BRONKOSKOPİDE ANESTEZİ

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Celal Bayar Üniversitesi Tıp Fakültesi

Manisa

BRONKOSKOPİDE ANESTEZİ

- Endikasyon- Kontrendikasyon
- Hemodinamik etkiler
- Monitoring
- Lidokain-Atropin
- Hipoksemi
- Sonrası problemler

BRONKOSKOPİDE ANESTEZİ

- Hava yolunu görüntü eşliğinde değerlendirme.

TARİHÇE

1847	H. Green	Trakeobronşial ağaç
1897	G. Killan	Endoskop ile yabancı cisim çıkarılması *"Direk bronkoskopi"*
1900	C. Jackson	Bronş biyopsileri
1960	H. A. Anderson	Parankim biyopsisi
1967	S. Ikeda	Fiberoptik endoskopi

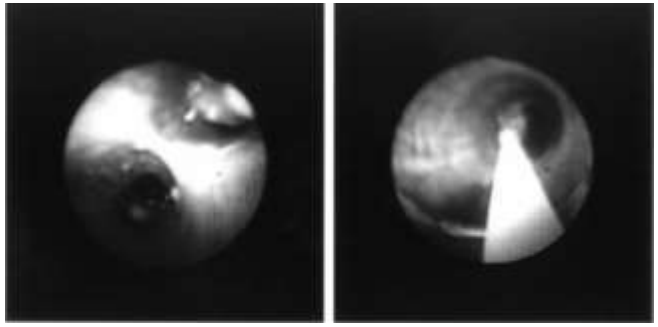
ANESTEZİDE BRONKOSKOPİ

Ameliyathane

- Zor entübasyon
- Endobronşial tüp doğrulama
- Bronşial blokerler yerleşimi

Yoğun Bakımda

- Atelektazi
- Trakeostomi yerinin doğrulanması

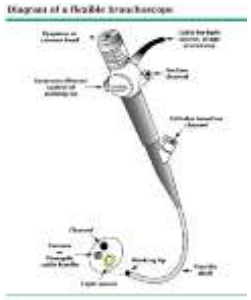


Yun *et al.*: *PEDIATRIC ENDOBRONCHIAL BLOCKER*
CAN J ANESTH 2002

Figure 2 A view of a patient's carina is seen on the screen of the VivaSight monitor.

Levy-Faber et al. | VivaSight DL vs conventional double-lumen tube Anaesthesia 2015, 70, 1259–1263

AMELİYATHANE DIŞINDA BRONKOSKOPİ



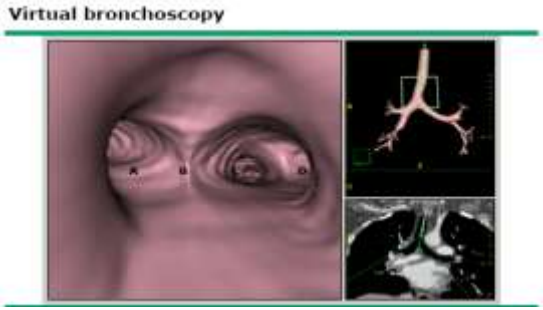
Bronkoskopi Ünitesi

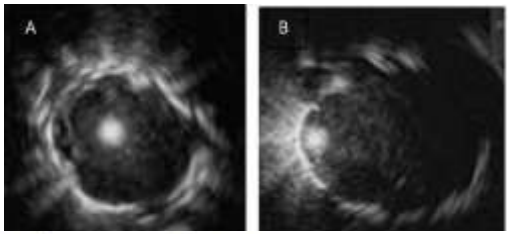
- Tanısal Amaçlı veya Tedavi Amaçlı

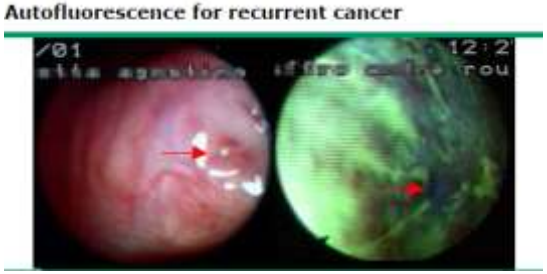
- **Virtual Bronkoskopi**
- **Radial probe EBUS**
- **Navigasyon bronkoskopi**

  Vertual veya elektromanyetik navigasyon bronkoskopi

- **Ultrathin bronchoscopy**
- **Floresan bronkoskopi**
- **Image-guıded bronchoscopy techniques**







