

Luftväg i obstetriken – nya brittiska riktlinjer samt algoritm

OAA Obstetric Anaesthetists' Association

DAS Difficult Airway Society

Obstetric Difficult Airway Guideline

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International Journal of Obstetric Anesthesia (2015) 24, 356–374

Failed tracheal intubation during obstetric general anaesthesia:
a literature review

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

Anaesthesia 2015, 70, 1286–1306

Guidelines

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 and A. C. Quinn

<http://www.das.uk.com/>

Introduktion

- Incidensen misslyckad intubation har varit oförändrad de senaste 40 åren och beräknas till ca 1 : 3 – 400
- Riskerna om detta inträffar är framför allt hypoxi och aspiration för mammans del
- 1 dödsfall per 90 misslyckade intubationer.

Varför är luftvägshantering svårare inom obsterisk anestesi än vid annan anestesi ?

- De övre luftvägarna är mer vaskulariserade och ödematösa än hos icke-gravida
- Status progredierar under graviditet och även under själva förlossningen.
- Svullnaden påverkas av pre-eclampsi, oxytocininfusion, intravenösa vätskor och valsalva-manövrar under värkarbetet.

Övriga riskfaktorer

- Sänkt funktionell residualkapacitet och ökad syrgaskonsumtion förkortar tiden till hypoxi vid apne. Obesitas förvärrar ytterligare denna situation.
- Progesteron sänker nedre esofagusfinkterns tonus vilket ökar risken för reflux.
- Ventrikeltömningen förlångsammass under värkarbetet och vid opioid-administration.

Övriga riskfaktorer

- Stora bröst gör att det är svårare att få in laryngoskopet
- Majoriteten av svår och misslyckad intubation sker i akutfall och på jourtid.
- Tidspressen för att förlösa gör att förberedelser, planering , kommunikation och tekniskt utförande försämras.
- Frekvensen generell anestesi har sjunkit avsevärt vilket har lett till sämre möjligheten att utbildas för dessa situationer

Övriga riskfaktorer

- Mänskliga faktorn spelar en stor roll när det brister vid beslutsfattande, uppgiftshantering och kommunikation
- "Fixation error" är ett fenomen som observeras specifikt vid luftvägsproblem

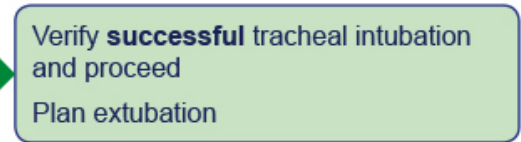
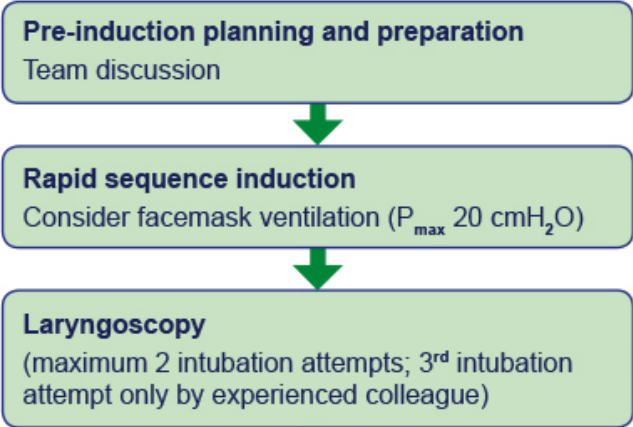
Mentometerfråga

Låter du någon i oplaget applicera crioidtryck för att förhindra regurgitation/aspiration då du söver obstetrisk patient med RSI ?

