

Oxygénothérapie de sauvetage au bloc opératoire



CHU LILLE

Dr Anne LAFFARGUE
Hôpital Jeanne de Flandre- CHU de Lille
Nantes 29 mars 2019

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- Aucun conflit d'intérêt

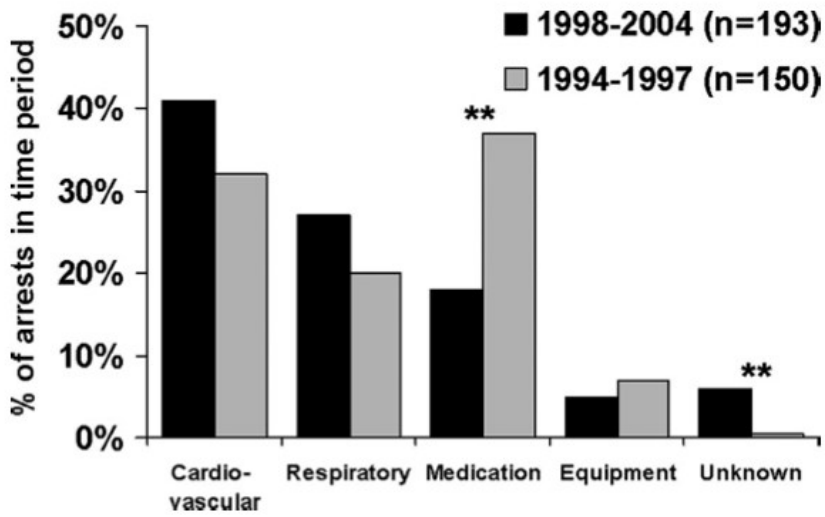
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Anesthesia-Related Cardiac Arrest in Children: Update from the Pediatric Perioperative Cardiac Arrest Registry

Sanjay Bhananker;Chandra Ramamoorthy;Jeremy Geiduschek;Karen Posner;Karen Domino;Charles Haberkern;John Campos;Jeffrey Morray;

Anesthesia & Analgesia. 105(2):344-350, AUG 2007



Causes respiratoires:
2e cause d'ACR

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Pediatric Anesthesia

Pediatric Anesthesia ISSN 1155-5645

SYSTEMATIC REVIEW

A systematic review and meta-analysis of acute severe complications of pediatric anesthesia

Asadollah Mir ghassemi[1], Victor Neira[1], Lee-Anne Ufholz[2], Nick Barrowman[3], Jamila Mulla[4], Carol L. Bradbury[5] & Matthew Dylan Bould[1]

1 Department of Anesthesiology, The Children's Hospital of Eastern Ontario, University of Ottawa, Ottawa, ON, Canada
2 Health Sciences Library, University of Ottawa, Ottawa, ON, Canada
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4 Department of Anesthesiology, Leeds Teaching Hospitals NHS Trust, Leeds, UK
5 Department of Anesthesiology, University Hospital, Coventry, UK

What is already known

- There are several published studies on pediatric anesthesia critical incidents/adverse events.

What this article adds

- The most common acute severe complications in pediatric anesthesia are related to airway management and respiratory system, followed by cardiovascular events.
- The data on pediatric anesthesia acute severe complications are poorly defined with large variation in the specificity of diagnostic reporting even within studies.

Pediatr Anaesth. 2015 Nov;25(11):1093-102.

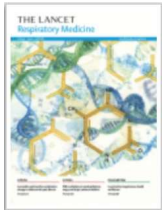
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Incidence of severe critical events in paediatric anaesthesia (APRICOT): a prospective multicentre observational study in 261 hospitals in Europe

Walid Habre, Nicola Disma, Katalin Virag, Karin Becke, Tom G Hansen, Martin Jöhr, Brigitte Leva, Neil S Morton, Petronella M Vermeulen, Marzena Zielinska, Krisztina Boda, Francis Veyckemans, for the APRICOT Group of the European Society of Anaesthesiology Clinical Trial Network*

Lancet Respir Med. 2017; 5:412-425.

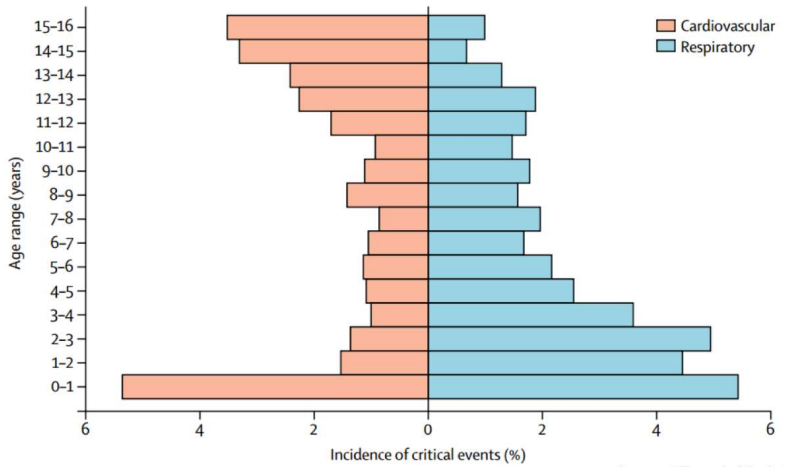


APRICOT

ESA Clinical Trial Network

Incidence critical events

Cardiovascular/ respiratory



Lancet Respir Med. 2017; 5:412-425.