TANISAL ya da TEDAVİ AMAÇLI

- Akciğer tümörleri tanısı, evreleme, tedaviye yanıt
- Hemoptizi, Öksürük
- Reküren atelektazi; Endobronşial tm?
- İnterstisiel akciğer hastalıklarında
- Yabancı cisim, Karsinoid tümör, Skarlar, (lazer, elektrokoter)
- Büyük havayolu darlıklarında (stent), bronko-plevral fistül tamir

Indications for bronchoscopy

Inspection
Cough (persistent, unexplained)
Hemoptysis
Wheeze (localized/fixed)
Diaphragmatic paralysis*
Unexplained hoarseness and/or vocal cord paralysis/stridor
Suspected tracheo-esophageal fistula
Chest trauma
Suspected tracheomalacia
Toxic inhalation or burn injury
Verify tracheostomy or endotracheal tube placement
Evaluate precancerous lesions (autofluorescence)
Donor transplant lung evaluation

Table 2. Indications of these procedures

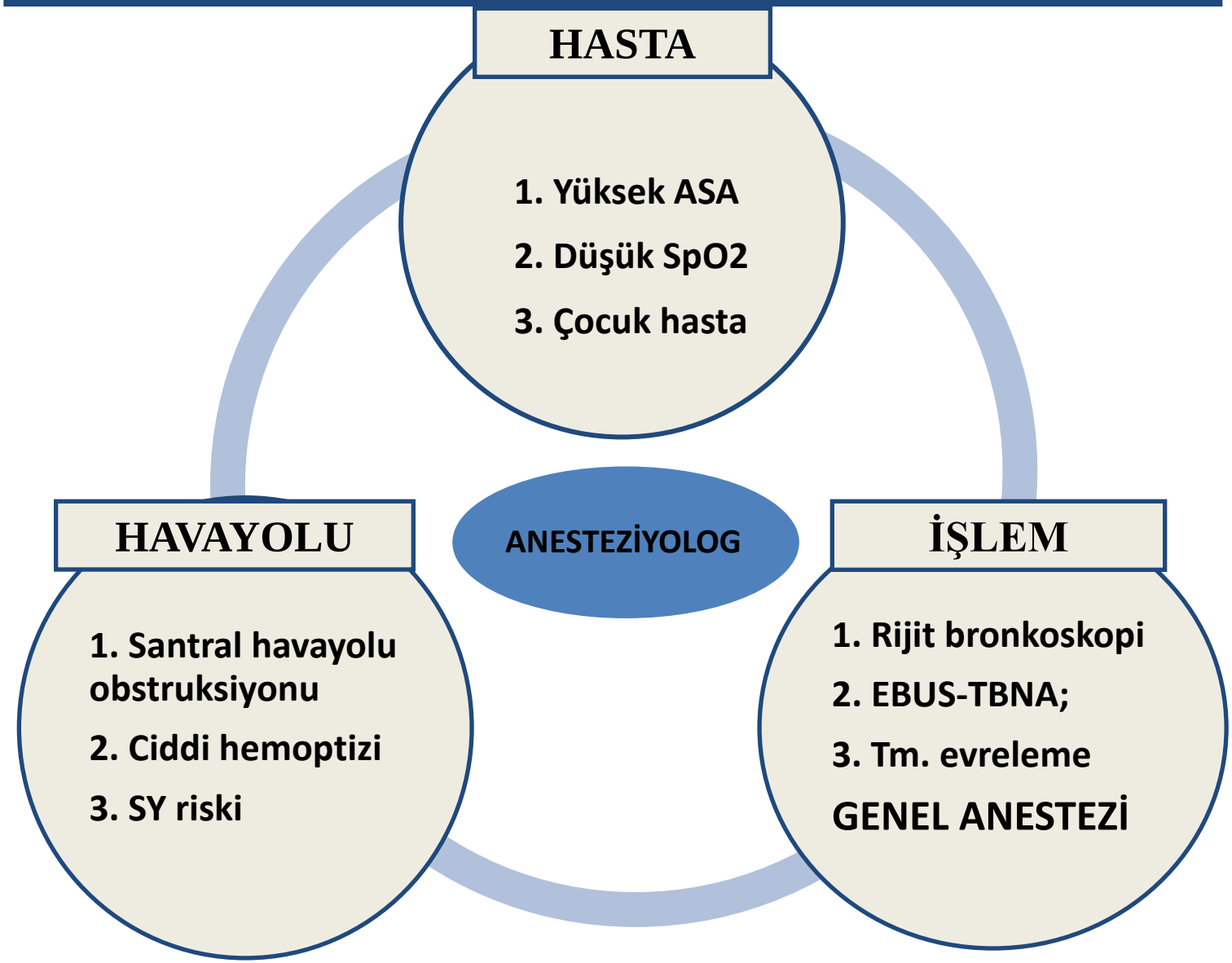
Indications	n	%
Indications for diagnostic procedure		
Mass/nodule	10,656	60
Infectious lung disease	3,012	16.9
Cough	2,596	14.7
Pulmonary atelectasis	1,497	8.4
Indications for therapeutic procedure		
Foreign body	756	12.8
Suctioning of sputum	727	12.3
Airway obstruction	2,571	43.4
Airway stenosis	1,867	31.5

