gestion des voies aériennes en obstétrique

P. Diemunsch, M. Hengen, E. Noll. - CHRU - Strasbourg

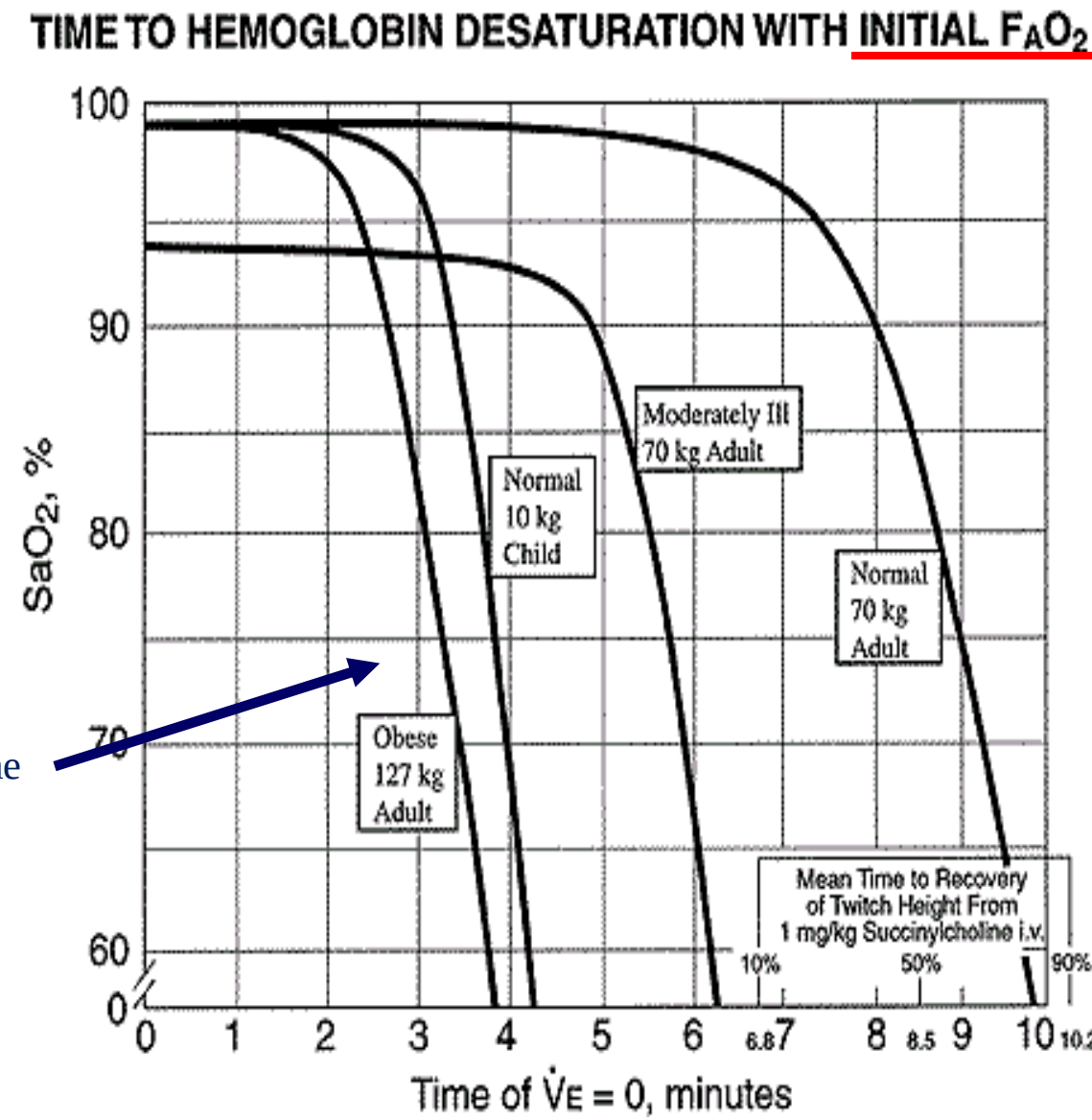
CARO Bruxelles 18/05/2017

Prof. Pierre Diemunsch MD, PhD, CHU de Hautepierre, 67000 Strasbourg, France

lectures, grants, study protocols : Karl Storz, Olympus, Ambu, Verathon, LMA Company, Covidien, Intersurgical, Andromis, Fisher & Paykel

Évolution se la SaO2 en fonction du temps d'apnée chez différents types de patients

Femme enceinte à terme



British Journal of Anaesthesia Page 1 of 5
doi:10.1093/bja/aet435

A. Bataille[1*], J. Rousset[1], E. Marret[1] and F. Bonnet[1,2]

BJA Advance Access published January 8, 2014

BJA

Ultrasonographic evaluation of gastric content during labour under epidural analgesia: a prospective cohort study

liquide gastrique toxique

activité gastrine-like placentaire:

pH + acide
volume + élevé

remontée favorisée

vomissements
régurgitation

poumon humide

œdème lésionnel grave
MENDELSON

Anesthesiology **2017** ; 126:376-393

Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures: An Updated Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration.

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2 h liquides clairs
6 h solides
davantage si repas copieux, gras, alcoolisé.

ANESTHESIOLOGY
The Journal of the American Society of Anesthesiologists, Inc.

Anesth Analg 2017 ;124:1174-1178

Gastric Fluid Volume Change After Oral Rehydration Solution Intake in Morbidly Obese and Normal Controls: A Magnetic Resonance Imaging-Based Analysis

T. Shiraishi , D. Kurosaki , M. Nakamura, T. Yazaki , S. Kobinata , Y. Seki , K. Kasama, H. Taniguchi

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EDITORIAL

Anesth Analg 2017 ; 124:1041-1043

Preoperative Fasting Guidelines: Why Are We Not Following Them?: The Time to Act Is NOW

R. E. Abola, T. J. Gan,

ANESTHESIA & ANALGESIA

Anesthesiology **2017** ; 126:376-393

Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures: An Updated Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration.

2 h liquides clairs
6 h solides
davantage si repas copieux, gras, alcoolisé.

These Guidelines **may not apply to, or may need to be modified** for (1) patients with coexisting diseases or conditions that can affect gastric emptying or fluid volume (e.g., **pregnancy,** obesity, diabetes, hiatal hernia, gastroesophageal reflux disease, ileus or bowel obstruction, emergency care, enteral tube feeding) and (2) patients in whom airway management might be difficult

ANESTHESIOLOGY
The Journal of the American Society of Anesthesiologists, Inc.

prévention du syndrome de Mendelson

mesures pharmacologiques

antiacides: citrate 0,3M

- antagonistes H_2 effervescents: cimé- rani- tidine
- benzamides: métoclopramide

  tonus du SIO, antiémétique, vidange gastrique

(inhibition des fasciculations)

prévention du syndrome de Mendelson

mesures générales

- **ALR** mais pas protection absolue; anticiper ++
  RPC CNGOF-SFAR extractions instrumentales
  utérus cicatriciel

- **AG**
  - préoxygénation
  - induction à séquence rapide
  - manœuvre de Sellick
  - IOT

- **REVEIL**
  - extubation: TOF = 4; ratio = 1
  - vidange gastrique: ± si repas récent copieux ??

European Journal of Obstetrics & Gynecology and Reproductive Biology 170 (2013) 25–32

Contents lists available at SciVerse ScienceDirect

European Journal of Obstetrics & Gynecology and Reproductive Biology

journal homepage: www.elsevier.com/locate/ejogrb

Review

Delivery for women with a previous cesarean: guidelines for clinical practice from the French College of Gynecologists and Obstetricians (CNGOF)

Loïc Sentilhes [a,*], Christophe Vayssière [b,c], Gael Beucher [d], Catherine Deneux-Tharaux [e], Philippe Deruelle [f,g], Pierre Diemunsch [h], Denis Gallot [i,j], Jean-Baptiste Haumonté [k], Sonia Heimann [l], Gilles Kayem [m], Emmanuel Lopez [n], Olivier Parant [b,c], Thomas Schmitz [o], Yann Sellier [p], Patrick Rozenberg [q], Claude d'Ercole [k]

Dans cette circonstance marquée par un **risque accru d'interventions obstétricales urgentes** pour lesquelles **il est souhaitable d'éviter l'anesthésie générale** (accord professionnel), **la réalisation d'une péridurale est encouragée** (accord professionnel).

Selon la circonstance et en fonction des souhaits de la parturiente, **un cathéter péridural peut être placé en attente en début de travail, par mesure de sécurité** (accord professionnel).

Anesthesiology 2007; 106:843–63

Practice Guidelines for Obstetric Anesthesia

*An Updated Report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia**

Recommendations. Neuraxial techniques should be offered to patients attempting **vaginal birth after previous cesarean delivery**. For these patients**, it is also appropriate to consider early placement of a neuraxial catheter** that can be used later **for labor analgesia, or for anesthesia** in the event of **operative delivery**.

Recommendations. Early insertion of a spinal or epi- dural catheter **for obstetric** (e.g., twin gestation or pre-eclampsia) **or anesthetic indications** (e.g., anticipated difficult airway or obesity) should be considered to reduce the need for GA if an emergent procedure becomes necessary. In these cases, the insertion of a spinal or epidural catheter **may precede the onset of labor or a patient's request** for labor analgesia.

le problème majeur de l'anesthésie en obstétrique est celui du contrôle des voies aériennes supérieures

Palmer & Gibbs. Int Anesth Clinics 1989.

- hypertrophie mammaire, infiltration cervicofaciale, congestion muqueuses
- faible tolérance à l'apnée
- attention particulière : obésité
  extubation
- stress et moindre entrainement des anesthésistes (ALR+++)

échecs d'intubation en obstétrique: incidence

- **6 ans: 1/300** *Lyons. Anaesthesia 1985;40:769-2*
- **4 ans: 1/280** ***v*** **1/2230 en chirurgie générale**
  Samsoon. Anaesthesia 1987;42:487-90
- **en fait: 2 sur 3810**

échec hors conditions optimales ≠ impossible

British Journal of Anaesthesia 110 (1): 74–80 (2013)
Advance Access publication 17 September 2012 · doi:10.1093/bja/aes320

BJA

OBSTETRICS

Failed tracheal intubation in obstetric anaesthesia: 2 yr national case–control study in the UK

n = 57; 2008 – 2010; **1/224**
LMA classic: rescue in **39 cases /57**
1 surgical front of neck approach
0 death, 0 post anoxic coma
4 Mendelson (8%)
age > 33 YO; BMI > 30; time 18 - 24h

Areas for further study include **evaluation of supraglottic devices in obstetric anaesthesia** to assess what extent they can safely
1) **replace the tracheal tube** and as
2) **adjuncts** for **intubation with direct fibreoptic vision**.

The increased use of the **video-laryngoscope** will also impact on obstetric anaesthesia.

Editor's key points

- This survey confirms the expected incidence of failed tracheal intubation in obstetrics at one in 224.
- The incidence of failed intubations did not decrease in the last 20 yr, despite advances in airway techniques.
- Age, BMI, and a recorded Mallampati score were significant independent predictors of failed tracheal intubation.

THE JOURNAL OF
Obstetrics and Gynaecology Research

doi:10.1111/jog.12677 J. Obstet. Gynaecol. Res. Vol. 41, No. 7: 1032–1039, July 2015

Adverse airway events in parturient compared with non-parturient patients. Is there a difference? Results from a quality management project

Sebastian Heinrich, Andrea Irouschek, Johannes Prottengeier, Andreas Ackermann and Joachim Schmidt

Department of Anesthesia, University Hospital Erlangen, Erlangen, Germany

Results: The records of 6393 cesarean deliveries including 851 with general anesthesia were analyzed. In 175 cases insufficient or delayed onset of regional anesthesia led to requirement for general anesthesia. The rate of poor laryngoscopic view in parturient women undergoing cesarean delivery was 14/851, and 4/814 in the reference group ($P = 0.023$). Failed intubation occurred in three patients undergoing cesarean delivery (0.4%) and in one non-obstetric patient (0.1%; $P = 0.339$).

Conclusion: The rate of failed intubations in patients undergoing cesarean delivery may be equivalent to non-obstetric patients. In time-challenging cesarean deliveries, delay of conversion from non-successful neuroaxial anesthesia to general anesthesia in order to avoid adverse airway events does not appear to be justified.

Incidence des échecs d'intubation: pas accrue par la grossesse *vs* hors grossesse

Laryngoscopie difficile ≠ échec d'IOT

Anesthesiology 2005; 103:429–37

Predicting Difficult Intubation in Apparently Normal Patients

A Meta-analysis of Bedside Screening Test Performance

Toshiya Shiga, M.D., Ph.D., Zen'ichiro Wajima, M.D., Ph.D.,† Tetsuo Inoue, M.D., Ph.D.,‡ Atsuhiro Sakamoto, M.D., Ph.D.§*

35 études **50 760 sujets** **ID 5,8% [1% - 20%]**

Mallampati **DTM (4 à 7 cm; ≤ 6 cm)**

DSM **OB** **Wilson**

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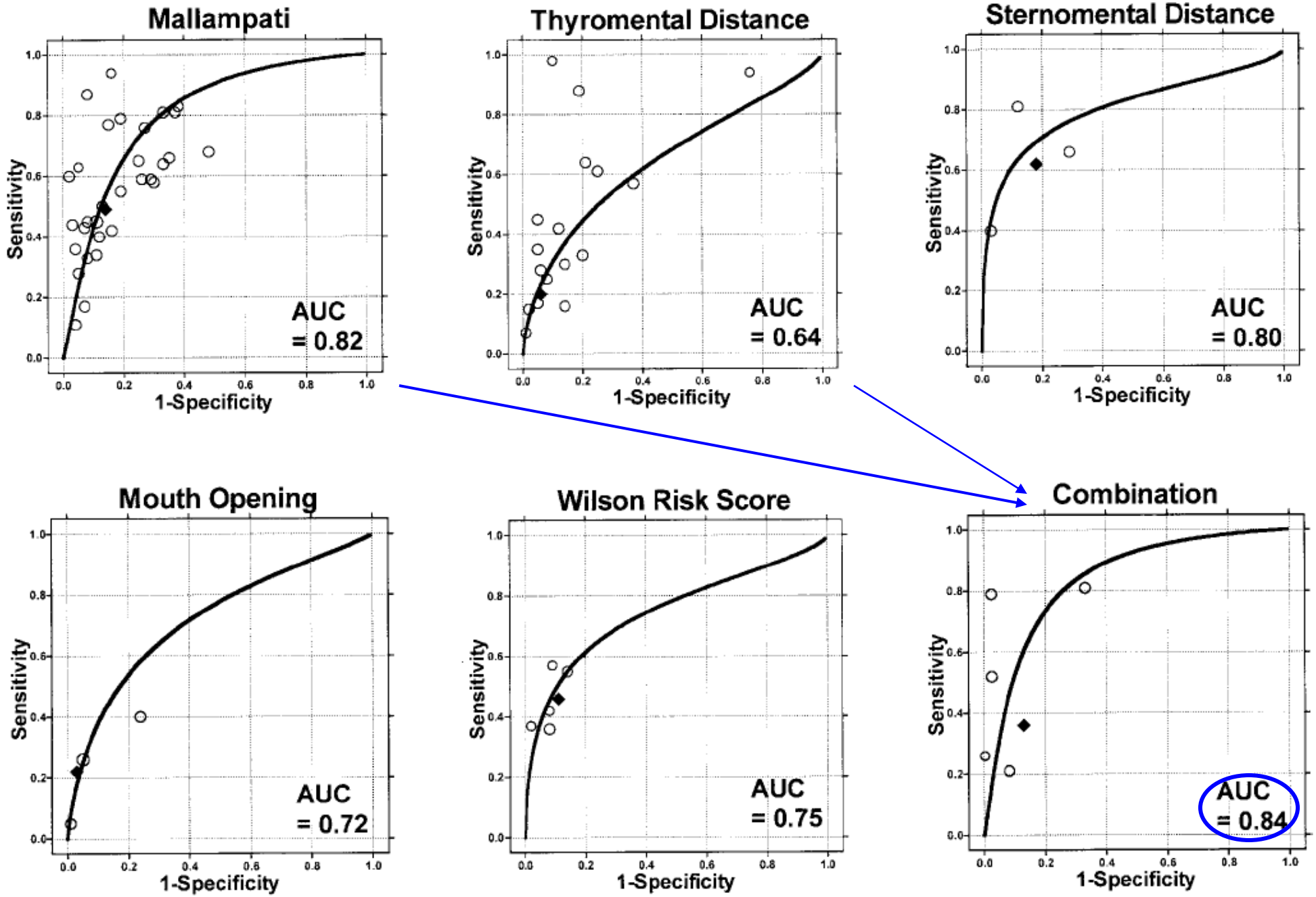
test isolé : peu de valeur; **combinaisons : plus efficaces**


Mallampati
Sensitivity
1-Specificity
AUC
= 0.82
Thyromental Distance
Sensitivity
1-Specificity
AUC
= 0.64
Sternomental Distance
Sensitivity
1-Specificity
AUC
= 0.80
Mouth Opening
Sensitivity
1-Specificity
AUC
= 0.72
Wilson Risk Score
Sensitivity
1-Specificity
AUC
= 0.75
Combination
Sensitivity
1-Specificity
AUC
= 0.84

Mallampati class changes during pregnancy, labour, and after delivery: can these be predicted?

M. Boutonnet, V. Faitot, A. Katz, L. Salomon and H. Keita

British Journal of Anaesthesia 104 (1): 67–70 (2010)

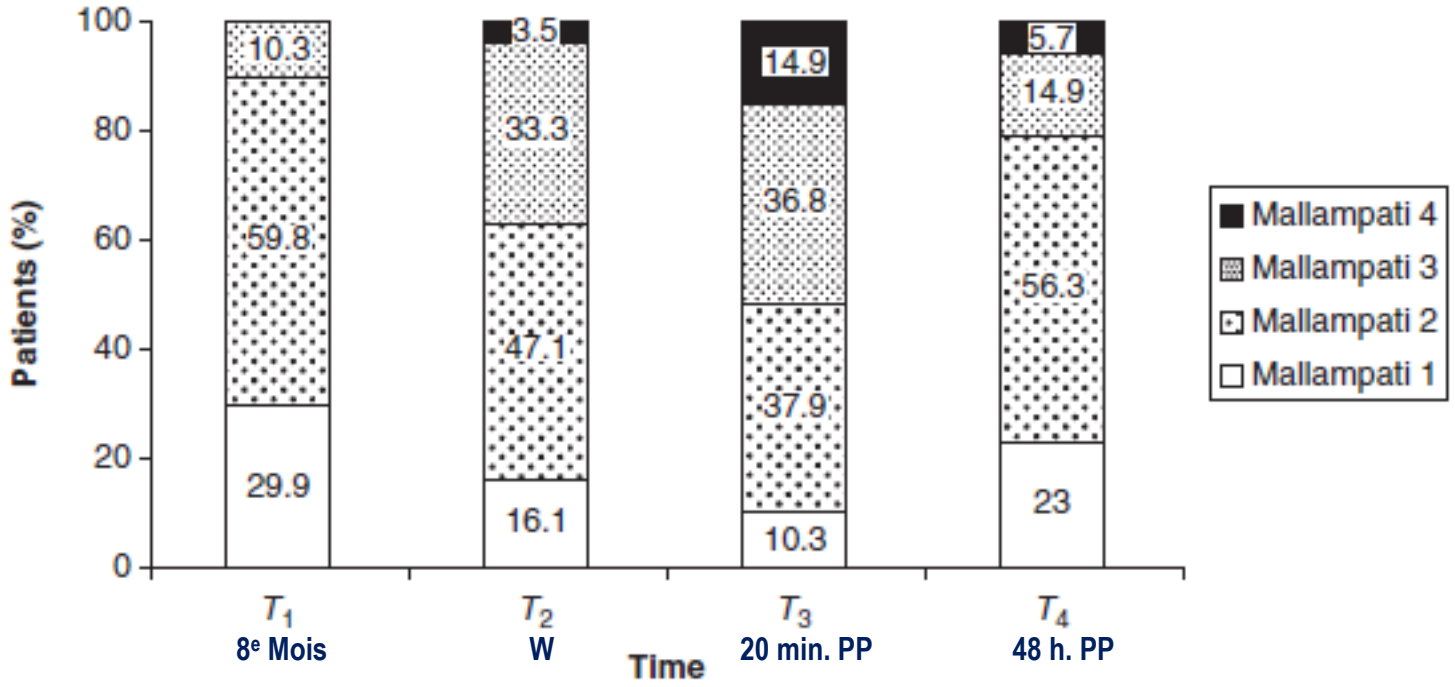


Fig 1 The Mallampati classes at different time points. T_1, 8 months of pregnancy; T_2, during labour; T_3, 20 min after delivery; T_4, 48 h after delivery. The percentages of patients with Mallampati class 3 or 4 changed significantly: T_1 *vs* T_2, P=0.0000; T_2 *vs* T_3, P=0.0005; T_3 *vs* T_4, P=0.0000; T_4 *vs* T_1, P=0.0062.

n = 87; 3 PE; aucun facteur prédictif identifié

=> examiner et réexaminer (+++)

critères prédictifs de ventilation au masque difficile *Langeron -> Kheterpal Anesthesiology 2006;105:885-91*

- **Présence de 2 des 5 critères suivants (grade C)**
  - **âge >55 ans => 57ans**
  - **IMC >26kg/m^2 => 30kg/m^2**
  - **limitation de la protraction mandibulaire**
  - **Mallampati > 2**
  - **édentation**
  - **ronfleur**
  - **barbe**

Peu probable chez femme enceinte

- **VMD multiplie par 4 le risque d'ID (grade D)**

The 5 predictors of difficult bag and mask ventilation and oxygenation

Langeron -> Kheterpal Anesthesiology 2006;105:885-91

can be summarized in the word "OBESE"

- Obese (body mass index > 30 kg/m^2)
- Bearded
- Elderly (older than 57 y)
- Snorers
- Edentulous

} not frequent in OB

Chest. 2016 Mar 17

Oropharyngeal crowding closely relates to aggravation of obstructive sleep apnea

E. Ito, S. Tsuiki, K. Maeda, I. Okajima, Y. Inoue

oropharyngeal crowding: tongue size (**TG**) **/** lower face cage (**LFC**) **ratio**

TG/LFC (as BMI) : significantly associated with high **A**pnea **H**ypopnea **I**ndex in obese and non-obese groups.
the **contribution of TG/LFC** to AHI : **larger than that of BMI** in the **obese**

CONCLUSIONS:
Oropharyngeal crowding : local anatomic factor that **independently relates to the severity of OSA (*and difficult face mask ventilation?*)** in both obese and non-obese patients.