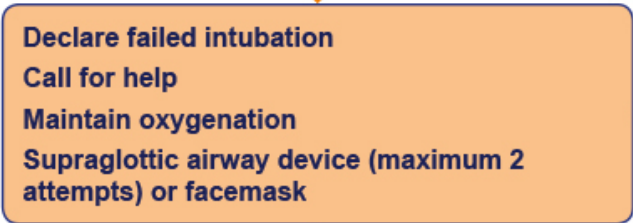
1. Ja
2. Nej
3. Ibland

Master algorithm – obstetric general anaesthesia and failed tracheal intubation

Algorithm 1 Safe obstetric general anaesthesia

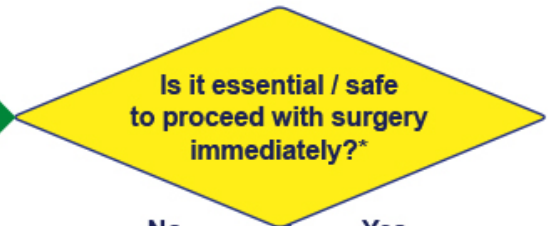
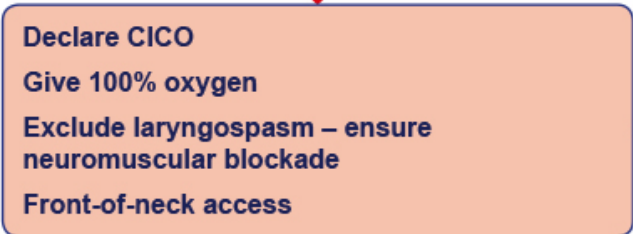


Algorithm 2 Obstetric failed tracheal intubation



Fail

Algorithm 3 Can't intubate, can't oxygenate



Wake[§]

Proceed with surgery[§]

*See Table 1, §See Table 2

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Algorithm 1 – safe obstetric general anaesthesia

Pre-theatre preparation

Airway assessment
Fasting status
Antacid prophylaxis
Intrauterine fetal resuscitation if appropriate

Plan with team

WHO safety checklist / general anaesthetic checklist
Identify senior help, alert if appropriate
Plan equipment for difficult / failed intubation
Plan for / discuss: wake up or proceed with surgery (Table 1)

Rapid sequence induction

Check airway equipment, suction, intravenous access
Optimise position – head up / ramping + left uterine displacement
Pre-oxygenate to $F_{ET}O_2 \geq 0.9$ / consider nasal oxygenation
Cricoid pressure (10 N increasing to 30 N maximum)
Deliver appropriate induction / neuromuscular blocker doses
Consider facemask ventilation (P_{max} 20 cmH₂O)

1st intubation attempt

If poor view of larynx optimise attempt by:

- reducing / removing cricoid pressure
- external laryngeal manipulation
- repositioning head / neck
- using bougie / stylet

Fail

Ventilate with facemask
Communicate with assistant

2nd intubation attempt

Consider:

- alternative laryngoscope
- removing cricoid pressure

3rd Intubation attempt only by experienced colleague

Fail

Follow Algorithm 2 – obstetric failed tracheal intubation

Success

Verify successful tracheal intubation

Proceed with anaesthesia and surgery
Plan extubation

Algorithm 1 – safe obstetric general anaesthesia

Pre-theatre preparation

Airway assessment
Fasting status
Antacid prophylaxis
Intrauterine fetal resuscitation if appropriate

Plan with team

Luftvägen ska bedömas för att förutsäga risken för svår intubation eller svår maskventilation.

När åt mamman senast och vad? Högrisk-mödrar ska inte äta under värkarbete, utan enbart inta klar dryck. Natrium citrat och H2 blockerare bör ges preop. Intrauterin fetal resuscitering bör göras om möjligt och sen bör situationen re-evalueras

Rapid sequence induction

Check airway equipment, suction, intravenous access
Optimise position – head up / ramping + left lateral tilt
Pre-oxygenate to $F_{ET}O_2 \geq 0.9$ / consider nasopharyngeal airway
Cricoid pressure (10 N increasing to 30 N if needed)
Deliver appropriate induction / neuromuscular blockade
Consider facemask ventilation ($P_{max} < 20$ cmH₂O)

1st intubation attempt

If poor view of larynx optimise attempt by:

- reducing / removing cricoid pressure
- external laryngeal manipulation
- repositioning head / neck
- using bougie / stylet

Algorithm 1 – safe obstetric general anaesthesia

Plan with team

- WHO safety checklist / general anaesthetic checklist
- Identify senior help, alert if appropriate
- Plan equipment for difficult / failed intubation
- Plan for / discuss: wake up or proceed with surgery (Table 1)

WHO:s checklista

Finns behov av senior hjälp? Larma ?

