



KARIM

1.LF UK A VFN V PRAZE

Proč potřebuje aspirace jako první krok bronchoskopii?

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MUDr. Michal Otáhal Ph.D.

Klinika anesteziologie, resuscitace a intenzivní medicíny
1. lékařská fakulta UK a Všeobecná fakultní nemocnice v Praze
U nemocnice 2, Praha 2



1. LÉKAŘSKÁ
FAKULTA
Univerzita Karlova



VŠEOBECNÁ FAKULTNÍ
NEMOCNICE V PRAZE



Proč potřebuje aspirace jako první krok bronchoskopii?

- Protože **„to dá rozum“**
- Aspirační pneumonitis / bronchopneumonie
- COMPLETE CARE
- Pomůže nám literatura?
- Jak na to? aneb praktické provedení
- www.bronchokurz.cz



Aspirace

- Záleží na množství
- **FOB toaleta = snížení nálože bakteriální infekce / redukce proinflamatorní nálože**
- Znovuzprůchodnění DC
- Aspiration pneumonitis (chemical pneumonitis) / aspiration pneumonia
 - *most common FOB finding was airway **hyperemic lesions encountered in 68%** of the subjects commonly on the surface of trachea and carina and more common on the surface of right bronchus than left.*
 - *second most common finding was **purulent secretions in 52.6%** of the cases*
 - ***blood clots were found in 23.7%** of the cases*
 - ***partial or complete bronchial obstruction** was noted in **15.8%** of the cases*
- Community aquired/ hospital
- Anaeroby ústup / 56.6% bakr. nález - PSAE, KLPM, ACBA, MRSA

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

Aspiration Pneumonia

Lionel A. Mandell, M.D., and Michael S. Niederman, M.D.



Aspirace

Aspiration-Induced lung injury

Krishnan Raghavendran, MD¹, Jean Nemzek, DVM, MS²

Crit Care Med. 2011 April ; 39(4): 818–826.

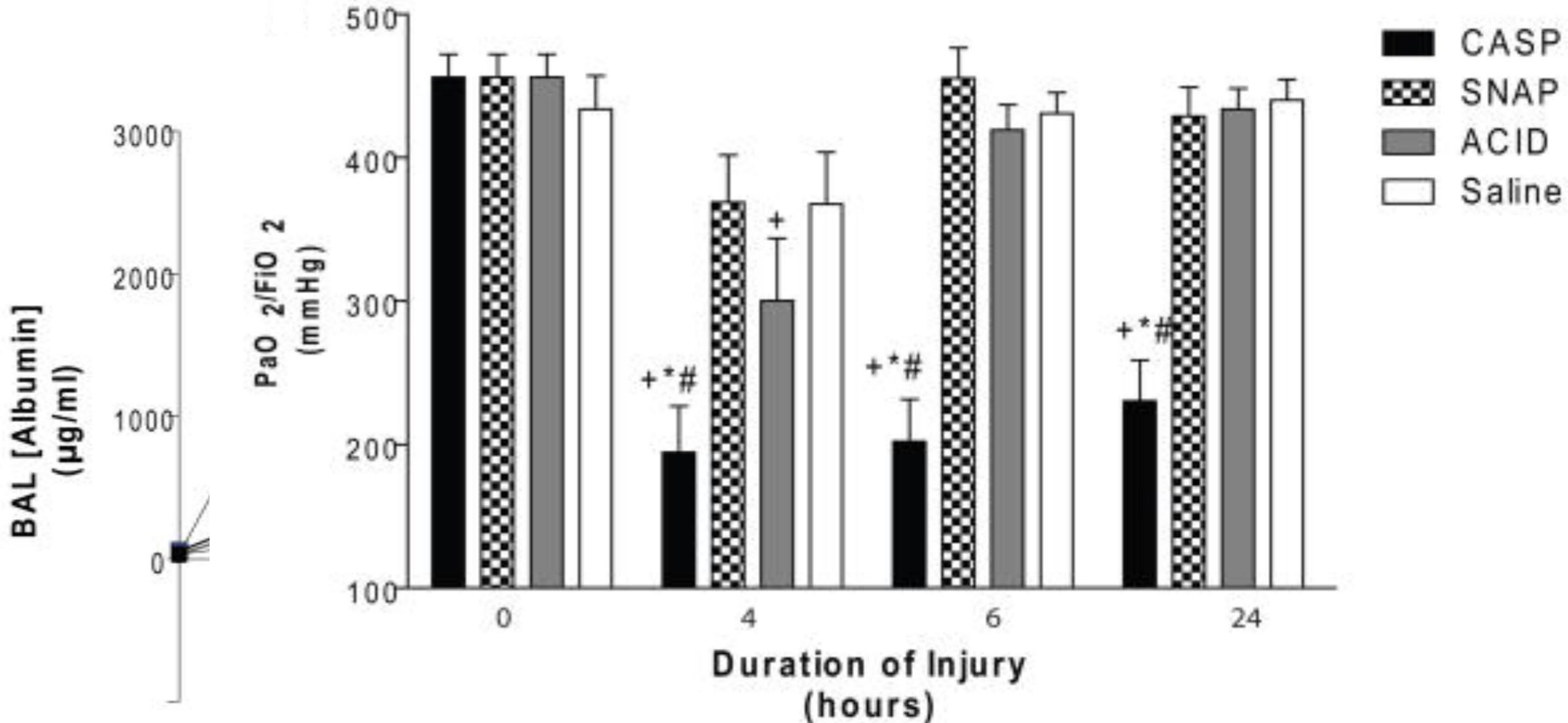
Crit Care Med.

- volume of gastric **aspirate** $>0.3 \text{ ml kg}^{-1}$ of **body weight** (i.e. 20–25 ml in adults) and a **pH** <2.5 was traditionally thought to be necessary for the development of aspiration pneumonitis.
- aspiration **of particulate food even if the pH >2.5 can cause significant pulmonary damage**
- Animal studies have shown a **biphasic pattern of injury**:
- **initial peak at 1–2 h** after aspiration (**direct burn effects**) and a **second peak at 4–6 h** (related to **neutrophil infiltration**)
- Acid aspiration (ACID)
- Small non-acidified gastric particles (SNAP)
- Combined acid/gastric food particle (CASP) aspiration lung injury