You-Ten KE. Anaesthesia. 2015 Nov;70(11):1230-4.

Accuracy of conventional digital palpation and ultrasound of the cricothyroid membrane in obese women in labour.

Anaesthetists palpated the cricothyroid membrane of 28 obese and 28 non-obese women in labour (cut-off BMI 30 $kg.m^{-2}$) and marked the entry point with an ultraviolet invisible pen.
US was used to mark the midpoint of the cricothyroid membrane
The distance between the two marks was measured.

The median (IQR [range]) distance between the two marks : significantly greater in the obese than the non-obese patients (5 (2-9.5 [0-34]) mm vs 1.8 (0.1-6 [0-15]) mm; p = 0.02).
The cricothyroid membrane : accurately identified with **digital palpation in only 39%** (11/28) of **obese** compared with 71% (20/28) of non-obese patients (p = 0.03).
Increased neck circumference in obese patients : significantly associated with inaccuracy in locating the cricothyroid membrane.

Percutaneous identification of the cricothyroid membrane in obese women in labour was poor. ***Pre-procedural ultrasound may help improve the identification of neck landmarks*** *for cricothyroidotomy.*

Place des US

•Ezri T, Gewürtz G, Sessler DI, Medalion B, Szmuk P, Hagberg C, et al. Prediction of difficult laryngoscopy in obese patients by ultrasound quantification of anterior neck soft tissue. Anaesthesia 2003;58:1111–4.

•Komatsu R, Sengupta P, Wadhwa A. Ultrasound quantification of anterior soft tissue thickness fails to predict difficult laryngoscopy in obese patients. Anesth & Intens Care 2007

•Kristensen 2014: repérer la MCThyroïdienne

Insights Imaging (2014) 5:253–279
DOI 10.1007/s13244-014-0309-5

REVIEW

Ultrasonography for clinical decision-making and intervention in airway management: from the mouth to the lungs and pleurae

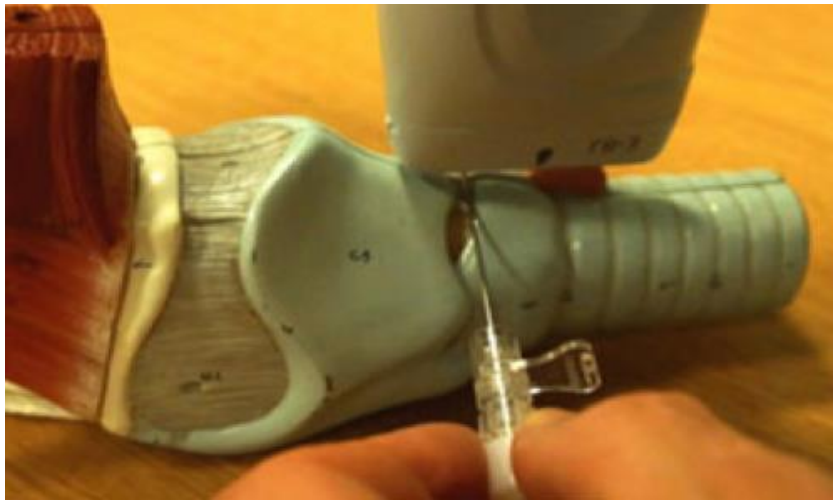
Michael S. Kristensen · Wendy H. Teoh · Ole Graumann · Christian B. Laursen

Anaesthesia. 2016 Apr 2. doi:10.1111/anae.13465

A randomised cross-over comparison of the transverse and longitudinal techniques for ultrasound-guided identification of the cricothyroid membrane in morbidly obese subjects

M. S. Kristensen, W. H. Teoh, S. S. Rudolph, R. Hesselfeldt, J. Børglum and M. F. Tvede

indifférent,
ce qui compte c'est l'entrainement



comme pour la fibroscopie…

Snapshot : Michael Seltz-Kristensen, Copenhagen, DK

Version 2013
Meilleure poignée
Meilleur écran
Meilleur canal d’aspiration
2 diamètres TOM-tom

NHS

National Institute for Health and Clinical Excellence : NICE - guidance

Medical Technologies Advisory Committee Meeting: ***21 February 2013***

aScope®

-Good clinical performance
-Cost savings
-Patient safety is increased due to more preparedness
-Specially recommended for UNEXPECTED difficult airway

1- Bonnes performances cliniques

2- Economies de santé ***acquisition, entretien, décontamination, réparations, personnel***

3- Sécurité des patients accrue par un meilleur niveau de réactivité

4- Spécialement recommandé pour les difficultés imprévues de p.e.c. des voies aériennes

- **protocole** connu de tous et disponible

- **chariot d'intubation difficile** de composition connue de tous, accessible

- précautions autour de l'**extubation**

- **entrainement régulier** aux techniques de l'algorithme

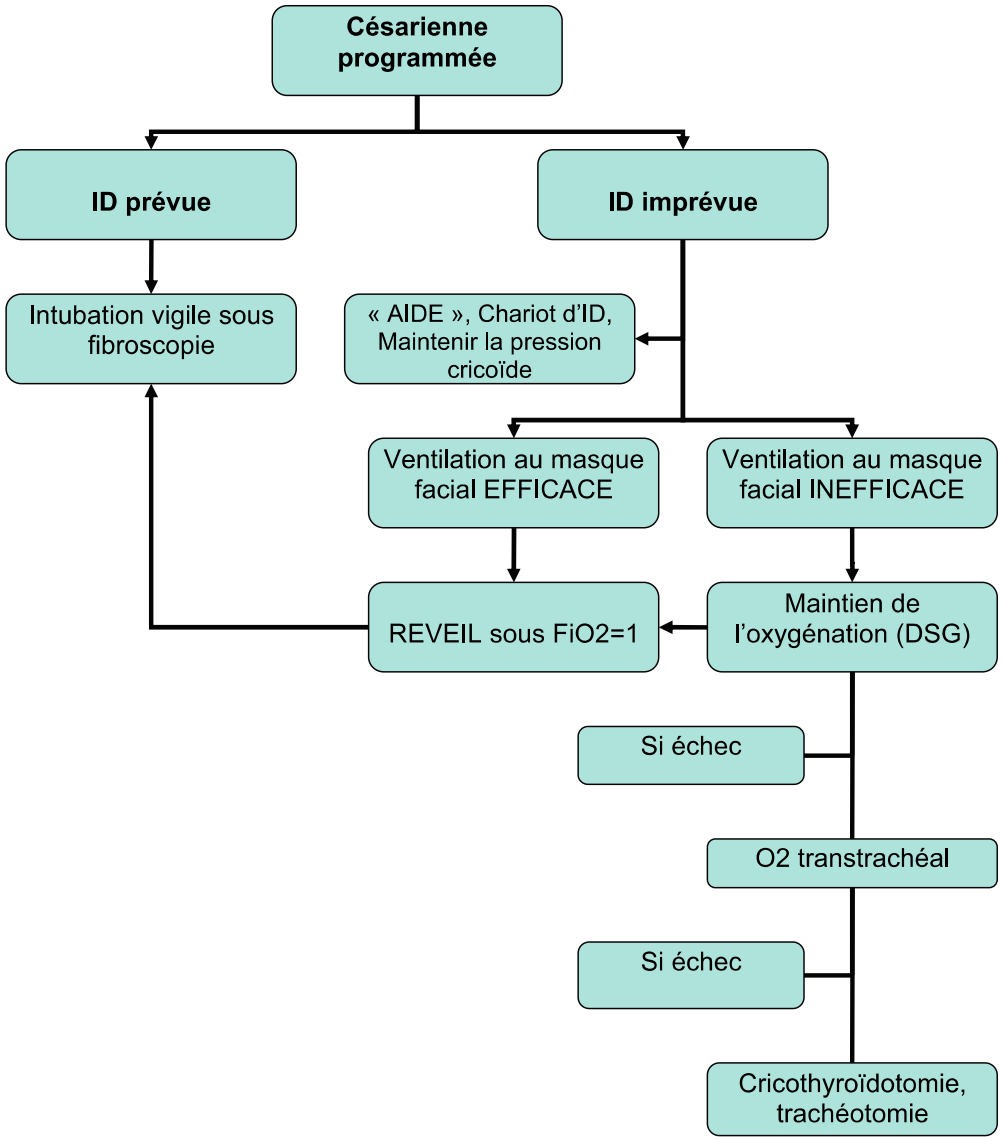
Revue générale

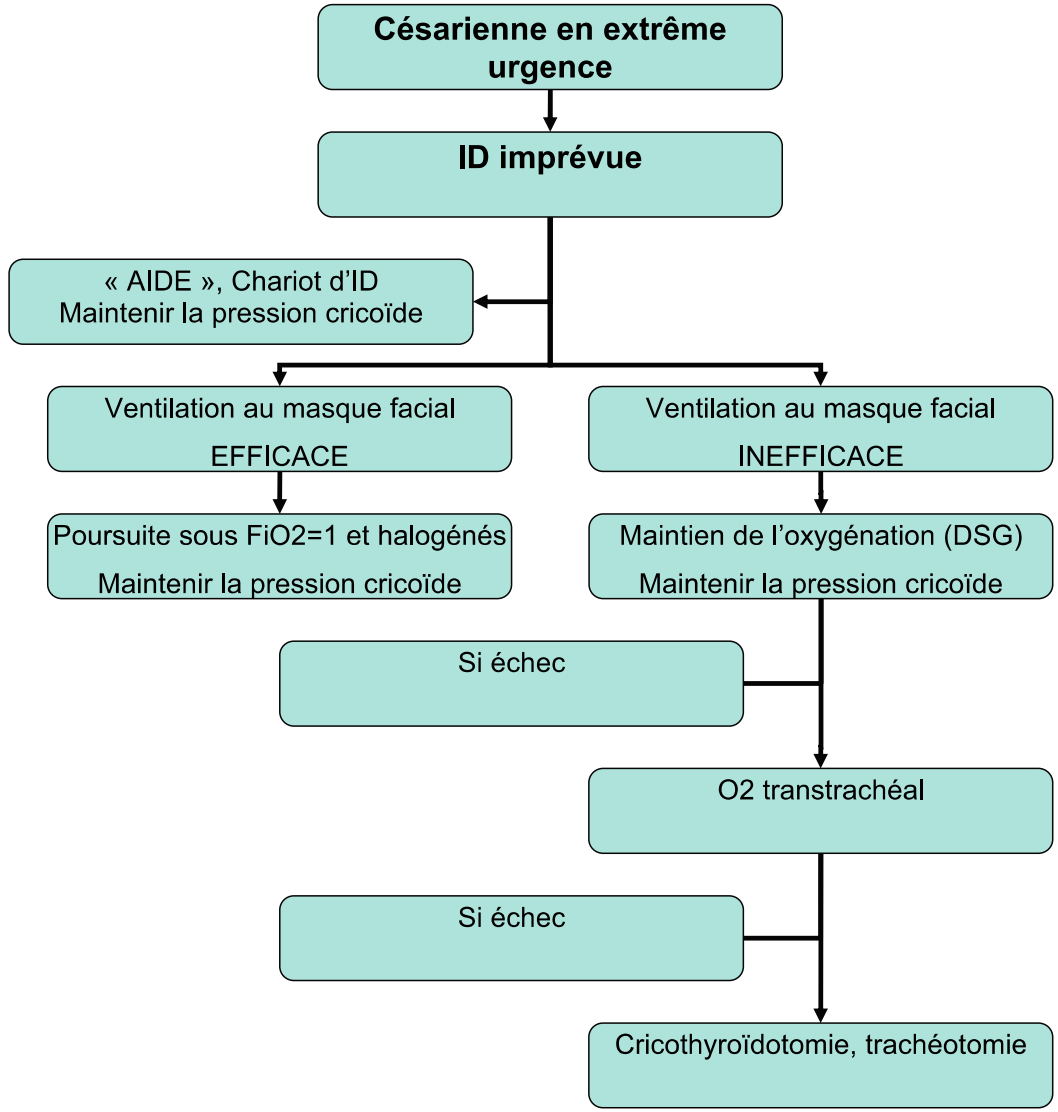
Gestion des voies aériennes en obstétrique

Airway management in obstetrics

M. Boutonnet [a], V. Faitot [b], H. Keïta [b,*]

Annales Françaises d'Anesthésie et de Réanimation 30 (2011) 651–664





Curr Opin Anaesthesiol. 2016 Feb 3. [Epub ahead of print]

Airway management and training in obstetric anaesthesia.

Mushambi MC, Jaladi S. Dept of Anaesthesia, University Hospitals, Leicester UK.

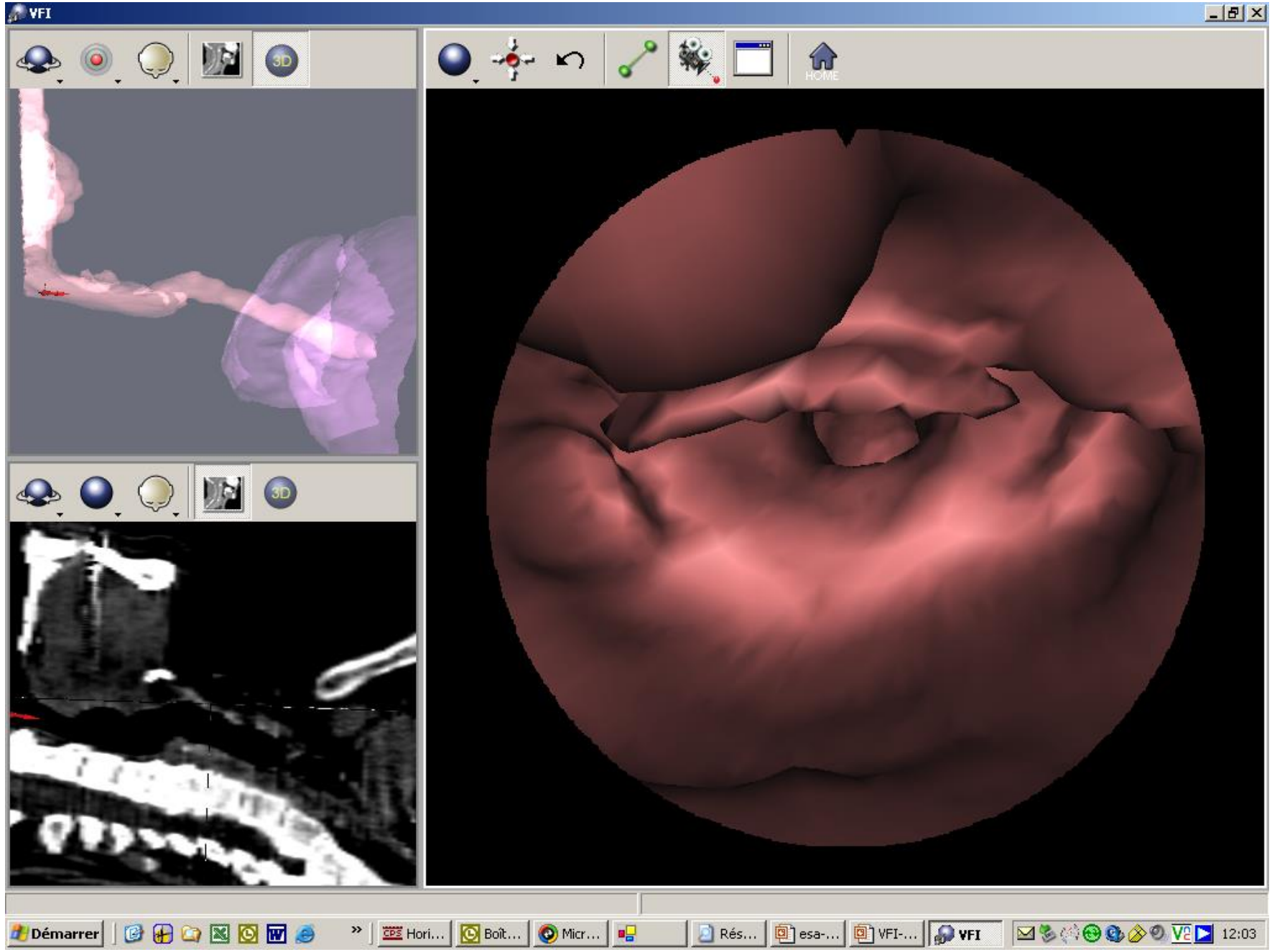
Recent advances and recommendations in the management of the obstetric airway should help to bring ***consistency of clinical practice, reduce adverse events****, and* ***standardize teaching*** *by providing a structure for teaching and training on failed tracheal intubation in obstetrics.*

Opportunities during ***elective caesarean sections*** *and* ***simulation*** *should be used as teaching tools to improve* ***anaesthetists'*** *and* ***team*** *performance during a crisis.*

European Journal of Anaesthesiology:
January 2010 - Volume 27 - Issue 1 - p 31-35
doi: 10.1097/EJA.0b013e3283312725
Airway Management Editor's Choice Article

Learning fibreoptic intubation with a virtual computer program transfers to 'hands on' improvement

Boet, Sylvain; Bould, M Dylan; Schaeffer, Roland; Fischhof, Simon; Stojeba, Nathalie; Naik, Viren N; Diemunsch, Pierre


VFI
3D
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HOME
Démarrer
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Micr...
Rés...
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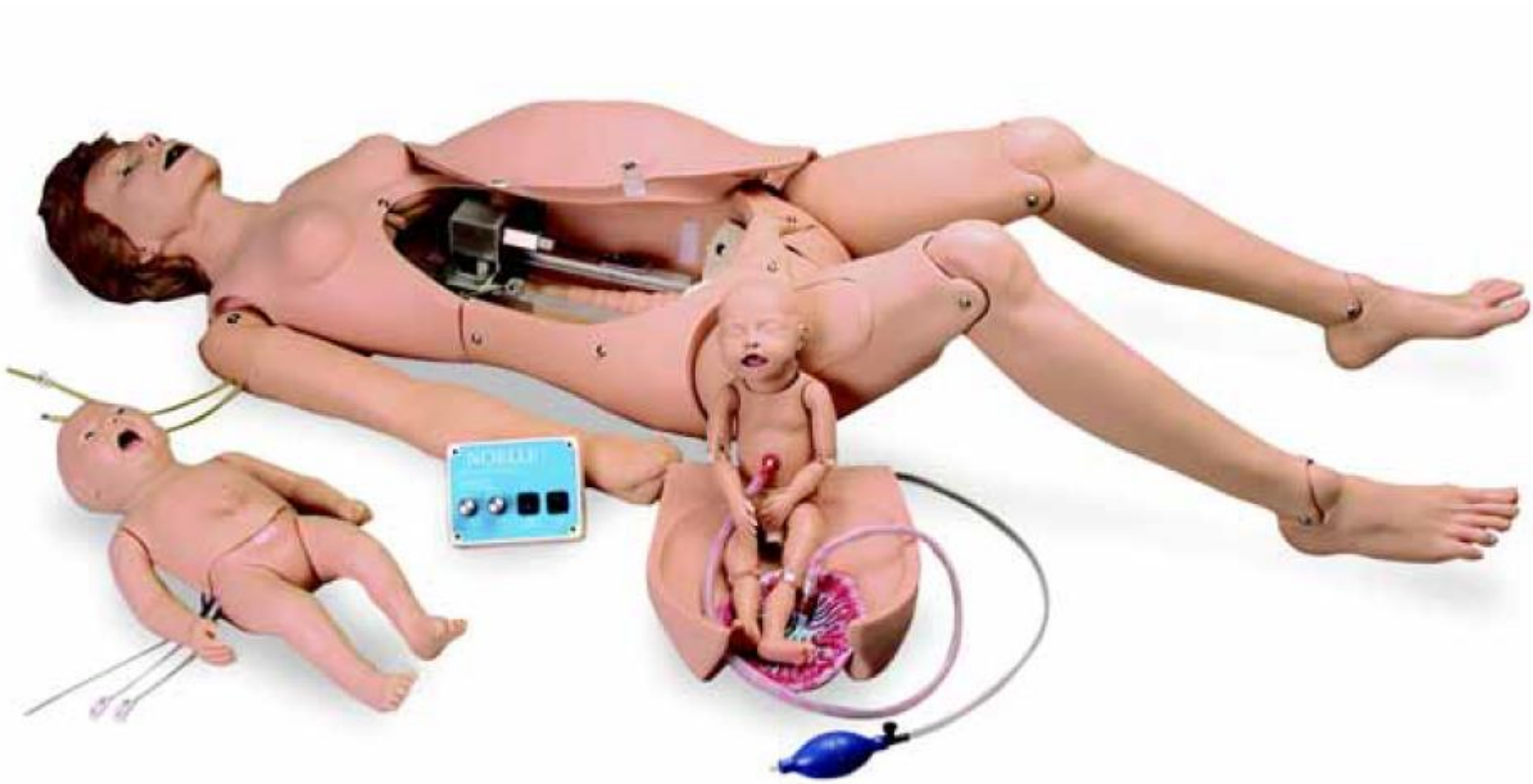
VFI-...
VFI
12:03



Anesthesiology **2012**; 117:883–97

Unanticipated Difficult Airway in Obstetric Patients

Development of a New Algorithm for Formative Assessment in High-fidelity Simulation

M Balki, M E Cooke, S Dunington, A Salman, E Goldszmidt

Scenario 1. Fetal emergency (cord prolapse)—critical event involving unanticipated difficult intubation and cannot ventilate.

