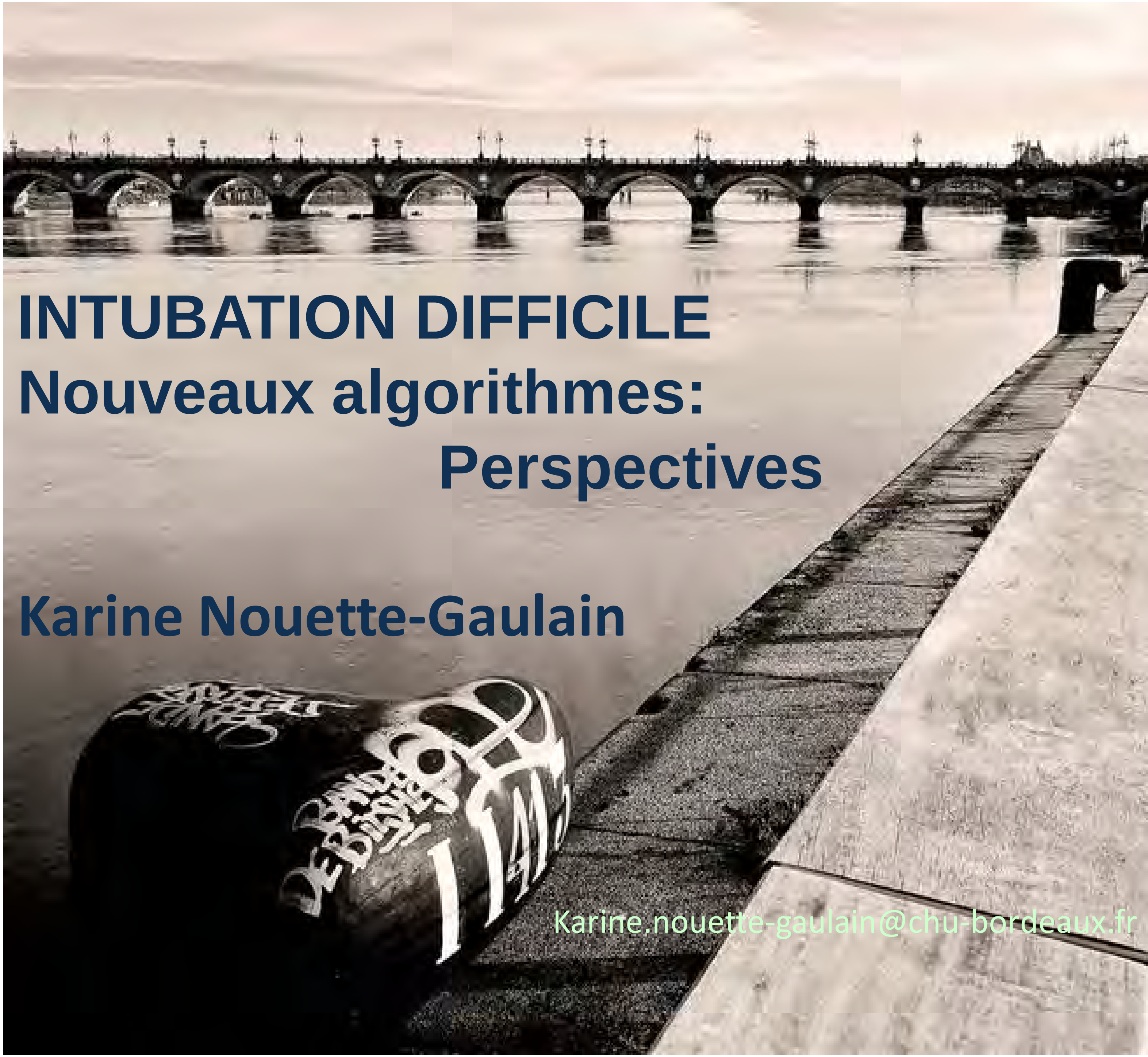


INTUBATION DIFFICILE
Nouveaux algorithmes: Perspectives

Karine Nouette-Gaulain

Karine.nouette-gaulain@chu-bordeaux.fr

Liens d’intérêt

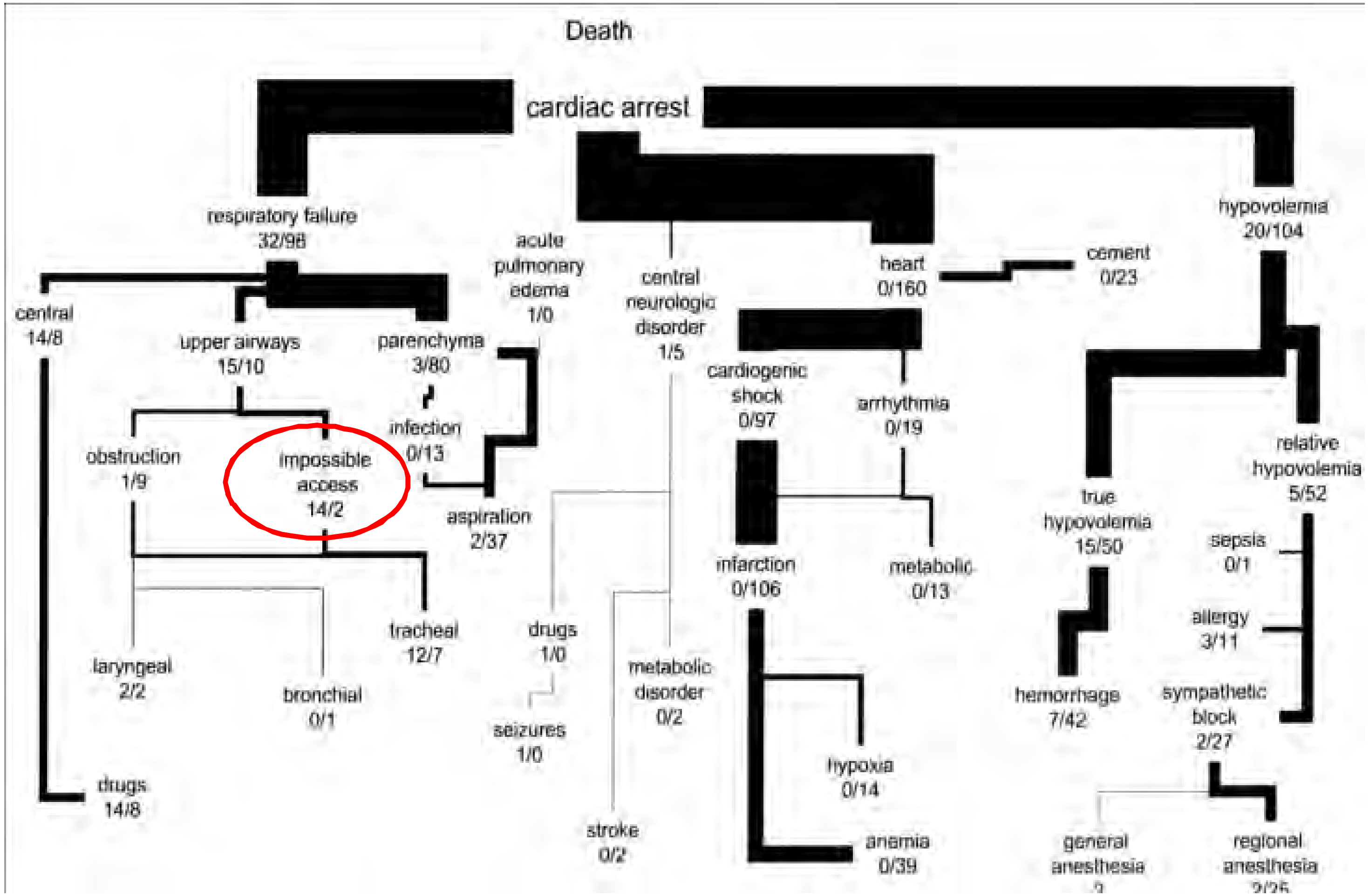
- Dans le service SAR 3
  - Airtraq, Glidescope, MacGrath,
  - Pentax, Kingvision pour l’apprentissage de l’intubation des élèves IADE