Aspirace

Aspiration Induced Lung Injury



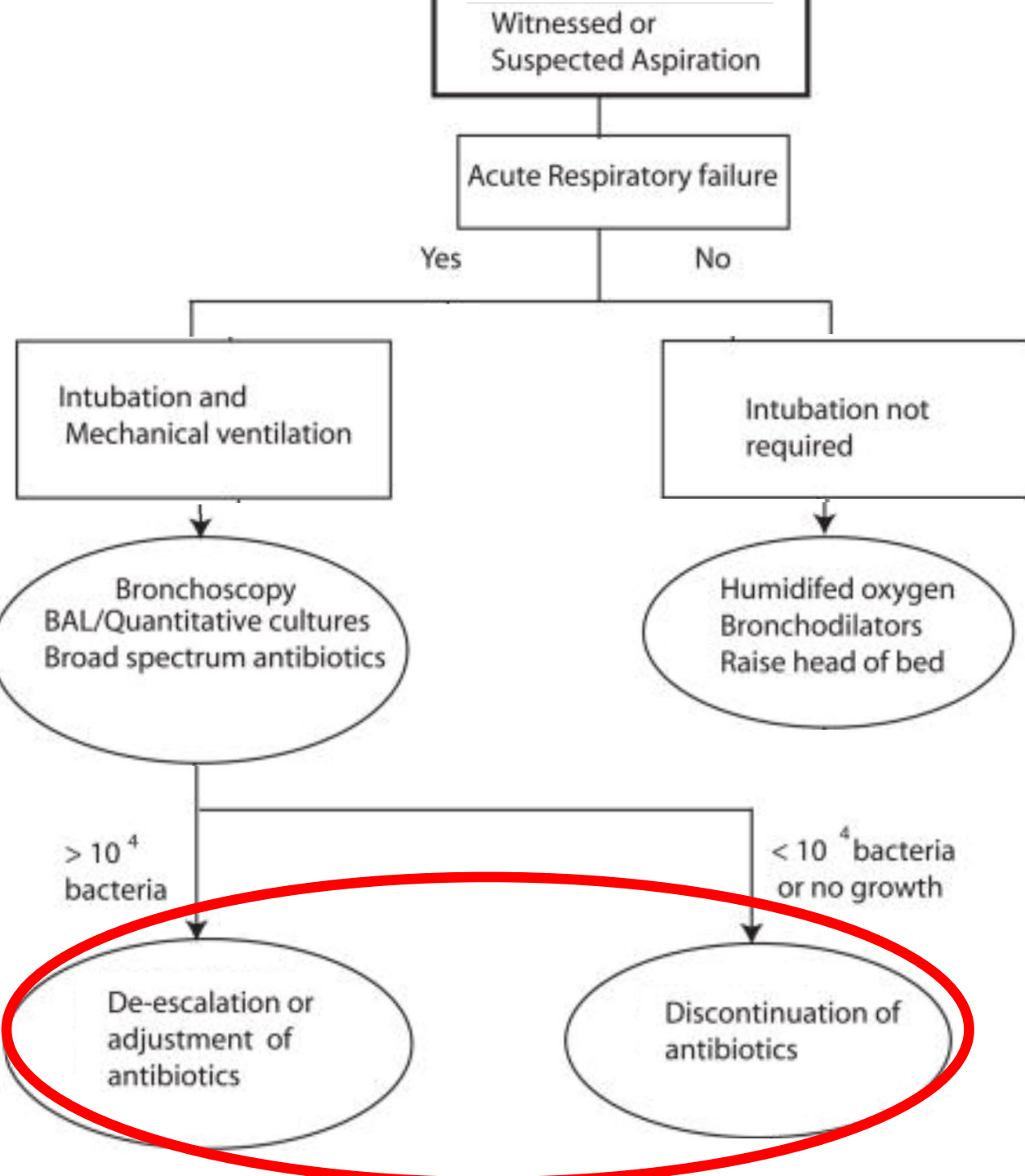


JOURNAL ARTICLE

Bronchoscopy in critical care



S Kabadayi, MBChB FRCA, M C Bellamy, MBBS MA FRCA FRCP |
BJA Education, Volume 17, Issue 2, February 2017, Pages 48–56



| | Inspection | Sampling | Therapeutic |
|----------------------|------------|----------|-------------|
| | X | X | X |
| | X | X | X |
| | X | X | X |
| rtion, BB insertion) | X | | X |
| ima, tracheostomy | X | | X |
| esophageal fistula) | | | |
| | X | | X |
| | X | | X |
| | X | | X |

COMPLETE care ... co musíme udělat?

RM

Lung Opening
Maneuver
ALT-EIT

Lung Opening

Ultrasound

Including
Hemodynamic
assessment

HEMO

POZICE

Back Rest
Lateral
Prone

Positioning

Chest Imaging

CXR
CT
EIT

FOB

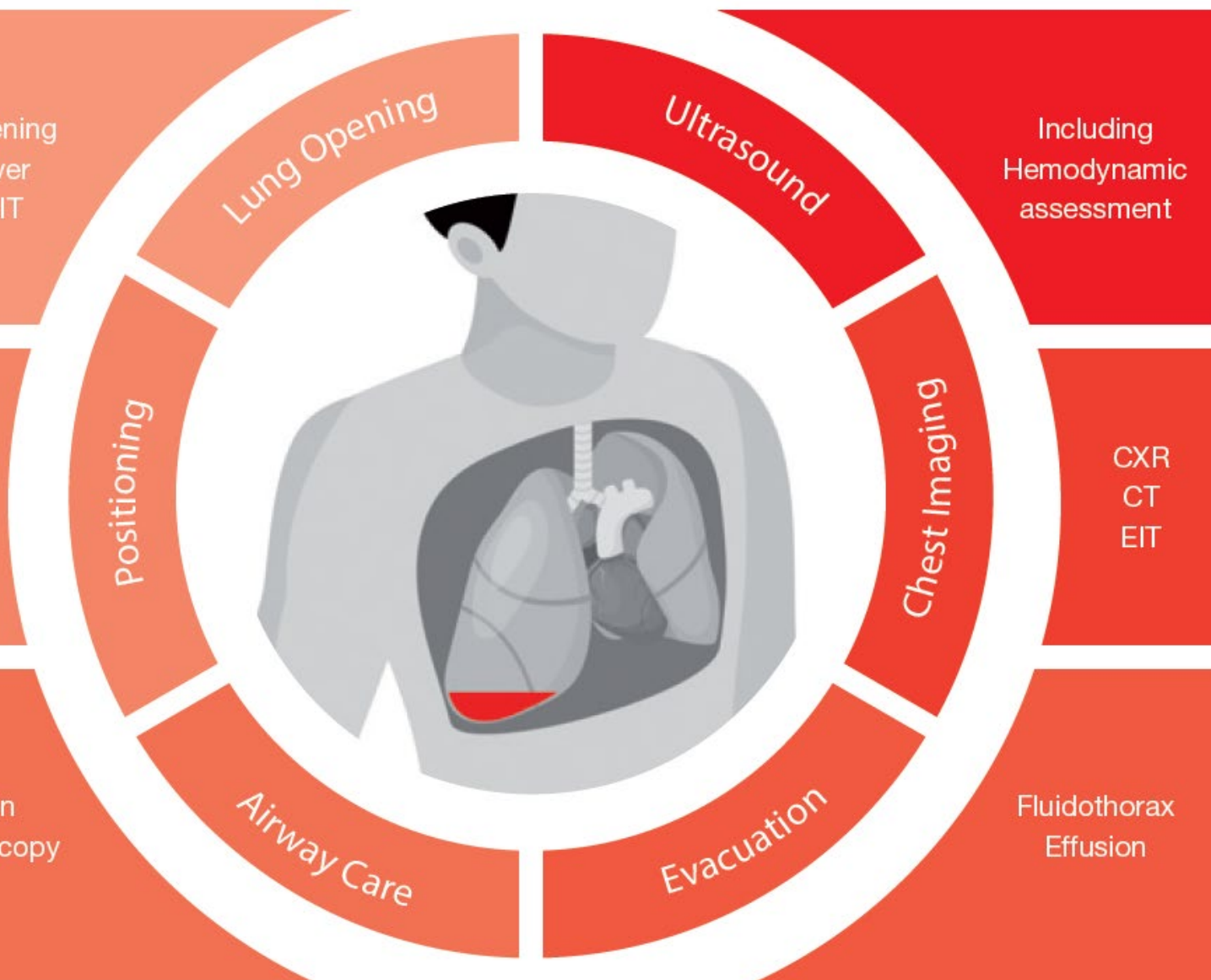
Suction
Bronchoscopy

Airway Care

Evacuation

Fluidothorax
Effusion

FLUIDO





Early bronchoscopy

Clinical impact of early bronchoscopy in mechanically ventilated patients with aspiration pneumonia

Hyun Woo Lee, Jinsoo Min, Jisoo Park, Yeon Joo Lee, Se Joong Kim, Jong Sun Park, Ho Il Yoon, Jae-Ho Lee, Choon-Taek Lee, Young-Jae Cho