Scenario 2. Maternal emergency (massive antepartum hemorrhage and fetal distress)—critical event involving unanticipated difficult intubation, can ventilate, and ongoing maternal hemodynamic instability.

Scenario 3. Fetal emergency (ruptured vasa previa)—critical event involving unanticipated difficult intubation and can ventilate.

Scenario 4. Elective CS under general anesthesia (regional technically impossible due to previous spinal surgery)—critical event involving unanticipated difficult intubation and can ventilate.

4 situations cliniques

16 internes

identification de situations type permettant de
1)mesurer les performances des internes
2)structurer la CAT clinique

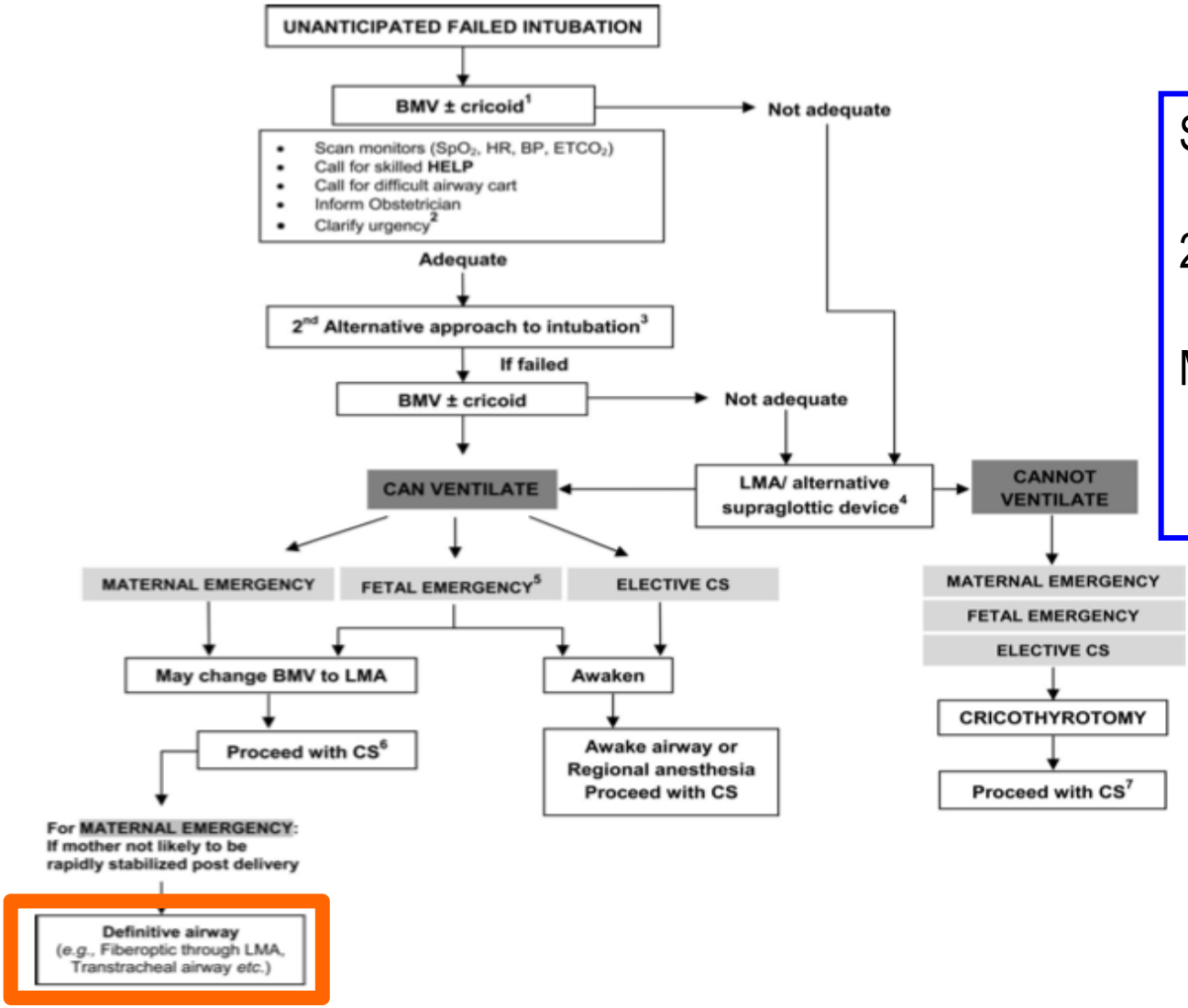
domaines d'erreur les plus fréquents:
- non appel d'un senior
- non demande du chariot d'ID
- trop de tentatives d'IOT
- recours au ML tardif
- non reprise des manœuvres après la naissance

Anesthesiology **2012**; 117:883–97

Unanticipated Difficult Airway in Obstetric Patients

Development of a New Algorithm for Formative Assessment in High-fidelity Simulation

M Balki, M E Cooke, S Dunington, A Salman, E Goldszmidt



Sellick relachée si obstacle à IOT ou V

2ème essai; si + : autre technique (VL)

ML : aide à la fibroscopie :

approche multimodale

ANESTHESIA & ANALGESIA
The Gold Standard in Anesthesiology
IARS

The Unanticipated Difficult Intubation in Obstetrics

Jill M. Mhyre, MD, and David Healy, MD

Anesth Analg 2011;112:648–52

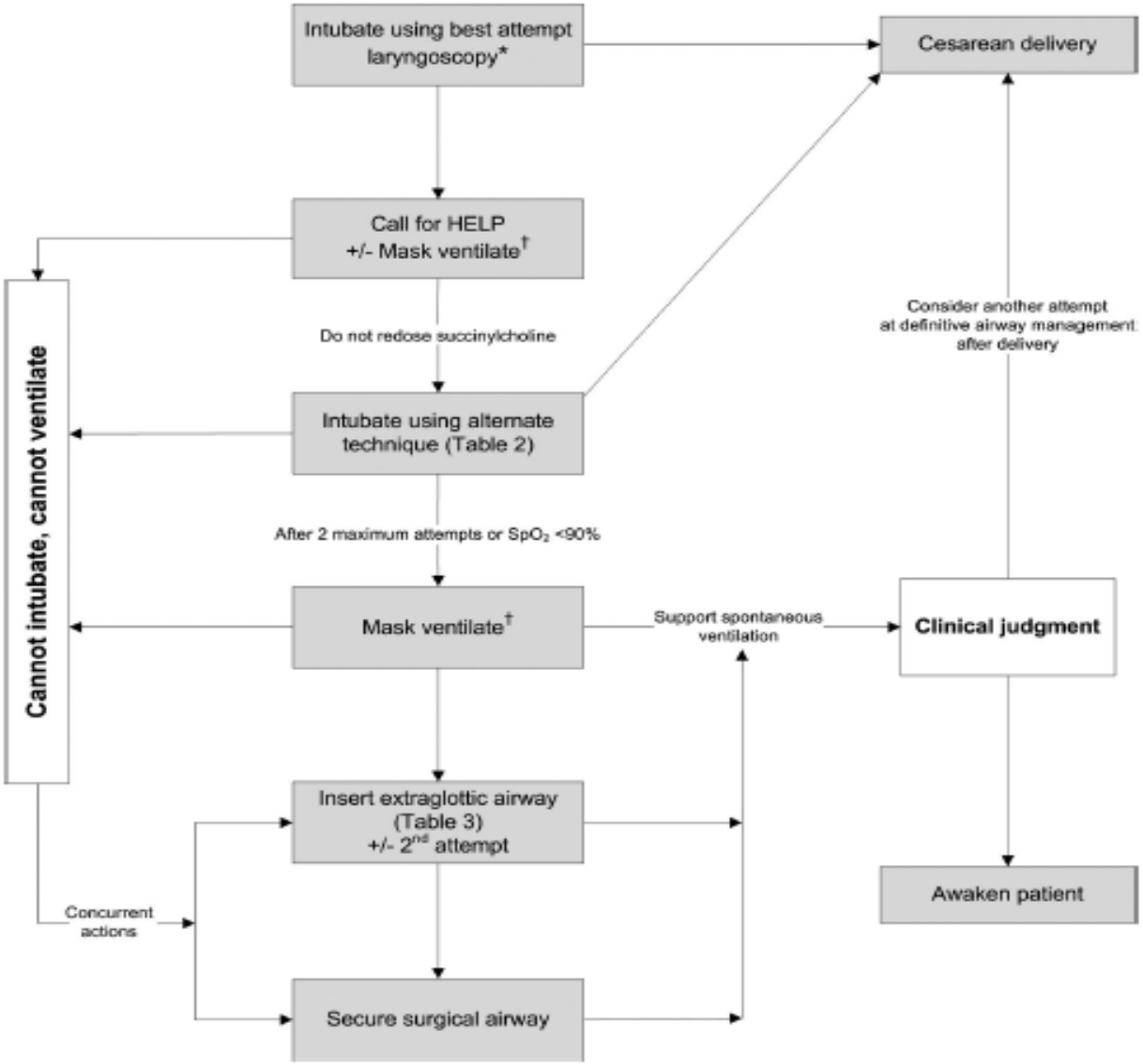


Figure 1. Suggested algorithm. *Adjust cricoid pressure; backward, upward, rightward pressure (BURP); bougie; minor position adjustments.
†Oral airway, jaw thrust, adjust cricoid pressure, 2-handed technique.

position

pré oxygénation

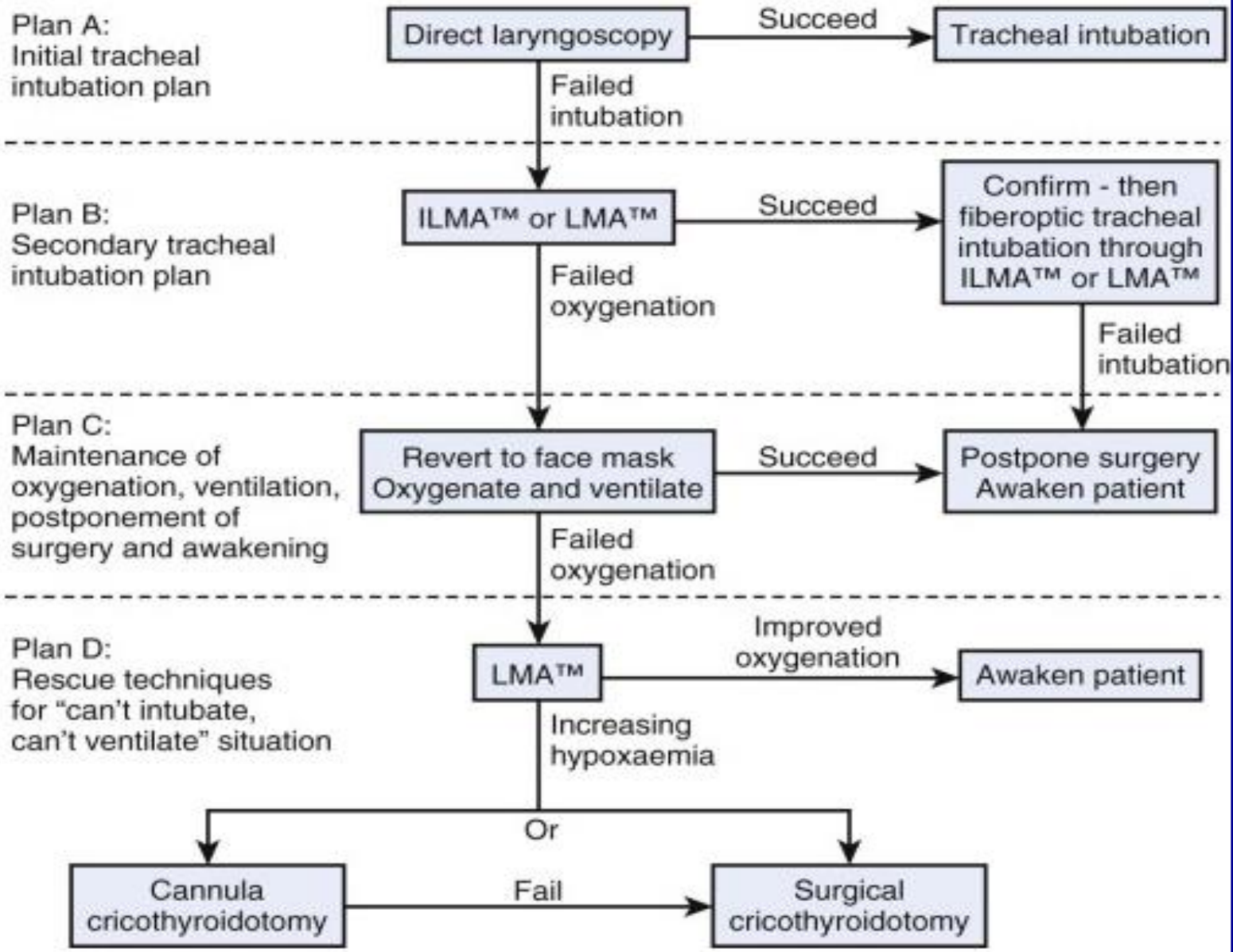
difficulté => **aide immédiate**

chariot d'intubation difficile disponible, en lieu connu

CAT claire sans improvisation

maintien régulier des connaissances et des automatismes

matériels de 1ère et de 2ème intentions: connus et maitrisés:
quel VL?
approche combinée



Hagberg 2013
« LA » référence

ML immédiat
puis
abord multimodal

re-oxygéner

Melker

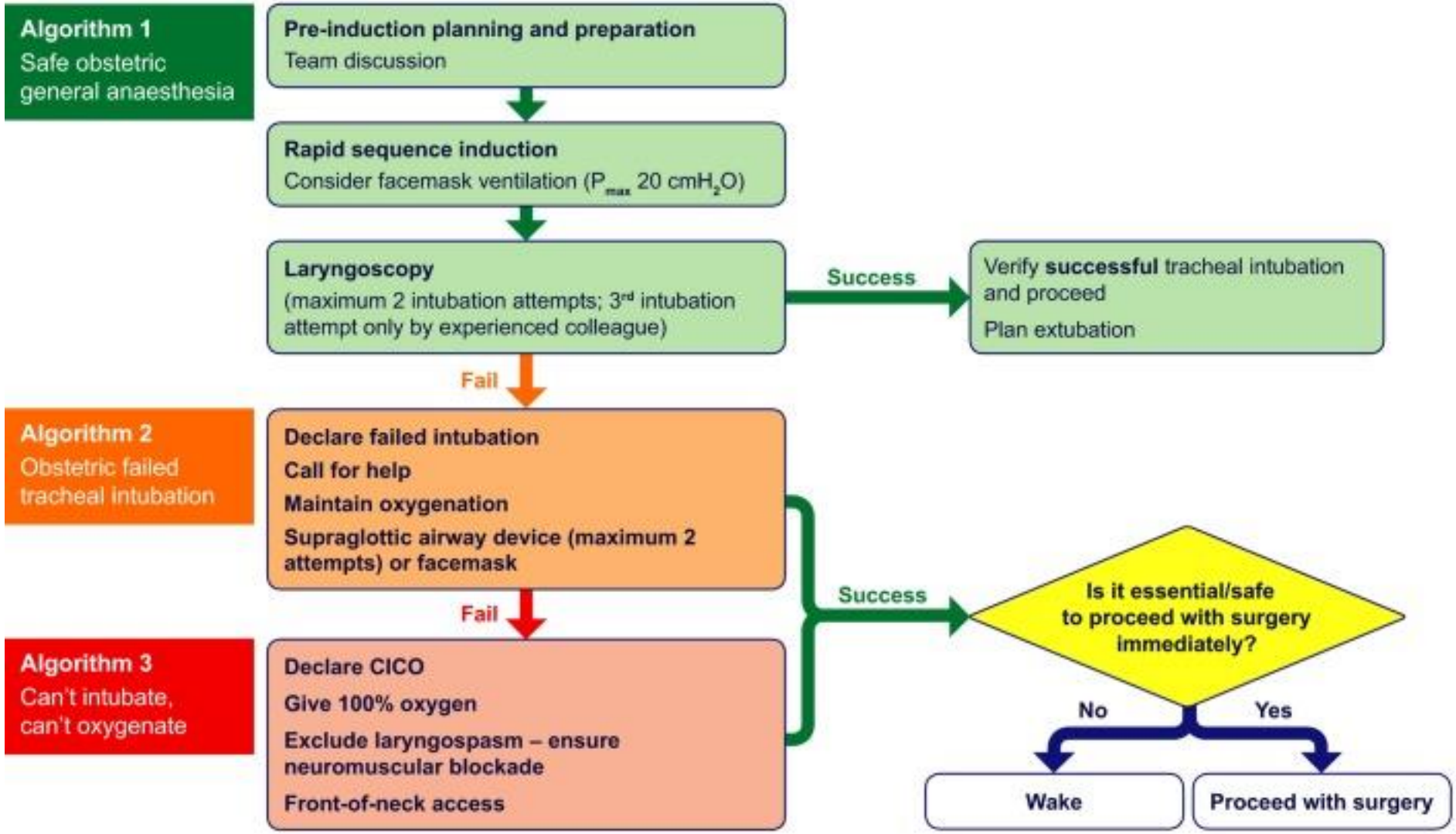
NB: PAS de VL

Anaesthesia 2015, 70, 1286

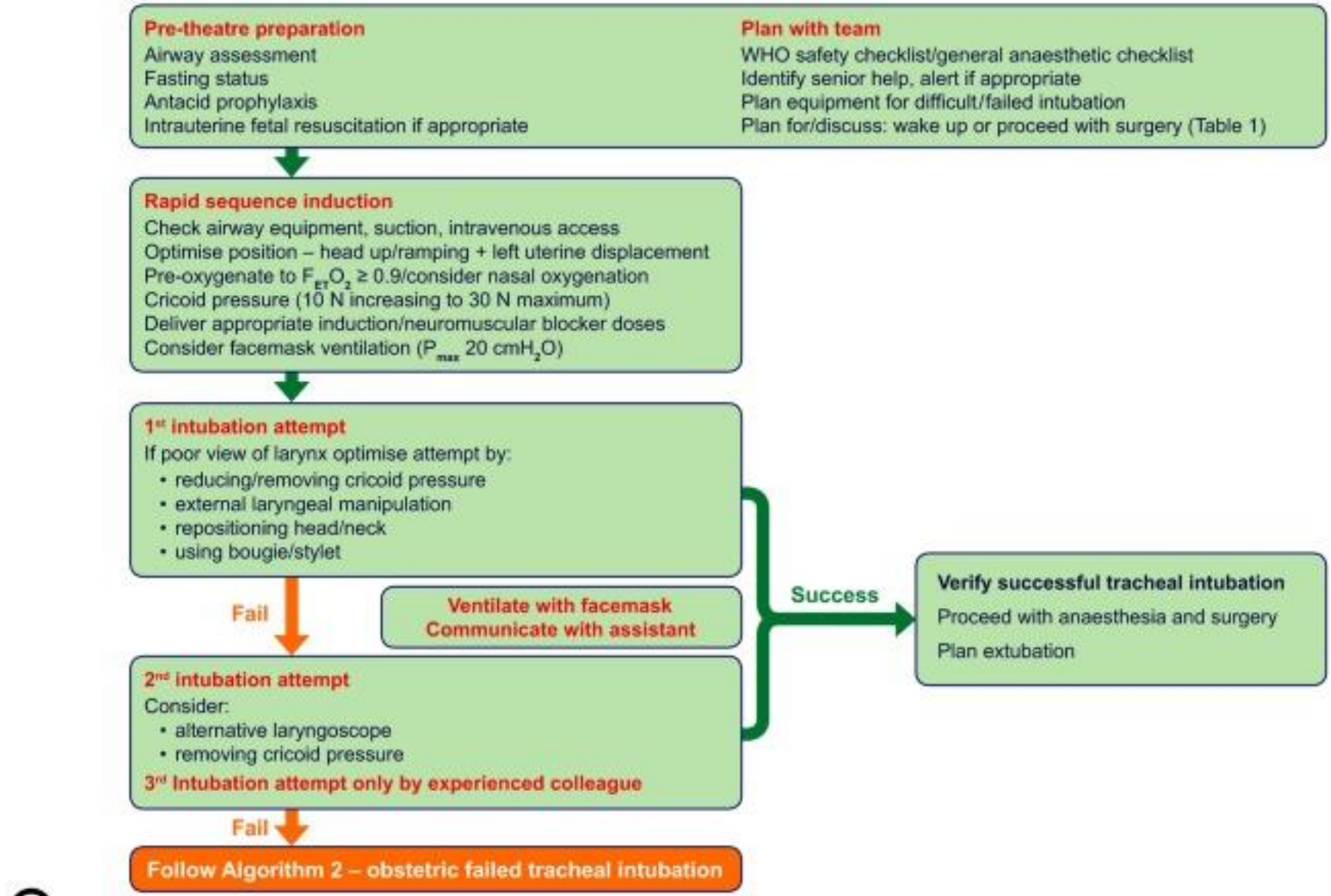
Obstetric Anaesthetists' Association and Difficult Airway Society guidelines for the management of difficult and failed tracheal intubation in obstetrics