Utrustning för svår / misslyckad intubation

Planera / diskutera - väcka eller fortsätta vid omöjlig intubation?

on if appropriate

uction, intraveno
/ ramping + left
9 / consider nas
asing to 30 N m

n / neuromuscular blocker doses
on (P_{max} 20 cmH₂O)

se attempt by:
oid pressure
ulation

Ventilate with facemask

Success

Verify successful tracheal intubation

Fråga

Vår anesthesi-jour/ ansvarig för KK anestesin gör rutinmässigt besök på förlossningsavd för att se vilka patienter som finns där och kunna fånga upp eventuella riskpatienter

1. Ja

2. Nej

Pre-theatre preparation

Airway assessment
Fasting status
Antacid prophylaxis
Intrauterine fetal resuscitation if appropriate

Plan with team

WHO safety checklist / general anaesthetic check
Identify senior help, alert if appropriate
Plan equipment for difficult / failed intubation
Plan for / discuss: wake up or proceed with surgery

Rapid sequence induction

Check airway equipment, suction, intravenous access
Optimise position – head up / ramping + left uterine displacement
Pre-oxygenate to $F_{ET}O_2 \geq 0.9$ / consider nasal oxygenation
Cricoid pressure (10 N increasing to 30 N maximum)
Deliver appropriate induction / neuromuscular blocker
Consider facemask ventilation ($P_{max} 20 \text{ cmH}_2\text{O}$)

Överväg syrgas via näskateter

1st intubation attempt

If poor view of larynx optimise attempt by:

- reducing / removing cricoid pressure
- external laryngeal manipulation
- repositioning head / neck
- using bougie / stylet

Överväg försiktig maskventilation

Fail

Ventilate with facemask
Communicate with assistant

Success

2nd intubation attempt

Consider:

- alternative laryngoscope
- removing cricoid pressure

Verify successful track
Proceed with anaesthesia
Plan extubation

Table 1 – proceed with surgery?

Factors to consider		WAKE	←————→	PROCEED	
Before induction	Maternal condition	• No compromise	• Mild acute compromise	• Haemorrhage responsive to resuscitation	• Hypovolaemia requiring corrective surgery • Critical cardiac or respiratory compromise, cardiac arrest
	Fetal condition	• No compromise	• Compromise corrected with intrauterine resuscitation, pH < 7.2 but > 7.15	• Continuing fetal heart rate abnormality despite intrauterine resuscitation, pH < 7.15	• Sustained bradycardia • Fetal haemorrhage • Suspected uterine rupture
	Anaesthetist	• Novice	• Junior trainee	• Senior trainee	• Consultant / specialist
	Obesity	• Supermorbid	• Morbid	• Obese	• Normal
	Surgical factors	• Complex surgery or major haemorrhage anticipated	• Multiple uterine scars • Some surgical difficulties expected	• Single uterine scar	• No risk factors
	Aspiration risk	• Recent food	• No recent food • In labour • Opioids given • Antacids not given	• No recent food • In labour • Opioids not given • Antacids given	• Fasted • Not in labour • Antacids given
	Alternative anaesthesia • regional • securing airway awake	• No anticipated difficulty	• Predicted difficulty	• Relatively contraindicated	• Absolutely contraindicated or has failed • Surgery started
After failed intubation	Airway device / ventilation	• Difficult facemask ventilation • Front-of-neck	• Adequate facemask ventilation	• First generation supraglottic airway device	• Second generation supraglottic airway device
	Airway hazards	• Laryngeal oedema • Stridor	• Bleeding • Trauma	• Secretions	• None evident

Criteria to be used in the decision to wake or proceed following failed tracheal intubation. In any individual patient, some factors may suggest waking and others proceeding. The final decision will depend on the anaesthetist's clinical judgement.