- Révision de la conférence d’experts intubation difficile SFAR

Anesthesiology 2006; 105:1087–97

Survey of Anesthesia-related Mortality in France

André Lienhart, M.D.,* Yves Auroy, M.D.,† Françoise Péquignot,‡ Dan Benhamou, M.D.,§
Josiane Warszawski, Ph.D., M.D.,|| Martine Bovet,# Eric Jougla, Ph.D.**



Anesthesiology 2005; 103:33–9

Management of the Difficult Airway

A Closed Claims Analysis

Gene N. Peterson, M.D., Ph.D.,* Karen B. Domino, M.D., M.P.H.,† Robert A. Caplan, M.D.,‡ Karen L. Posner, Ph.D.,§
Lorri A. Lee, M.D.,* Frederick W. Cheney, M.D.‖

Table 3. Timing of Perioperative Claims (n = 156)

	1985–1992 (n = 73)		1993–1999 (n = 83)	
Timing	Claims, n (%)	Death/BD, n (row %)*	Claims, n (%)	Death/BD, n (row %)*
Preinduction (n = 3)	2 (3)	2 (100)	1 (1)	1 (100)
Induction (n = 104)	52 (71)	32 (62)†	52 (63)	18 (35)†
Intraoperative (n = 23)	11 (15)	6 (55)	12 (14)	10 (83)
Extubation in operating room (n = 18)	6 (8)	6 (100)	12 (14)	10 (83)
Recovery (n = 8)	2 (3)	1 (50)	6 (7)	4 (67)

* Percent of row resulting in death or brain damage (death/BD). † Bonferroni $P = 0.04$, 1993–1999 *vs.* 1985–1992.

Anesthesiology 2005; 103:33-9

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Lorri A. Lee, M.D.,* Frederick W. Cheney, M.D.‖

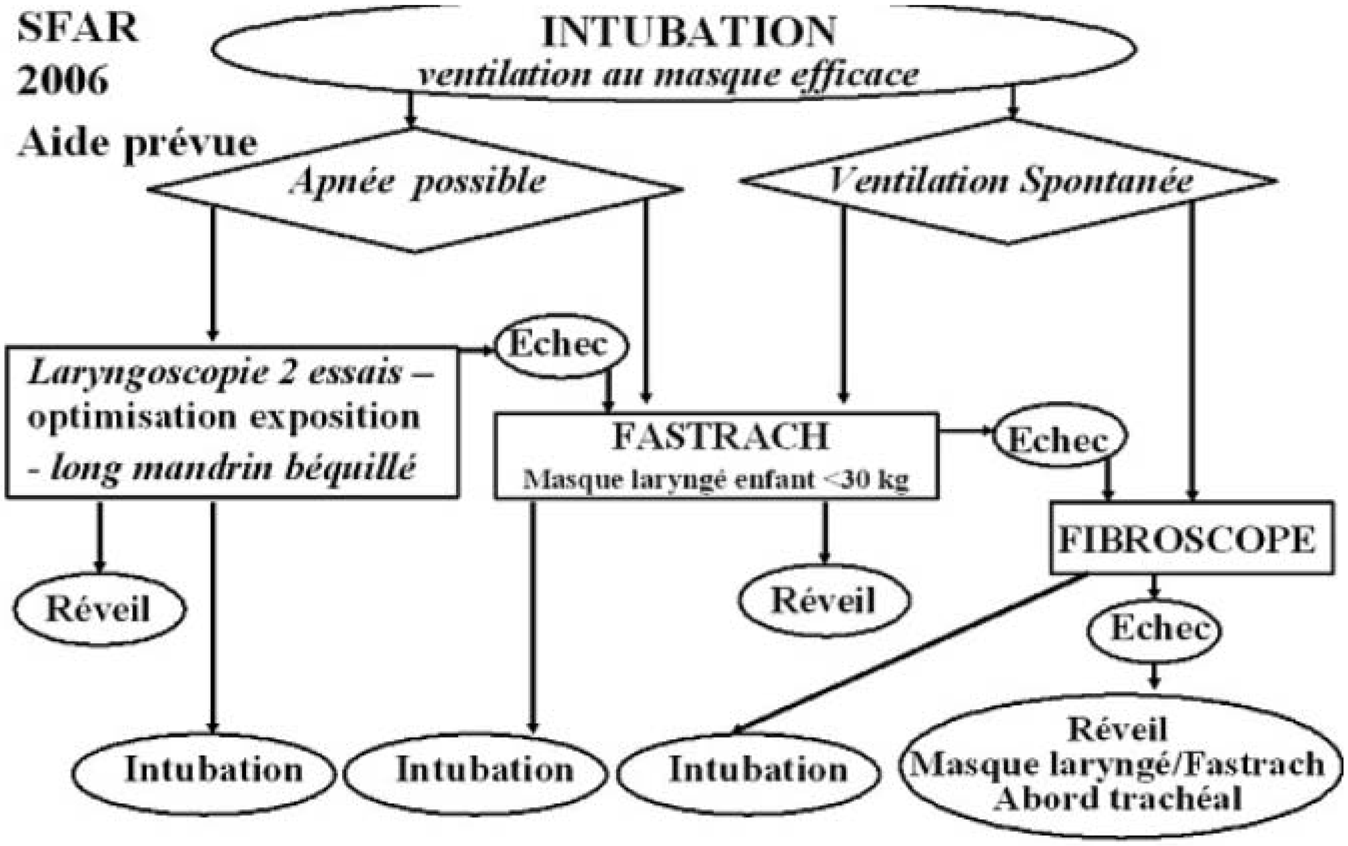
Table 5. Univariate Analysis of Factors Associated with Death or Brain Damage in Perioperative Claims

Variable	n	OR (95% CI)	P Value
Time period			
1985–1992	73	Reference	
1993–1999	83	0.60 (0.31–1.13)	0.11
Difficult airway anticipated			
No	97	Reference	
Yes	59	1.11 (0.58–2.15)	0.75
Difficult mask ventilation			
No	91	Reference	
Yes	65	4.25 (2.09–8.65)	< 0.001
Induction phase			
No	52	Reference	
Yes	104	0.278 (0.13–0.59)	0.001
Airway emergency			
No	71	Reference	
Yes	75	15.46 (6.83–35.0)	< 0.001

Multivariate logistic regression found airway emergency increased the odds of death or brain damage (odds ratio [OR], 14.98; 95% confidence interval [CI], 6.37–35.27; $P < 0.001$). The odds of death or brain damage was decreased in claims associated with induction in 1993–1999 compared with 1985–1992 (OR, 0.26; 95% CI, 0.11–0.63; $P = 0.003$).