M. C. Mushambi, S. M. Kinsella, M. Popat, H. Swales, K. K. Ramaswamy, A. L. Winton, A. C. Quinn

Master algorithm – obstetric general anaesthesia and failed tracheal intubation

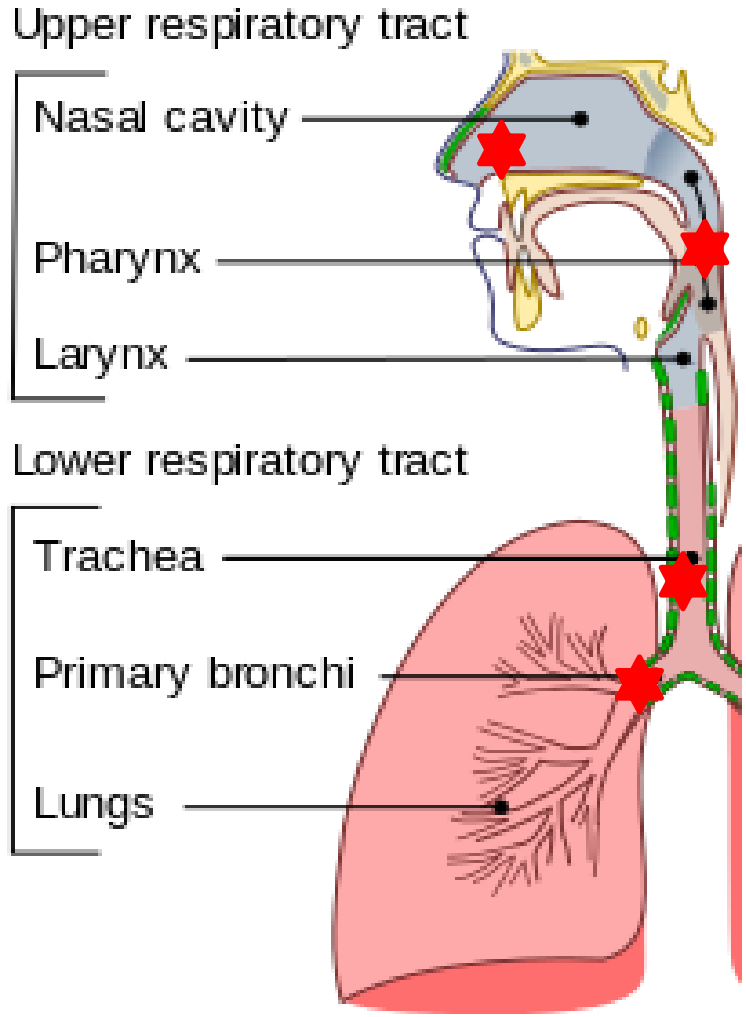


Algorithm 1 – safe obstetric general anaesthesia



oxygénation apnéique

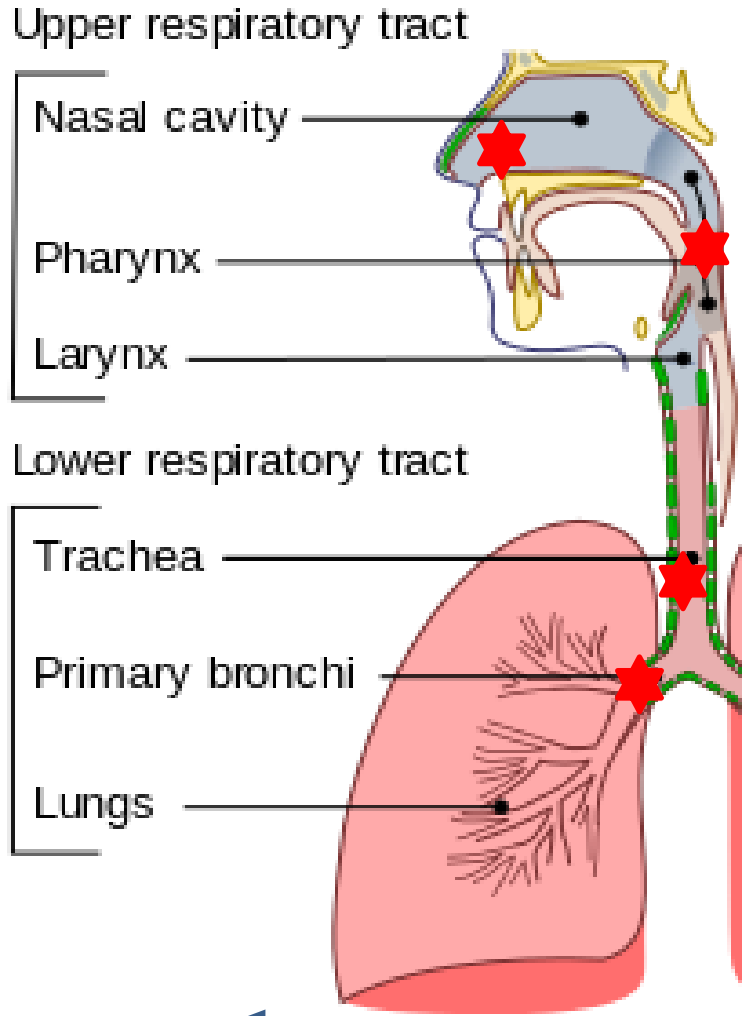
facilité sécurité tolérance



efficacité (même débit)

oxygénation apnéique

facilité sécurité tolérance



efficacité (même débit)

augmenter le débit d'O_2

-site: BS D&G
-débit: fort
-indication: concept

Acta Anaesthesiol Scand 1985: 29: 750–752

Clinical Application of Continuous Flow Apneic Ventilation

M. F. Babinski, O. G. Sierra, R. Brian Smith, E. Leano, A. Chavez and A. Castellanos

Department of Anesthesiology, University of Texas Health Science Center at San Antonio, San Antonio, Texas, U.S.A. and Department of Anesthesiology, University of Guadalajara, Guadalajara, Jalisco, Mexico

---

n = 5; hystérectomies

AG: fentanyl, thopental, pancuronium

O_2 pur au masque : 5 min

KT Ø 2,5 mm dans BSD et BSG, contrôle fibro; 40'' en tout

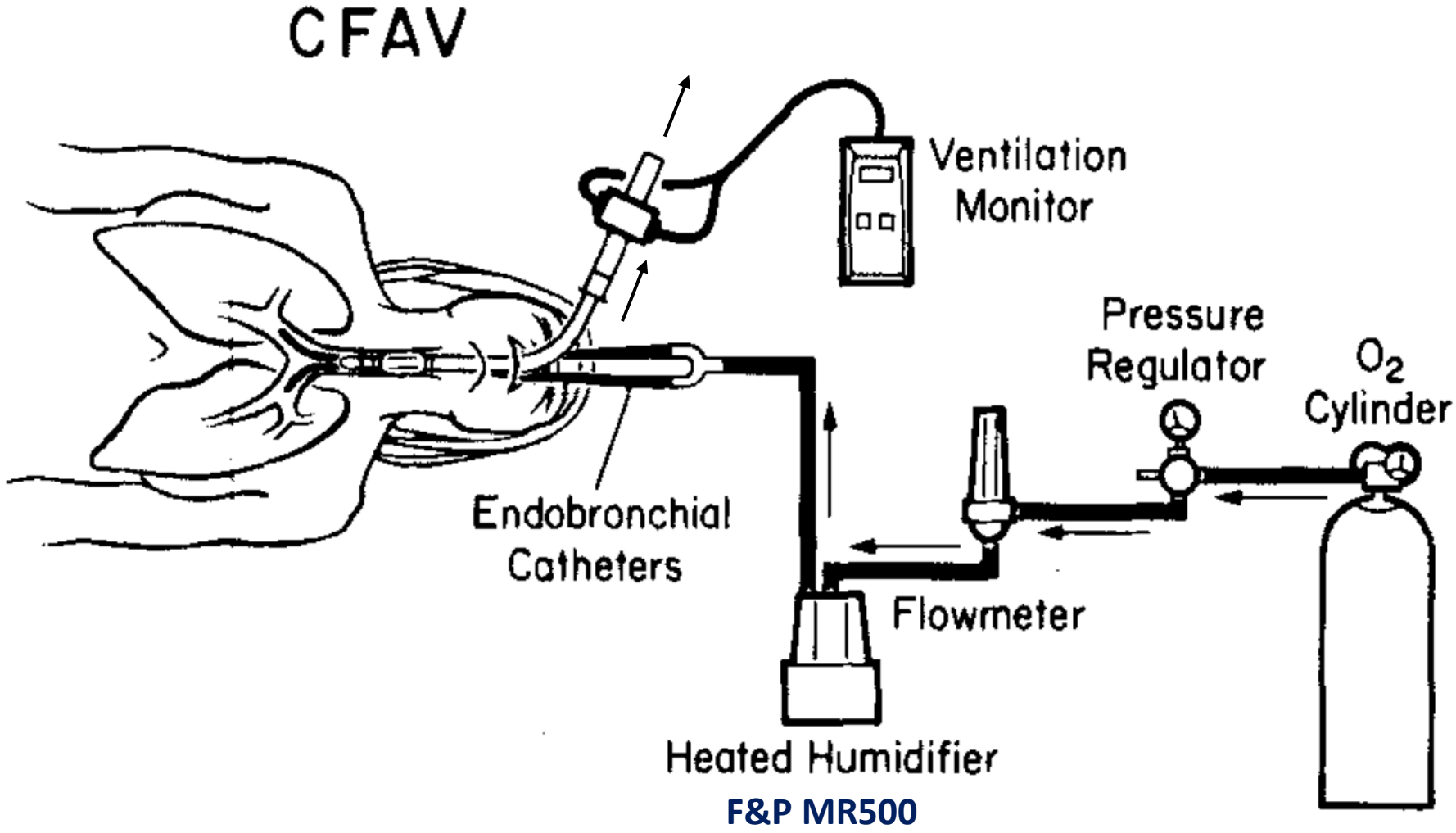
IOT # 7,5 et Ventilation en O_2 pur: 5 min; 2nd contrôle fibro

sonde d'IOT ouverte pour l'expiration

O_2 : 0,6 – 0,7 L/Kg/min (32 - 38 L/min)**, BTPS** (F&P MR500*)

gazométries a par 5'; durée de l'expérience: 30'

-site: BS D&G
-débit: fort
-indication: concept



Babinski et al, 1985

-site: BS D&G
-débit: fort
-indication: concept

Mean values of $Paco_2$ and Pao_2 (± s.e.mean) in kPa (mmHg) in five patients during 30 min of CFAV.

	$Paco_2$	Pao_2
Control	4.92 ± 0.25 (37.0 ± 1.9)	42.69 ± 6.12 (321 ± 46)
5 min	6.34 ± 0.25 (47.7 ± 1.9)*	43.62 ± 4.39 (328 ± 33)
15 min	7.06 ± 0.3 (53.1 ± 2.3)*	44.82 ± 4.52 (337 ± 34)
30 min	7.30 ± 0.53 (54.9 ± 4.0)*	39.76 ± 4.92 (299 ± 37)

ns

$Paco_2$ kPa (mmHg) in one patient (M.G.) during 30 min of CFAV.

Control	5 min	15 min	30 min
5.53 (41.6)	5.53 (41.6)	6.19 (46.6)	5.82 (43.8)

Babinski et al, 1985

-site: nasal
-débit: fort
-indication: IOT D, chir ORL

Anaesthesia
Journal of the Association of Anaesthetists of Great Britain and Ireland

Anaesthesia 2015, 70, 323–329 doi:10.1111/anae.12923

Original Article

Transnasal Humidified Rapid-Insufflation Ventilatory Exchange (THRIVE): a physiological method of increasing apnoea time in patients with difficult airways

A. Patel[1,2] and S. A. R. Nouraei[3]

n = 25; ID prévue et/ou intolérance à l'apnée (ASA I - IV)
préoxygénation: **Optiflow*** **70L/min**; 10 min; proclive 40°
AG: propofol, fentanyl, rocuronium
proclive 20° **IOT: 1) Mcintosh 2)tentative(s) VL si échec(s);**

-site: nasal
-débit: fort
-indication: IOT D, chir ORL

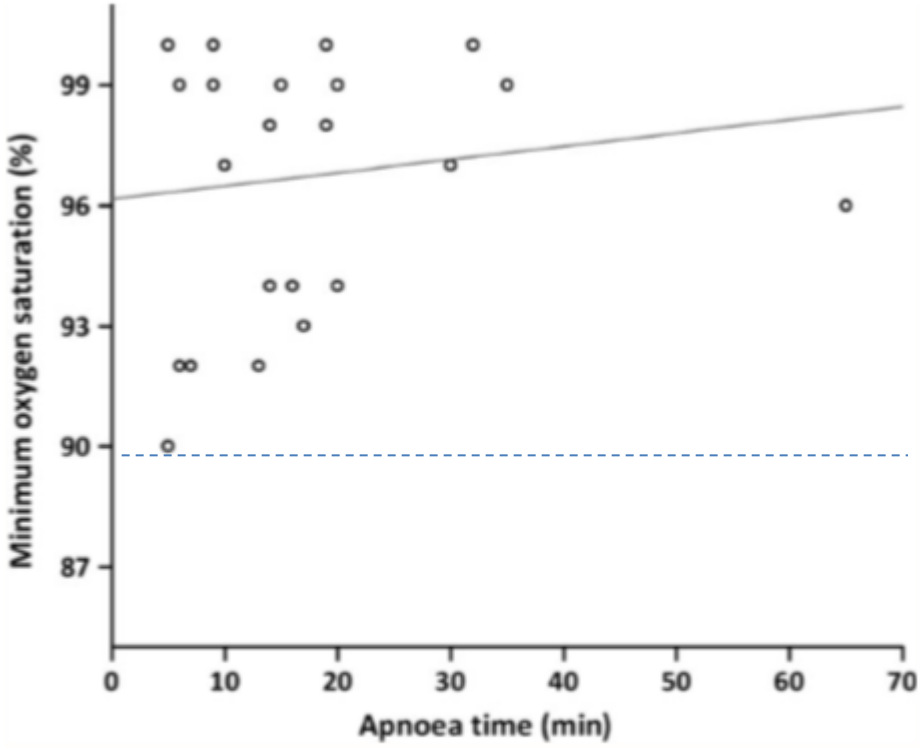


Figure 2 The relationship between apnoea time and oxygen saturation levels (n = 25). The line represents linear regression with r = 0.136 and p = 0.51.

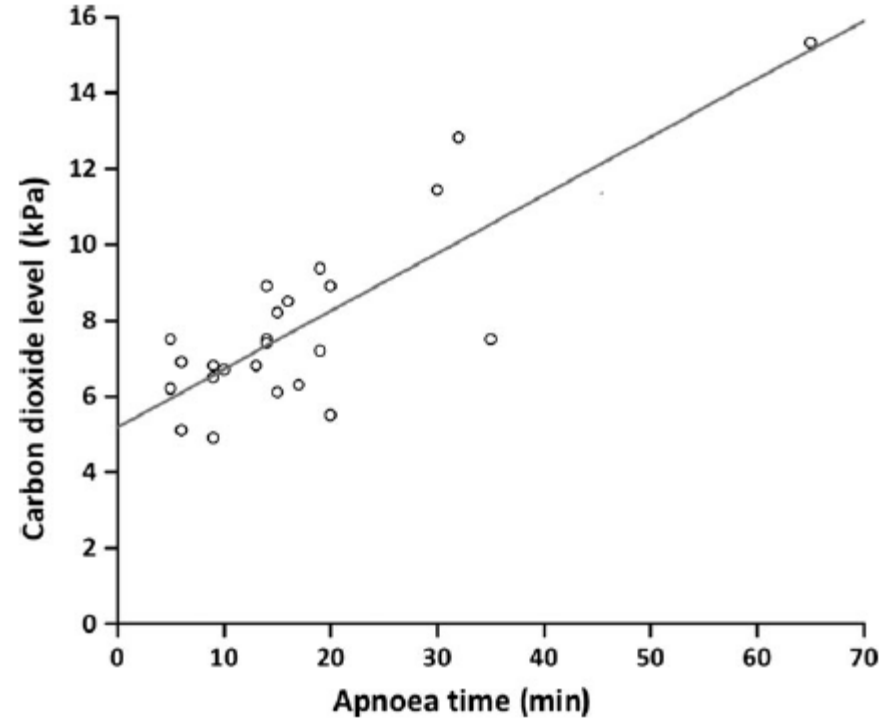


Figure 3 The relationship between apnoea time and end-tidal (and in four patients, arterial) carbon dioxide levels (n = 24). The line represents linear regression with r = 0.82 and p < 0.0001. The regression equation was $CO_2 = (5.2 \pm 0.5) + (0.15 \pm 0.02) \times$ apnoea time.

aucune désaturation < 90%
aucune complication cardiaque
rend la gestion de l'ID plus sereine