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Fall

- 27 årig kvinna, BMI 40
- Ett tidigare C/S
- I värkarbete, CTG ej helt invändningsfritt
- Luftväg bedöms av ST-NLÄK med 2 års erfarenhet– Mallampati 2, thyromentalt avstånd ua, gapar bra

Fall

- Inom en timme efter bedömningen
- Navelsträngs prolaps
- Fetal bradykardi < 60 . Anmäls för omedelbart C/S
- Barnmorska trycker upp fosterhuvudet
- Samma ST-NLÄK möter upp i op-salen

Fråga

Tycker du att ST –narkosläkaren ska söva patienten på egen hand för detta omedelbara kejsarsnitt?

1. Ja
2. Nej

- RSI
- Thiopental 500mg och Celocurin 150mg
- 1:a försök vanligt layngoskop –dålig insyn- försök med bougie som ej passerar
- 2:a försök med samma resultat
- 3:e försök -videolaryngoskop-posteriora delen av larynx kan ses- går inte att få dit tuben (patienten börjar bli ytlig)

- Börjar desaturera(SaO₂ <70%)
- Man lägger en LMA, I-gel (size 4) –det går att ventilera
- Saturationen stiger

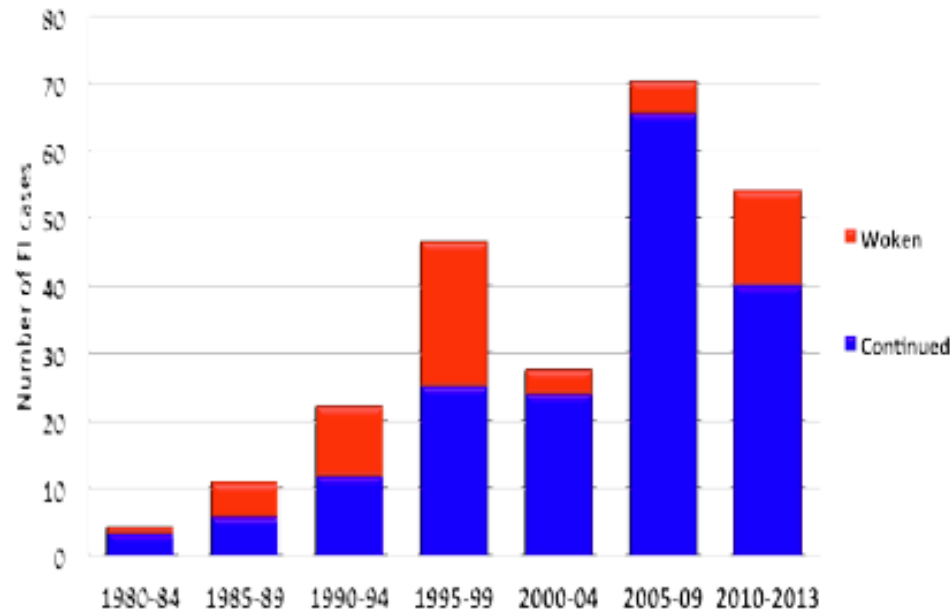
Frågor?

- RSI teknik –läkemedel/position/pre-oxygenation /cricoidtryck
- Val av laryngoskop
- Larynxmask och sond
- Väcka eller fortsätta
- Hur väcker man, respektive fortsätter
- Vilken extra hjälp finns att tillgå

Väcka eller fortsätta?