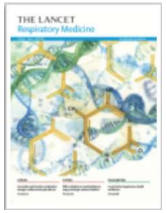
Complications respiratoires plus fréquentes chez les enfants les plus jeunes

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Airway management complications in children with difficult tracheal intubation from the Pediatric Difficult Intubation (PeDI) registry: a prospective cohort analysis

John Edem Fiadjoe, Akira Nishisaki, Narasimhan Jagannathan, Agnes I Hunyady, Robert S Greenberg, Paul I Reynolds, Maria E Matuszczak, Mohamed A Rehman, David M Polaner, Peter Szmuk, Vinay M Nadkarni, Francis X McGowan Jr, Ronald S Litman, Pete G Kovatsis



	Anticipated difficult airway (n=821)	Unanticipated difficult airway (n=197)	Total (n=1018)
Success*	810 (99%)	188 (95%)	998 (98%)
Surgical or failed airway*	10 (1%)	9 (5%)	19 (2%)
Any complications	157 (19%)	47 (24%)	204 (20%)
Severe complications†	19 (2%)	11 (6%)	30 (3%)
Cardiac arrest	10 (1%)	5 (3%)	15 (1%)
Severe airway trauma	8 (1%)	6 (3%)	14 (1%)
Death	3 (<1%)	2 (1%)	5 (<1%)
Aspiration	1 (<1%)	0	1 (<1%)
Pneumothorax	1 (<1%)	0	1 (<1%)
Non-severe complications†	148 (18%)	44 (22%)	192 (19%)
Hypoxaemia	65 (8%)	29 (15%)	94 (9%)
Minor airway trauma	36 (4%)	8 (4%)	44 (4%)
Oesophageal intubation with immediate recognition	21 (3%)	11 (6%)	32 (3%)
Laryngospasm	24 (3%)	8 (4%)	32 (3%)
Epistaxis	12 (1%)	2 (1%)	14 (1%)
Bronchospasm	7 (1%)	5 (3%)	12 (1%)
Pharyngeal bleeding	10 (1%)	2 (1%)	12 (1%)
Arrhythmia	3 (<1%)	1 (1%)	4 (<1%)
Emesis	4 (<1%)	0	4 (<1%)

Lancet Respir Med 2016; 4: 37–48

5 fois plus fréquent si intubation ou ventilation difficile non prévues

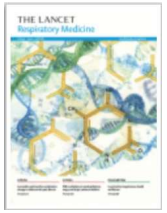
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Lancet Respir Med 2016; 4: 37–48

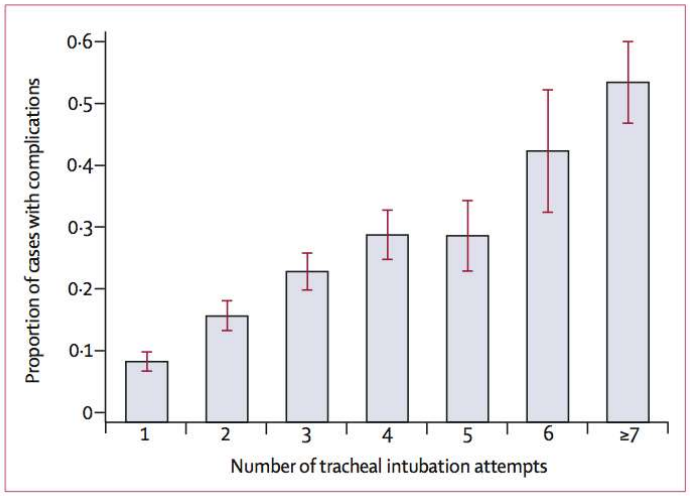


Figure 2: **Proportion of cases with complications by the number of attempts for airway management**
The average proportion of cases with complications by the number of required intubation attempts. Each error bar represents mean (SD).

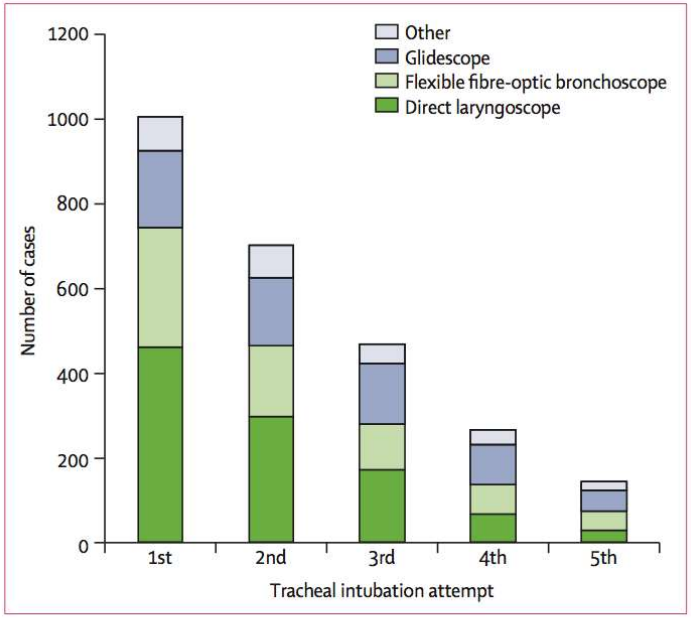


Figure 3: **Type of device for each attempt**
Other includes Airtraq, Karl Storz C-MAC, optical stylet, Anterior Commissure scope, and others.

Savoir s'arrêter

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Proposal for the management of the unexpected difficult pediatric airway

MARKUS WEISS MD* AND THOMAS ENGELHARDT MD, PhD†

*Department of Anaesthesia, University Children's Hospital, Zurich, Switzerland and
†Department of Anaesthesia, Royal Aberdeen Children's Hospital, Aberdeen, UK