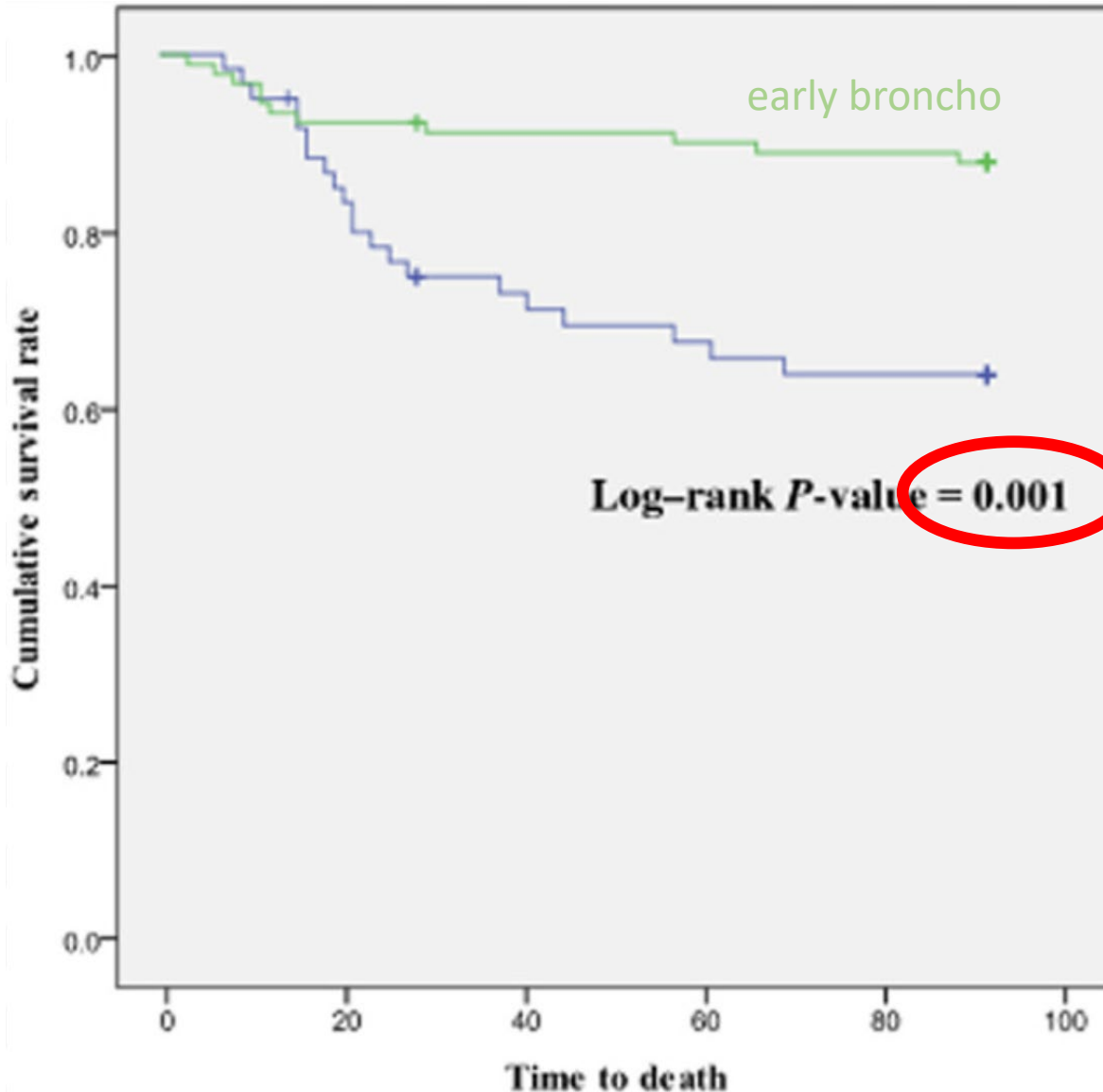
Official Journal of the Asian Pacific Society of Respirology

Respirology

- retrospective cohort , from 2003 through 2013 in a tertiary hospital
- all the diagnoses of pneumonia were supported by the **probability of aspiration** and **consolidation** of dependent areas **confirmed by CT**
- patients who underwent bronchoscopy **within 24 h after intubation** were categorized as the **early bronchoscopy** group



Early bronchoscopy



Clinical impact of early bronchoscopy in mechanically ventilated patients with aspiration pneumonia

Hyun Woo Lee, Jinsoo Min, Jisoo Park, Yeon Joo Lee, Se Joong Kim, Jong Sun Park, Ho Il Yoon, Jae-Ho Lee, Choon-Taek Lee, Young-Jae Cho

Official Journal of the Asian Pacific Society of Respirology

Respirology

93) showed
ICU mortality 4.9% vs 24.6%
and 90-day mortality 11.8 vs 32.8%
regardless of the initial empirical antibiotics
were extubated earlier with a higher
of mechanical ventilation and had a



Early bronchoscopy

ORIGINAL ARTICLE

Use of Early Bronchoscopy in Mechanically Ventilated Patients with Aspiration Pneumonitis

Mohammed M Megahed¹, Ahmed M El-Menshawy², Ahmed M Ibrahim³

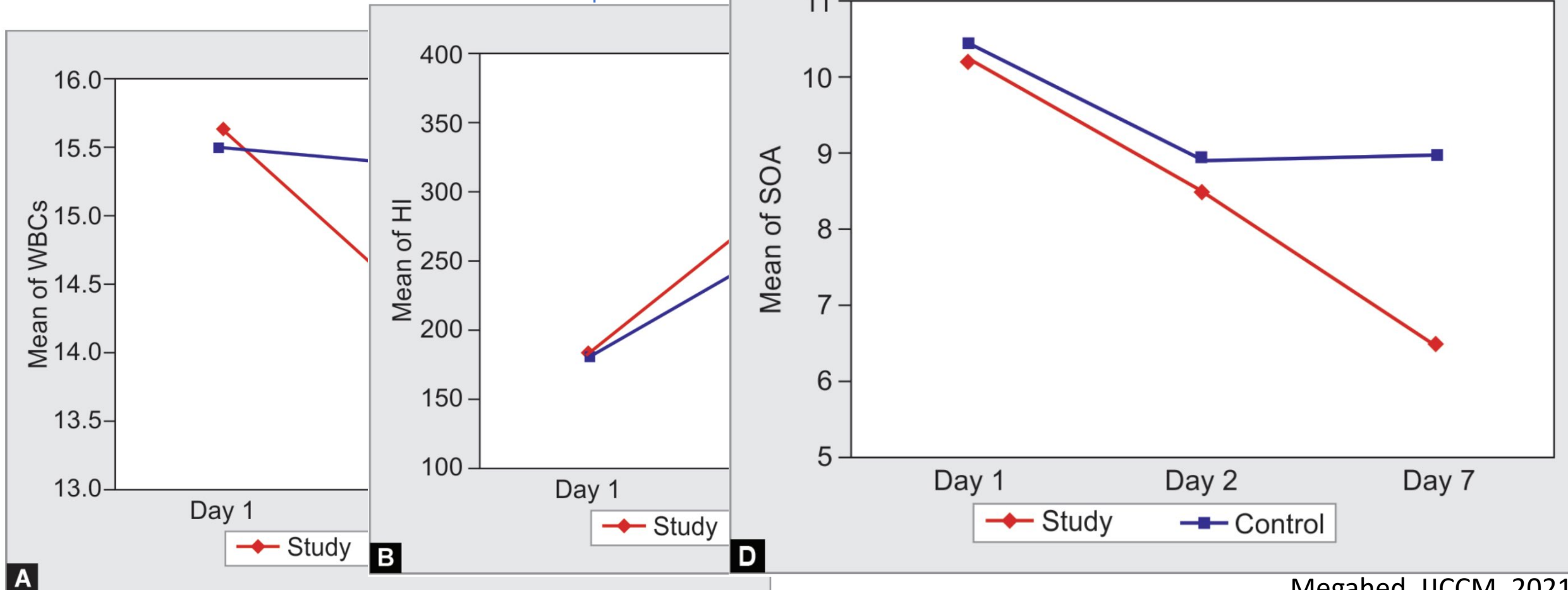
- **(98) .. 76** adult subjects MV due to aspiration pneumonitis, half the subjects received **early bronchoscopy in the first 24** hours
- intervention group had a **significant reduction in the rate of development of pneumonia at 60.5 vs 81.6% $p = 0.043$**
- the intervention group has a **significantly better hypoxic index (HI), white blood count, clinical pulmonary infection score, lung injury score, and sepsis-related organ failure assessment (SOFA) score** compared to the control group