Respiration. 2008;76(4):429

TANISAL ya da TEDAVİ AMAÇLI

Tool	Scope	Complication				
		Rapid Effect	Repeatable	Immediate	Delayed	Lesion
Laser	Rigid/flexible	++++	++++	++	+	Endobronchial
Brachytherapy	Flexible[a]	+	+	+	+++	Endobronchial/submucosal
Cryotherapy	Rigid/flexible	++	++++	++	++	Endobronchial
Balloon dilation	Rigid/flexible	++++	++++	+++	+	Submucosal/external compression
Photodynamic therapy	Flexible[a]	++	+++	+	+++	Endobronchial/submucosal
Electrocautery	Rigid/flexible	+++	++++	++	++	Endobronchial
Stent	Rigid/flexible[b]	++++	+++	++	+++	External compression

ANESTEZİYOLOG DESTEĞİNİ GEREKTİREN DURUMLAR

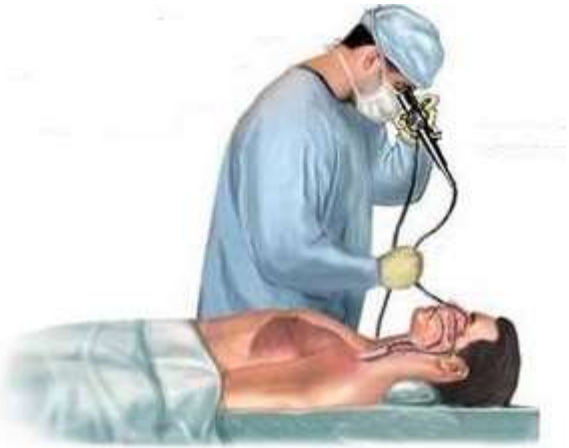


ANESTEZİYOLOGDAN BEKLENEN

- Hasta- Uygulayıcı **KONFORU**
  - Kötü deneyim
  - Ajitasyon
  - Öksürük
- Güvenli hava yolu, yeterli oksijenasyon
- İşlem sonrası hızla geri dönen, MV desteği gerektirmeyen anestezi
- Komplikasyonlarla başetme
- İşlem akıcılığı; uygulayıcının konsantrasyonu

ANESTEZİ YÖNTEMİNİ BELİRLEYEN FAKTÖRLER

- Çocuk hasta
- Rijit bronkoskopi
- Yandaş Hastalıklar
- Girişimsel işlemin niteliği



FOB vs Rijit Bronkoskopi

- Yabancı cisim çıkarılması
- Masif hemoptizi kontrolü
- Bronkoskopik görüntü kalitesi
- Trakea darlığında FOB, hava geçişini engeller, ek solunum sıkıntısı
- Mekanik rezeksiyon, dilatasyon (stenoz)

Bronkoskopi göreceli kontrendikasyonları

- **Göreceli kontrendikasyonlar**
  - **KVS hastalıklar (yakın zamanda geçirilmiş MI, stabil angina, aritmi, hipertansiyon)**
  - **Serebrovasküler patoloji varlığı**
  - **Kafa içi basınç yüksekliği**
  - **Konvülziyon**
  - **Kanama diatezi**
  - **Trombositopeni (BAL<20.000/mm^3, biyopsi 50.000 /mm$^{3)}$**
  - **Trombosit fonksiyon bozukluğu**
  - **Ağır anemi**
  - **Portal hipertansiyon**
  - **Üremi**

Bronkoskopi kontrendikasyonları-I

- **Mutlak kontrendikasyonlar**
  - ✓ **%100 oksijen uygulaması sonucu**
  - ✓ **PaO_2< 60 mmHg kalıyorsa**
  - ✓ **Ağır bronkospazm**
  - ✓ **Stabil olmayan astım**