Pediatric Anesthesia 2010 **20**: 454–464

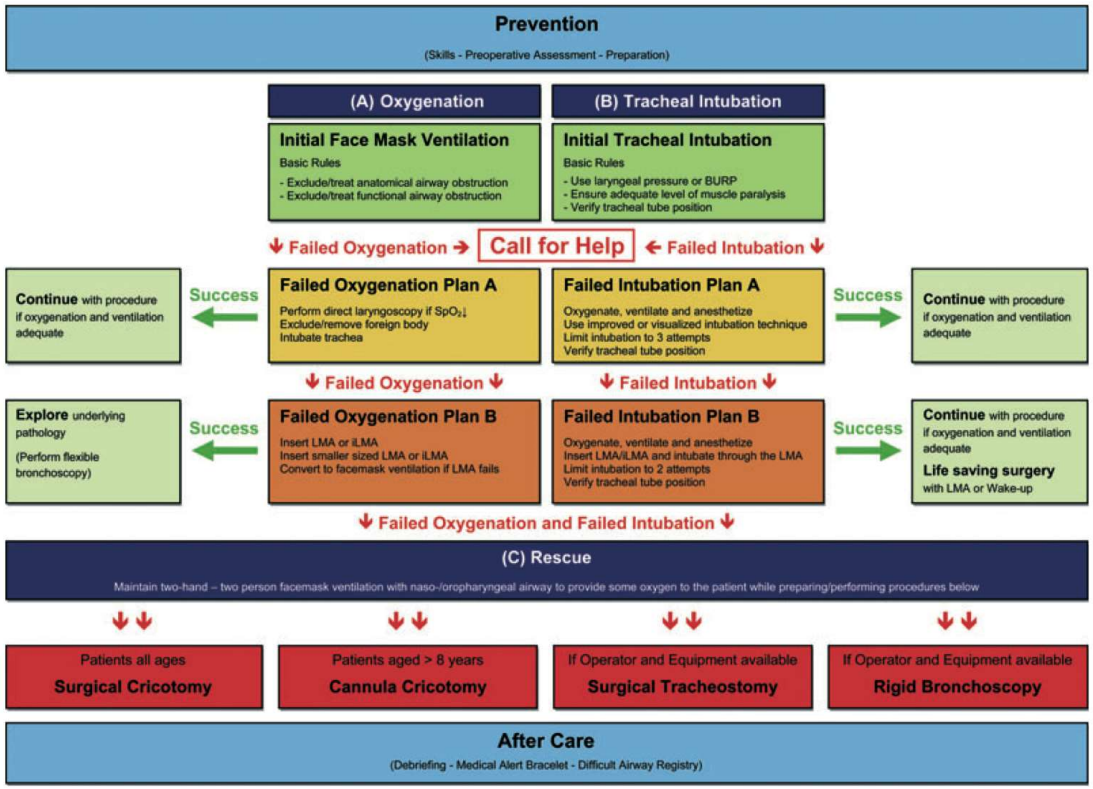


Table 1
Causes for unexpected facemask (A) and tracheal tube (B) ventilation problems

(*A*) *Unexpected facemask ventilation problems*
Exclude and treat anatomical obstruction
- Reopening the airway
- Oro/naso – pharyngeal airway (nasal obstruction)
- Two-hand – jaw thrust/open mouth/chin lift – facemask ventilation and two person ventilation

Exclude and treat functional obstruction
- Upper airway
  - Inadequate anesthesia
  - Laryngospasm
- Lower Airway
  - Thoracic rigidity
  - Bronchospasm
  - Overinflated stomach (air)

(*B*) *Unexpected tracheal tube ventilation problems* (37)
Exclude and treat
- **D** Displacement of tracheal tube
- **O** Obstruction of tracheal tube (Secretions, blood, tracheal wall, pouch, tracheal foreign body)
- **P** Pneumothorax
- **E** Equipment problems
- **S** Stomach – increased intra-abdominal pressure

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Development of a guideline for the management of the unanticipated difficult airway in pediatric practice

Ann E. Black[1], Paul E.R. Flynn [2], Helen L. Smith[3], Mark L. Thomas [1] & Kathy A. Wilkinson[4]



Pediatric Anesthesia **25** (2015) 346–362

APA — Difficult mask ventilation (MV) – during routine induction of anaesthesia in a child aged 1 to 8 years

Difficult MV → **Give 100% oxygen** → **Call for help**

Step A Optimise head position — Check equipment — Depth of anaesthesia

Consider:
- Adjusting chin lift/jaw thrust
- Inserting shoulder roll if <2 years
- Neutral head position if >2 years
- Adjusting cricoid pressure if used
- Ventilating using two person bag mask technique

Consider changing:
- Circuit
- Mask
- Connectors

If equipment failure is suspected, change to self-inflating bag and isolate from anaesthetic machine promptly

Consider deepening anaesthesia
Use CPAP

Step B Insert oropharyngeal airway

Call for help again if not arrived

Assess for cause of difficult mask ventilation
- Light anaesthesia
- Laryngospasm
- Gastric distension – pass OG/NG tube

Maintain anaesthesia/CPAP
Deepen anaesthesia (Propofol first line)
- If relaxant given – intubate
- If intubation not successful, go to unanticipated difficult tracheal intubation algorithm

Step C Second-line: Insert SAD (e.g. LMA™)

- Insert SAD (e.g. LMA™) – **not > 3 attempts**
- Consider nasopharyngeal airway
- Release cricoid pressure

Good airway — Yes → **Continue**

Good airway — No — SpO_2 >80% → Consider:
- SAD (e.g. LMA™) malposition/blockage
- Equipment malfunction
- Bronchospasm
- Pneumothorax

→ **Wake up patient**

No — SpO_2 <80% → Attempt intubation
- Consider paralysis

Succeed → **Proceed**

Fail → **Go to scenario cannot intubate cannot ventilate (CICV)**

SAD = supraglottic airway device

Guidelines APA et DAS

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Pediatric Anesthesia **25** (2015) 346–362

APA — Unanticipated difficult tracheal intubation – during routine induction of anaesthesia in a child aged 1 to 8 years

Difficult direct laryngoscopy → **Give 100% oxygen and maintain anaesthesia** → **Call for help**

Step A Initial tracheal intubation plan when mask ventilation is satisfactory — Ensure: Oxygenation, anaesthesia, CPAP, management of gastric distension with OG/NG tube

Direct laryngoscopy – **not > 4 attempts**
Check:
- Neck flexion and head extension
- Laryngoscopy technique
- External laryngeal manipulation – remove or adjust
- Vocal cords open and immobile (adequate paralysis)

If poor view – consider bougie, straight blade laryngoscope* and/or smaller ETT

→ Succeed → Tracheal intubation → Verify ETT position
- Capnography
- Visual if possible
- Ausculation

If ETT too small consider using throat pack and tie to ETT

If in doubt, take ETT out

Failed intubation with good oxygenation

Step B Secondary tracheal intubation plan — **Call for help again if not arrived**