Patel 2015

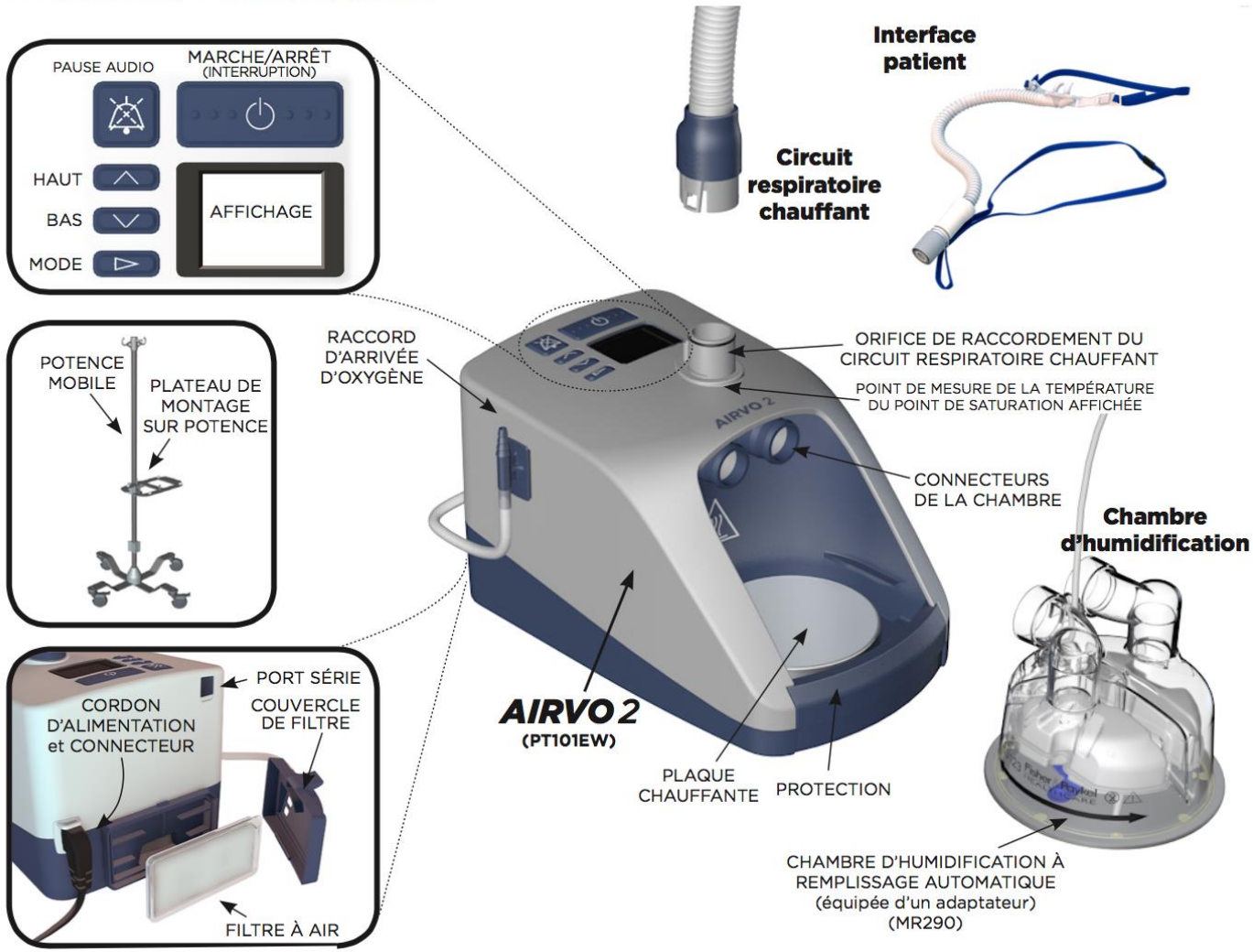
principales études sur l'OA

5	hyX	**BS d&g**	0,6L/Kg/min	**30 min**
47	Endsc	**trachée**	**0,5L/min**	**25 min**
8	Furmin	**trachée**	**200mL/min**	**53 min**
17	IOT OB	**Nphx**	5L/min	4 min ou SpO_2<95
15	IOT DS	**Nphx**	5L/min	6 min ou SpO_2<95
12	IOT DS	**Nphx**	3L/min	10 min ou SpO_2<92
23	FOB	**N**	5L/min	3 min
14	IOT	**N**	10L > 5L/min	4 min
28	IOT DS	**Nphx > N**	5L/min	10 min ou SpO_2<95
15	IOT DSOB	**N**	5L/min	6 min ou SpO_2<95
25	IOT DOB	**N**	**70L/min**	**>60 min**

Optiflow

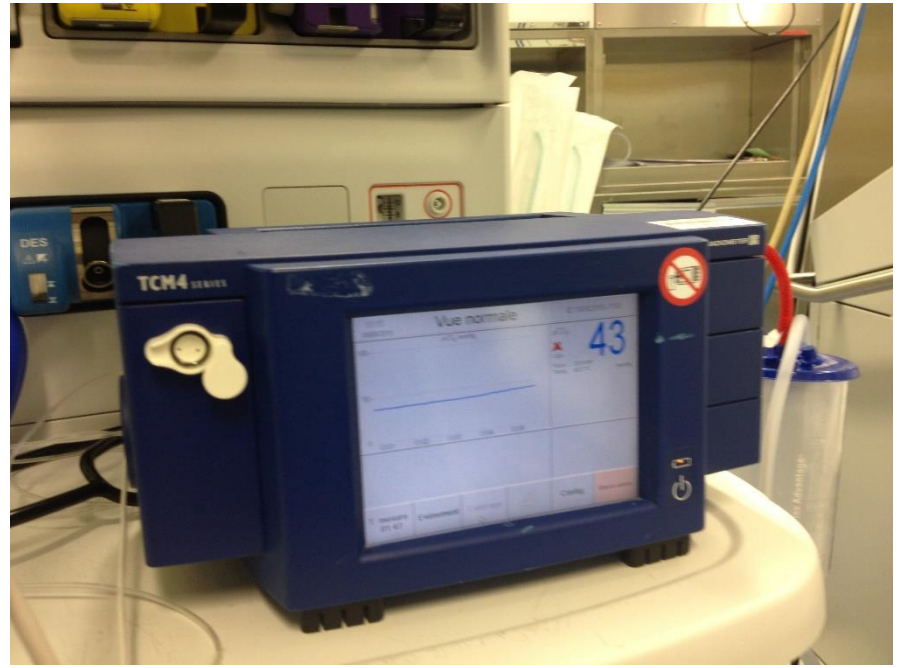
- Oxygénothérapie à concentrations et débits variables, avec une humidité optimale
- Conditions BTPS (body temperature and pressure saturated) (Gaz à 37° avec 44mg H_2O/l) afin d'éviter les jet lesions
- Débit d'oxygène de 0 à 60 l/min
- Pression positive au niveau des voies aériennes

AIRVO 2 ET ACCESSOIRES



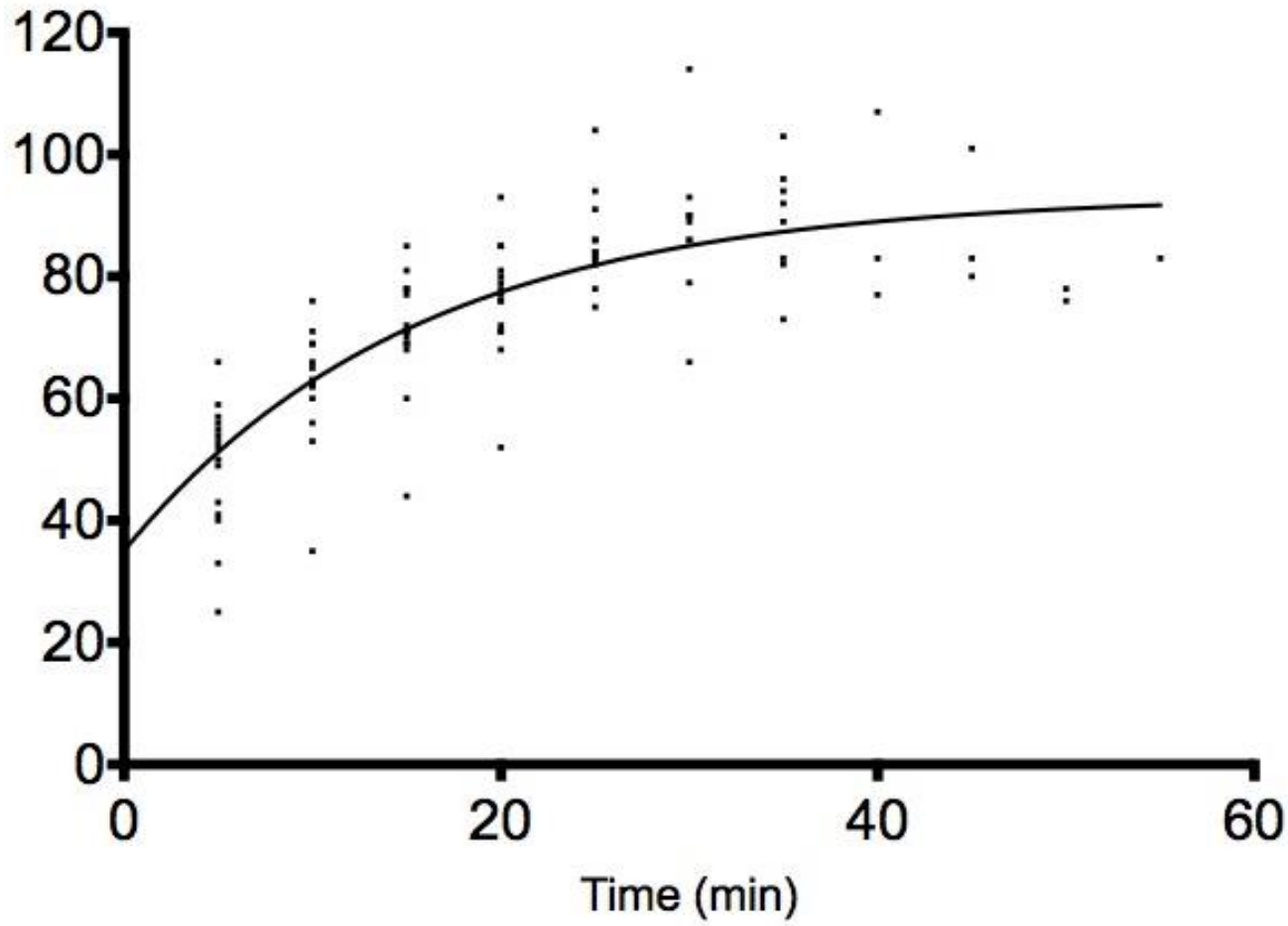
Optiflow* 60L/min
FiO2 = 1

stable after 9 min



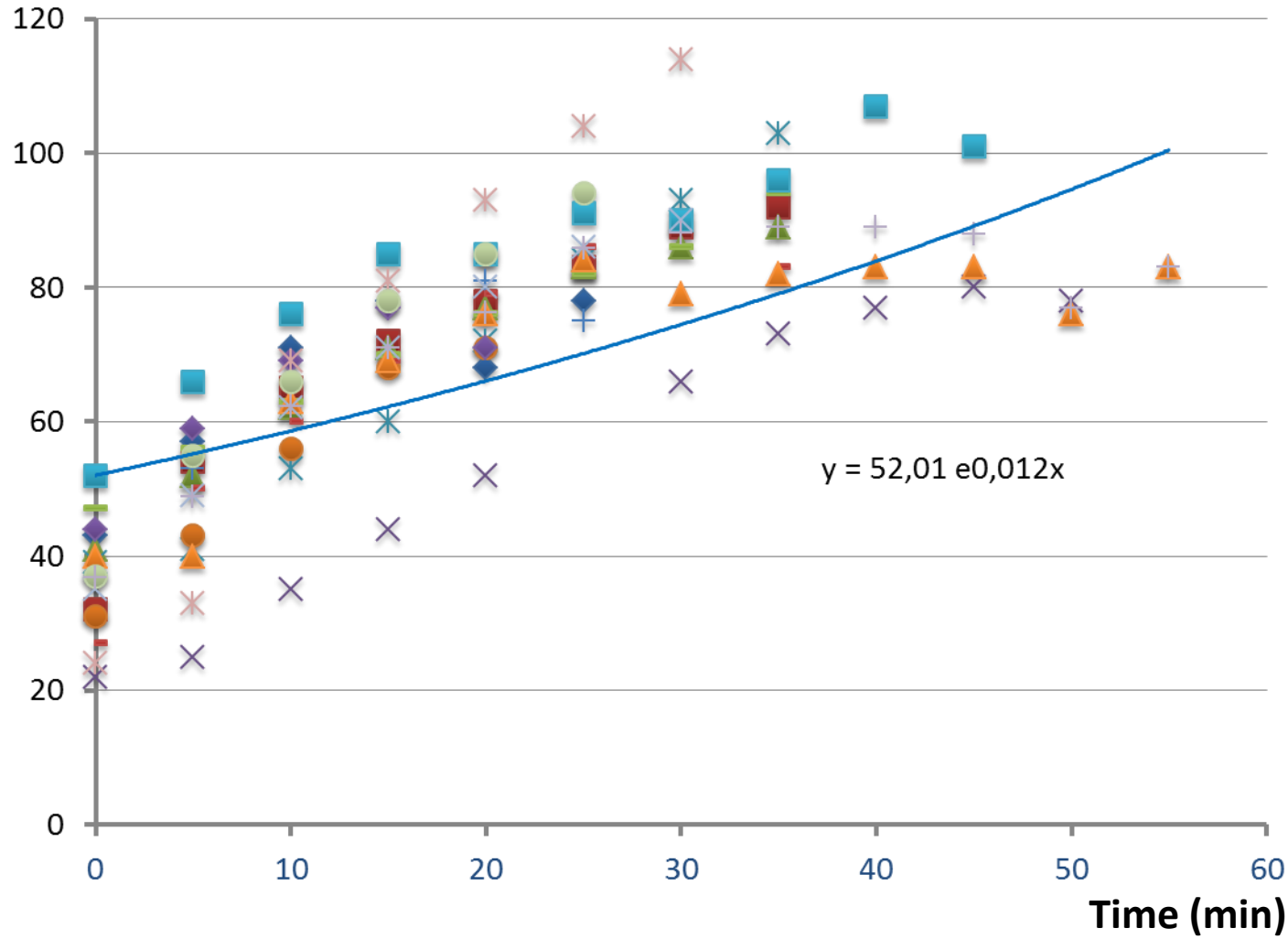
Transcutaneous tissular CO_2 Pressure

$PtcCO_2$ (mmHg)



Transcutaneous tissular CO_2 Pressure

$PtcCO_2$ (mmHg)

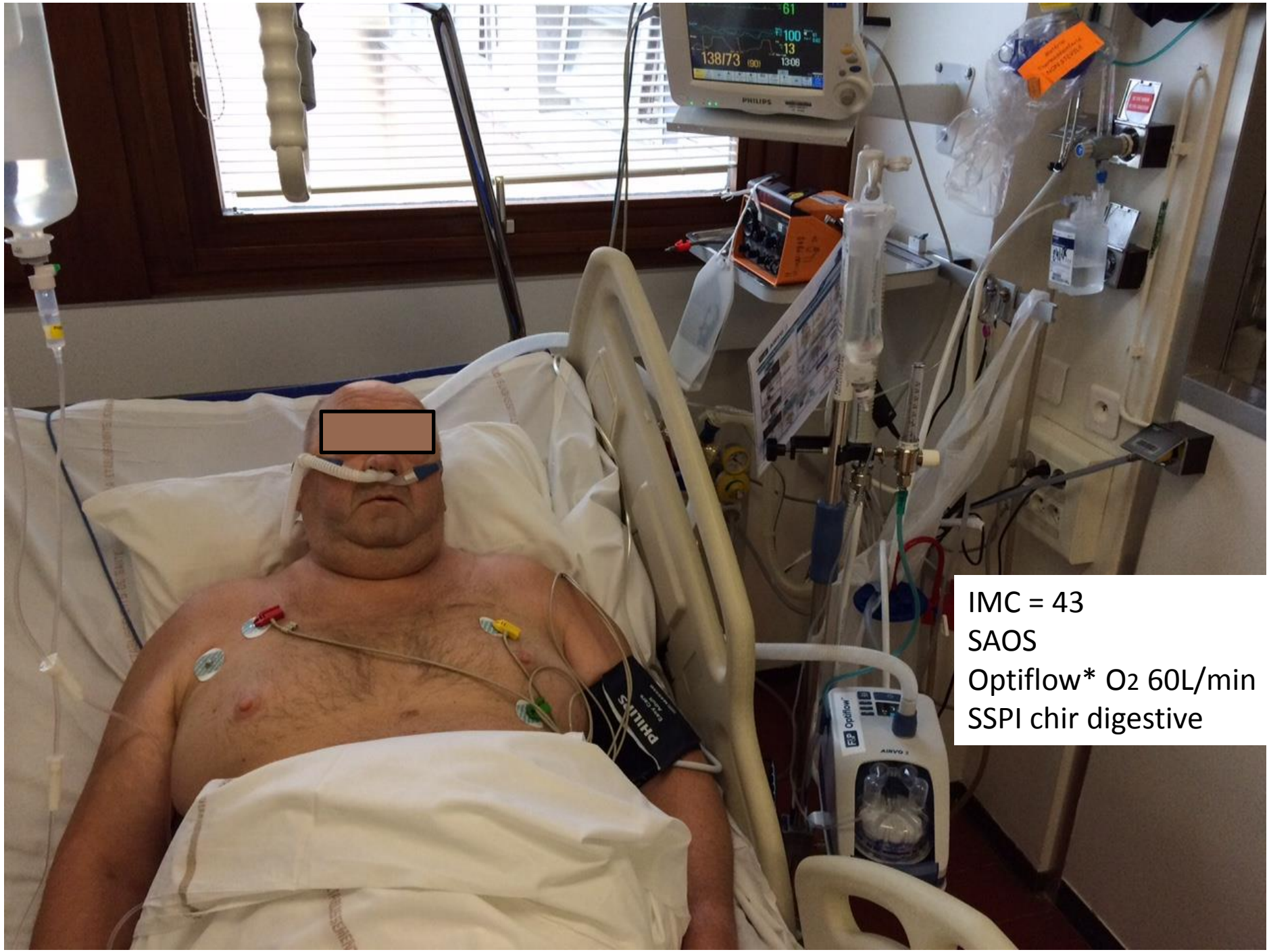


Oxygénation Apnéique (OA) et IOT multimodale: Bronchoscope flexible + Vidéolaryngoscope

OA (70L/min) : débutée avant l'induction de l'anesthésie (t0) et maintenue jusqu'à la confirmation capnométrique de l'intubation (t1).

Résultats et discussion. 8 femmes et 34 hommes d'âge médian 62 ans ont été inclus.
16 cas l'IMC >30 kg/m^2.
15 patients tumeur ORL : 7 radiothérapies. 8 antécédents d'IT difficile.
6 patients : SpO_2 en air ambiant < 95%
.
5 patients ont présenté une SpO2< 95% entre t0 et t1: 2 obèses installés en décubitus dorsal ; 1 patient non curarisé ayant fait un laryngospasme; et 2 patients avec difficulté du positionnement du VL liée à une ouverture buccale limitée.
La **durée médiane** d'apnée nécessaire à l'IT était de **6 minutes** (IQR 4-8,25). La **SpO2 minimale médiane était de 98%** (IQR 96-100).

4 patients ayant un antécédent de fibroscopie vigile, étaient très satisfaits de cette technique alternative. Chez les 20 patients dont la satisfaction a été évaluée, 6 ont rapporté une douleur oropharyngée légère, 3 une dysphagie légère et 3 patients une dysphonie légère. La satisfaction médiane de l'opérateur était de 10 (IQR 8,25-10).


IMC = 43
SAOS
Optiflow* O2 60L/min
SSPI chir digestive

Transnasal Humidified Rapid-Insufflation Ventilatory Exchange (THRIVE) For Preoxygenation Before Cesarean Section Under General Anesthesia: A Case Report

Maryse Hengen, MD,[1] Rosalie Willemain,[1] Alain Meyer, MD,[1] Bruno Langer, PhD,

Girish P. Joshi, MBBS, MD, FFARCSI,[3] and Pierre Diemunsch, MD, PhD[1]

A&A Case Reports 2017

Clinical Care. Education. Perioperative Services. Global Health. Patient Safety.

27 yo pregnant lady, **29 weeks** of gestation

- **respiratory distress** : polypnea, dyspnea, difficulty to speak
- coughing for 24h, **hyperthermia : 38,1 C**
- auscultation: bilateral widespread crackling sounds
- Bp 121/83 mmHg; HR 127/min
- Chest X-ray : bilateral widespread alveolar syndrome
- **SpO2 80%** room air
- **with 9L/min face mask O2: SpO2 95% & PaO2 105 mmHg**

- contact with people with upper airway infection symptoms, who had recently traveled to North Africa

- **suspected viral pneumonia**

A&A CASE REPORTS 2017
Clinical Care. Education. Perioperative Services. Global Health. Patient Safety.

- Obstetrician : C-section under GA
- Tamiflu* oseltamivir 150 mg oral + Claforan* cefotaxime 2g IV.

