and early cognitive function in the elderly after xenon or desflurane anesthesia a double-blinded randomized controlled trial. *Br J Anaesth* 2007 98(6):756-762.

In an incidence study evaluating the number of cases of nausea and vomiting in 142 patients receiving xenon *versus* 71 patients receiving propofol[10], PONV were observed for 24 hours after surgery, in 66.2% of the patients in the xenon group *versus* 35.2% in the group receiving propofol ($p<0.001$).

In addition, the SPC reports the following items:
As with other inhalational anaesthetics, xenon will cause respiratory depression more or less in a concentration-dependent manner.

Postoperative nausea and vomiting is very commonly reported in xenon anaesthesia procedures (up to 45 % of patients).

Table 1: Adverse events with LENOXe

Immune system disorders:	
Common (≥ 1/100, < 1/10)	Intraoperative or postoperative rise in temperature or sweating
	Chills
Cardiac disorders:	
Common	Bradycardia
Vascular disorders:	
Very common	Hypertension
Common	Hypotension
Gastrointestinal disorders	
Very common (≥ 1/10)	Postoperative nausea and vomiting
Respiratory, thoracic and mediastinal disorders	
Very rare (≤ 1/10,000)	Bronchial spasm

The following events have also been observed in clinical studies, without revealing a direct correlation to xenon anaesthesia:

- Arrhythmia
- Elevated liver enzymes
- Renal dysfunction
- Hypersecretion
- Hypocalcaemia
- Hyperleukocytosis
- Metabolic acidosis
- Tachycardia

[10] Coburn M, Kunitz O, Apfel CC, Hein M, Fries M, Rossaint R. *Incidence of postoperative nausea and emetic episodes after xenon anaesthesia compared with propofol-based anaesthesia. Br J Anaesth*. 2008 Jun;100(6):787-91.

3.3. Conclusion

In 4 randomised controlled trials *versus* halogenated derivatives (isoflurane or desflurane) enrolling more than 500 patients, LENOXe had a higher efficacy on a composite endpoint, the recovery index, for maintenance of anaesthesia. It was difficult to quantify the effect because of the choice of endpoint. The recovery time was similar to that observed with halogenated anaesthetics including the most recently marketed agents (desflurane and sevoflurane) which have the advantage of shortening the duration of the recovery phase. At individual level, the gain of a few minutes induced by reducing the duration of anaesthesia is negligible. It should be pointed out that the inclusion criteria of the studies presented in the dossier do not strictly correspond to the MA indications although the exclusion criteria restricted inclusion in the study to patients in good general health (ASA I-II).

The adverse effects most commonly noted during clinical development were nausea and/or vomiting. The safety profile was otherwise similar between the groups, except for arterial hypotension and hypertension. It should be underlined that according to the MA, LENOXe should be used in patients in good general health (ASA I-II), i.e. little prone to complications, who may undergo surgery using conventional anaesthetics.

4 TRANSPARENCY COMMITTEE CONCLUSIONS

4.1. Actual benefit

The seriousness of the disorders managed is very variable. These disorders require surgery and some may be life-threatening.
This proprietary medicine is intended for preventive treatment.

This product is for first-line therapy. There are alternative drugs available.
The efficacy/safety ratio of this product is high.

Public health benefit:

The burden of disorders requiring surgery with general anaesthesia cannot be evaluated as the seriousness of these disorders is extremely variable.
The therapeutic need is covered by existing general anaesthetics.
The available data do not suggest that LENOXe will have an impact on the reduction in morbidity and mortality or improve the quality of life of anaesthetised patients.
In addition, the use of LENOXe requires the acquisition of a specific anaesthesia machine.
Accordingly, LENOXe is not expected to have an impact on public health.

The actual benefit of this drug is substantial.

4.2. Improvement in actual benefit

In the absence of any evidence for the superiority of LENOXe compared to other volatile anaesthetic agents, LENOXe does not provide an improvement in actual benefit (IAB V) for the maintenance of general anaesthesia in ASA I-II adults, in combination with opioids as part of balanced anaesthesia.

4.3. Therapeutic use

General anaesthesia comprises three phases: induction, maintenance of anaesthesia and recovery. Patients are premedicated (usually by the administration of a benzodiazepine) in order to induce sedation or for relieving anxiety.