- Insert SAD (e.g. LMA™) – **not > 3 attempts**
- Oxygenate and ventilate
- Consider increasing size of SAD (e.g. LMA™) once if ventilation inadequate

→ Succeed →
- Consider modifying anaesthesia and surgery plan
- Assess safety of proceeding with surgery using a SAD (e.g. LMA™)

→ Unsafe → **Postpone surgery Wake up patient**

→ Safe → **Proceed with surgery**

Failed oxygenation e.g. SpO_2 <90% with FiO_2 1.0

- **Consider 1 attempt at FOI via SAD (e.g. LMA™)**
- Verify intubation, leave SAD (e.g. LMA™) in place and proceed with surgery

→ Succeed → **Proceed with surgery**

Failed intubation via SAD (e.g. LMA™) → **Postpone surgery Wake up patient**

- Convert to face mask
- Optimise head position
- Oxygenate and ventilate
- Ventilate using two person bag mask technique, CPAP and oro/nasopharyngeal airway
- Manage gastric distension with OG/NG tube
- Reverse non-depolarisating relaxant

→ Succeed → **Postpone surgery Wake up patient**

→ Failed ventilation and oxygenation → **Go to scenario cannot intubate cannot ventilate (CICV)**

Following intubation attempts, consider • Trauma to the airway • Extubation in a controlled setting

*Consider using indirect larygoscope if experienced in their use

SAD = supraglottic airway device

Guidelines APA et DAS

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Pediatric Anesthesia **25** (2015) 346–362

APA — Cannot intubate and cannot ventilate (CICV) in a paralysed anaesthetised child aged 1 to 8 years

Failed intubation inadequate ventilation → **Give 100% oxygen** → **Call for help**

Guidelines APA et DAS

Step A Continue to attempt oxygenation and ventilation

- FiO_2 1.0
- Optimise head position and chin lift/jaw thrust
- Insert oropharyngeal airway or SAD (e.g. LMA™)
- Ventilate using two person bag mask technique
- Manage gastric distension with an OG/NG tube

Step B Attempt wake up if maintaining SpO_2 >80%

If rocuronium or vecuronium used, consider suggamadex (16mg/kg) for full reversal

Prepare for rescue techniques in case child deteriorates

Step C Airway rescue techniques for CICV (SpO_2 <80% and falling) and/or heart rate decreasing

Call for help again if not arrived

Call for specialist ENT assistance

- ENT available → Consider:
  - Surgical tracheostomy
  - Rigid bronchoscopy + ventilate / jet ventilation (pressure limited)
- ENT not available → Percutaneous cannula cricothyroidotomy / transtracheal jet ventilation (pressure limited)
  - Succeed → Continue jet ventilation set to lowest delivery pressure until wake up or definitive airway established
  - Fail →
    - Perform surgical cricothyroidotomy / transtracheal and insertion of ETT / tracheostomy tube*
    - Consider passive O_2 insufflation while preparing

Cannula cricothyroidotomy

- Extend the neck (shoulder roll)
- Stabilise larynx with non-dominant hand
- Access the cricoithyroidotomy membrane with a dedicated 14/16 gauge cannula
- Aim in a caudad direction
- Confirm position by air aspiration using a syringe with saline
- Connect to either:
  - Adjustable pressure limiting device, set to lowest delivery pressure

  or
  - 4Bar O_2 source with a flowmeter (match flow l/min to child's age) and Y connector
- Cautiously increase inflation pressure/flow rate to achieve adequate chest expansion Wait for full expiration before next inflation
- Maintain uper airway patency to aid expiration

SAD = supraglottic airway device

*Note: Cricothyroidotomy techniques can have serious complications and training is required – only use in life-threatening situations and convert to a definitive airway as soon as possible

Appeler à l'aide !









CICO: Continuer d'essayer d'oxygéner
= reconnaître et traiter les causes d'obstruction

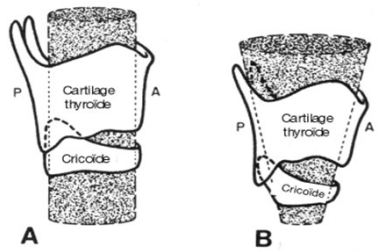
FiO2 100%

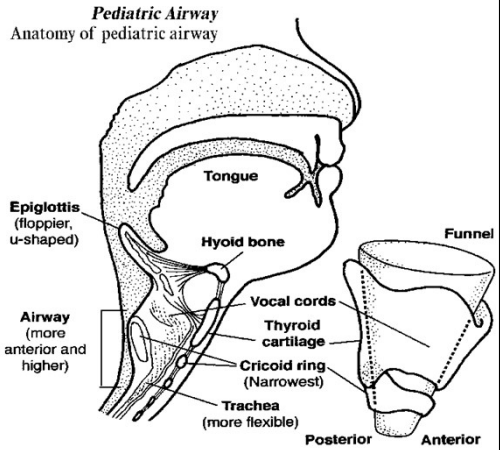
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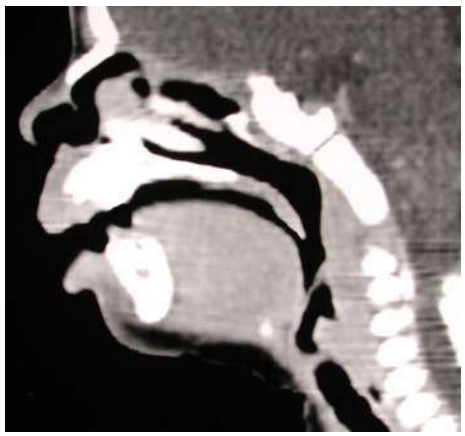
Particularités pédiatriques des VAS

- Volume de la cavité buccale plus faible
- Langue plus grosse, plus proche du palais
- Luette au contact du vestibule
- Larynx plus haut et plus antérieur
- Cartilages trachéaux souples
- Résistances augmentées des VAS

- ➔ risque obstructif +++









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Reconnaître et traiter les causes d'obstruction

- Causes anatomiques
  - Mauvaise position de la tête
  - Mauvais positionnement du masque
  - Hypertrophie adénoïde ou amygdalienne
  - Sécrétions