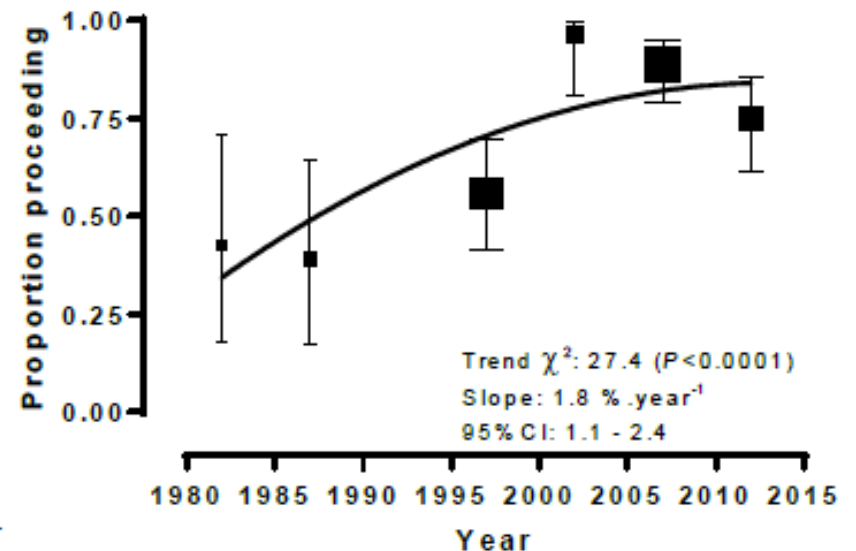


Wake up or continue after failed intubation



- 73% of cases were continued
- Emergency vs elective - no difference

Failed Tracheal Intubations Proceeding



Failed tracheal intubation during obstetric general anaesthesia: a literature re- view

S.M. Kinsella, A.L.S. Winton, M.C. Mushambi, K. Ramaswamy, H. Swales, A.C. Quinn, M. Popat IJOA 2015

Wake up vs continue

Why the change?

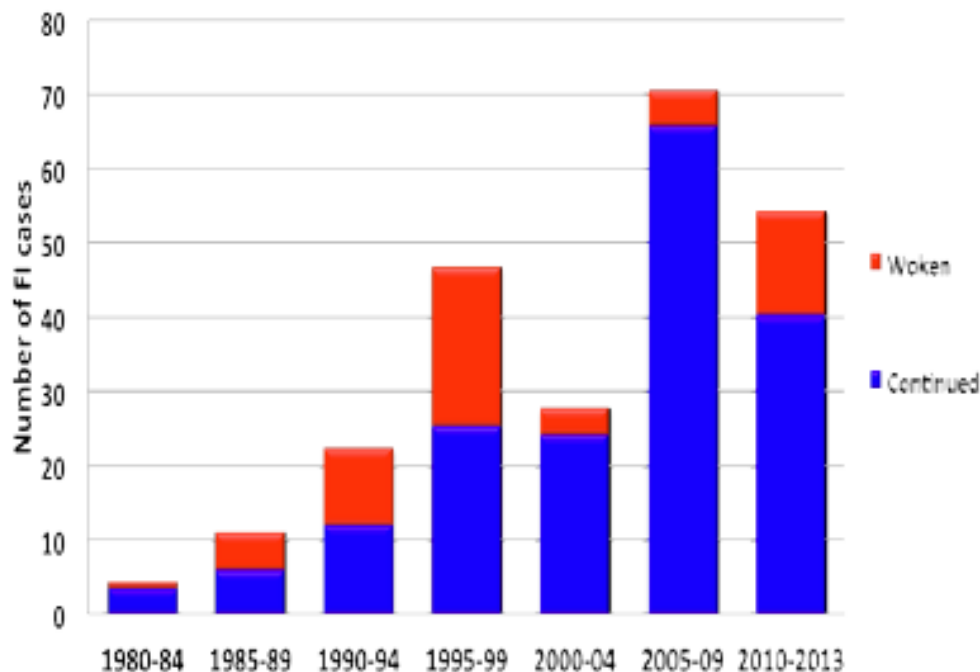
Experience with LMAs and SAD

Publications of the use of SAD for FI (DAS guidelines 2004)