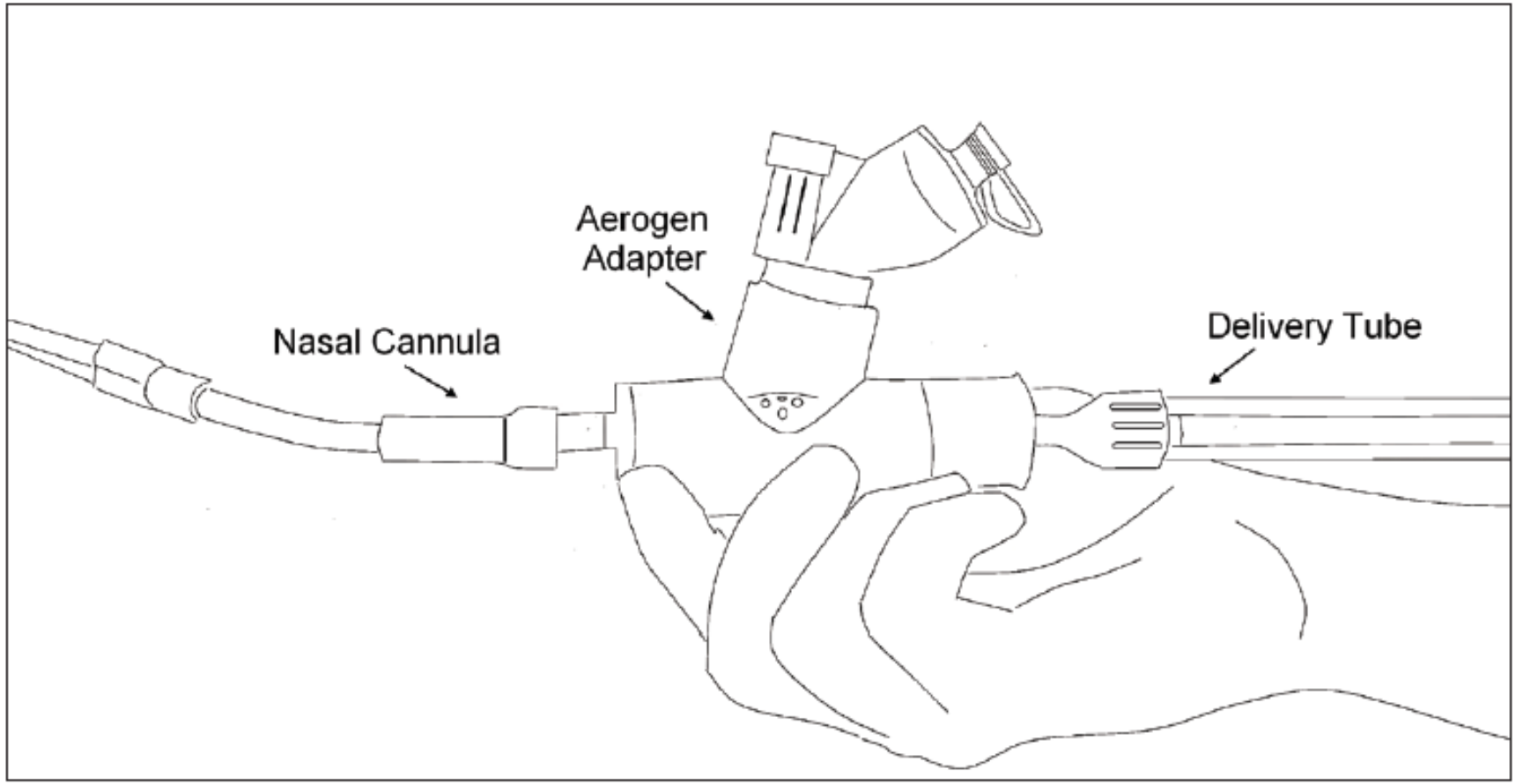
- **7h28**: PreO2 : **Optiflow*: 100% O2; 70 L/min**
- **7h33**: better comfort + **Sp02 98%**

- **RSI**: Thiopental 450 mg + Suxamethonium 100 mg; intubation
- **7h34**: extraction, SpO2 97%; Apgar 1min: 9; 5min: 10
- Sp02 maintained at 95-96% with a FiO2 = 85%.
- PaO2 141 with FiO2 85%; PaO2/FiO2 = 165 : ARDS

- **ICU** postop : confirmation of a severe B Influenza
- Recovered eventually

A&A CASE REPORTS 2017
Clinical Care. Education. Perioperative Services. Global Health. Patient Safety.

VAPOTHERM®

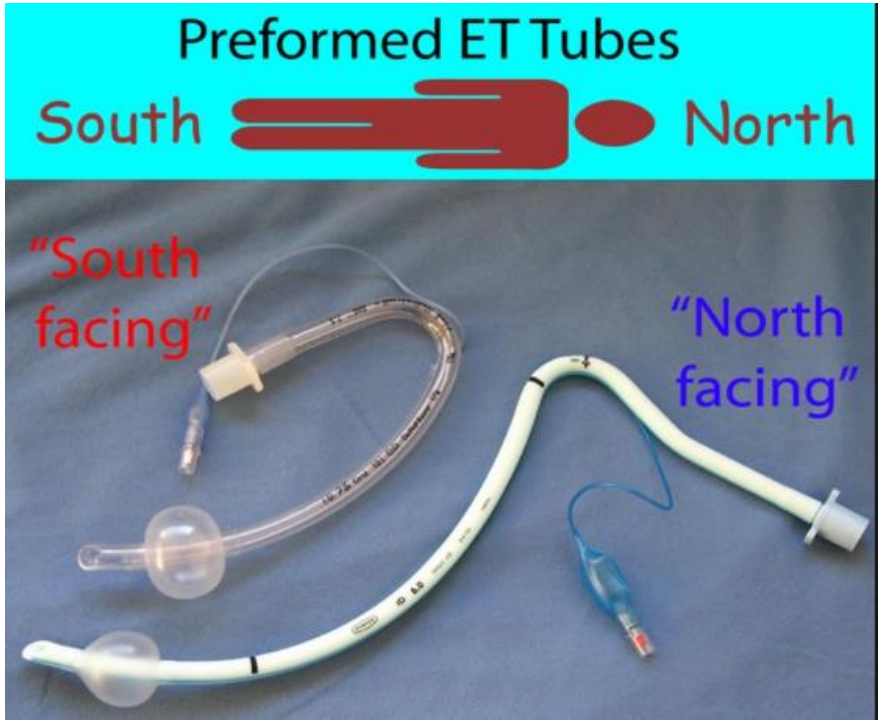


VAPOTHERM®

Anesth Analg 2017 124:1162-1167

Apneic Oxygenation During Prolonged Laryngoscopy in Obese Patients: A Randomized, Controlled Trial of Buccal RAE Tube Oxygen Administration.

A. Heard, A. Toner, J.R. Evans, A. M. Aranda Palacios, S. Lauer



RAE tubes are named after their inventors **Ring, Adair and Elwyn** who described the use of their novel **oral preformed tube** in pediatric patients in 1975 (Ring et al., 1975). RAE tubes were designed with the intention to **facilitate intra-oral and some types of facial surgery**

ANESTHESIA & ANALGESIA

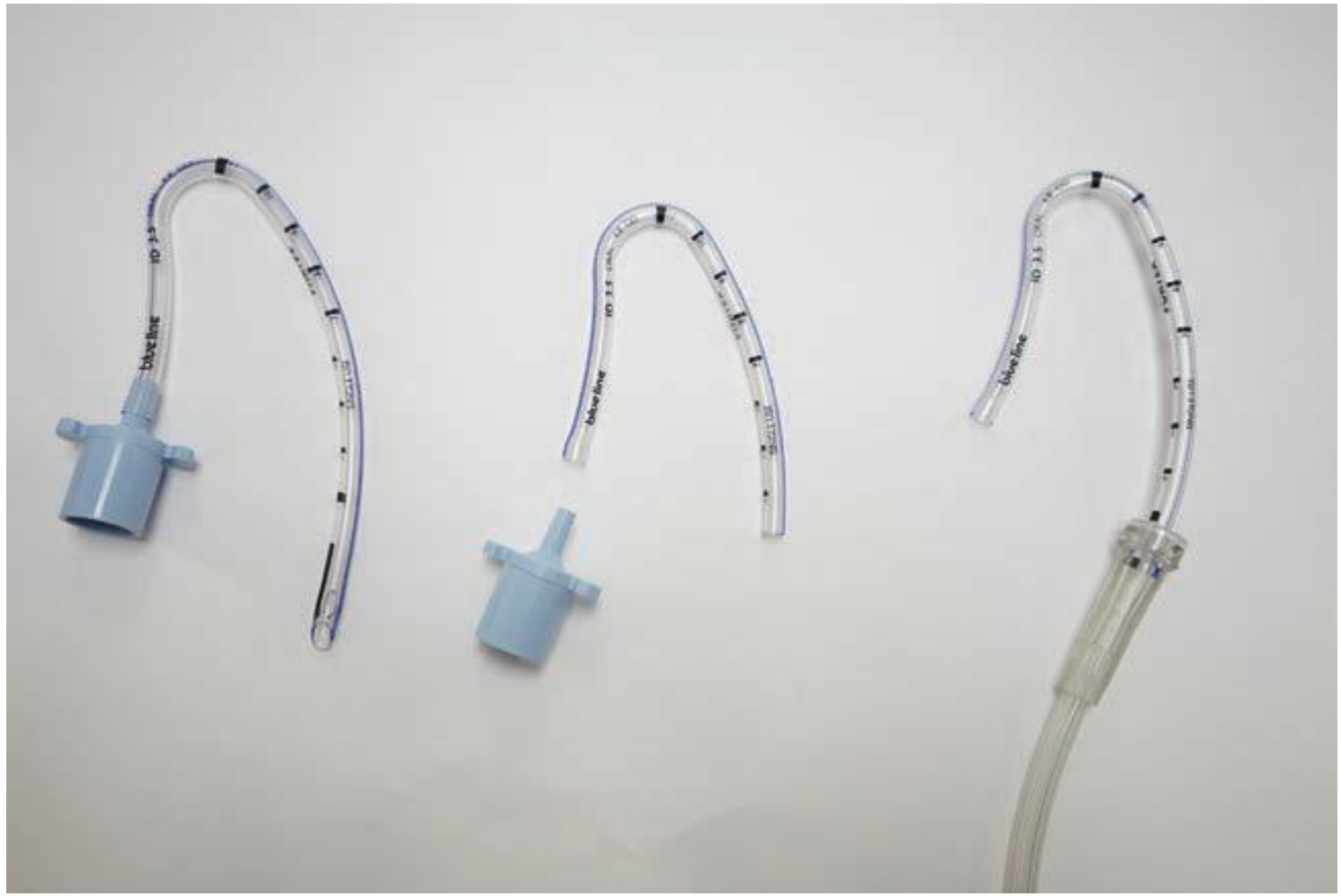


Figure 1. Adapted 3.5-mm south-facing Ring-Adair-Elwyn (RAE) tube for administration of buccal oxygen. Pictures from left to right show intact apparatus, connector removed, and distal tube cut above Murphy eye, modified apparatus with auxiliary oxygen tubing attached to cut end.

Figure 2. Adapted Ring-Adair-Elwyn (RAE) tube secured for oxygen delivery to the left buccal space.

2 groupes de 20 sujets obèses comparables

Table. Perioperative Characteristics

	Standard Care (n = 20)	Buccal Oxygenation (n = 20)
Age, y	42 ± 14 (19–66)	42 ± 18 (19–80)
Weight, kg	105 ± 13 (83–132)	104.3 ± 15 (75–133)
Height, cm	174 ± 9 (160–191)	174 ± 8 (157–188)
BMI	34.5 ± 2.8 (30.5–39.3)	34.3 ± 3.0 (30.3–39.0)
Male, n (%)	15 (75)	13 (65)
Even fat, n (%)	11 (55)	13 (65)
Central fat, n (%)	8 (40)	5 (25)
Peripheral fat, n (%)	1 (5)	2 (10)
Baseline Spo_2, %	98 (97–100)	98 (96–100)
Induction Spo_2, %	100 (99–100)	100 (99–100)
Peak $Etco_2$, mm Hg	40 (38–45)	44 (39–50)
Persistent T1, 150 s after rocuronium, n (%)	11 (55)	11 (55)

Data are presented as mean ± SD (range), or median (interquartile range); n is the number of patients; T1 is the first twitch of the train-of-four.
Abbreviation: BMI, body mass index.

Pré-oxygénation au masque

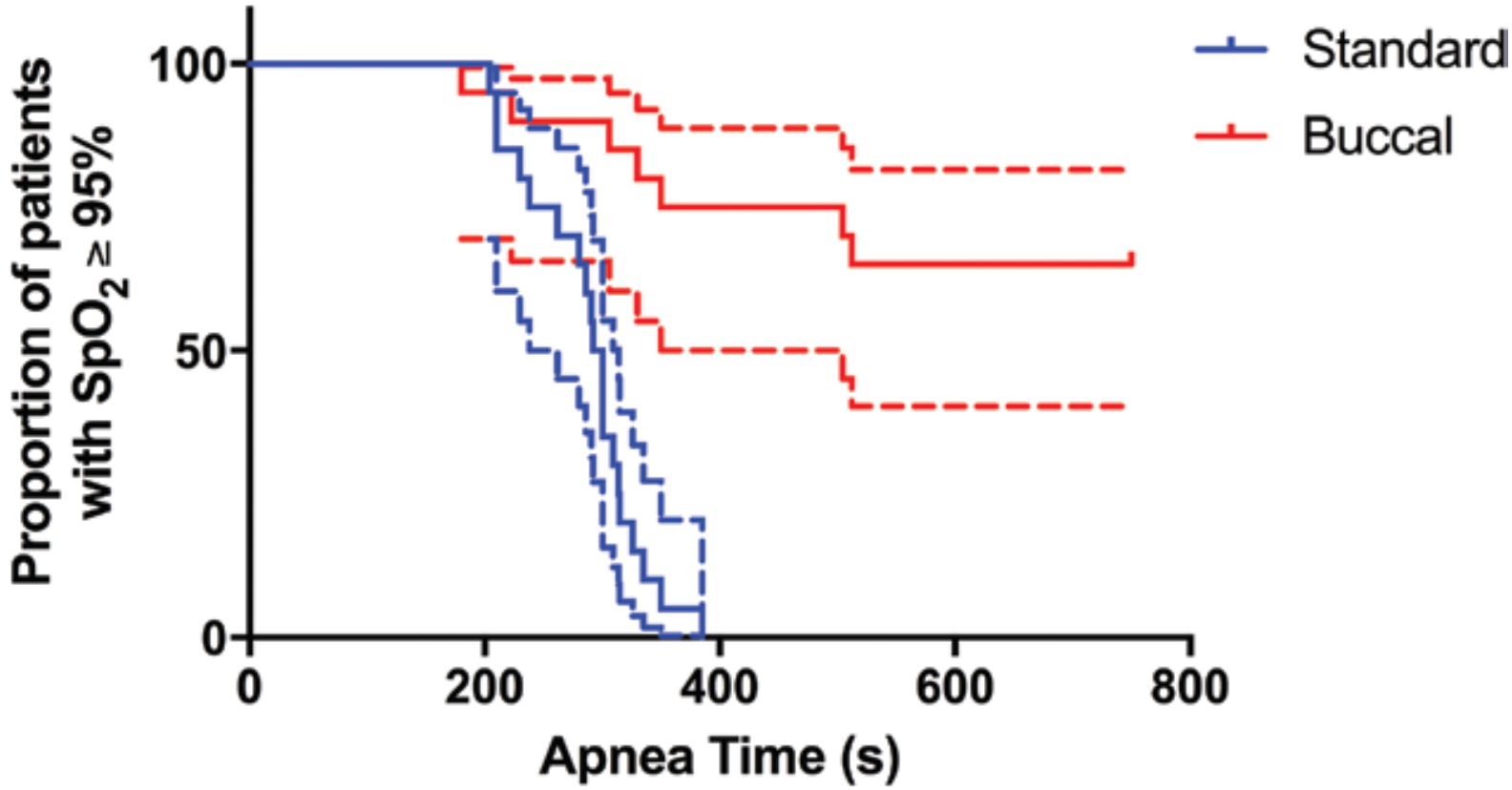
FETO2 > 80% => **O2 buccal: 10L/min.**

AG: propofol – rémifentanil – rocuronium

Glide Scope et C&L grade III

ID simulée durant 750 sec (12,5 min) ou SpO2 < 95%

ANESTHESIA & ANALGESIA



Proportion of **patients with Spo2 ≥ 95% during 750 s apnea** (95% confidence bands shown with dashed lines). Hazard ratio for Spo2 < 95% 0.159, 95% confidence interval 0.044–0.226, *P* < .0001. Kaplan Meyer.

ANESTHESIA & ANALGESIA

Anesthesiology 2014 Feb;120(2):326-34

Real-time Detection of Gastric Insufflation Related to Facemask Pressure–controlled Ventilation Using Ultrasonography of the Antrum and Epigastric Auscultation in Nonparalyzed Patients.

L. Bouvet, M.L. Albert, C. Augris, E. Boselli, R. Ecochard, M. Rabilloud, D. Dominique Chassard, B. Allaouchiche.

ANESTHESIOLOGY
The Journal of the American Society of Anesthesiologists, Inc.

Fig. 1. Positioning of both the ultrasonography probe and the stethoscope on the epigastric area.

ANESTHESIOLOGY
The Journal of the American Society of Anesthesiologists, Inc.

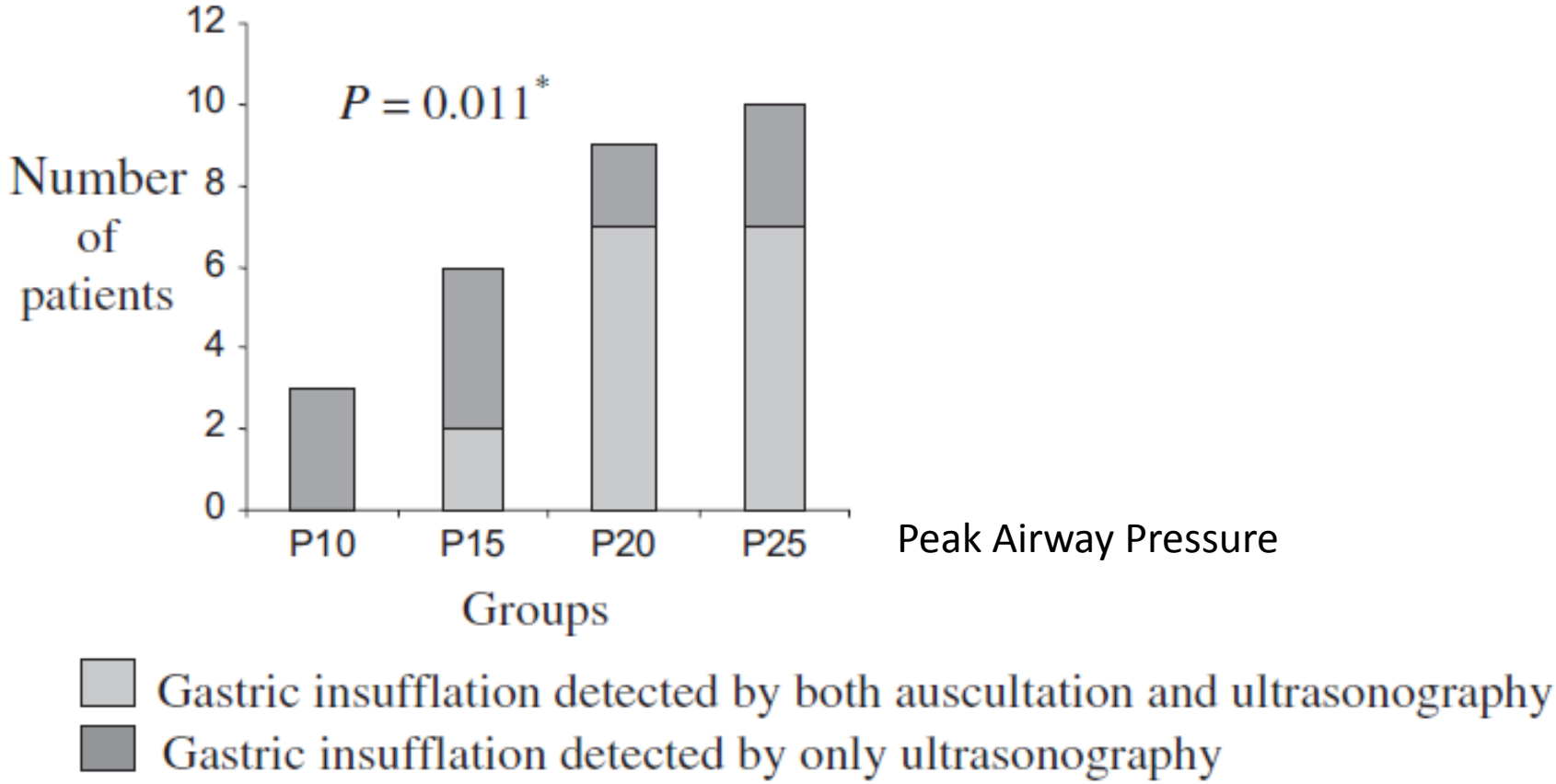


Fig. 3. Detection of gastric insufflation in the four groups according to the method used. All cases detected by auscultation were also detected by ultrasonography. **P* value is given for chi-square tests for trend performed for auscultation and for ultrasonography.