VOUS

- Causes fonctionnelles
  - Profondeur d'anesthésie insuffisante
  - Laryngospasme
  - Bronchospasme
  - Rigidité thoracique

MEDICAMENTS

D'après T Engelhardt ESPA 2018

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Reconnaître et **traiter** les causes d'obstruction

- Causes anatomiques
  - Repositionner la tête, le cou,
  - Subluxation de la mâchoire
  - Canule oropharyngée, nasopharyngée, DSG
  - Ventilation à 2 personnes, 4 mains
  - Aspiration des sécrétions
  - Décompression estomac

- Causes fonctionnelles
  - Approfondir anesthésie
  - Envisager curarisation
  - Epinephrine

FiO2 100%

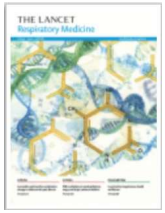
D'après T Engelhardt ESPA 2018

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Lancet Respir Med 2016; 4: 37–48

	Anticipated difficult airway (n=821)			Unanticipated difficult airway (n=197)			Total (n=1018)		
	No complications (n=664)	Complications (n=157)	p value	No complications (n=150)	Complications (n=47)	p value	No complications (n=814)	Complications (n=204)	p value
Mask ventilation			<0·0001			0·03			<0·0001
Easy mask ventilation	430 (65%)	66 (42%)	..	118 (79%)	30 (64%)	..	548 (67%)	96 (47%)	..
Airway adjunct needed	119 (18%)	39 (25%)	..	24 (16%)	11 (23%)	..	143 (18%)	50 (25%)	..
Difficult mask ventilation	39 (6%)	28 (18%)	..	4 (3%)	6 (13%)	..	43 (5%)	34 (17%)	..
Impossible for mask ventilation	0 (0%)	5 (3%)	..	1 (<1%)	0 (0%)	..	1 (<1%)	5 (2%)	..
Not attempted	76 (11%)	19 (12%)		3 (2%)	0 (0%)		79 (10%)	19 (9%)	

Ventilation au masque impossible très rare: 6/1018
5/6 anticipables
Ventilation améliorée par curarisation 4/6, DSG 2/6

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CICO: Envisager le réveil de l'enfant

FiO2 100%

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Envisager le réveil de l'enfant

- Si SpO2 > 80%
- Reprise d'une ventilation spontanée
- Envisager réversion curares



CICO: Se préparer à une technique de sauvetage

FiO2 100%

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Se préparer à une technique de sauvetage



- Appel ORL expérimenté
- Envisager trachéotomie chirurgicale
- Envisager bronchoscopie rigide et jet ventilation
- Envisager accès cricothyroïdien
- Essai de jet ventilation
- Envisager cricothyroïdotomie chirurgicale



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Front of the neck access: FONA Aiguille?



ORIGINAL ARTICLE

The 'Can't Intubate Can't Oxygenate' scenario in Pediatric Anesthesia: a comparison of different devices for needle cricothyroidotomy

Jonathan Stacey[1], Andrew M. B. Heard[2], Gordon Chapman[2], Catherine J. Wallace[1,2], Mary Hegarty[1], Shyan Vijayasekaran[3,4] & Britta S. von Ungern-Sternberg[1,5]

Pediatric Anesthesia **22** (2012) 1155–1158

- Lapins, trachée 3.5 mm ID
- Cricothyroïdotomie avec KT 14 ou 18G
- 60 essais: taux de succès 60%
- Pas de différence selon la taille du KT
- Lésions mur postérieur: 42%
- Quicktrach Child ® : 100% échec

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Front of the neck access: FONA
Kit cricothyroïdotomie?



ORIGINAL ARTICLE

The 'Can't Intubate Can't Oxygenate' scenario in pediatric anesthesia: a comparison of the Melker cricothyroidotomy kit with a scalpel bougie technique

Sarah L. Prunty[1], Alberto Aranda-Palacios[2], Andy M. Heard[2], Gordon Chapman[2], Anoop Ramgolam[3,4], Mary Hegarty[3], Shyan Vijayasekaran[1,5] & Britta S. von Ungern-Sternberg[3,6]

- Lapins, trachée 3.5 mm ID
- 2 Praticiens expérimentés
- Abord trachéal soit Kit Cook® Melker soit technique scalpel/bougie à différents niveaux de la trachée
- Kit Cook® Melker: 100% réussite vs 75%
- Lésions du mur postérieur: 25 à 50%, plus fréquent si technique scalpel

Pediatric Anesthesia **25** (2015) 400–404

Table 2 Tracheal wall damage for both techniques

Injury to tracheal wall	Device used: Melker kit	Scalpel/Bougie
Lateral tracheal wall injury on bronchoscopy	1 (6%)	3 (19%)
Lateral tracheal wall injury on pathology	3 (19%)	7 (44%)
Posterior tracheal wall injury on bronchoscopy	4 (25%)	5 (31%)
Posterior tracheal wall injury on pathology	8 (50%)	8 (50%)

Front of the neck access: FONA
KT transtrachéal?

ORIGINAL ARTICLE

Emergency airway access in children – transtracheal cannulas and tracheotomy assessed in a porcine model

Rolf J. Holm-Knudsen[1], Lars S. Rasmussen[1], Birgitte Charabi[2], Morten Bøttger[1] & Michael S. Kristensen[1]

Pediatric Anesthesia **22** (2012) 1159–1165

- Porcelets, trachée ID 10 mm
- 32 praticiens
- Cathéter de jet ventilation/KT intraveineux puis trachéotomie
- Temps max autorisé 120 sec
- KT jet ventilation : 66% succès, en 69 sec
- KT intraveineux: 68,8% succès, en 42 sec
- Perforation trachéale: 50% (compression++)