Early bronchoscopy

ORIGINAL ARTICLE

Use of Early Bronchoscopy in Mechanically Ventilated Patient





Early bronchoscopy

| Outcome | Intervention (n = 38) | | Control (n = 38) | | Test of sig. | p-value |
|---------------------------------|--------------------------|------|---------------------|------|--------------------|---------|
| | No. | % | No. | % | | |
| Development of pneumonia | | | | | | |
| No | 15 | 39.5 | 7 | 18.4 | $\chi^2 = 4.094^*$ | 0.043* |
| Yes | 23 | 60.5 | 31 | 81.6 | | |
| Days of MV | | | | | | |
| Min.–Max. | 1.0–23.0 | | 1.0 – 25.0 | | $U = 543.50$ | 0.063 |
| Mean \pm SD | 7.39 \pm 5.67 | | 10.13 \pm 6.92 | | | |
| Median | 5.0 | | 8.0 | | | |
| Outcome | | | | | | |
| Discharge | 28 | 73.7 | 20 | 52.6 | $\chi^2 = 3.619$ | 0.057 |
| Death | 10 | 26.3 | 18 | 47.4 | | |

Early bronchoscopy in Mechanically Ventilated Patients with Bacterial Pneumonitis

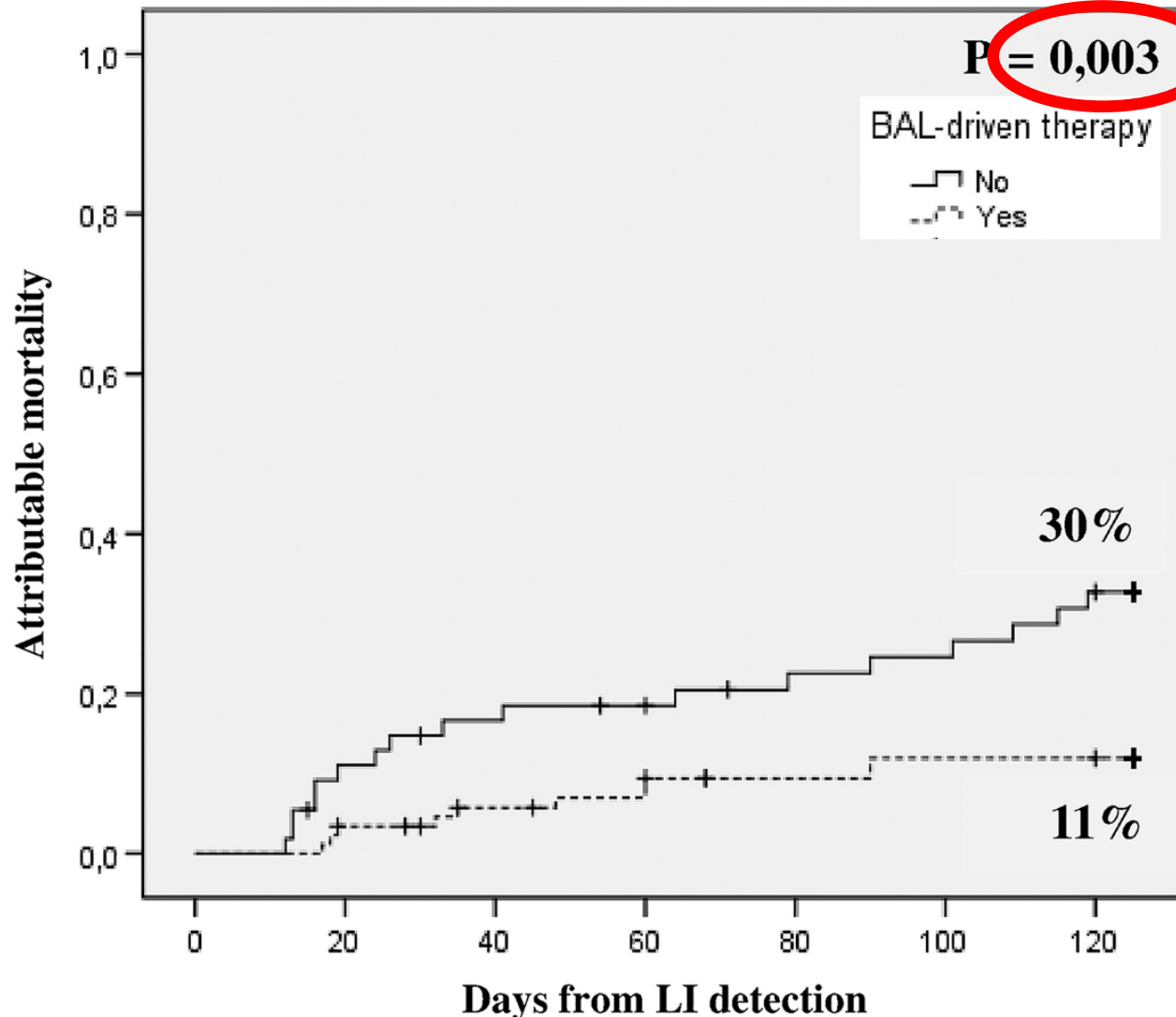
Magdy², Ahmed M Ibrahim³

BAL driven ATB

A bronchoalveolar lavage-driven antimicrobial treatment improves survival in hematologic malignancy patients with

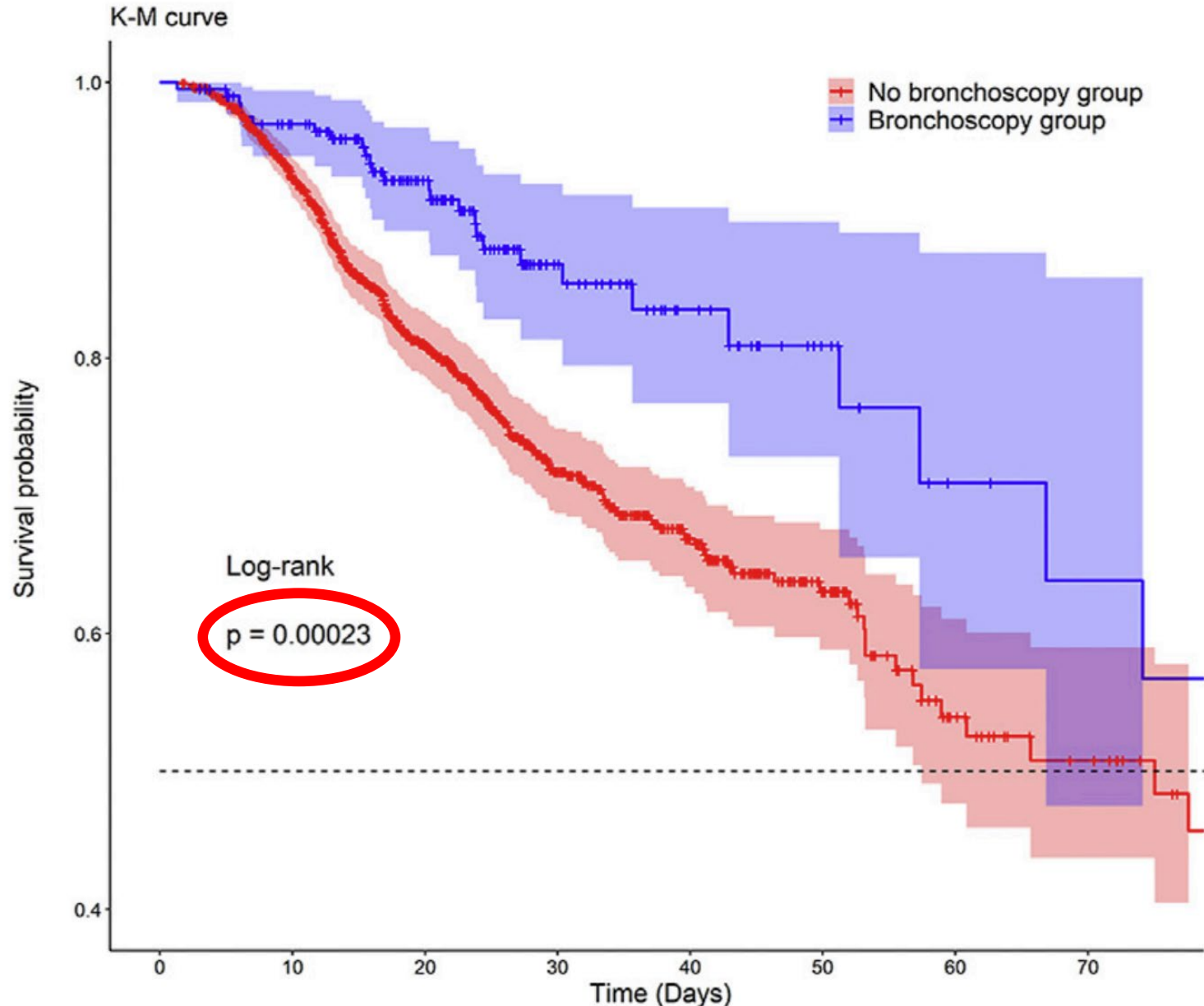
infiltrates: A prospective multicenter study of
 Group
 American Journal of
Hematology