ANESTEZİ YÖNTEMLERİ

- **Lokal - Rejyonal Anestezi**
- **Bilinçli Sedasyon**
- **Genel Anestezi**

  TİVA - İnhalasyon

HASTA DEĞERLENDİRİLMESİ

HİPOKSEMİ

- Solunum Fonksiyon Testi

- **FEV_1 < 1 L; % 35**
  FEV_1 < 1 - 1,5 L; % 7
  FEV_1 > 1L; % 7

SpO_2

< % 90

Jones AM et al. Do al patients require supplemental oxygen during fkexible bronchoscopy? Chest 2000

HASTA DEĞERLENDİRİLMESİ

KARDİYAK RİSK

- Efor ??
- Eko
- Anjiyografi

- **FOB- sempatik yanıt- taşikardi, HT**
  V/P bozukluk- BAL ile; Hipoksemi

- **HİPOKSEMİ- ARİTMİ gelişiminde prediktör.**

Matot I et al. Myocardial ischemia in sedated patients undergoing fiberptic bronchoscopy? Chest 2001

Monitorizasyon, Ekipman

- **Kardiyopulmoner monitör**

  EKG, TA, SpO_2, $EtCO_2$ (Transkütanöz, perkütan)

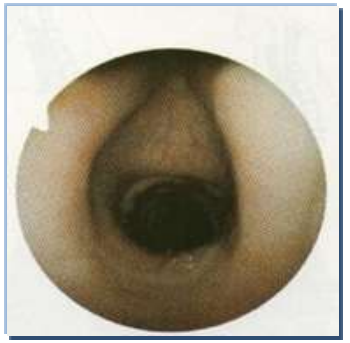
- **Resüsitasyon düzeneği**

  ET, Laringoskop, İlaçlar

- **Oksijen, aspiratör**

- **Bronkoskop ve yardımcı aletler**

Bronkoskopi Hazırlık

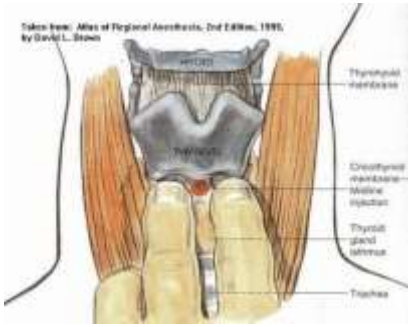


- Açlık süresi
- Bilgilendirme: ONAM
- Hasta değerlendirme
- Premedikasyon
- Nebülizatör ile lokal anestezi uygulanır

  (%1 Lidokain, 5-7mL 10-15 dk)

LİDOKAİN TOPİKAL

- Atomizasyon, sprey
- Ultrasonik veya jet NEBULİZE LİDOKAİN : % 4 Lidokain
- Transkrikoid enjeksiyon
- Bronkoskop kanalından; ilerledikçe lidokain (% 1 veya 2)

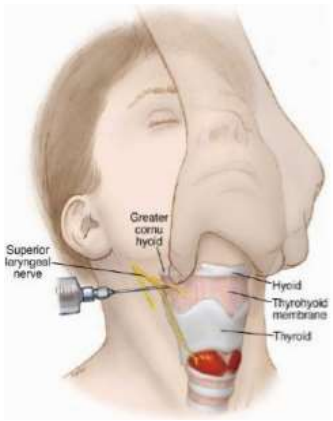


LİDOKAİN REJYONAL BLOK

- Bilateral superiyor laringeal sinir bloğu
- Recurrent laringeal sinir (transtrakeal veya translaringeal blok)

✓ **Zor hava yolu, FOB**

✓ **Farmakolojik ilaç kullanımından kaçınılması**



LİDOKAİN

- Plazma seviyelerini öngörmek zor
- Farmakokinetik etkileniyor: Süre, Suction sıklığı
- % 1 Lidokain kullanımı; The British Thoracic Society
- % 1-10 ; CHEST
- 8.2 mg/kg: max. doz

TOKSİSİTEYİ ÖNLEME

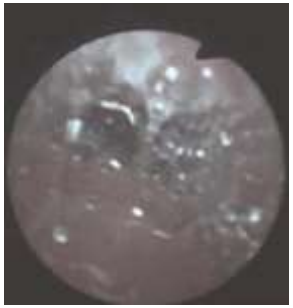
- Renal ve hepatik disfonksiyonlu
- Havayolu inflamasyonlu
- Pediyatrik yaş grubu

DOZ AZALTILMASI

KOMPLİKASYON ORANI % 0.09

LİDOKAİN

- Non-kardiyojenik pulmoner ödem
- Anafilaktik reaksiyon



NADİR: AKILDA TUTULMALI

Life-threatening Anaphylactic Reaction after the Administration of Airway Topical Lidocaine

Pediatric Pulmonology 46:505–508 (2011)

Acute Respiratory Distress Syndrome After Airway Anesthesia With Lidocaine

Tommaso D'Elia, MD, and Loredana Ghio, MD

(*J Bronchol Intervent Pulmonol* 2010;17:245–247)

ATROPİN RUTİN KULLANIMI !?