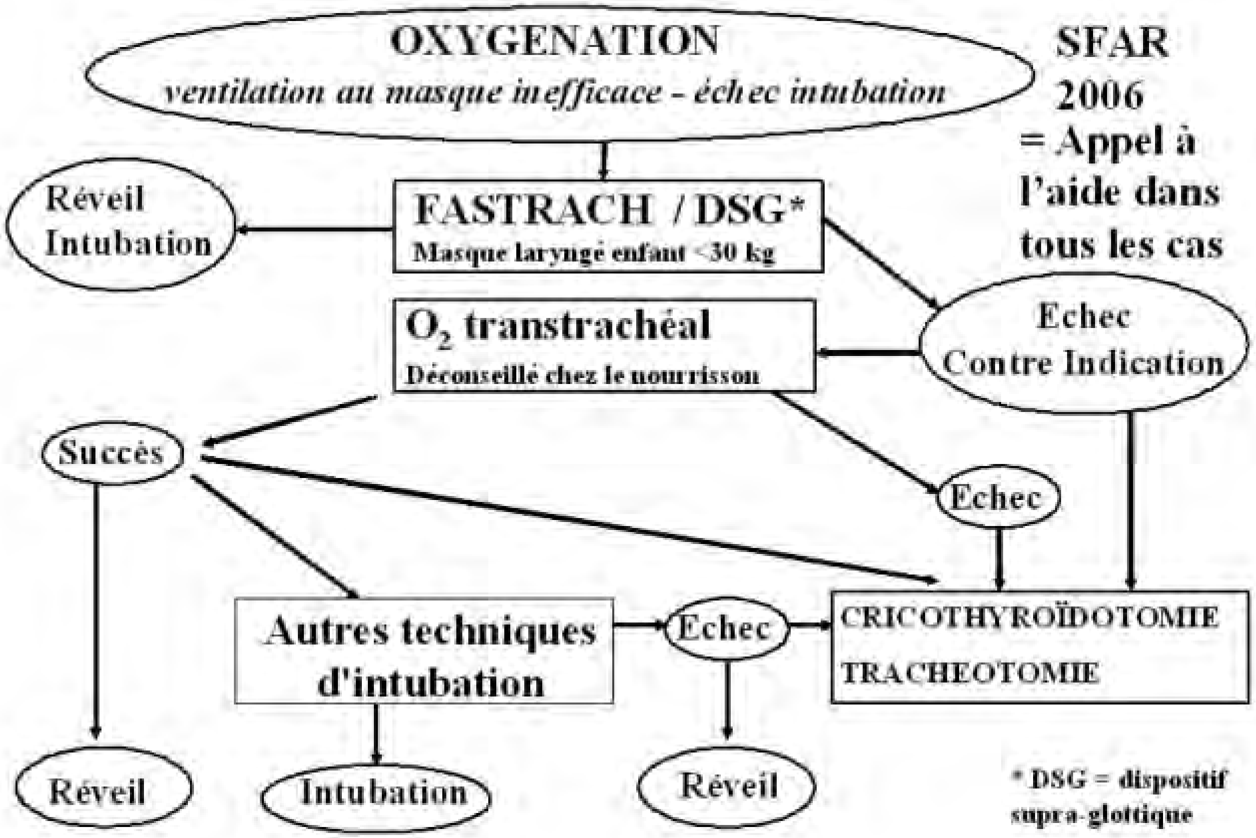
Conférence INTUBATION DIFFICLE 2006

Intubation Difficile + Ventilation +



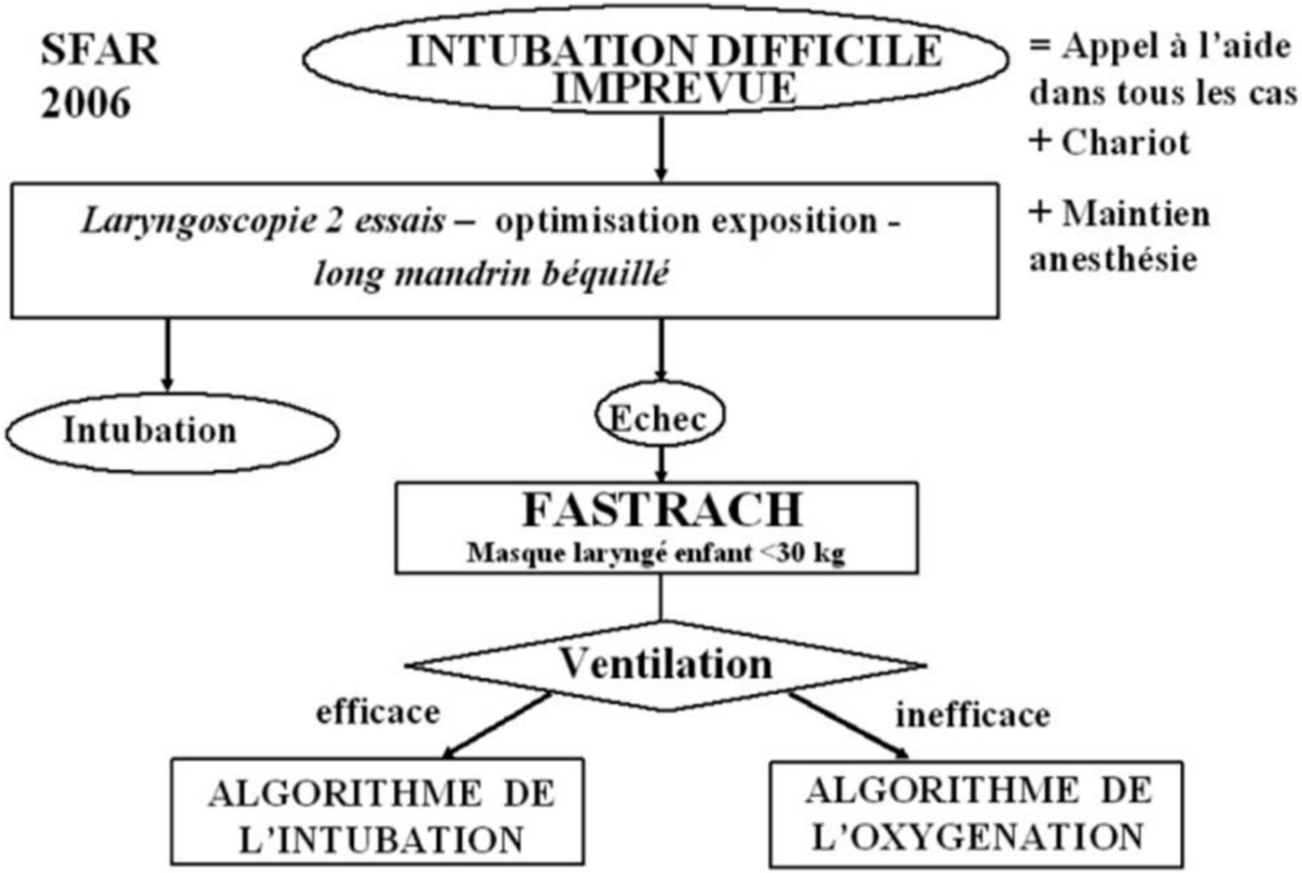
Conférence INTUBATION DIFFICLE 2006

Intubation Difficile + Ventilation -



Conférence INTUBATION DIFFICLE 2006

Intubation Difficile non prévue



SFAR

Mais depuis 2006…

- Progrès technologiques
  - Vidéolaryngoscopes
  - Simulation
  - Ventilation
  - Echographie,….
- Progrès pharmacologiques
  - Sugammadex