Giara Cattaneo, Marianna Criscuolo, Mario Delia, Michelina Dargenio,
 Anna Maria Di Biase, SEIFEM Group



- BAL for LI among 3055 HM patients
- BAL was performed in 145 out of 434 patients who developed LI
- A putative causal agent was detected in 111 cases (76%),
- 89 cases (61%) the BAL results provided guidance to antimicrobial treatment
- 120-day attributable mortality (120d-AM) (11% vs 30%; $P = 0.003$)

VAP x bronchoscopy



The Association Between Bronchoscopy and the Prognoses of Patients With Ventilator-Associated Pneumonia in Intensive Care Units: A Retrospective Study Based on the MIMIC-IV Database

Frontiers in *Pharmacology*

Luming Zhang^{1,2†}, Shaojin Li^{3,†}, Shiqi Yuan^{4,†}, Xuehao Lu^{1,2}, Jieyao Li¹, Yu Liu¹, Tao Huang²

- MIMIC-IV approx. 250,000 patients hospitalized from 2008 to 2019 / MIT
- 1,560 patients with VAP: **1,355** in the **no-bronchoscopy** group and **205** in the **bronchoscopy** group
- When patients are undergoing IMV, bronchoscopy can not only help suck out the obstructions such as sputum and foreign bodies in the trachea, remove secretions, but also **repeatedly suction and wash the lungs, which is of great significance for reducing inflammation and improving lung ventilation**



Aspirace cizího tělesa

- recidivující krvácení
- absces



Single-use bronchoskopy

Výhody:

- vždy připraven
- sterilní – **nemožnost přenosu infekce**
- jednoduché použití
- nevyžaduje proškolený personál

Nevýhody:

- horší manipulace? NE
- horší zobrazení? NE
- **Cena???**

Výrobce:

- **AMBU**
- **Boston Scientific**
- **TSC**

- **Vathin**
- **Verathon**
- **Karl Storz**
- **Olympus**
- **Pentax**



Single-use bronchoscopy

The Cost of Flexible Bronchoscopes: A Systematic Review and Meta-analysis

Annals of Intensive Care

RESEARCH

Cost analysis of single-use (Ambu[®] aScope[™]) and reusable bronchoscopes in the ICU