Evaluation de l'insufflation gastrique au cours de l'oxygénation d'apnée

M. Hengen[1], G. Bischoff[1], S. Koessler[1], L. Bouvet[2], P. Diemunsch[1]
[1]CHU de Hautepierre, Strasbourg
[2]Hospices Civils de Lyon, Hôpital Femme Mère-Enfant, Lyon

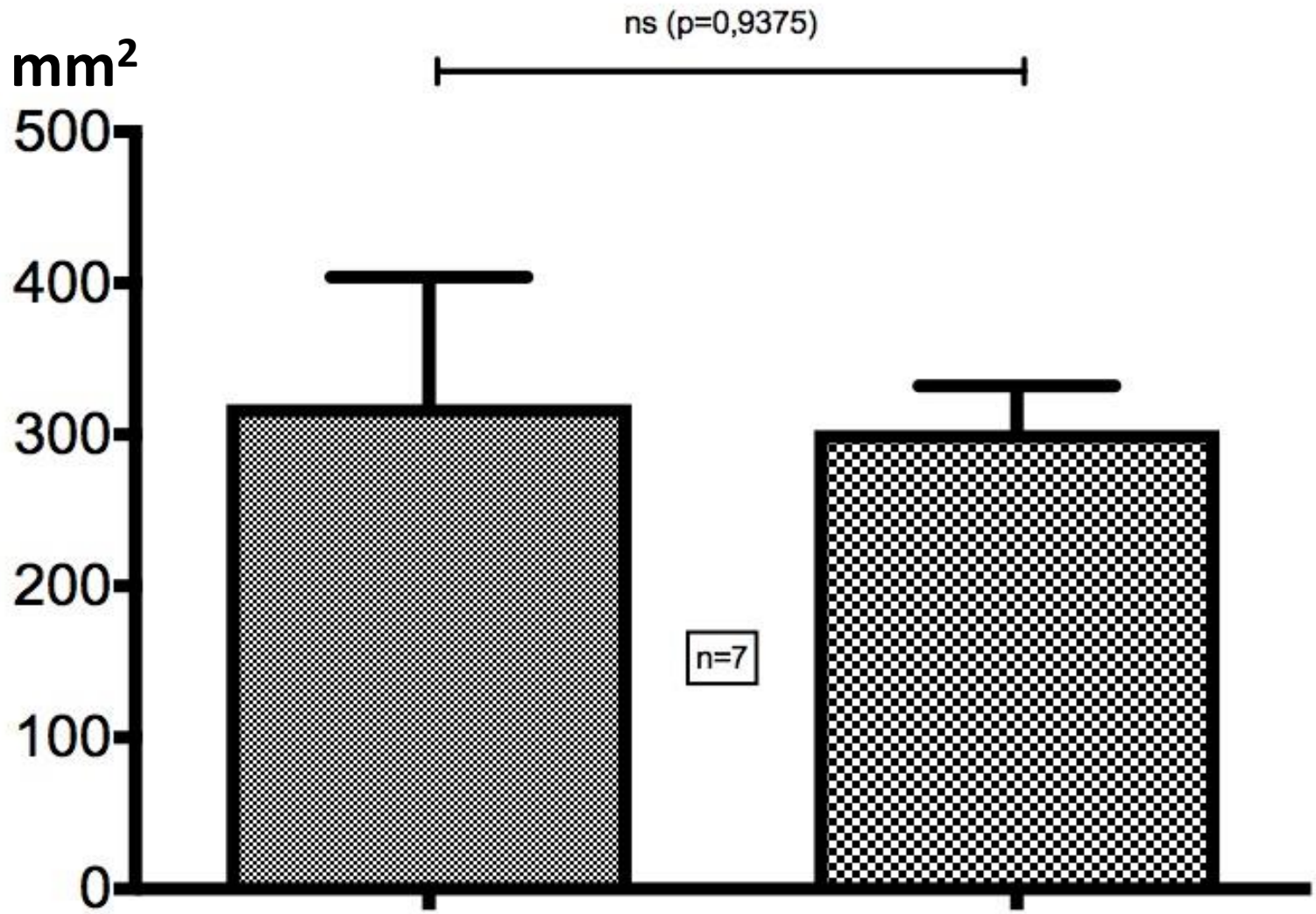
Patients : AG, curarisés, sans ventilation mécanique, **chir ORL**
THRIVE : **70 l/min et 37° C**
SpO2 < 92% : critère d'arrêt de l'OA et ventilation artificielle .

aire antrale (AA) : coupe sagittale passant par le lobe gauche du foie et l'aorte,
AA = D1 x D2 x π/4,
D1 : diamètre longitudinal, D2 : diamètre antéropostérieur

avant l'induction de l'AG, puis en SSPI
queues de comètes :(air antral) recherchées

7 patients; OA : 37+ /-11 min.
Aucune désaturation
AA médiane avant OA :320 mm^2 (écart interquartile [25-75%] : 252-404 mm^2)
après OA (301 mm^2, écart interquartile [25-75%] : 292-365 mm^2
p=0,94.

aucune image en queue de comète



Chirurgie ORL

OA: 37±11 min; O2: 70 L.min^{-1}

THRIVE: nombreuses questions

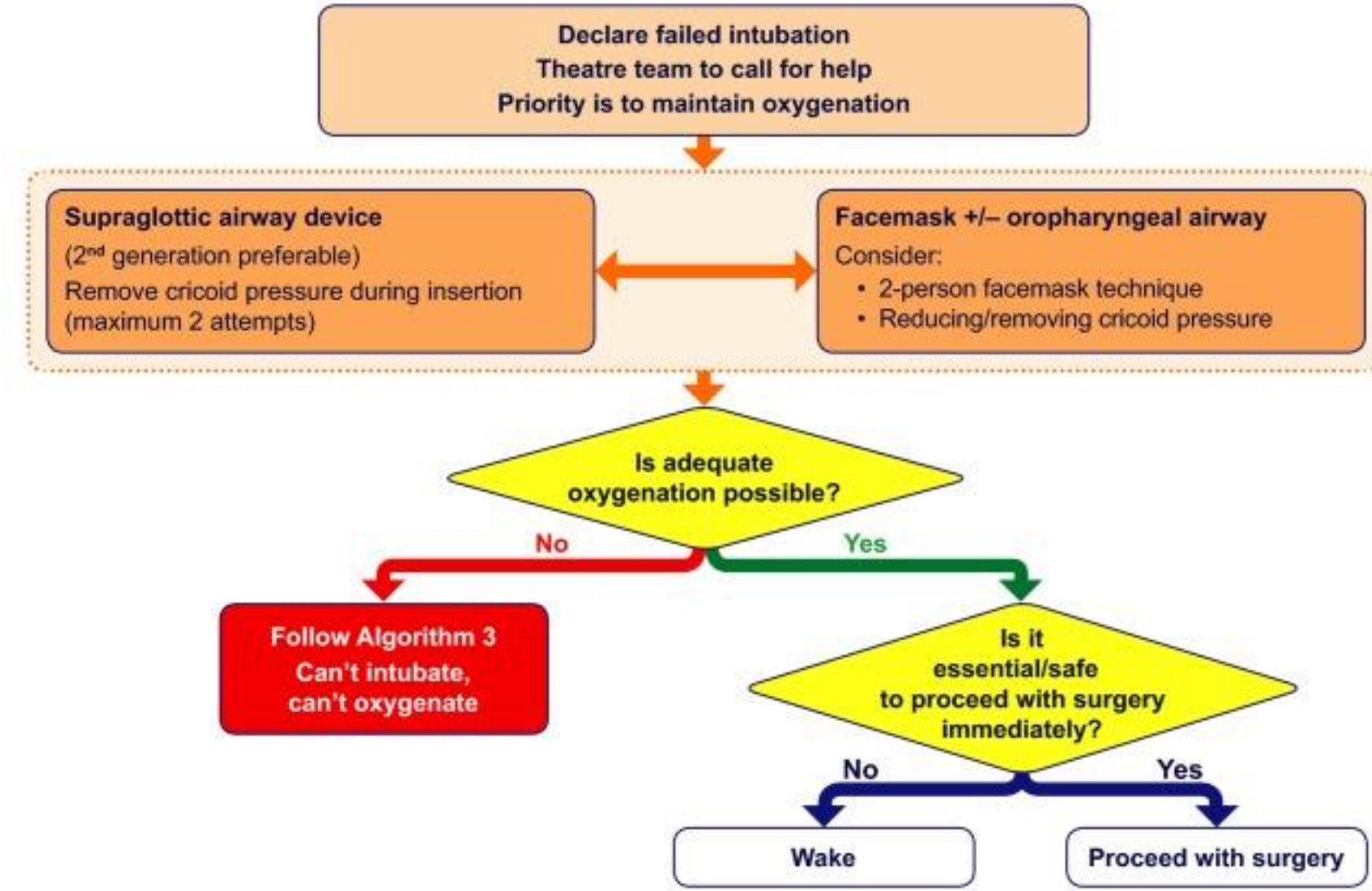
Place indications en réanimation
indications en anesthésie
versus jet ventilation

Physiologie diffusion de l'O_2
élimination du CO_2

Sécurité toxicité de l'O_2 (locale, systémique)
effets du flux gazeux
tolérance de l'hypercapnie (HTIC, pH, K^+)
O_2 et Laser

Courbes dose/effet O_2: 100%, 50%, 21% ?
débit: 70 L, 1,0 L/Kg, 0,5 L/Kg, 0,3 L/Kg,?
relation FiO_2/débit

Algorithm 2 – obstetric failed tracheal intubation



International Journal of Obstetric Anesthesia (2015) **24**, 356–374
SPECIAL ARTICLE
ELSEVIER
www.obstetanesthesia.com

Failed tracheal intubation during obstetric general anaesthesia: a literature review

S.M. Kinsella,[a] A.L. Winton,[a] M.C. Mushambi,[b] K. Ramaswamy,[c] H. Swales,[d] A.C. Quinn,[e] M. Popat[f]

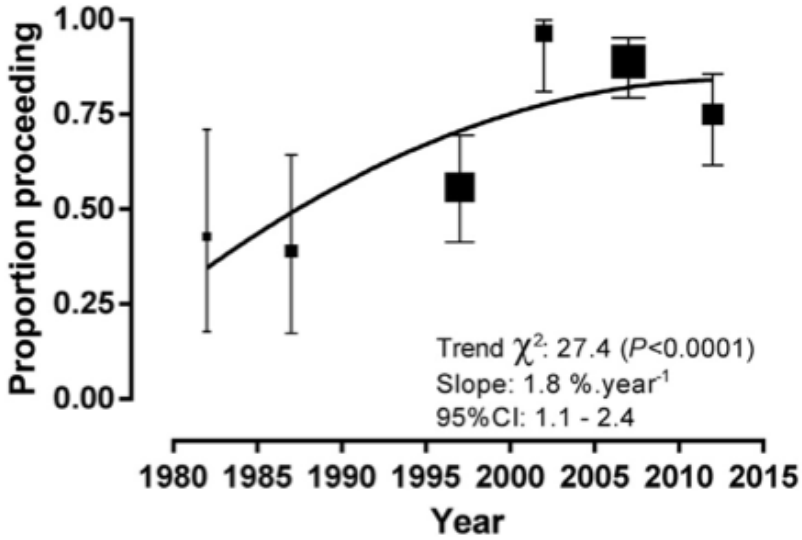


Fig. 3 Graph of proportion of cases in which general anaesthesia was continued after failed tracheal intubation at caesarean section; reports pooled into 5-year epochs. Error bars=95% confidence interval

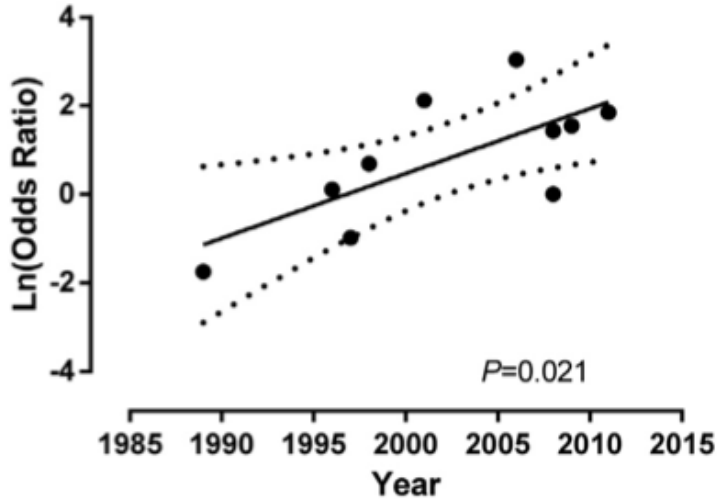
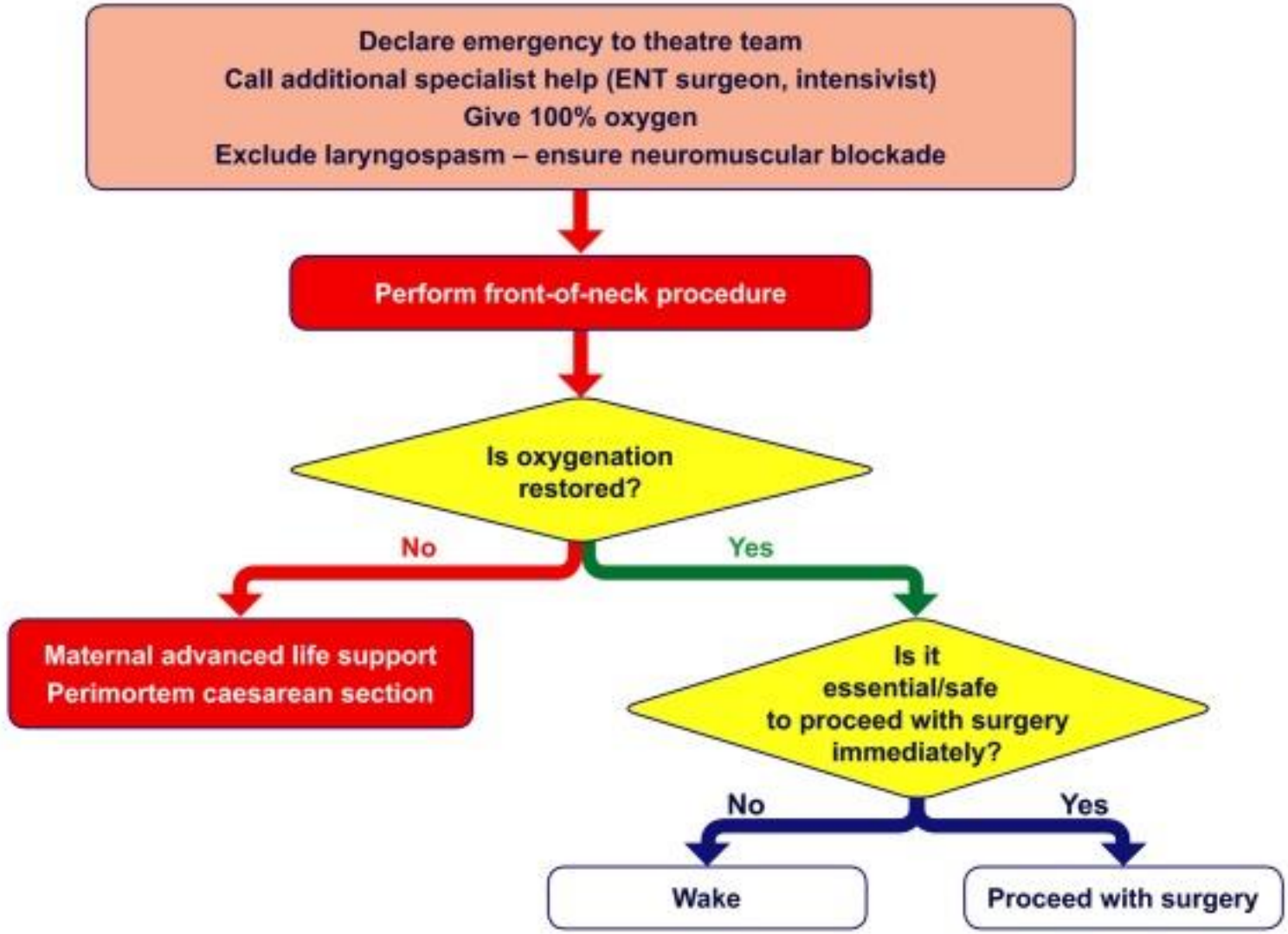


Fig. 4 Ratio of 'proportion of general anaesthesia continued after failed tracheal intubation at emergency caesarean section'/'proportion of general anaesthesia continued after failed tracheal intubation at elective caesarean', plotted by year of publication. Dotted lines=95% confidence interval

Algorithm 3 – can't intubate, can't oxygenate



Br. J. Anaesth. (2016) 116 (1): 143-144

Percutaneous emergency airway access: prevention, preparation, technique and training

K. McPherson, S. West

Surgical

Seldinger technique

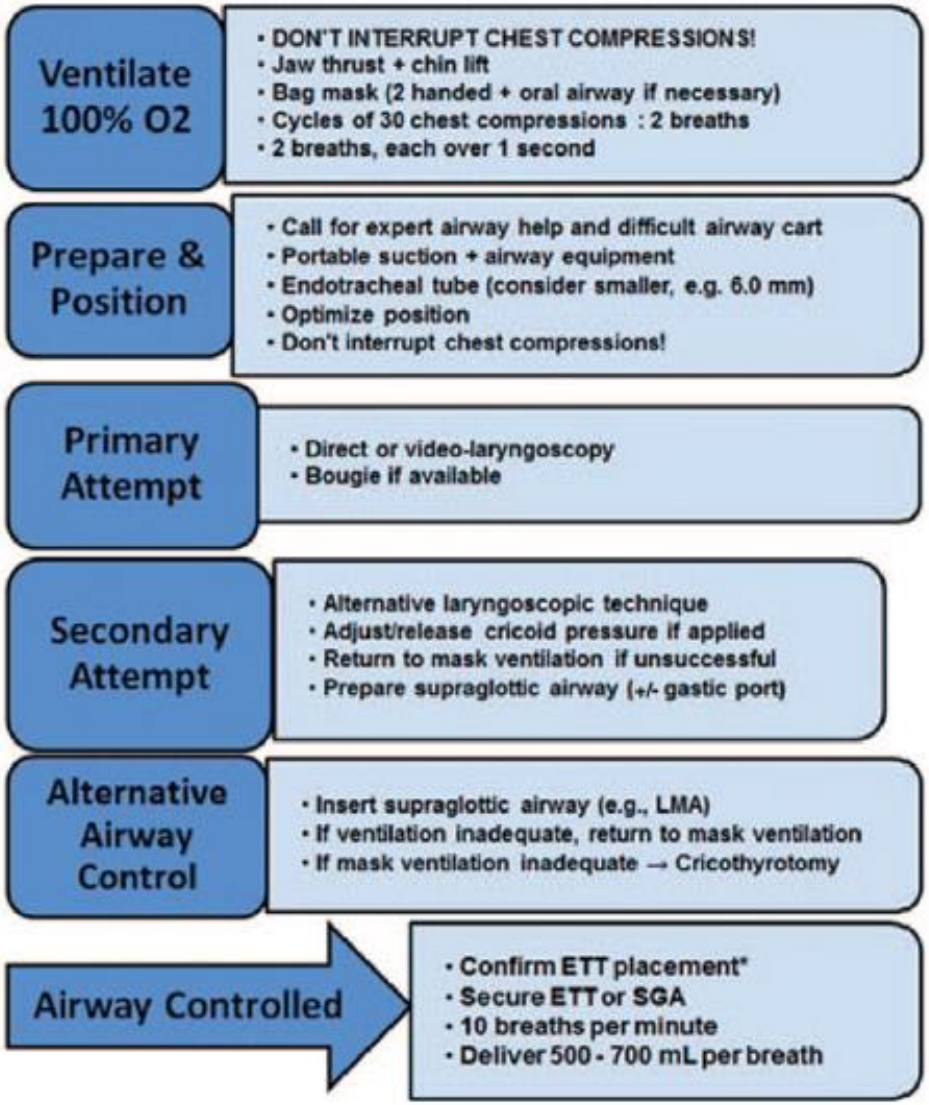
- Melker
- the “new Frova” kit

SPECIAL ARTICLE

CME The Society for Obstetric Anesthesia and Perinatology Consensus Statement on the Management of Cardiac Arrest in Pregnancy

Anesth Analg **2014**;118:1003–16

Steven Lipman, MD,* Sheila Cohen, MB, ChB, FRCA,* Sharon Einav, MD,†



O2
4 mains, 30/2, Sellick

appel senior, posture, sonde 6 mm
laryngoscopie directe ou Vidéo L.