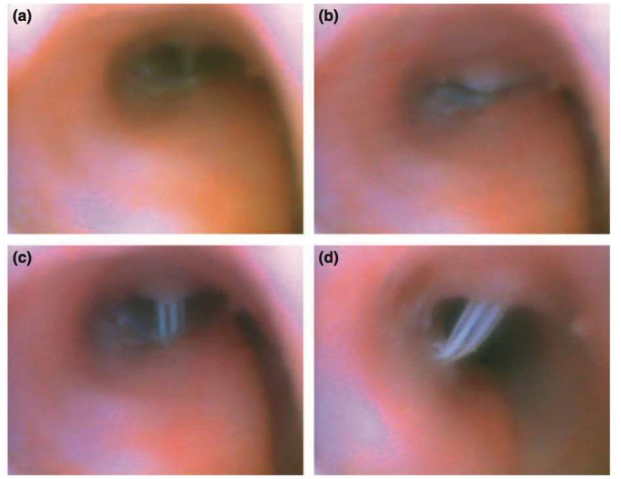


Table 2 V
tions

Tracheal lu	7*
Tracheal lu	7*
was not s	
Perforation	7*
Aspiration	7*
Catheter in	7**
Perforation	7**
Catheter ki	7**

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Front of the neck access: FONA
Trachéotomie?



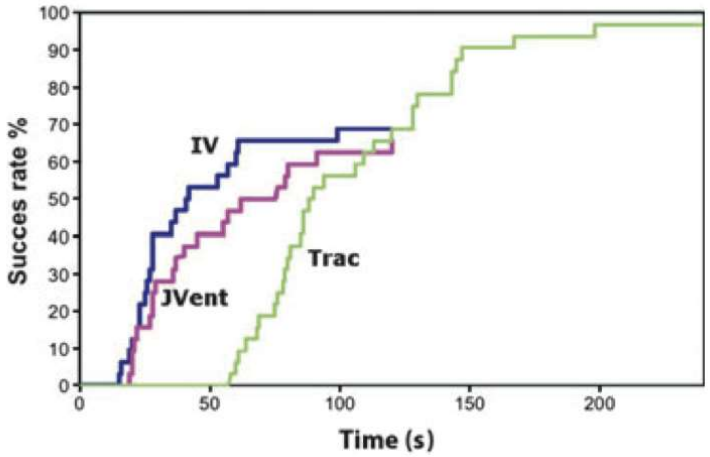
ORIGINAL ARTICLE

Emergency airway access in children – transtracheal cannulas and tracheotomy assessed in a porcine model

Rolf J. Holm-Knudsen[1], Lars S. Rasmussen[1], Birgitte Charabi[2], Morten Bøttger[1] & Michael S. Kristensen[1]

Pediatric Anesthesia **22** (2012) 1159–1165

- Porcelets, trachée ID 10 mm
- 32 praticiens
- Cathéter de jet ventilation/KT intraveineux puis trachéotomie
- Temps max autorisé 240 sec
- Trachéotomie: 97% succès, en 88 sec
- 3 complications



Front of the neck access: FONA
Cannule ou Trachéotomie?

Cannot ventilate-cannot intubate an infant: surgical tracheotomy or transtracheal cannula?

KARINA JOHANSEN MD*, ROLF J. HOLM-KNUDSEN MD*,
BIRGITTE CHARABI MD†, MICHAEL S. KRISTENSEN MD*
AND LARS SIMON RASMUSSEN MD PhD*

Pediatric Anesthesia 2010 **20**: 987–993

- Porcelets, 8 kg
- 30 praticiens
- Cannule transtrachéale jet ventilation/trachéotomie
- Temps max autorisé 120 sec/240 sec
- Cannule: succès 27%, en 68 sec
- Trachéotomie: succès 80%, en 89 sec

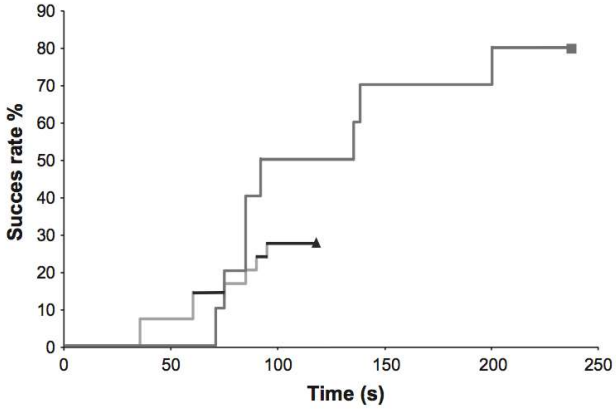
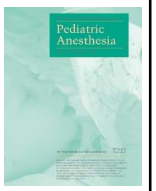


Figure 5
Kaplan–Meier analysis of time and success for performing transtracheal cannula (▲) and tracheotomy (■).

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Front of the neck access: FONA
Quicktrach baby®?



ORIGINAL ARTICLE

Emergency cricothyrotomy in infants – evaluation of a novel device in an animal model

T. Metterlein[1], M. Frommer[2], P. Kwok[3], S. Lyer[4], B.M. Graf[1] & B. Sinner[1]

Pediatric Anesthesia **21** (2011) 104–109

- Lapins, n=10
- 2 praticiens, entrainés en simulation
- Quicktrach baby®
- Temps max autorisé 180 sec
- Succès 100%, en 31 sec
- Fracture du cartilage cricoïde X 2
- Lésion du mur postérieur X 1



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REVIEW ARTICLE



The emergency paediatric surgical airway

A systematic review

Lena Koers, Darja Janjatovic, Markus F. Stevens and Benedikt Preckel

Eur J Anaesthesiol 2018; **35:**1–8

Table 3 **Aggregated results for mean time placement, success rate and complication rate for different surgical airway techniques from original studies**