Perbet et al. *Ann. Intensive Care* (2017) 7:3

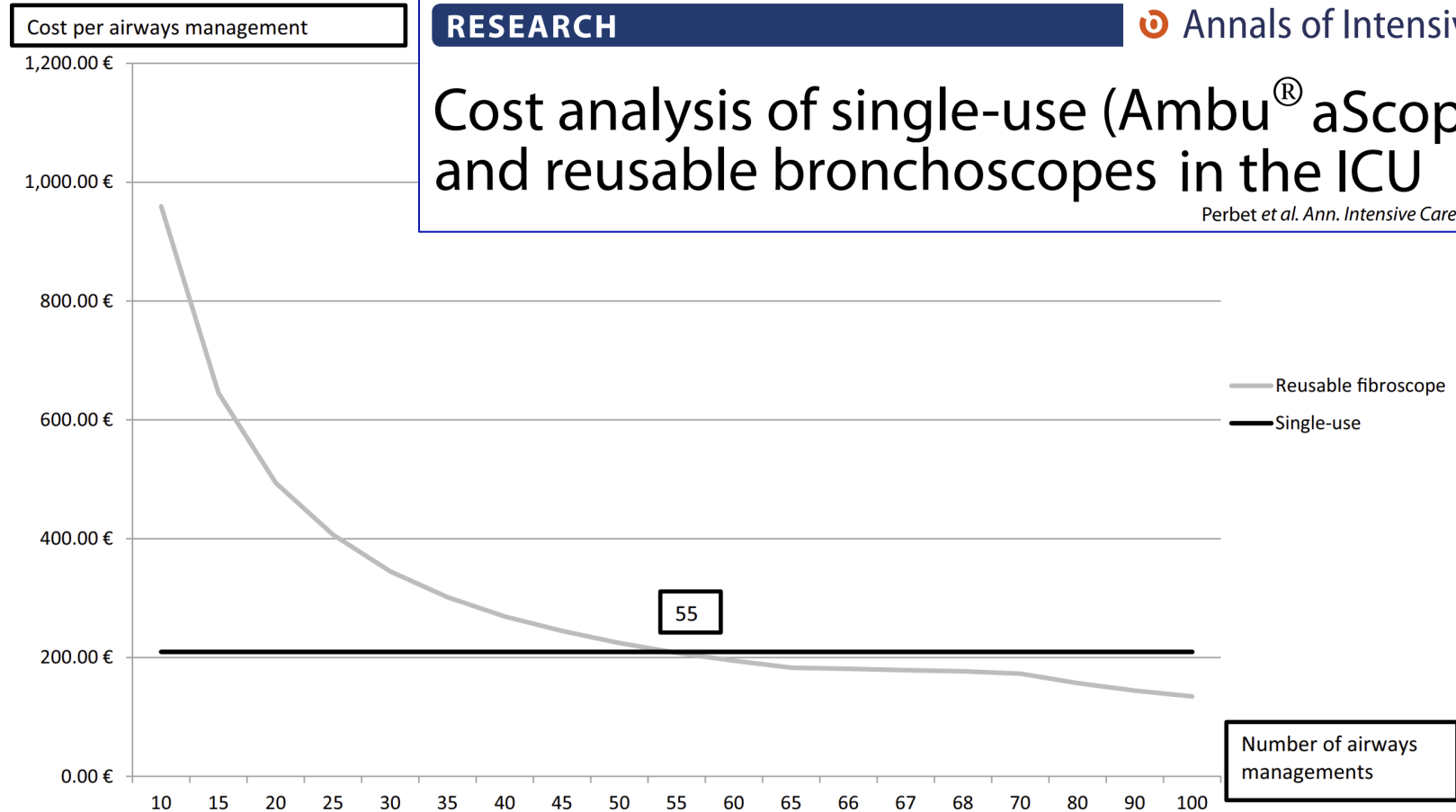
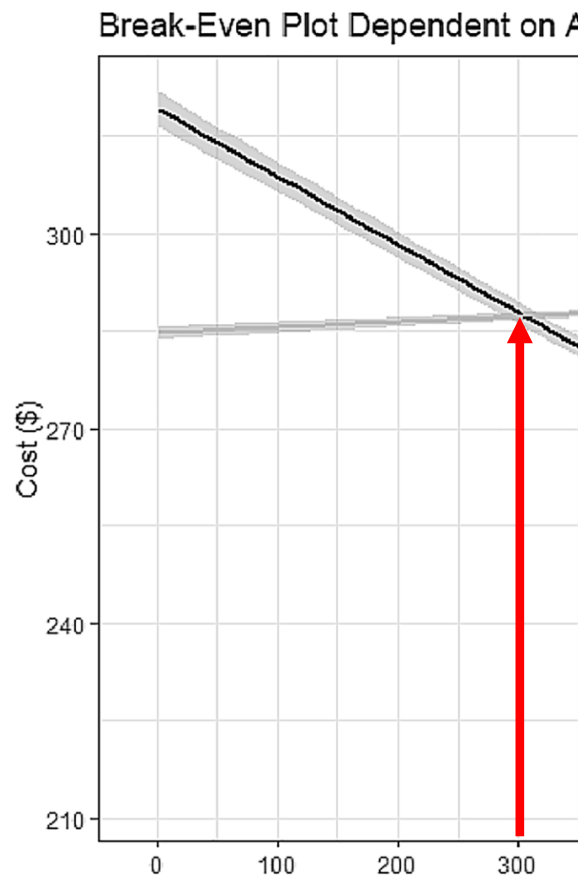
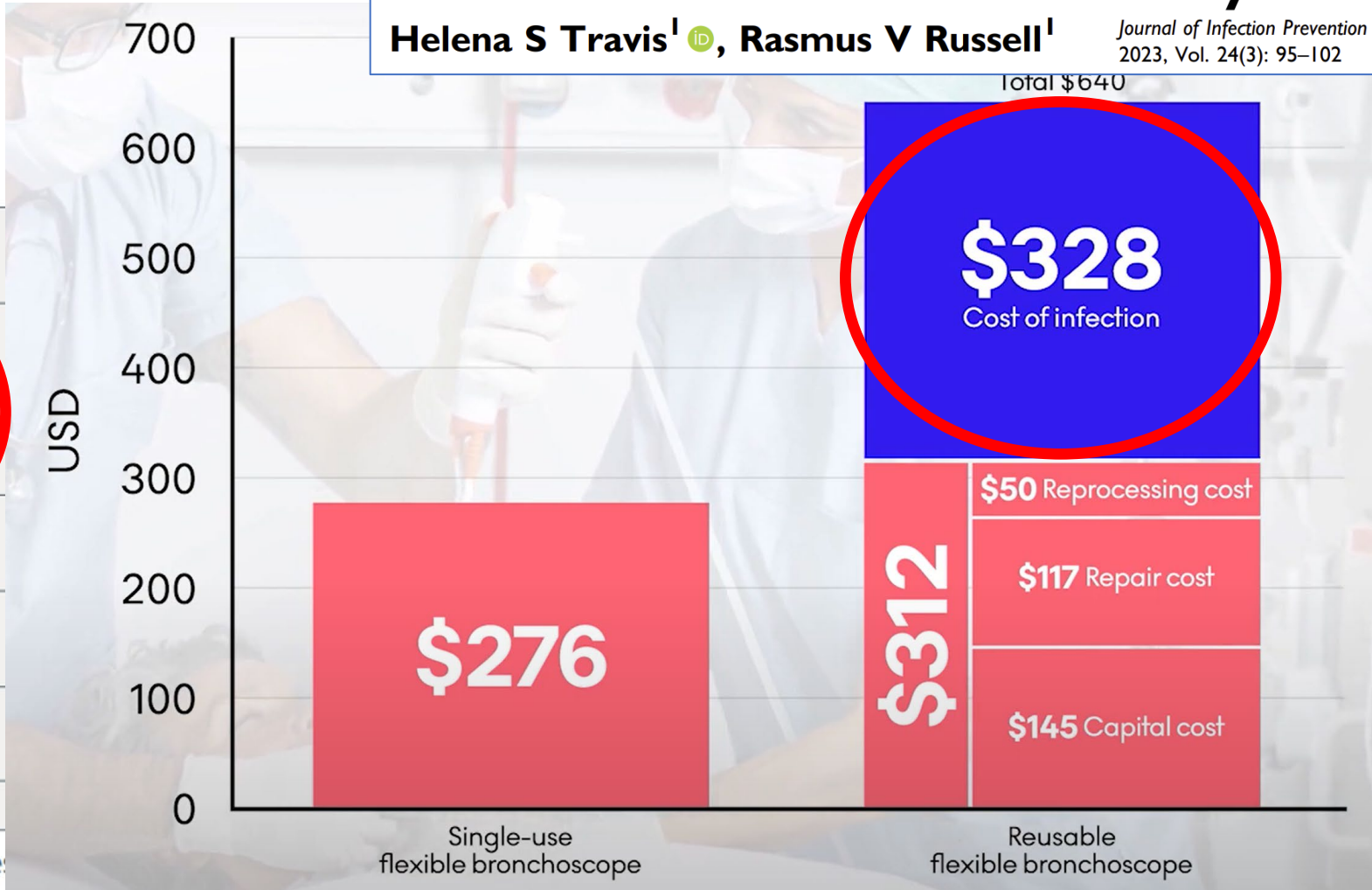
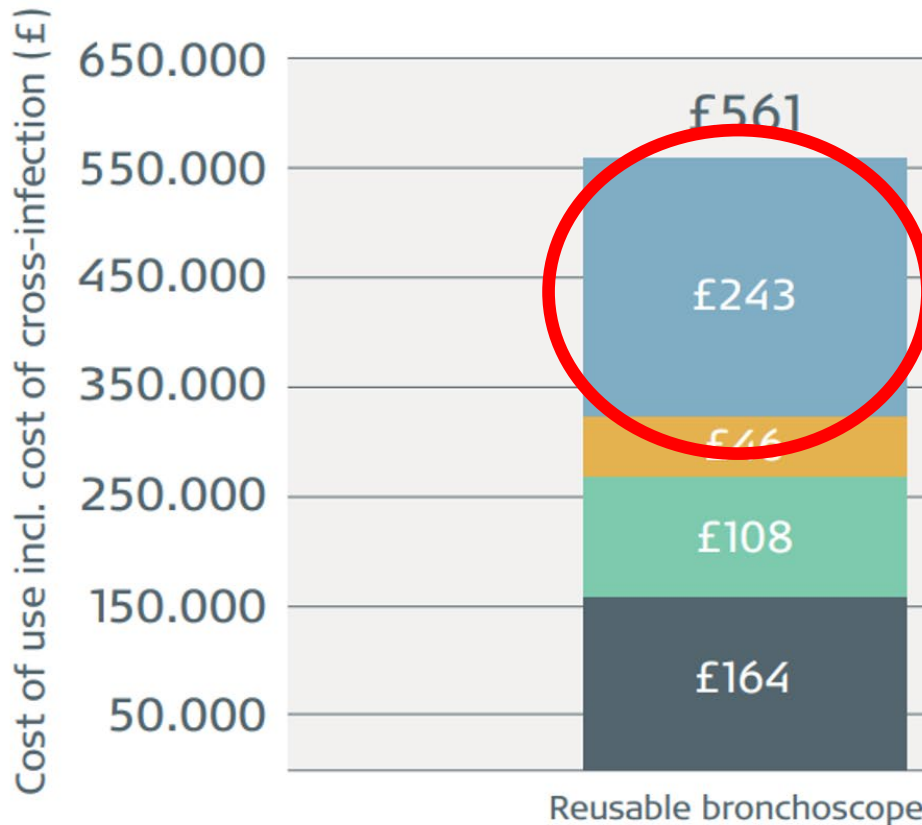


Fig. 1 Evolution of cost per airways management (EUR) when using one reusable scope per 50 airways managements per year comparing with single-use scopes



Single-use bronchoscopy

total RFB **cross-contamination rate**
was 8.69% ± 1.86



Cross-contamination rate of reusable flexible bronchoscopes: A systematic literature review and meta-analysis