Anticholinergic Agents

17. Atropine and glycopyrrolate, when administered prebronchoscopy, do not produce a clinically meaningful improvement in lung function or decrease in bronchial secretions, and their use is discouraged.

CHEST Consensus Statement

American College of Chest Physicians Consensus Statement on the Use of Topical Anesthesia, Analgesia, and Sedation During Flexible Bronchoscopy in Adult Patients

CHEST 2011; 140(5):1342–1350

BİLİNÇLİ SEDASYON

	Minimal sedasyon (anksiyoliz)	**Orta derecede sedasyon/analjezi (bilinçli sedasyon)**	**Derin sedasyon/ analjezi**	**Genel anestezi**
Yanıt verme	Sözlü uyaranlara normal yanıt	Sözlü ve taktil uyaranlara maksatlı* yanıt	Tekrarlayan veya ağrılı uyaranlara maksatlı* yanıt	Ağrılı uyaranlarla bile uyandırılamama
Havayolu	Etkilenmemiş	Müdahale gerektirmiyor	Müdahale Gerekebilir	Sıklıkla müdahale gerekir
Spontan solunum	Etkilenmemiş	Yeterli	Yetersiz olabilir	Sıklıkla yetersiz
Kardiyovasküler fonksiyon	Etkilenmemiş	Genellikle Korunuyor	Genellikle korunuyor	Bozulmuş olabilir

* Ağrılı uyarana refleks geri çekme maksatlı yanıt kabul edilmemektedir.

Gullo A. Sedation and anesthesia outside the operating room: definitions, principles, critical points and recommendations. Minerva anesthesiol 2005;71:1-9

BDZ ve OPİOİD

MİDAZOLAM

- Anterograd amnezi
- Sedasyon
  - Hızlı etki başlangıcı
  - Hızlı pik etki
  - Kısa etki süresi

Yetişkin doz:
0.06-0.07 mg/kg (0.5-2.5 mg IV

Pediyatrik doz:
0.05-0.2 mg/kg IV (max 0.6 mg/kg)

FENTANİL

- Öksürüğü baskılma
- Analjezik etki
  - Hızlı etki başlangıcı
  - Hızlı pik etki
  - Kısa etki süresi

Yetişkin doz:
25-50 mcg; 1-2 dk içinde

Pediyatrik doz:
1-2 mcg/kg

BDZ ve OPİOİD' lerin tercih nedenleri

Table 2—*Reversal Agents for Benzodiazepines and Opioids*

Reversal Agent	Antagonized Drug	Metabolism	Excretion	Dosage and Administration	Onset of Action	Duration of Action	Special Considerations
Flumazenil	Benzodiazepines via the GABA benzodiazepine receptor	Hepatic	Renal	0.2 mg IV over 15 s, may repeat same dosage at 60-s intervals (maximum dosage: 1 mg/dose; 3 mg/h)	1-2 min	30-60 min	May lower seizure threshold in predisposed patient population; may cause benzodiazepine withdrawal in patients with chronic benzodiazepine use
Naloxone	Opioids via the opioids receptors (μ, κ, σ)	Hepatic	Renal	0.1-0.2 mg IM/IV/SQ over 2-3 min (may need to repeat dosage relative to half life of opioids)	IV: 1-2 min IM/SQ: 2-5 min	1-4 h	May result in opioid withdrawal in patients with chronic narcotic use

GABA = γ-aminobutyric acid; SQ = subcutaneous.

PROPOFOL

- **Sedasyon**
- **Anksiyolitik**
- **Amnestik**

Yetişkin doz:

İndüksiyon: 0.1-0.15 mg/kg/dak.

İdame: 0.025-0.075 mg/kg/dak.

Etki başlangıç: 30-45 sn,

Etki süre 20-75 dak.

- Ciddi kardiyak disfonksiyon
- Propofol infüzyon sendromu (>5mg/kg/h , süre >48h)
- Metabolic asidosis, rabdomiyoliz**,** hiperkalemi, lipemi,hepatik, renal, kardiyak yetmezlik.