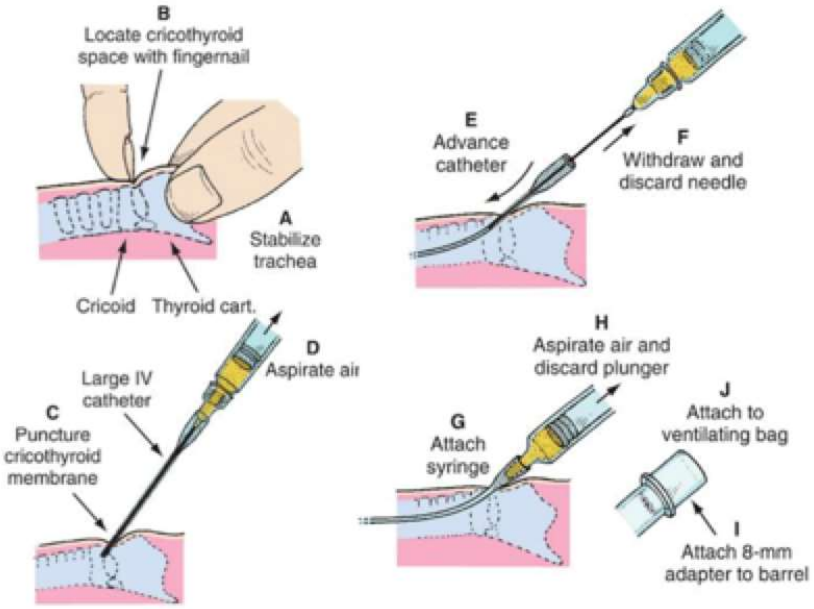
	Mean time placement (s)	Success rate	Complication rate
Catheter over needle	44[17]	43% (10/23)[17,19]	34% (3/10)[17 a]
Wire-guided	Not reported[b]	100% (16/16)[18]	69% (11/16)[18]
Cannula	67.3[15,16]	56% (87/154)[15,16,19]	36% (55/151)[15,19]
Scalpel and bougie	108.7[15,16]	88% (51/58)[15,16,18]	38% (18/48)[15,19]

[a] Stacey *et al.*[19] did not report complication rate as failure rate was 100%. [b] No time was reported for the wire-guided technique.

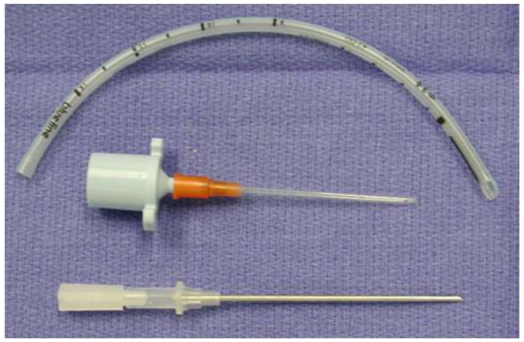


FONA: quelle technique choisir?

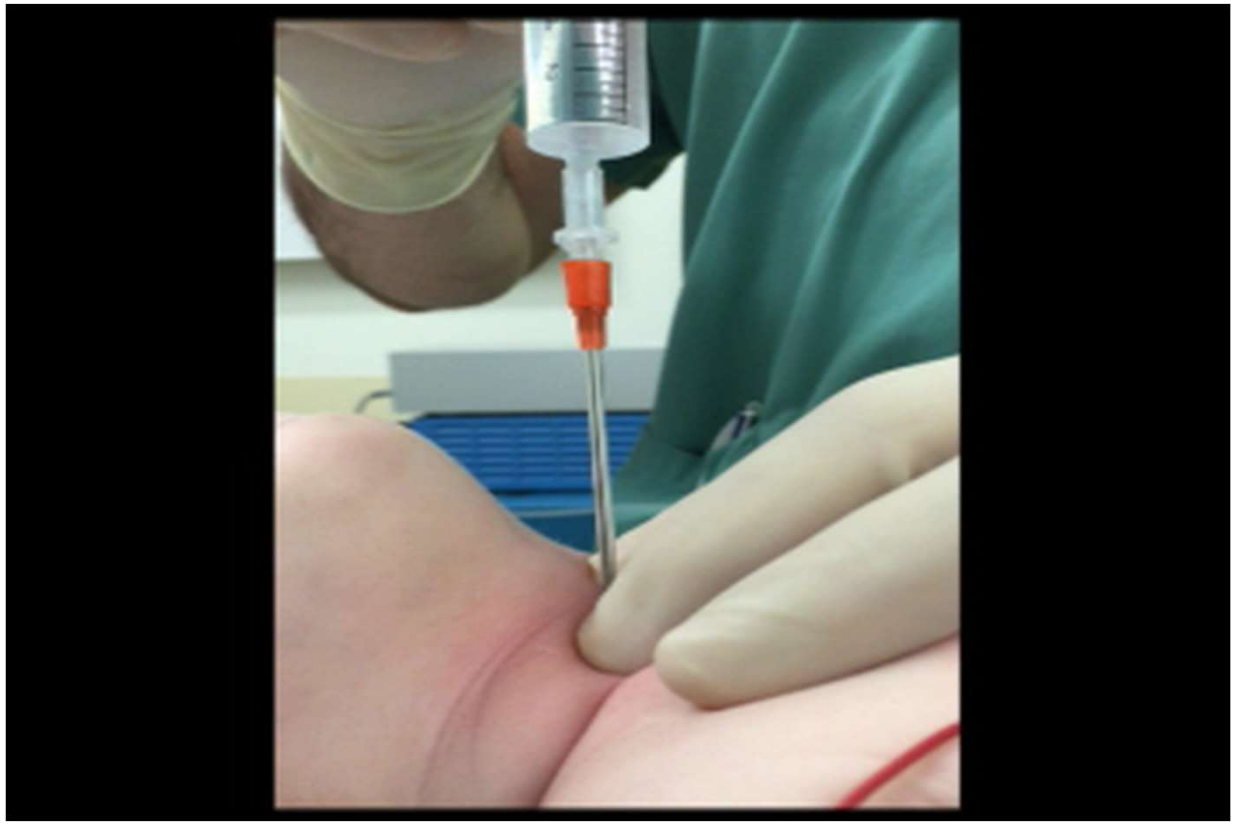
FONA: abord intercricoïdien



Wheeler M, Cote C, Todres D. 2009;
A practice of Anaesthesia for infants and children



FONA: abord intercricoïdien



Avec l'aimable autorisation du Pr P Fayoux, CHU Lille

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Oxygénation: débitmètre O2

Débitmètre O2 via raccord en Y
Débit: âge de l'enfant 2 ans= 2l/mn
Obturer une des branches en Y pour ventiler
Risque de baro trauma et de PNO