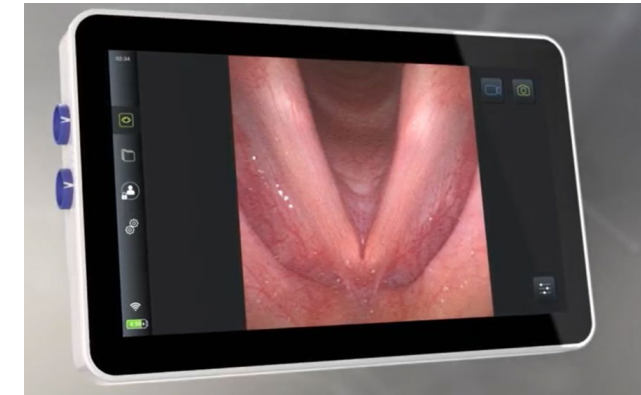
Helena S Travis¹, Rasmus V Russell¹

Journal of Infection Prevention
2023, Vol. 24(3): 95-102



Single-use bronchoskopy

- Výrobce:
- **AMBU**



- Ambu® aScope™ 5 Broncho HD 5.6/2.8
- Ambu® aScope™ 5 Broncho HD 5.0/2.2

aScope 4 Broncho
Slim 3.8/1.2
180°/180°

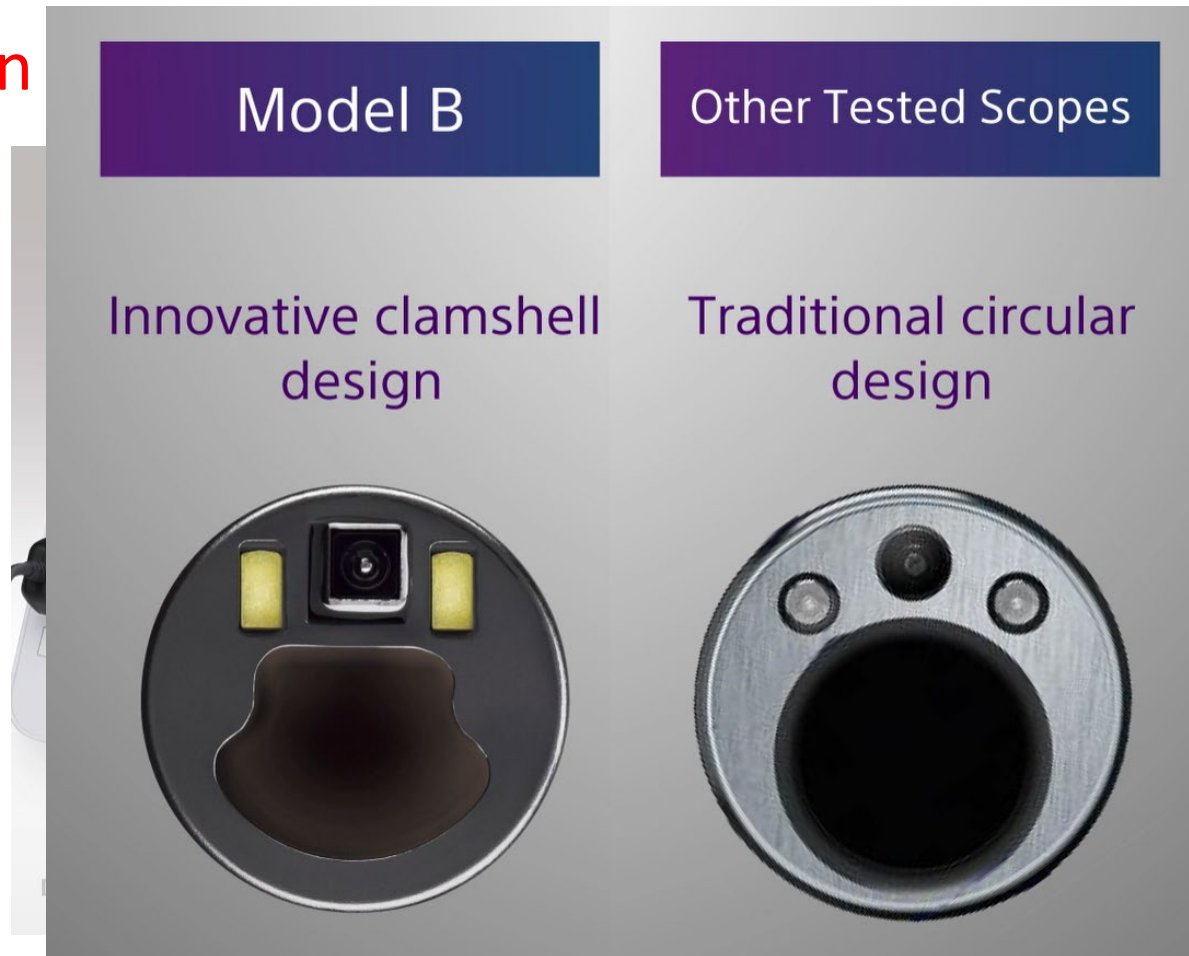
aScope 4 Broncho
Regular 5.0/2.2
180°/180°

aScope 4 Broncho
Large 5.8/2.8
180°/160°



Single-use bronchoscopy

- Výrobce:
- **Boston**





Single-use bronchoskopy



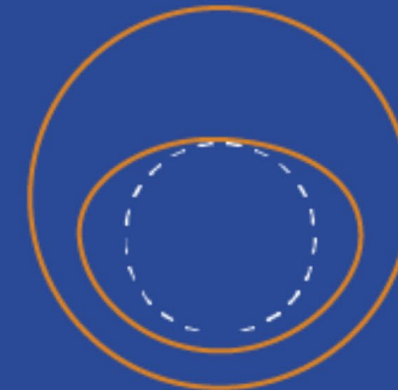
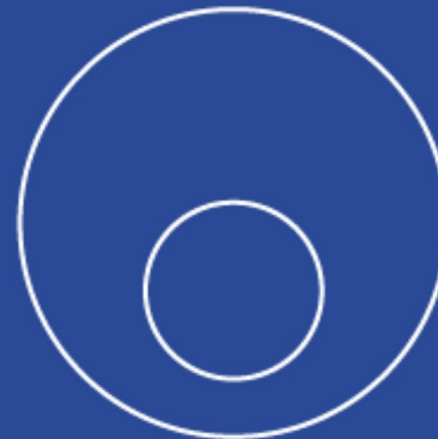
- Výrobce:

- TSC

BRONCOFLEX™

Standard single-use bronchoscopes

Broncoflex™
Vortex



| | |
|---------------------------------|-------|
| Ø Distal tip (mm) | Ø 5,5 |
| Ø Working channel (mm) | Ø 2,0 |
| Suction area (mm ²) | 3,80 |