REMİFENTANİL

- Ultra kısa etkili sentetik opiod
- Dose: 1 mcg/kg bolus

  0.05-0.2 mcg/kg/min
- Plazma esterazları ile metabolize olur
- Doza bağımlı; KAH, TA, SS ve TV azalır
- Rijitide

DEXMEDETOMİDİNE

- **Alfa 2 agonist**
- **Sedatif, Anksiyolitik, Analjezik, Sempatolitik**

Yetişkin doz:

1 mcg/kg yükleme doz, süre: 10 dak içinde.

İdame: 0.2-1 mcg/kg/h idame.

- **DESATÜRASYON**; - **Remifentanilden** daha az, recovery süresi daha uzun, LA gereksinimi yüksek, uygulayıcı memnuniyeti düşük

Ryu JH et al, Br J Anaesth. 2012 Mar;108(3):503-11

- **MİDAZOLAM** ‘dan daha az,

Liao W et al. Journal of International Medical Research, 2012

- **İŞLEME TOLERANS** ; **MDZ** dan daha iyi.

Pulmonary Medicine 2015

BİLİNÇLİ SEDASYON AJANLAR

- DEX vs Midazolam PMC4620292, 2015
- DEX vs Sufentanil *Clin Respir J 2014; 8: 100–107*
- DEX vs DEX+KETA J Anaesth Clin Pharm 2014
- Propofol ve Remifentanil GA vs seda. Singapore Med J 2013
- Propofol vs Sevofluran *Minerva Anestesiol 2010;76:780-6)*

Öksürük, hemodinamik stabilite

Hipoksemi- Desatürasyon

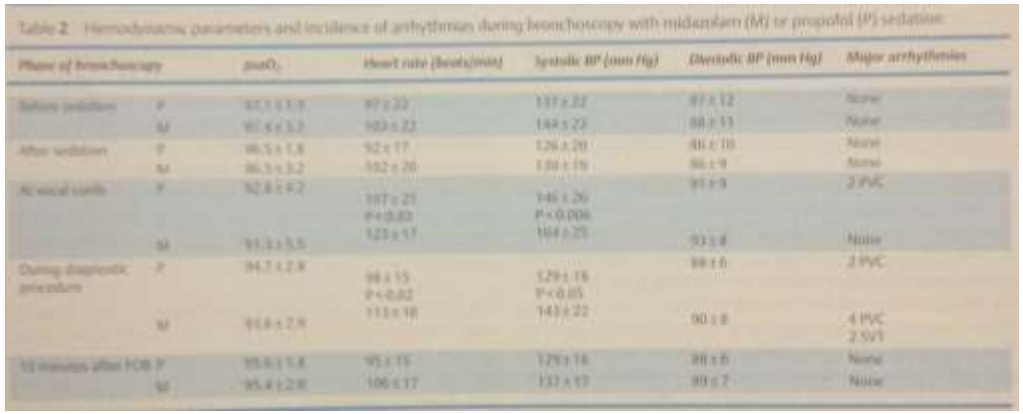
Uygulayıcı memnuniyeti

Sedasyon derecesi, hasta toleransı

T. Öztürk[1]
A. Çakan[2]
G. Gülerçe[2]
G. Olgaç[3]
S. Deren[2]
A. Özsöz[2]

Sedation for Fiberoptic Bronchoscopy: Fewer Adverse Cardiovascular Effects with Propofol than with Midazolam

Anaesthesiol Intensivemed Notfallmed Schmerzther 2014



FEV1< % 50

Propofol
Daha iyi hemodinami
Benzer disritimi

Fospropofol; > 65 y hastalarda benzer sedasyonla ilgili advers olaylar ve hipoksemi sıklığı(% 26)

Fospropofol Disodium for Sedation in Elderly Patients Undergoing Flexible Bronchoscopy spropofol Disodium. J Bronchology Interv Pulmonol. 2011 Jan;18(1):15-22

GENEL ANESTEZİ

Fig. 8 – Lowering of the tube through the mask.

Intubation with rigid bronchoscope

İNHALASYON

SEVOFLURAN

TİVA

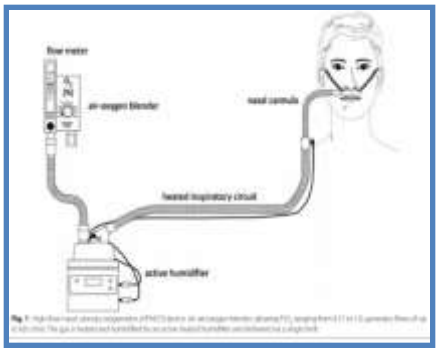
REMİ + KETA
REMİ + PROPOFOL
DEX + PROPOFOL
DEX + REMİ