- **Question 1**
- **Quels sont les facteurs prédictifs de la ventilation au masque difficile et de l’intubation difficile ?**

Intérêt des scores composites?

Prediction of Difficult Tracheal Intubation

Time for a Paradigm Change

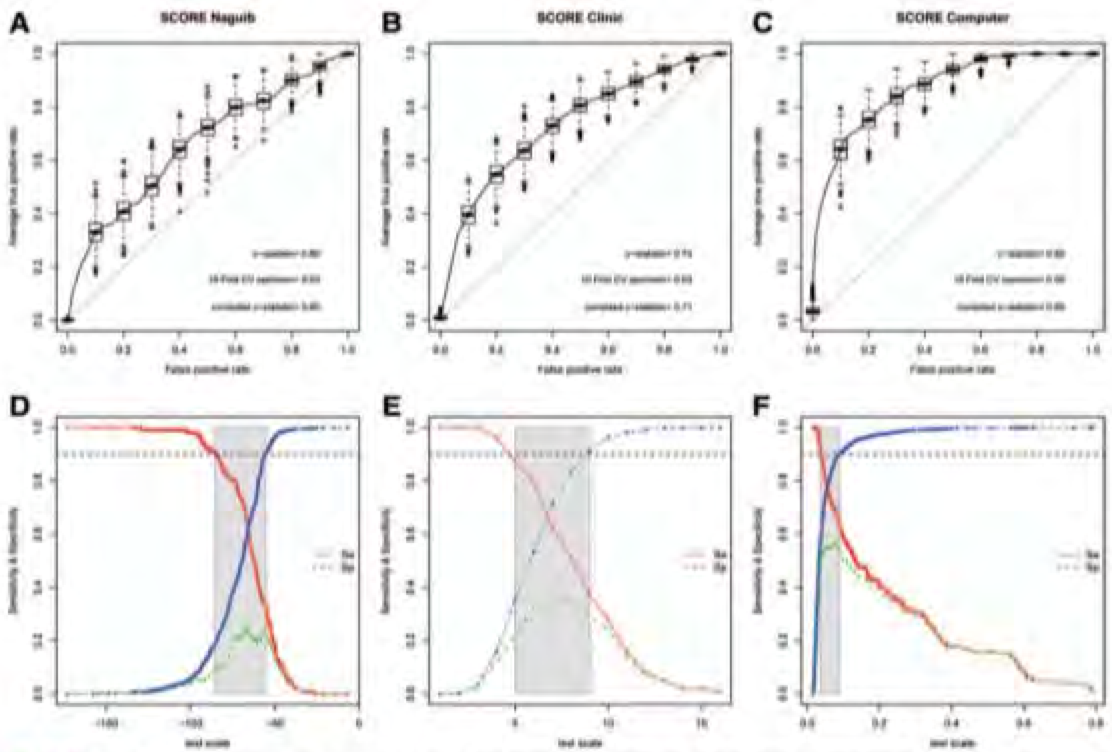


Fig. 3. Average receiver operating characteristic (ROC) curves obtained by 1,000-fold resampling of the study population (n = 1,359) for $SCORE_{Naguib}$ (*A*), the $SCORE_{Clinic}$ (*B*), and the $SCORE_{Computer}$ (*C*) (n = 1,655); see Methods for explanation of the scores. Two graphs ROC curves with determination of the inconclusive zone (*dashed* area) using a diagnosis tolerance of 10% for $SCORE_{Naguib}$ (*D*), the $SCORE_{Clinic}$ (*E*), and the $SCORE_{Computer}$ (*F*). AUC_{ROC} = area under the ROC curve; *P* values refer to difference *versus* the no discrimination. All AUC_{ROC} were significantly different from 0.5 ($P < 0.001$). CV = cross validation; Se = sensitivity; Sp = specificity.

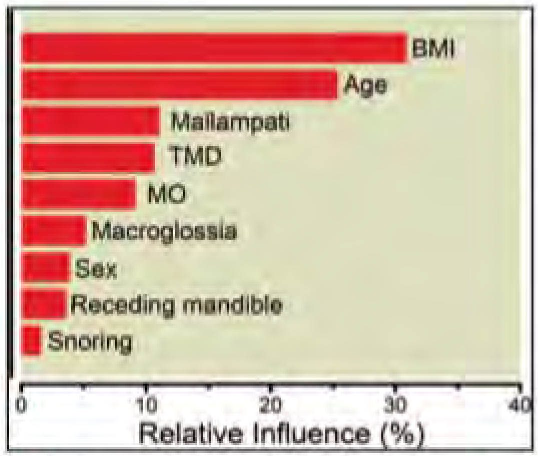


Fig. 4. Illustration of the relative influence of each variable (*i.e.*, the reduction of squared error attributable to each variable) used in the $SCORE_{Computer}$. BMI = body mass index; MO = mouth opening; TMD = thyromental distance.

Anesthesiology 2012;117:1223-33

La question…

- Faut il complexifier l’évaluation?
- Faut il mieux évaluer?

- **Question 2. Stratégies et algorithmes**

Place des vidéolaryngoscopes?

Les Vidéolaryngoscopes

Lame Macintosh/Lame anatomique?