- In adults, anaesthesia is usually induced intravenously. Induction involves a rapid maintenance of the airways which may require neuromuscular blockade if endotracheal intubation is attempted. The usual regimen consists in intubating the patient after neuromuscular blockade and instituting controlled ventilation, though it is not always necessary to inject neuromuscular blockers for intubation, or perform intubation for airway control (the alternative consists in using a laryngeal or face mask). Patients may continue to breathe normally during mild anaesthesia.

- Maintenance of anaesthesia is achieved using halogenated agents and/or intravenous agents administered intermittently or by continuous infusion. The rule is to combine different agents (hypnotics, opioids, inhalation anaesthesia), even if a single agent may be used preferentially. The depth of the anaesthesia is routinely assessed mainly from changes in blood pressure and heart rate.

- Recovery from anaesthesia follows the elimination of the anaesthetic agents administered. For short surgical procedures, anaesthetic recovery coincides with the length of surgery. After major or prolonged surgery, the duration of the anaesthesia exceeds that of surgery and respiratory support is only terminated once patients have completely warmed up and when the pulse and heart rate are stable. During the recovery phase, monitoring is continued and patients are only returned to their hospital rooms once the effects of anaesthetic agents, and in particular their respiratory effects[11] have disappeared.

Three types of drugs are administered during general anaesthesia:
- Drugs inducing narcosis
- Potent analgesic agents (usually synthetic opioids)
- Drugs inducing muscular relaxation (neuromuscular blocking agents).

The choice of the anaesthetic technique and anaesthetic agent depends in particular on the surgical indication, the patient's clinical status and the practitioner's experience. No evidence has been obtained to show that any volatile anaesthetic is superior to the others[5].

LENOXe may be proposed for anaesthesia maintenance in adults. One of the main advantages of LENOXe is that it potentially maintains cardiovascular function during anaesthesia because of its capacity to keep blood pressure relatively stable. It does not modify the force of myocardial contraction.

This medicinal product is for first-line therapy.

4.4. Target Population

General anaesthesia may be induced either by intravenous injection or inhalation of a general anaesthetic. Current practices tend to combine these 2 approaches during the same operation: this is the principle of balanced anaesthesia, which combines the use of anaesthetic and analgesic agents in particular. LENOXe is intended for maintaining narcosis in combination with opioids as part of balanced anaesthesia in adults of ASA class I-II.
According to available epidemiological data, the proportion of ASA I and II patients is approximately 80% of the population undergoing surgery in France[12], which currently represents 6.4 million per year. This percentage corresponds to 5 million procedures per year. According to experts opinion, LENOXe may be used in particular in patients with a past history of cardiovascular and/or neurological disorders.
The population likely to be preferentially treated by LENOXe is difficult to specify, in the absence of sufficient data.

4.5. Transparency Committee recommendations

The Transparency Committee recommend inclusion on the list of medicines approved for use in the hospital and various public services in the indications and dosages of the MA.

[11] Paris VI University Saint-Antoine Medical School, Optional Anaesthesia Certificate
[12] SFAR Press conference of 18 September 2003. “Anaesthetic safety update: where are we?”, First results of national surveys: “anaesthesia-related mortality” and “demographics of anaesthetist-intensivists

APPENDIX

I. Aldrete Score

Purpose: to evaluate the clinical status of a patient after anaesthesia and determine if he may be discharged from the postsurgical recovery room and return to his room.

Function	Clinical Status	Score
Physical activity	Unable to move	0
	Able to move 2 limbs	1
	Able to move 4 limbs	2
Respiration	Apneic	0
	Dyspnoea or hypoventilation	1
	Able to breathe deeply and cough freely	2
Change in systolic BP	Greater or equal to 50 mmHg	0
	From 20 to 50 mmHg	1
	Less than or equal to 20 mmHg	2
Consciousness	Unresponsive	0
	Arousable with stimulation	1
	Awake	2
Colour	Cyanotic	0
	Pale, dusky	1
	Normal	2

Interpretation: Patient with a score of 10 may be returned to his room.

II. ASA Score

Purpose: score established by the *American Society of Anaesthesiology* to evaluate the risk associated with anaesthesia according to degree of preoperative impairment of major vital functions.

Clinical Status	ASA Class
o Normal healthy patient	Class I
o Patient with mild systemic disease	Class II
o Patient with severe systemic disease with no incapacity	Class III
o Patient with severe systemic disease that is a constant threat to life	Class IV
o A moribund patient who is not expected to survive for more than 24 hours without the operation	Class V
o A declared brain-dead patient whose organs are being removed for donor purposes	Class VI

Interpretation: the anaesthetic risk increases with the score, in particular for ASA class III patients in an unstable condition or ASA>III.