| |
|-------|
| Ø 6,3 |
| Ø 2,6 |
| 6,15 |

| |
|-------|
| Ø 5,6 |
| Ø 2,8 |
| 9,95 |



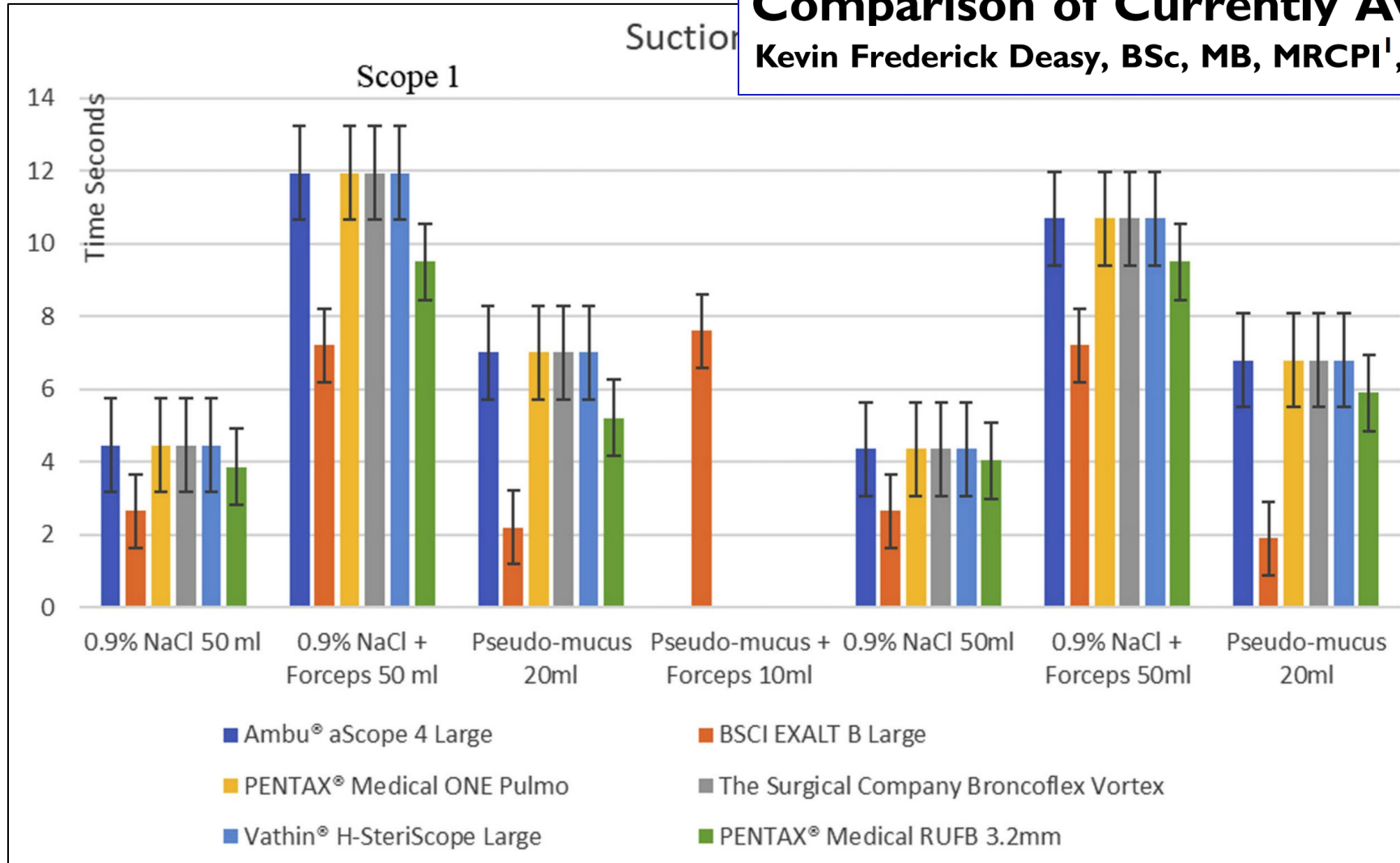
Single-use bronchoscopy



Single Use or Disposable Flexible Bronchoscopes: Bench Top and Preclinical Comparison of Currently Available Devices

Kevin Frederick Deasy, BSc, MB, MRCPI¹,

Journal of Intensive Care Medicine
2023, Vol. 38(6) 519-528



SUFB Specifications

Scope

Art
La

Outer dimension (OD) (average (maximum)) (mm)

Inner dimension (ID) (average (minimum)) (mm)

Length

Weight (g)

5.8

2.8

60

95

Suction

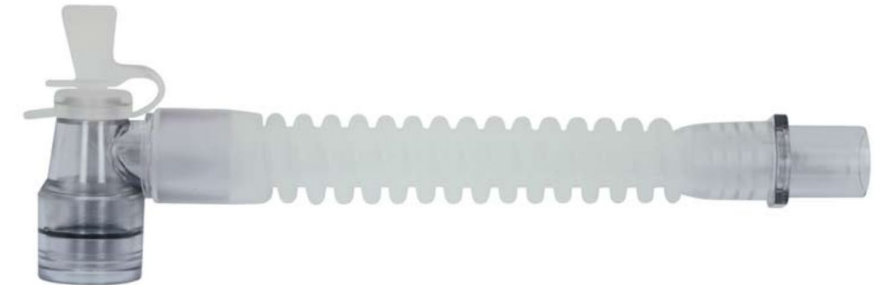
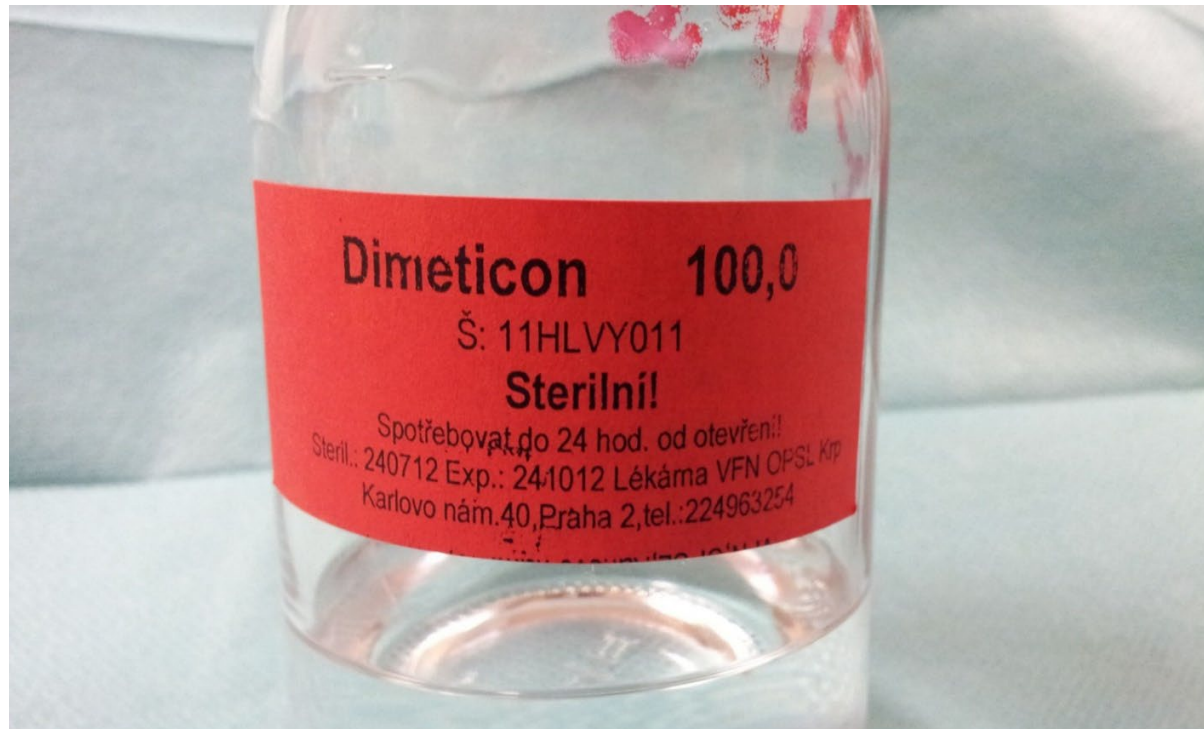
Scope 1

Jak na to? aneb praktické provedení

Kdo maže ten jede!



VŠEOBECNÁ FAKULTNÍ
NEMOCNICE V PRAZE



„Husí krk“ Obj.č. 65-65-130 č.šarže 1050477
Sterilizace v autoklávu
Výrobce: VBM MEDIZINTECHNIK GMBH –
dodavatel firma Cheiron
Cena: 273kč, opakovaná resterilizace (10-15x)

- polydimethylsiloxan, patří mezi silikonové oleje, liší se stupněm polymerace a tím i viskozitou.
- **dostupný Dimetikon 350 /f.Dr.Kulich/, Dimetikon 200 /f.Fagron/ 10g/ 246Kč**
při odběru 20ks / 10g / 66,40Kč
- nejsou sterilní, požadavek sterility se musí z vaší strany zdůraznit

Provedení za kontinuální UPV





Proč potřebuje aspirace jako první krok bronchoskopii?

- **FOB toaleta = snížení nálože bakteriální infekce**
/ redukce proinflamatorní nálože
- COMPLETE CARE = znovuzprůchodnění DC
- Odběr materiálu cílená ATB ... deescalace
- VAP/ ARDS 3.5 – 6 billion dollars and \$4,150 per patient/day in the U.S.
- **SNÍŽENÍ MORTALITY**



www.bronchokurz.cz