Publications of SAD for elective CS

Often GA is last resort for failed RA

Pressure to deliver the baby



Neonatal outcome vid väckning

- 14 fall av FI vid C/S två hade dåligt neonatal outcome
- 23 fall av FI vid C/S varav 7 för fetal distress så hade man ett fall av dåligt neonatalt outcome. Tvillingar som fick hjärnskador , dock var mamman aldrig hypoxisk.
- Man har sett extremt låga saturationer hos modern med gott neonatal outcome.
- Omöjligt att skilja neonatalt outcome som effekt av luftvägsproblemet från det faktum att barnets situation indicerade ett omedelbart C/S
- Man har inget evidens för att rekommendera väckning eller fortsättning av ingreppet när det gäller neonatal outcome

Fråga

Tycker du att ST läkaren bör fortsätta anestesin och därmed operationen? Bakjouren har inte hunnit komma ännu.

1. Ja

2. Nej

WAKE

OR

PROCEED

Novice

No maternal
compromise

Morbid obese

Some surgical
difficulty expected

Alternative anaesthesia
- ?difficult

Fetal bradycardia

In labour
No opiates



Bakjouren anländer

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Criteria to be used in the decision to wake or proceed following failed tracheal intubation. In any individual patient, some factors may suggest waking and others proceeding. The final decision will depend on the anaesthetist's clinical judgement.

WAKE

OR

PROCEED

No maternal
compromise

Morbid obese

Some surgical
difficulty expected

Alternative anaesthesia
- ?difficult


Consultant

Fetal bradycardia

In labour
No opiates



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WAKE

OR

PROCEED

No maternal
compromise

Morbid obese

Some surgical
difficulty expected

Alternative anaesthesia
- ?difficult

2nd gen SAD

No airway hazard

Consultant

Fetal brady

In labour
No opiates



Table 2 - management after failed tracheal intubation

Wake

- Maintain oxygenation
- Maintain cricoid pressure if not impeding ventilation
- Either maintain head-up position or turn left lateral recumbent
- If rocuronium used, reverse with sugammadex
- Assess neuromuscular blockade and manage awareness if paralysis is prolonged
- Anticipate laryngospasm / can't intubate, can't oxygenate

After waking

- Review urgency of surgery with obstetric team
- Intrauterine fetal resuscitation as appropriate
- For repeat anaesthesia, manage with two anaesthetists
- Anaesthetic options:
 - ❑ Regional anaesthesia preferably inserted in lateral position
 - ❑ Secure airway awake before repeat general anaesthesia

Proceed with surgery

- Maintain anaesthesia
- Maintain ventilation - consider merits of:
 - ❑ controlled or spontaneous ventilation
 - ❑ paralysis with rocuronium if sugammadex available
- Anticipate laryngospasm / can't intubate, can't oxygenate
- Minimise aspiration risk:
 - ❑ Maintain cricoid pressure until delivery (if not impeding ventilation)
 - ❑ after delivery maintain vigilance and reapply cricoid pressure if signs of regurgitation
 - ❑ empty stomach with gastric drain tube if using second-generation supraglottic airway device
 - ❑ minimise fundal pressure
 - ❑ administer H₂ receptor blocker i.v. if not already given
- Senior obstetrician to operate
- Inform neonatal team about failed intubation
- Consider total intravenous anaesthesia

Fallberättelse



Väcka eller fortsätta?

Tabellen "Proceed with surgery?" ger exempel på alla de faktorer som behöver övervägas vid omöjlig intubation

Det slutliga beslutet åligger den ansvariga anestesilogens bedömning.

Situationen kan vara extremt komplex och unik.

God kommunikation obstetriker-narkosläkare är av oerhörd betydelse

Key messages

- Genomarbetad algoritm för handläggning av obstetrisk luftväg vid generell anestesi
- ”Väcka eller fortsätta?” frågeställningen analyseras innan sövning
- Maskventilation vid RSI
- Näskateter med O₂
- Larynxmask vid misslyckad intubation
- Hantera algoritmen tillsammans med riktlinjen dvs rationalen bakom varje ruta

Key messages

Bästa sättet att förebygga detta problem är att välja:

Ryggbedövning