➔Temps expiratoire ++ I/E=1/3
➔Solution d'attente





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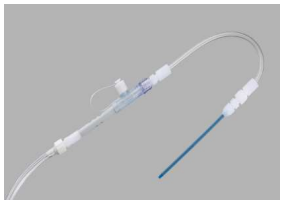
Oxygénation: Manujet®

Permet l'oxygénation sur canule trans-trachéale
Génère pressions pulmonaires très élevées si FR trop rapide
Danger si obstruction totale de l'airway
Risque de baro trauma et de PNO

➔FR basses (< 12/mn)
➔Temps expiratoire ++ I/E= 1/3
➔Solution d'attente







Oxygénation: Enk OFM®

Cathéter rigide avec 5 trous
O2 15l/mn, FiO2 100%
Moindre pression d'insufflation
Insufflation < 1sec
Permet l'exsufflation (FR basses)
Plus adapté si obstruction totale de l'airway
Risque de baro trauma et de PNO

➔FR basses (< 12/mn)
➔Temps expiratoire ++ I/E= 1/3
➔Solution d'attente

Oxygen Delivery During Transtracheal Oxygenation: A Comparison of Two Manual Devices

François Lenfant, MD, PhD,* Didier Péan, MD,† Laurent Brisard, MD,† Marc Freysz, MD, PhD,* and Corinne Lejus, MD, PhD†

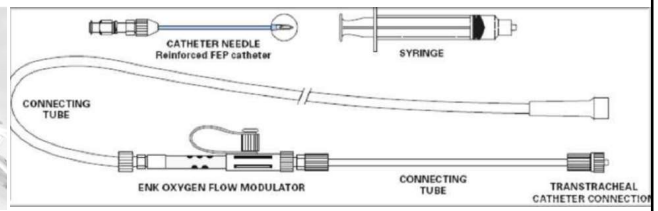
ANESTHESIA & ANALGESIA October 2010 • Volume 111 • Number 4

Table 1. Airway Pressure Delivered by the ENK Oxygen Flow Modulator™ During Total Airway Obstruction

Respiratory rate (breaths/min)	Mean pressure during inspiration (cm H_2O)	Peak pressure (cm H_2O)	Mean pressure during expiration (cm H_2O)
0			13.2 ± 0.0
4	21.9 ± 4.4	27.7 ± 0.7	18.8 ± 3.8
12	62.7 ± 24.3*	95.9 ± 21.2*	51.4 ± 21.4*

* $P < 0.05$, 4 vs 12 breaths/min.





Oxygénation: Ventrain®



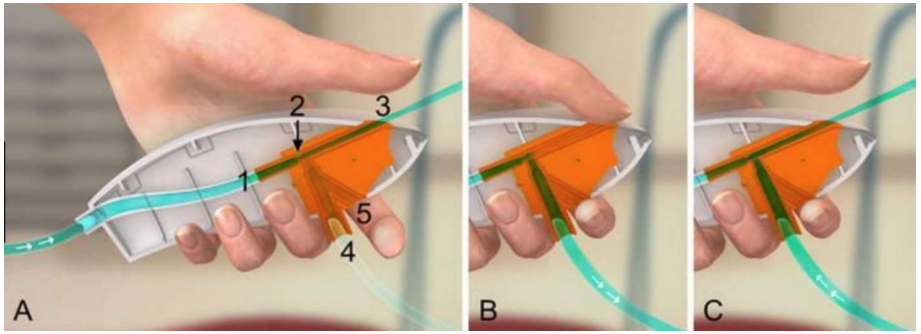
Permet oxygénation ET décarboxylation
Expiration active (Expiratory Ventilation Assistance)
Utilisable si obstruction totale de l'airway
Débit d'O2 à adapter (regarder le thorax)
Moindre risque de baro-trauma

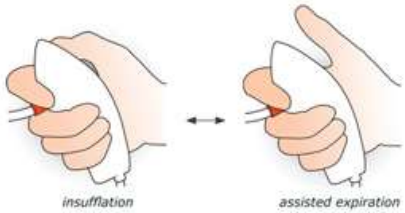
➔FR basses (< 12/mn)
➔Temps expiratoire ++ I/E= 1/3
➔Solution d'attente

Emergency ventilation with the Ventrain® through an airway exchange catheter in a porcine model of complete upper airway obstruction

Michiel W. P. de Wolf, MD · Reiner Gottschall, MD · Niels P. Preussler, MD · Markus Paxian, MD, PhD · Dietmar Enk, MD, PhD

Can J Anesth/J Can Anesth (2017) 64:37–44





38e CONGRÈS ANNUEL DE L'ADARPEF

Association des Anesthésistes Réanimateurs Pédiatriques d'Expression Française

An institutional approach to the management of the 'Can't Intubate, Can't Oxygenate' emergency in children

Stefano C. Sabato[1,2] & Elliot Long[2,3,4]



Pediatric Anesthesia **26** (2016) 784–793

- Préparation au scénario
- Matériel disponible immédiatement et facilement
- Compréhension de la physiologie de la ventilation au travers d'un dispositif étroit
- But: oxygénation (≠ ventilation)
- Attention traumatisme irréversible de l'airway
- Reconnaissance des différences importantes de l'algorithme CICO enfant/adulte

Apprentissage en centre de simulation +++





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INVITED COMMENTARY

Cannot oxygenate, cannot intubate in small children

Urgent need for better data!

Markus Weiss, Robert W.M. Walker, Hilary A. Eason and Thomas Engelhardt

Eur J Anaesthesiol 2018; **35:**556–557



different age groups. Therefore, at this point, we would like to call for the setup of a suitable paediatric airway registry to capture the success and failures of difficult airway management and front of neck access. Ideally, this

Most importantly, however, we must continue to focus on the need to prevent emergency front of neck access by implementing the teaching and training of reasonably simple, straightforward paediatric airway algorithms.

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Association des Anesthésistes Réanimateurs Pédiatriques d'Expression Française





27 & 28 MARS 2020
MONTPELLIER

Save the date

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