KAS GEVŞETİCİLİ veya KAS GEVŞETİCİSİZ

HİPOKSEMİ YÖNETİMİ

Yeterli oksijenizasyon

- Yüksek akımlı nazal kanul (HFNCO) 60 ml/dk
- LMA üzerinden FOB
- NIMV ile FOB



Sebahat Genç, Kemal Can Tertemiz, Leyla İyilikçi Karaoğlan, Özge Oral Taşan,

Fiberoptic bronchoscopy under noninvasive ventilation and propofol target-controlled infusion in hypoxemic patients Intensice care 2011

Flexible Fiberoptic Bronchoscopy Through the Laryngeal Mask Airway in a Small Premature Infant

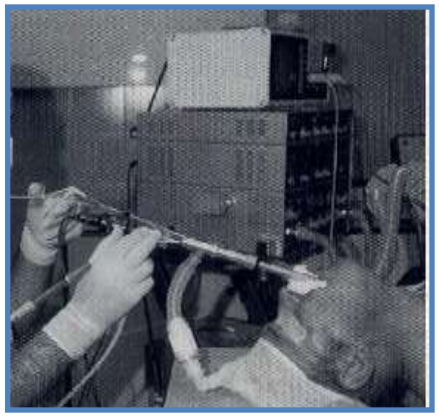
Ahmet Hakan Gedik[1], Erkan Çakır[1], Ufuk Topuz[2]

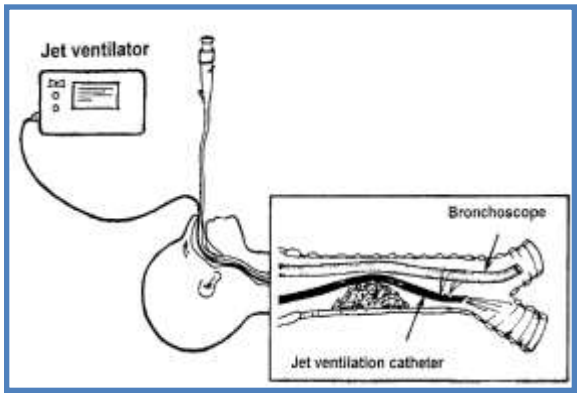
HİPOKSEMİ YÖNETİMİ

Yeterli oksijenizasyon

- Rijit bronkoskopi
- HFJV
- PEEP

MesH Vibrating Micropump Nebulizer





High Frequency Jet Ventilation in Interventional Fiberoptic Bronchoscopy: PRO+ALF

KOMPLİKASYONLAR

- Disritmi
- Hemodinamik bozukluklar
- Hipoksemi
- Laringospazm-bronkospzm
- Öksürük
- Hemoptizi
- Barotravma
- LA Toksisitesi
- Kardiyak Arrest; % 0.07 Vazo-vagal senkop

Table 3. Severe complications of diagnositic bronchoscopy

Severe complications	n
Laryngospasm or tracheospasm or bronchospasm	30
Massive hemoptysis	28
Pneumatothorax and/or subcutaneous emphysema	4
Cardiac arrhythmia	11
Total	73

Table 4. Severe complications of therapeutic bronchoscopy

Severe complications	n
Laryngospasm or tracheospasm or bronchospasm	38
Massive hemoptysis	9
Cardiac arrhythmia	13
Airway obstruction	8
Esophagotracheal fistula	5
Tracheal perforation	3
Death	3
Total	79

% 0.08-6

Severe complications of bronchoscopy. Respiration. 2008;76(4):429

KOMPLİKASYONLAR

Table 5. Severe complications of bronchoscopy

Procedure	Complications							
	death	laryngospasm or tracheospasm or bronchospasm	massive hemoptysis	cardiac arrhythmia	airway obstruction	esophago-tracheal fistula	pneumato-thorax and/or subcutaneous emphysema	racheal perforation
Bronchoscopic direct observation		10		1				
Endobronchial neoplasm or mucosal biopsy	1	10	19	2	1			
Lung tissue biopsy		2	8	1			4	
Endobronchial brushing		4		1				
Transbronchial biopsy		4	1	1				
Bronchoscopic suction of sputum		13						
Tracheal intubation via bronchoscope		9		4				
Bronchoscopic hemostasis				1				
Bronchoscopic retrieval of airway foreign body		1		1				
Microwave thermotherapy		10		2	2	2		2
Laser photoresection	2			2	2	3		1
Electrocautery			9	1	3			
Argon plasma coagulation		2		1	1			
Tracheobronchial stenting		2						
Balloon dilation		1		1				