2ème essai: approche alternative
O2

LMA

Melker

entraînement

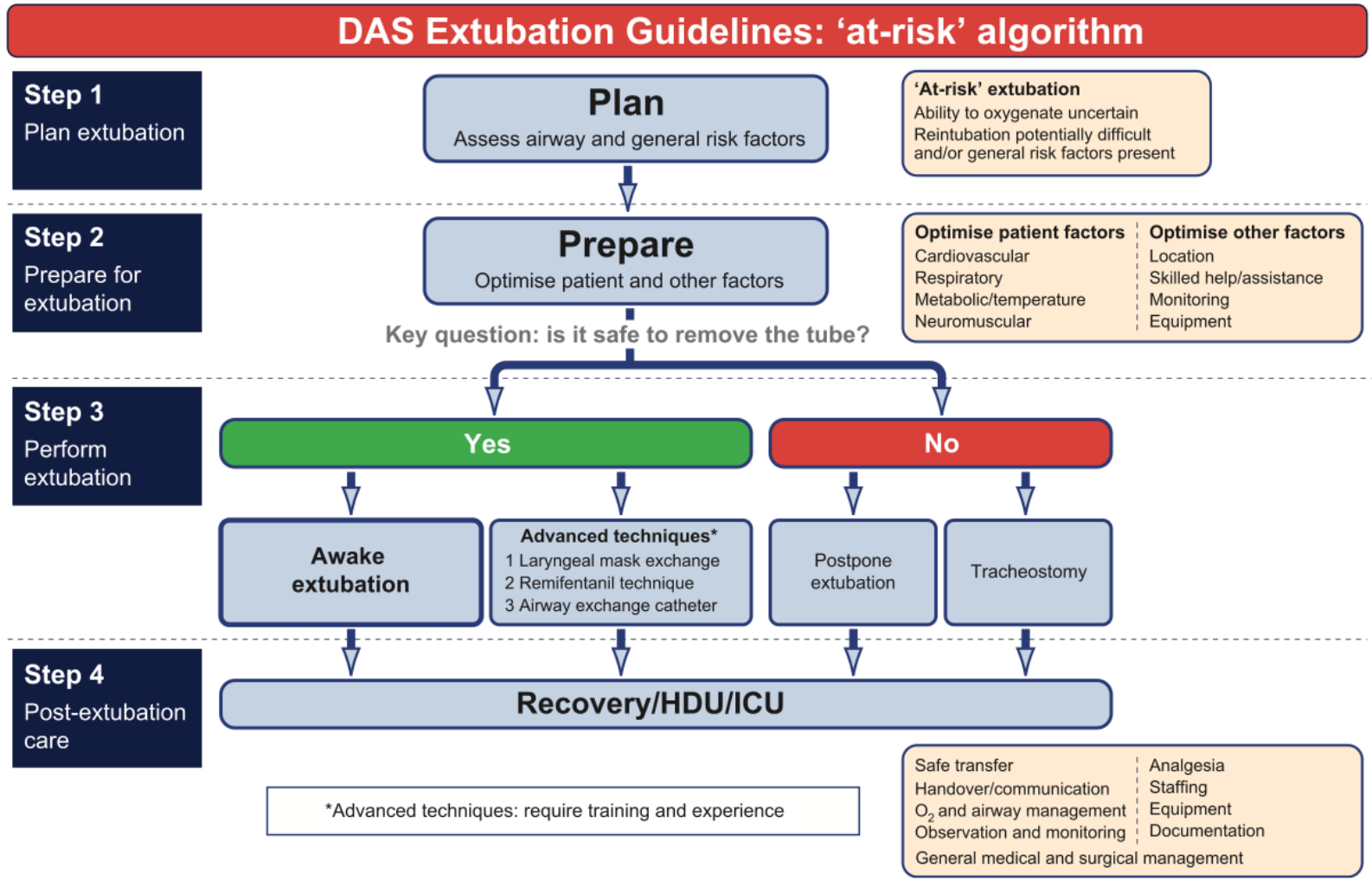


Figure 3 DAS extubation guidelines: 'at-risk' algorithm.

Fig. 1 Patient with airway exchange catheter in situ following removal of the tracheal tube

0959-289X/$ - see front matter
http://dx.doi.org/10.1016/j.ijoa.2014.03.010

Safe extubation of a parturient using an airway exchange technique

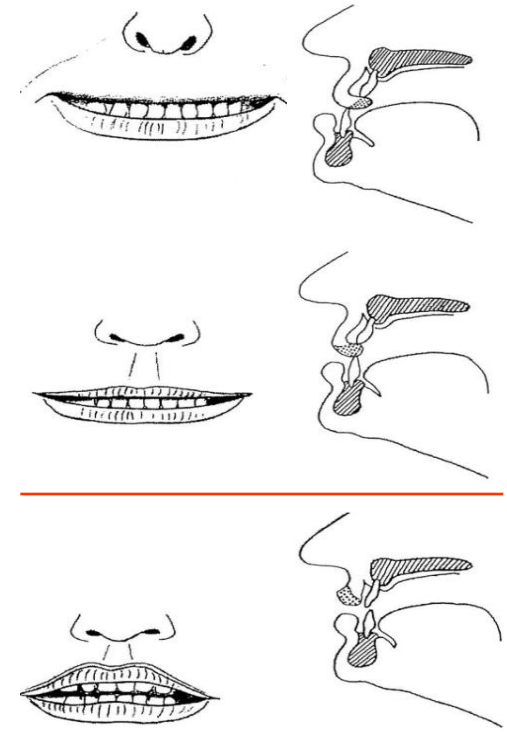
A.D. Spong, D.J.A. Vaughan
Department of Anaesthesia, Northwick Park Hospital, Harrow, Middlesex, UK

échecs des vidéolaryngoscopies : nombreux

la fibroscopie règle ces échecs mais

quels sont les **signes prédictifs des vidéolaryngoscopies difficiles**?

quand faut-il préparer la fibro?



Poor Visualization During Direct Laryngoscopy and High Upper Lip Bite Test Score Are Predictors of Difficult Intubation with the GlideScope® Videolaryngoscope

MH Tremblay. Anesth Analg 2008;106:1495–1500

1/400 patient (0.25%) could not be intubated with the GlideScope after 3 attempts; this patient was C&L grade 1 with a conventional laryngoscopy. The problem was difficulty coordinating endotracheal tube advancement with stylet removal.
He was intubated with direct laryngoscopy on the first attempt.

British Journal of Anaesthesia **99 (6)**: 906–11 (2007)
doi:10.1093/bja/aem297 Advance Access publication October 25, 2007

BJA

Predictive value of the El-Ganzouri multivariate risk index for difficult tracheal intubation: a comparison of Glidescope® videolaryngoscopy and conventional Macintosh laryngoscopy

P. Cortellazzi[1]*, L. Minati[2], C. Falcone[3], M. Lamperti[1] and D. Caldiroli[1]

Criterion	0 point	1 point	2 points
Weight (kg)	<90	90-110	>110
Head and neck mobility (degrees)	>90	90±10	<80
Mouth opening	>=4 cm	<4 cm	
Subluxation >0	possible	not possible	
Thyromental distance	>6.5 cm	6-6.5 cm	<6 cm
Mallampati class	I	II	III
History of DI	no	possible	established

Valeur prédictive de l'EGRI (seuil = 3) pour laryngoscopie difficile: **C&L grade III ou IV (pas IDI)**

Glidescope AUC 0.91

Mcintosh AUC 0.73

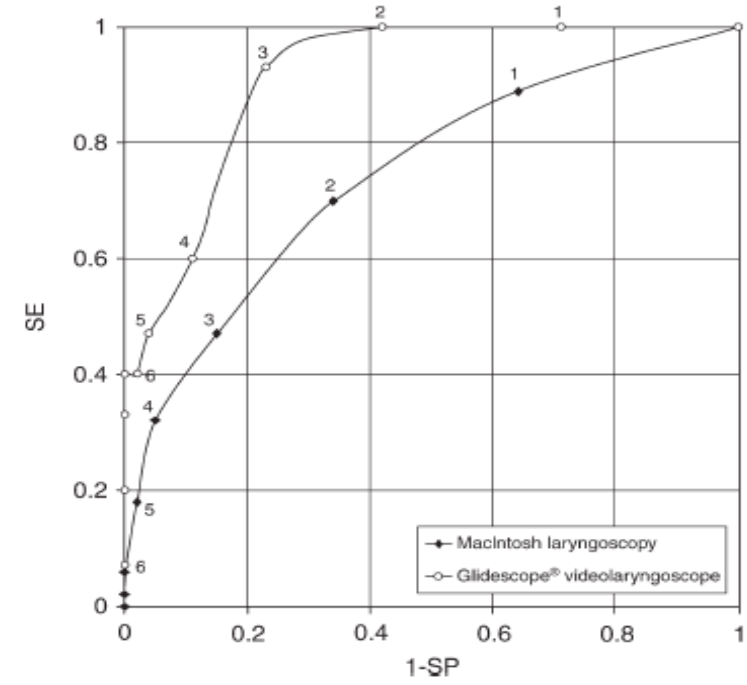


Fig 2 ROC curves for the El-Ganzouri risk index, computed using Macintosh laryngoscopy or Glidescope® videolaryngoscopy as reference standard. The ciphers along the curves are the corresponding El-Ganzouri scores. SE, sensitivity; SP, specificity.

faut-il toujours intuber en obstétrique?

règle générale

démentie par la pratique notamment pour les RS

Zieleskiewicz L, Bellefleur JP, Antonini F, Ortega D, Leone M, Martin C.
Gestion des voies aeériennes supérieures en fin d'accouchement : enquête de pratique.
Ann Fr Anesth Reanim 2009;28:119–23

« A` l'heure de l'évaluation des pratiques professionnelles, il est en effet inconcevable de laisser perdurer une situation où les pratiques non recommandées deviennent la norme »

Benhamou D, Mercier FJ.
Prévention du syndrome de Mendelson en obstétrique: l'intubation trachéale doit-elle demeurer un principe intangible? Ann Fr Anesth Reanim 2009;28:115–8

Fin de travail: 30% en CHU et 10% en clinique

NPC avant et après la naissance (forceps vs RS)!

Enzer R294 **SFAR 2013**

Can J Anaesth. 2001 Dec;48(11):1117-21.

The laryngeal mask airway is effective (and probably safe) in selected healthy parturients for elective Cesarean section: a prospective study of 1067 cases.

Han TH, Brimacombe J, Lee EJ, Yang HS.

Department of Anesthesiology Samsung Medical Center, SungKyunKwan University School of Medicine, Seoul, Korea.

série prospective, consécutive, **1067** césariennes programmées
très sélectionnées: BMI < 30, pas de reflux ni signes d'ID, à jeun depuis > 6h
pento-célo; praticiens ayant une solide expérience
Sellick jusqu'à la naissance

résultats:
pas de régurgitation, ni d'inhalation, ni de désaturation (SpO2< 90%)

pourquoi pas de rachi ???

… /…

L'évolution du rôle du masque laryngé en Obstétrique

Roanne Preston MD FRCPC. CAN J ANESTH 2001;48:1061–1065

« Après la lecture de l'étude de Han et la mise à l'écart des préoccupations éthiques, les anesthésiologistes n'ont qu'un message à retenir : le ML est acceptable comme **dispositif d'urgence** pour la prise en charge des voies aériennes chez la parturiente ».

« D'après les conclusions de cette étude, **on ne peut conseiller** : "Le ML est sûr pour protéger les voies aériennes d'une parturiente" ».

« **N'oublions pas que les ML ont été utilisés chez des parturientes minces, à jeun et soumises aux conditions anesthésiques idéales** ».

pas une alternative à IOT mais un outil pour régler les IOT difficiles

Curr Opin Anaesthesiol. 2015 Dec;28(6):717-26

Laryngeal mask airway indications: new frontiers for second-generation supraglottic airways

A. Timmermann, U.A. Bergner, S.G. Russo

The question of patient safety has to be evaluated.

RECENT FINDINGS:

The review describes the evolution of these devices in detail with an analysis of the increased range of possible uses for prolonged application periods, minor laparoscopic procedures, obese patients, surgery in the prone position, and **caesarean sections**.

SUMMARY:

The use of second-generation SGA for expanded indications seems useful and safe, provided the contraindications are heeded, the placement and performance tests are successfully completed and there is adequate clinical expertise.

Br J Anaesth. 2016 Feb 24.

Current practice of rapid sequence induction of anaesthesia in the UK - a national survey

A. Sajayan, J. Wicker, N. Ungureanu, C. Mendonca, P. K. Kimani

68% pre-oxygenated by monitoring end-tidal oxygen concentration
76% of the respondents use 20–25° head up tilt for all RSIs.

Propofol is the most commonly used induction agent (64% of all respondents).
Opioid has been used by 80% of respondents
only 18% use suxamethonium for all patients
82% : rocuronium or suxamethonium based on clinical situation.

92% of anaesthetists use cricoid pressure,
83% of them never objectively measure the force used.
17% of the respondents : gentle mask ventilation during apnoeic period .

the 'classical' technique of RSI is now seldom used.
there is a clear **need for developing consistent guidelines** for the practice of RSI.

Priebe HJ. **Obstetric tracheal intubation guidelines and cricoid pressure.**
Anaesthesia, 2016 Mar;71(3):345-6. doi: 10.1111/anae.13382.

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*Current recommendations aim to **move away from the traditional and outdated obstetric RSI technique** to introduce changes, which are **in keeping with anaesthetic practice in the nonpregnant patients**. Such changes include the choice of induction agent and muscle relaxant, preoxygenation techniques, and mask ventilation during Rapid Sequence Induction; and* the early release of cricoid pressure, should failed intubation occur.

Mushambi MC. **Obstetric tracheal intubation guidelines and cricoid pressure - a reply.**
Anaesthesia. 2016 Mar;71(3):346-7. doi: 10.1111/anae.13394.

Int J Obstet Anesth. 2012 Jul;21(3):286-7

Use of rocuronium and sugammadex for caesarean delivery in a patient with myasthenia gravis.

Garcia V, Diemunsch P, Boet S.

35-year-old 80 kg woman with **myasthenia gravis**, admitted at 34 weeks of gestation
worsening respiratory distress : caesarean delivery the next day

propofol 180 mg, rocuronium 16 mg, sufentanil 20 mcg
modified Rapid Sequence Induction : rocuronium + reversal with sugammadex

dose of rocuronium (0.2 mg/ kg) : << that used for RSI (0.9 mg/kg).
intubating conditions : satisfactory (increased sensitivity to NMBA in myasthenia).

paralysis : still profound 90 min later
sugammadex 200 mg (4 mg/kg) => TOF 4/4 in 4 min.

Anesth Analg 2016 ;123:82-92.

The Myth of Rescue Reversal in "Can't Intubate, Can't Ventilate" Scenarios

Mohamed Naguib, MB, BCh, MSc, FCARCSI, MD,* Lara Brewer, PhD, MS,† Cristen LaPierre, PhD,‡ Aaron F. Kopman, MD, and Ken B. Johnson, MD*

… Depending on body habitus, the duration of intolerable ventilatory depression after sugammadex reversal may be as long as 15 minutes in 5% of individuals.

CONCLUSIONS: *The clinical management of CICV should focus primarily on restoration of airway patency, oxygenation, and ventilation consistent with the American Society of Anesthesiologist's practice guidelines for management of the difficult airway. Pharmacologic intervention cannot be relied upon to rescue patients in a CICV crisis.*

ANESTHESIA & ANALGESIA

Anesth Analg 2016 ;123:82-92.

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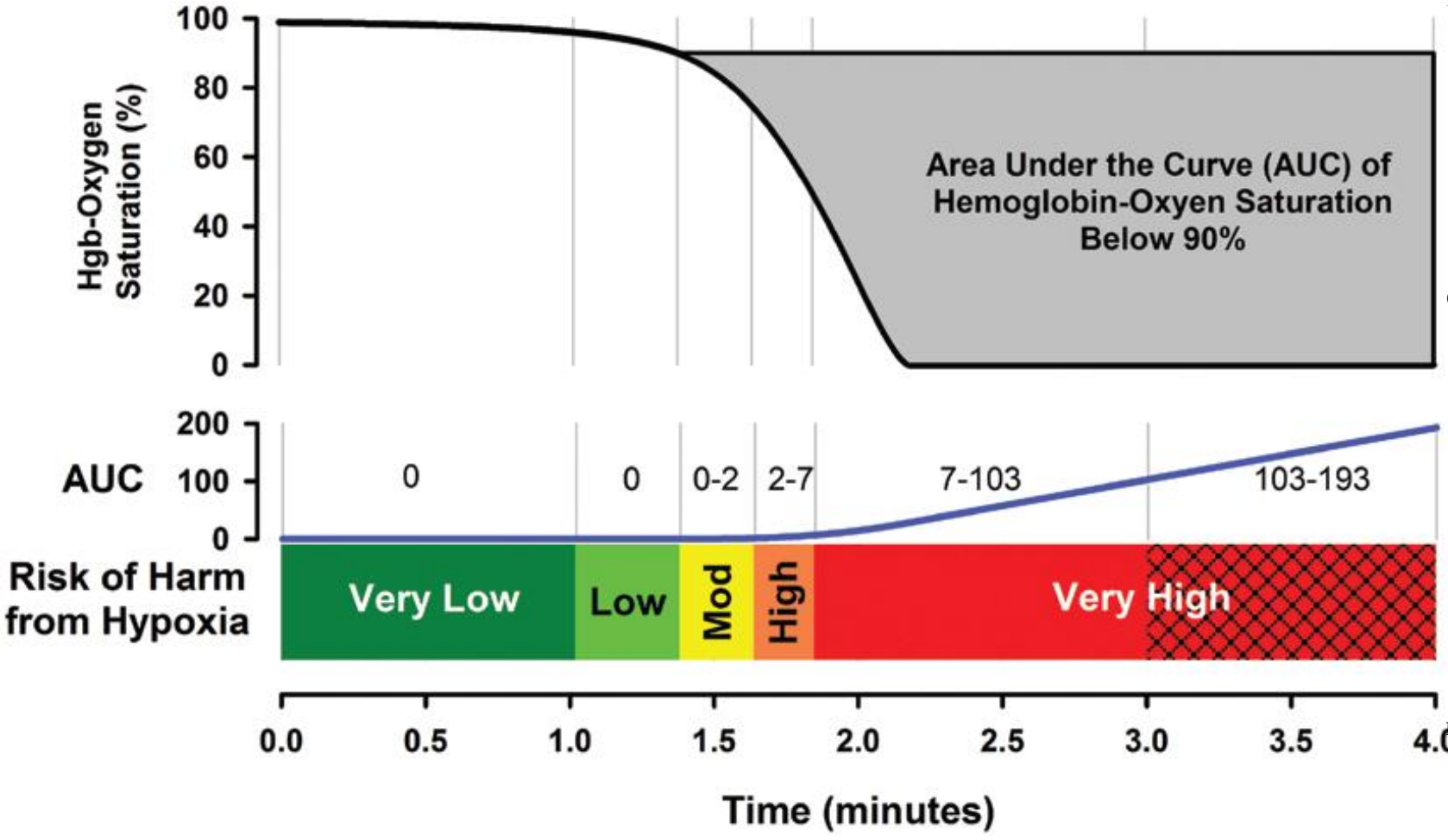
Mohamed Naguib, MB, BCh, MSc, FCARCSI, MD,* Lara Brewer, PhD, MS,† Cristen LaPierre, PhD,‡ Aaron F. Kopman, MD, and Ken B. Johnson, MD*



An example of model predictions of hemoglobin (Hgb) oxygen desaturation during a 4-minute period to illustrate (1) the area under the curve (AUC) of hemoglobin oxygen saturation levels <90% (gray area), (2) the change in AUC over time (blue line), and (3) a 5-point scale describing the potential risk of harm from hypoxia. This example assumes complete apnea during the 4-minute period. The cumulative AUC at each transition in the scale is presented as a numeric range within the AUC plot. The "very high" element of the scale has 2 segments: Solid red represents the duration of hemoglobin oxygen saturation <50 for up to 1.2 minutes. Cross-hatched red represents the period beyond 1.2 minutes and for simulation purposes is defined as a critical period associated with a very high risk of harm from hypoxic.

ANESTHESIOLOGY NEWS

AUGUST 12, 2016

Multimodal Airway Management: Combining Advanced Airway Techniques Can Be Better

… ***a combination of VL and flexible fiberscope*** *guidance were included more specifically in the list of "alternative difficult airway approaches" in the* ***2013 ASA Difficult Airway Algorithm****;*
we also suggest that this list of alternative approaches be a choice in the ***Awake Intubation*** *limb of the algorithm.*