D'après F Lenfant et G Dhonneur

Vidéolaryngoscopes

Principe

Vision **indirecte** de la glotte

Différence entre les différents dispositifs

-Forme de la lame

-Canal latéral pour guider la sonde trachéale ou utilisation d'un mandrin

-Caractéristiques techniques

Fibres optiques, prisme ou jeu de miroirs, pile ou secteur, vision sur un écran déporté ou non

Vidéolaryngoscopie et Pubmed >700 références

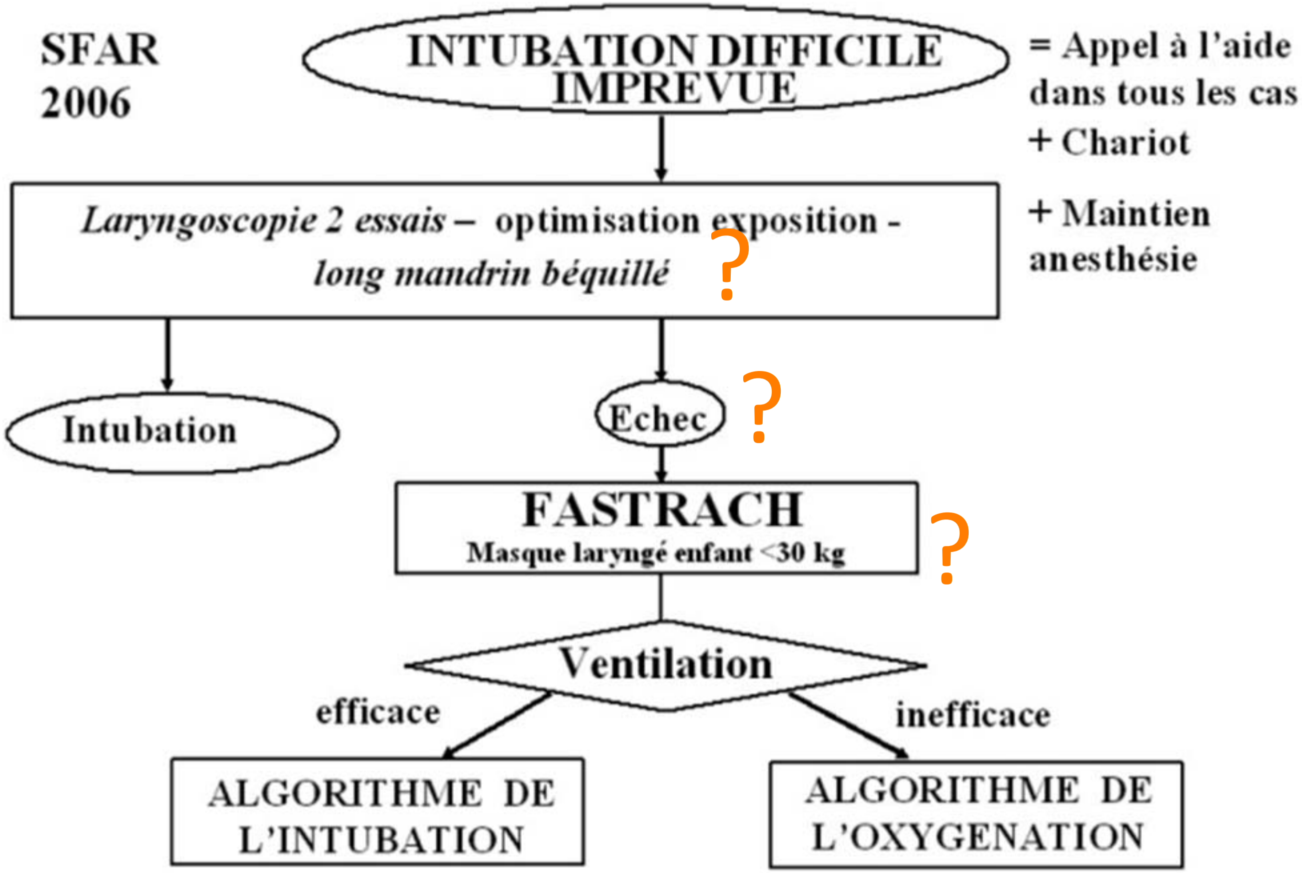
- L'apprentissage et la simulation

- Les terrains particuliers
  - L'obèse
  - L'intubation difficile
    - Rachis
    - Ouverture de bouche limitée
  - L'urgence
  - La pédiatrie

Les principaux résultats

- Les vidéolaryngoscopes permettent:
  - Une meilleure visualisation
  - Une courbe d’apprentissage plus rapide
  - Un taux de succès plus important
  - Des durées d’intubation plus courts

Conférence INTUBATION DIFFICLE 2006 et vidéolaryngoscopes



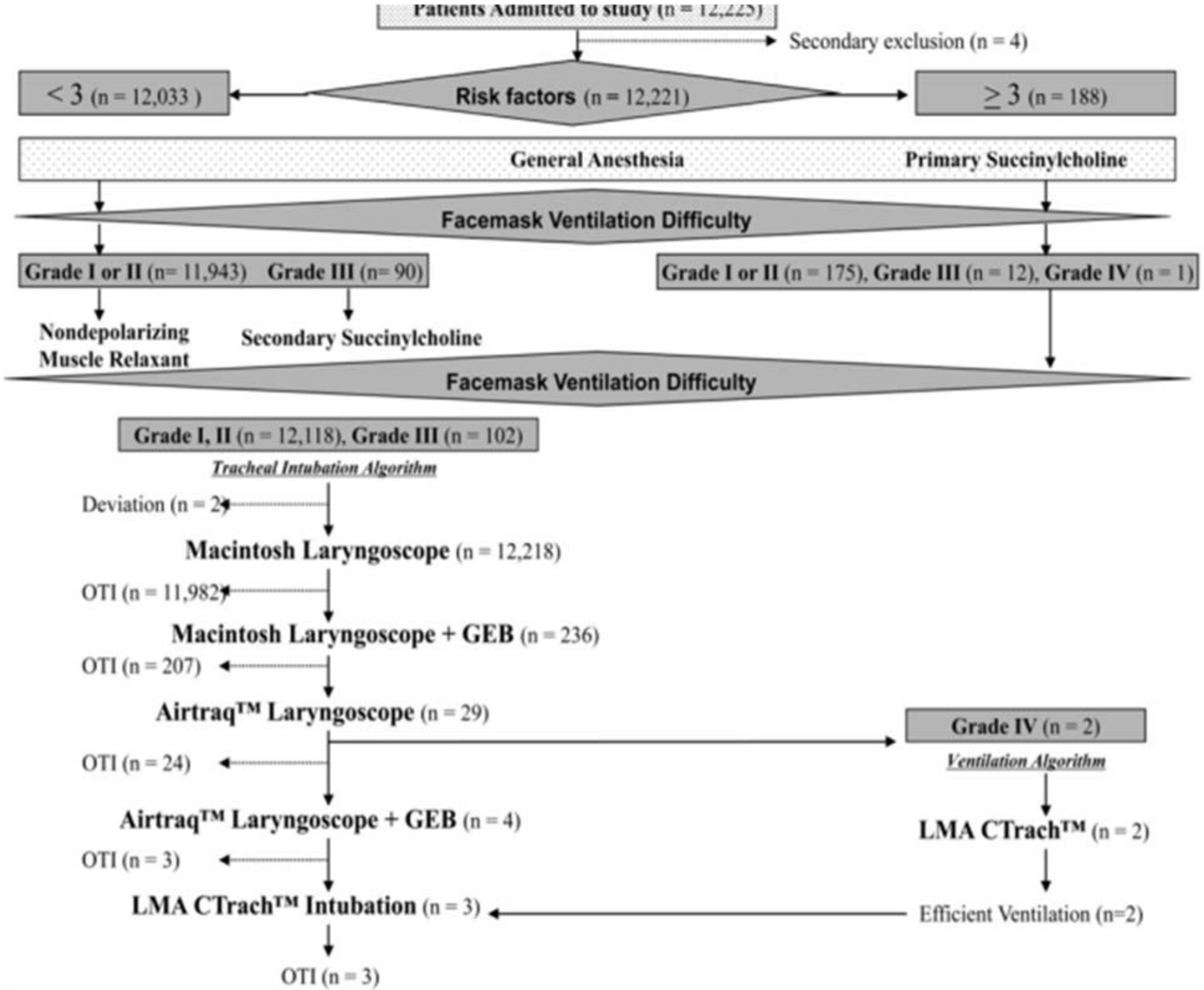
An Algorithm for Difficult Airway Management, Modified for Modern Optical Devices

(Airtraq Laryngoscope; LMACTrach™)

Anesthesiology 2011; 114: 25–33

Homme 50 ans
BMI 30 kg/m2
SAOS
Mal III ou IV
DTM<65 mm
Protusion mandibule

Circ cou
- *40 femme,*
- *45 homme*



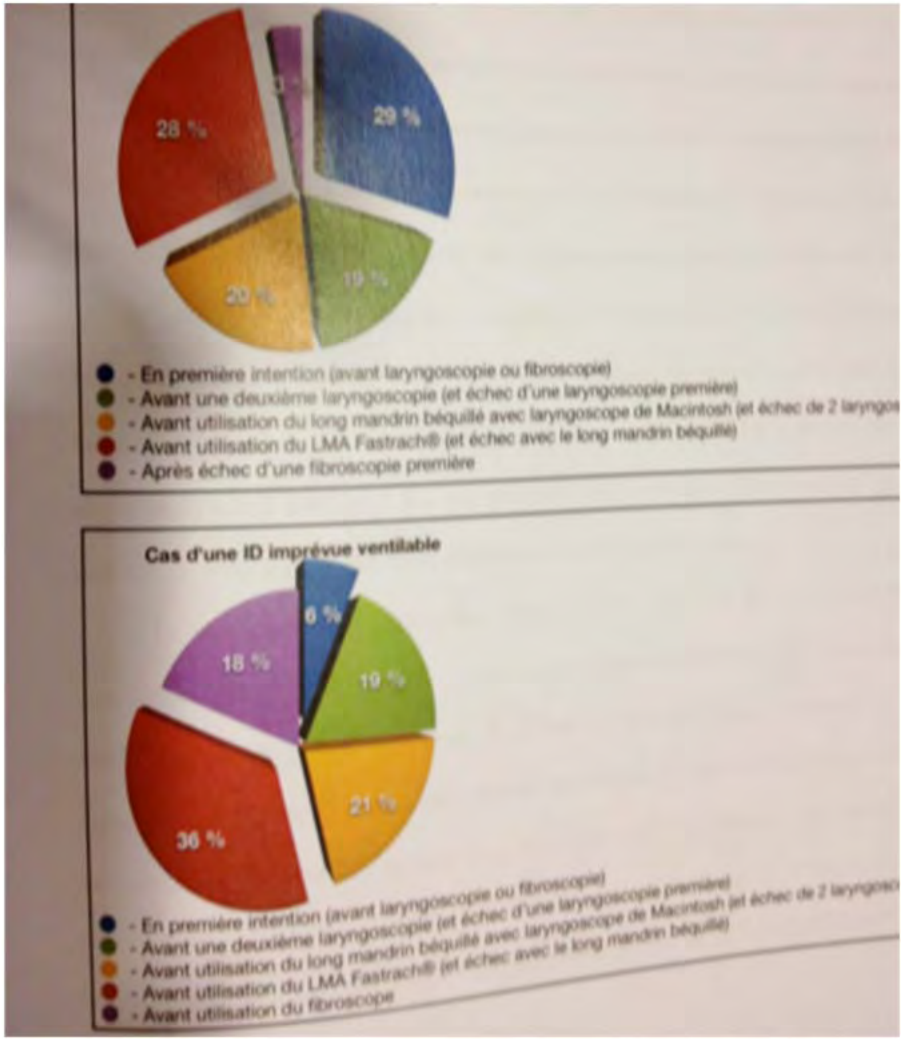
Région Clermont-Ferrand: enquête Dr Pouchain

105 AR seniors ou internes

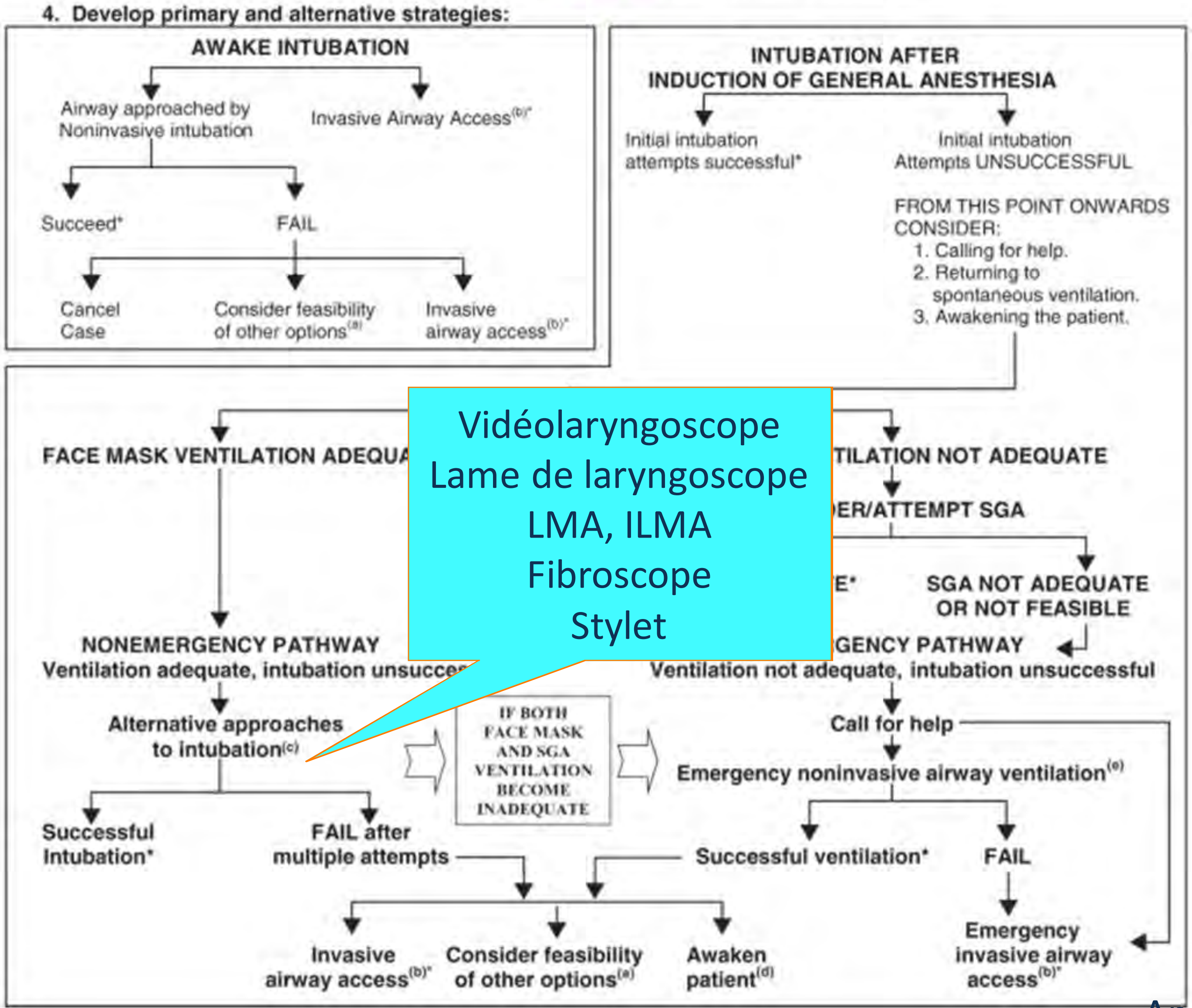
2 questions

Place des glottiscopes ID prévue
chez patient avec ventilation possible

Place des glottiscopes ID non prévue
chez patient avec ventilation possible



PRACTICE GUIDELINES FOR MANAGEMENT OF THE DIFFICULT AIRWAY



Anesthesiology 2013

- **Question 3. Désaturation artérielle en oxygène et maintien de l’oxygénation pendant l’intubation**

Rôle de la VNI?

Noninvasive Ventilation Improves Preoxygenation before Intubation of Hypoxic Patients

Randomisée 27 malades/groupe
VNI versus VS
Obésité

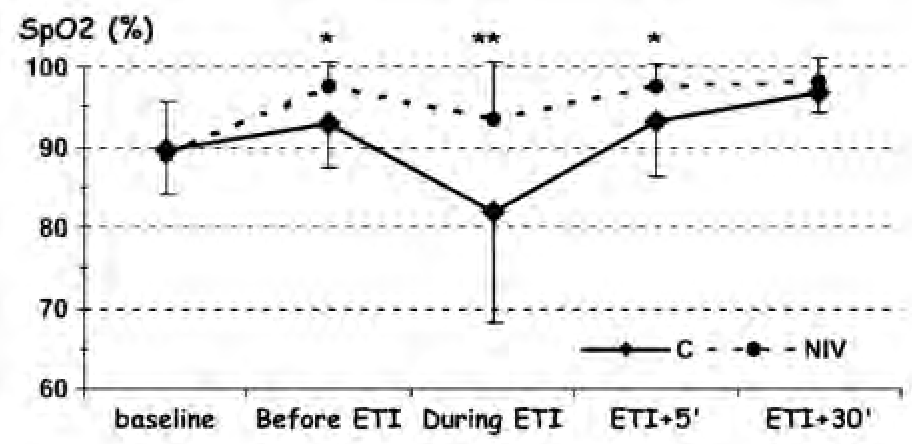


Figure 3. Variation in mean Sp_{O_2} during preoxygenation and intubation (endotracheal intubation [ETI]). Sp_{O_2} is shown for the five steps of the study: (*1*) Before preoxygenation (i.e., baseline), when the patients are breathing with a mean of 13 L/min of O_2 supply; (*2*) after 3 min of preoxygenation with either NIV or the usual method (C) according to the randomization (i.e., before ETI); (*3*) the minimal value during ETI; (*4*) 5 min after ETI; and (*5*) 30 min after ETI. *Solid line*: control (C) group; *dotted line*: NIV group. $^*p < 0.05$, $^{**}p<0.01$, comparison between the

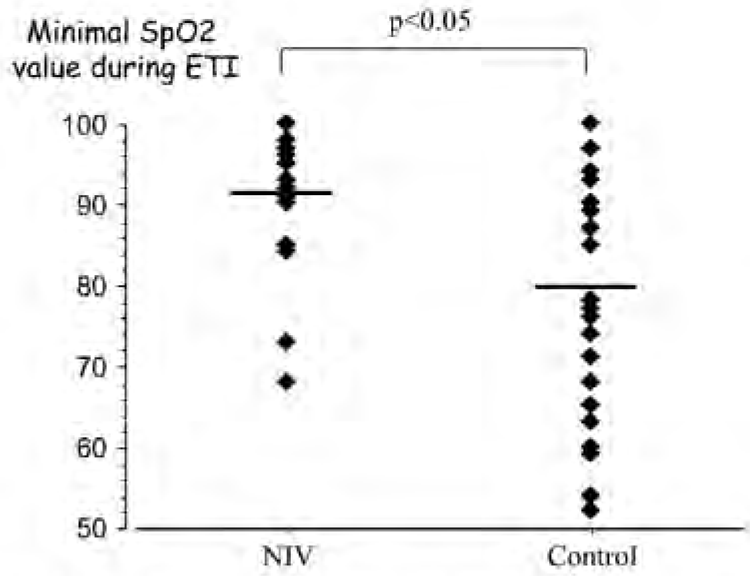


Figure 4. Minimal Sp_{O_2} values recorded during ETI. *Thick lines* represent the lowest mean Sp_{O_2} values recorded in each group of patients. NIV

Baillard Am J Respir Crit Care Med Vol 174. pp 171–177, 2006

- **Question 4. Choix d’une technique d’anesthésie pour intubation difficile (hors fibroscopie)**

Intérêt du Sugammadex?

Sugammadex et
Can't intubate, can't ventilate situation

Table 2 Tracheal intubation conditions, time to reappearance of a spontaneous ventilation, and recovery of neuromuscular function in surgical patients randomized to either succinylcholine or rocuronium–sugammadex for RSII. Values are median (inter-quartile range), n=number of patients. The T_1-max value was the second value of three consecutive T_1 values in the TOF, after T_1 had reached a plateau with little or no further increase in its amplitude. The T_1 90% value was calculated as 90% of the T_1-max value

	Succinylcholine (1 mg kg^{-1}) (n=26)	Rocuronium (1 mg kg^{-1}) Sugammadex (16 mg kg^{-1}) (n=29)	P-value
Time from start of procedure to tracheal intubation (s)	330 (313–351)	324 (312–343)	0.45
Intubation conditions			0.13
Excellent	20 (76%)	27 (93%)	
Good	6 (24%)	2 (7%)	
Poor	0 (0%)	0 (0%)	
Intubation difficulty score			0.23
≤5	24 (92%)	28 (100%)	
>5	2 (8%)	0 (0%)	
Time from tracheal intubation to spontaneous ventilation (s)	406 (313–507)	216 (132–425)	0.002
Time from tracheal intubation to T_1 90% (s)	518 (451–671) (n=17)	168 (122–201) (n=27)	<0.0001
Time from injection of NMBA to T_1 90% (s)	719 (575–787) (n=17)	282 (242–319) (n=27)	<0.0001

British Journal of Anaesthesia 2012 108: 682–9

- **Question 5. Choix d’un protocole d’anesthésie pour l’intubation difficile prévue avec fibroscope**

A Comparison of Propofol and Remifentanil Target-Controlled Infusions to Facilitate Fiberoptic Nasotracheal Intubation

	Propofol	Rémifentanil	
Failure (n) [cause]	1/30 (Obstruct. apnea)	1/30 (Panic)	NS
Drug requirements and adjustments			
Final target concentration	3.9 ± 1.4 μg/mL	2.4 ± 0.8 ng/mL	
Total dose	142 ± 55 mg	76 ± 27 μg	
Total dose, weight adjusted	2.4 ± 1.1 mg/kg	1.1 ± 0.4 μg/kg	
Number of increments	1.6 ± 1.5	1.9 ± 1.5	NS
Duration (s)	320 ± 115	305 ± 95	NS
Intubating conditions			
Vocal cord movement (Score 1/2/3/4)	10/9/11/0	18/8/3/0	0.03
Cough (None/Slight/Mod/Severe)	13/7/7/2	18/6/3/2	NS
Movement (None/Slight/Mod/Severe)	18/7/4/0	22/5/2/0	NS
Sedation and recall			
Final OAA/S	1 [1–3]	4 [2–5]	<0.0001
Recall (Yes/No)	14/14	26/1	0.0001
Pain associated with the procedure(VAS)	2.6 ± 2.5	2.3 ± 2.4	NS
Hemodynamics			
Mean arterial blood pressure (mm Hg) Baseline	101 ± 13	104 ± 16	NS
Minimal value	89 ± 16*	102 ± 17	0.008
Maximal value	112 ± 18*	116 ± 20*	NS

Data expressed as M ± SD, Median [Range] or number of patients per status.

OAA/S = observer's assessment of alertness/sedation scale; VAS = visual analog scale.

* $P < 0.05$ versus baseline.

Anesth Analg 2009;108:852–7

A comparison of the effectiveness of dexmedetomidine versus propofol target-controlled infusion for sedation during fibreoptic nasotracheal intubation

Table 2 Measurements made during fibreoptic intubation in patients receiving dexmedetomidine or propofol during awake intubation. Data are expressed as mean (SD) or number.

	Dexmedetomidine group (n = 20)	Propofol group (n = 20)	p value
Success	20	20	1
Intubation scores			
Vocal cord movement; 1/2/3/4	16/4/0/0	9/7/4/0	0.03
Cough; 1/2/3/4	8/9/3/0	7/6/5/2	0.37
Movement; 1/2/3/4	12/6/1/1	7/5/7/1	0.12
Intubation time (min)	3.8 (1.1)	3.5 (1.7)	0.48
Final target concentration C_e ($\mu g.ml^{-1}$)	NA	3.6 (0.6)	–
Drug requirements	65.5 (12.2) µg	131 (42) mg	–
State entropy at intubation	88.2 (2.5)	66.5 (6.4)	< 0.001

Tsai, Anaesthesia, 2010: 254-9

- **Question 6. Quel matériel d'intubation et de ventilation doit être présent dans une salle où se pratique une anesthésie et SSPI, immédiate : les incontournables?**

Disponibilité des autres matériaux

Lié aux algorithmes

- **Question 7. Extubation à risque (hormis sevrage VM prolongée) : critères d’extubation. Gestion d’une situation à risque y compris d’une réintubation difficile**

Les objectifs

- Risque Basal
- Risque spécifique

- Situation à bas risque et Situation à haut risque
  Anaesthesia 2012

- Le niveau d'anesthésie et de conscience

- Lieu de l'extubation et les intervenants

- Les procédures d'optimisation de réserve en oxygène pré et post extubation

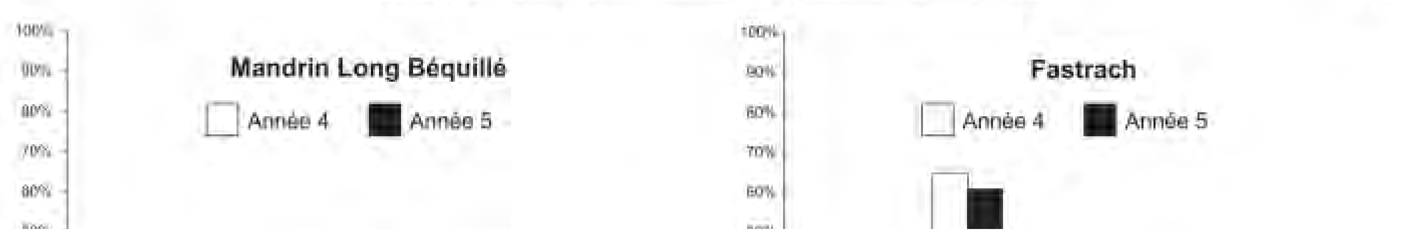
- la check list d'extubation à risque : contrôle ultime de validation du geste

- **Question 8. Quel enseignement et quelle formation ?**

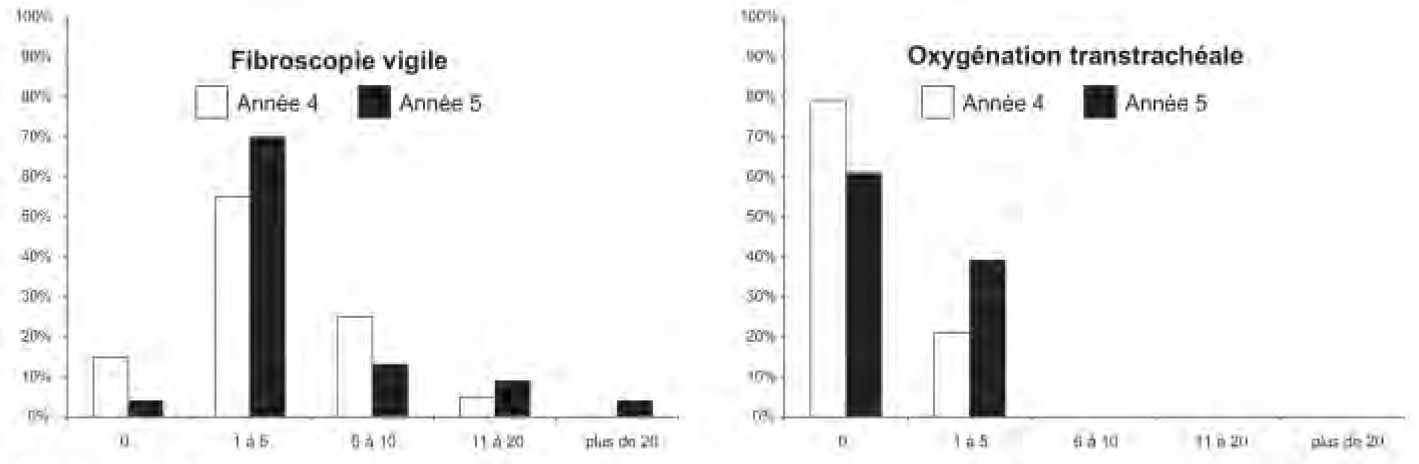
Quels objectifs?

Intubation difficile : évaluation des connaissances et de l'expérience des internes en anesthésie-réanimation

A. Duwat et al. / Annales Françaises d'Anesthésie et de Réanimation 32 (2013) 231–234 233



Quatre ans après la parution de la conférence d'experts sur l'intubation difficile, les connaissances et les compétences des internes en DES d'anesthésie-réanimation de l'interrégion Amiens, Caen et Rouen restent insuffisantes en fin de cursus



En perspectives

- Intégrer les nouveaux dispositifs et définir les limites
- Intégrer les nouvelles stratégies pharmacologiques
- Mieux définir les objectifs pédagogiques