Severe complications of bronchoscopy. Respiration. 2008;76(4):429

RESEARCH ARTICLE

Effect of Acute Hypercapnia on Outcomes and Predictive Risk Factors for Complications among Patients Receiving Bronchoscopic Interventions under General Anesthesia

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Acute Hypercapnia on Outcomes and ComplicationsPLOS ONE DOI:10.1371/ 2015 1 / 8

Locations				
Trachea	11(13.3)	57(25.9)	15(31.9)	0.01
Bronchus	62(74.7)	60(31.1)	10(21.3)	0.00
Trachea+Bronchus	10(12.0)	76(39.4)	22(46.8)	0.00
Severe stenosis	11(13.3)	31(16.1)	15(31.9)	0.02

Data are presented as mean± standard deviation (median, range) or as a number (percentage).

Severe stenosis: diameter of trachea < 6 mm; the obstruction is above 90% of the main bronchus in a cross-sectional area. KPS: Karnofsky performance

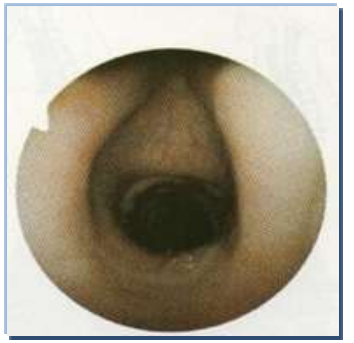
Grup C Kontrol: PaCO2: 60 mmHg
Grup M: PaCO2:61–100 mmHg
Grup S: PaCO2: >100 mmHg

- **HFJV, RB içinden Fiber**
- **GA: PROP+REMİ+ROCUR veya SÜKSİNİL KOLİN**

Table 3. Independent predictive factors for surgery complications.

Complications	Independent predictive factor	Odds ratio(95% CI)	*P*
Postoperative congestive heart failure, tracheorrhagia, delayed recovery and transfer to ICU	Procedures duration*	0.079(0.028~0.13)	0.003
	Lobectomy	12.6(4.8~20.3)	0.007
	Dynamic airway collapse	15.6(3.5~27.8)	0.01
	Severe bronchial stenosis	7.56(1.55~13.57)	0.01
	Hypercapnia	3.21(2.3~ 7.6)	0.02

BRONKOSKOPİ SONRASI SORUNLAR



- ÖKSÜRÜK
- LARİNGOSPAZM
- BRONKOSPAZM
- REAKTİF HAVA YOLU
- KANAMA

Buhar, hidrasyon, steroid, bronkodilatör

ATEŞ

PNÖMONİ

BRONKOSKOPİ SONRASI SORUNLAR

ÇOCUKTA UZUN SÜREN TEKRARLAYAN BRONKOSKOPİ

- **Post glottik veya laringeal ödem**
- **Laringeal stridor**
- **Bronkospazm**

Buhar, hidrasyon, steroid, bronkodilatör

The effect of remifentanil on the emergence characteristics o children undergoing FBO for bronchoalveolar lavage with sevoflurane anaesthesia

Ozturk et al. European Journal of Anaesthesiology 2009, 26 :338-41

Table 2 Duration of bronchoscopy, anaesthesia, emergence and recovery (minutes) in children receiving sevoflurane (group S) or sevoflurane plus remifentanil (group SR) for diagnostic fiberoptic bronchoscopy

	Group S ($n=25$)	Group SR ($n=25$)	P^a
Bronchoscopy	12±3	10±4	0.4
Anaesthesia	19±4	18±4	0.8
Emergence	10±3	8±2	0.1
Recovery	13±4	7±6	0.0001
EtSevo (%)	4.4±0.8	3.8±0.4	0.001
Remifentanil (μg)	–	22±8	
Lidocaine (mg)	33±6	32±7	0.5
Midazolam (mg)	8±2	8±2	0.3

In addition, end-tidal sevoflurane concentrations (EtSevo) and total dose of medications used are given. Data are presented as mean ± SD. [a] Student's *t*-test.

Table 3 Coughing scores (median ± interquartile range) in children during the recovery period (at times 0, 5 min, 10 min, and 15 min) after having received sevoflurane (group S) or sevoflurane plus remifentanil (group SR) for diagnostic fiberoptic bronchoscopy

Times during recovery period	Group S ($n=25$)	Group SR ($n=25$)	P^a
Time 0 (emergence)	0±0.25	0±0.75	0.06
Time 5 min[c]	1±0.75	1±1	0.27
Time 10 min[c]	1±0.50	1±1.25	0.77
Time 15 min	0±1	0.5±0.75	0.33
P^b	<0.0001	0.3	

[a] Kruskal–Wallis ANOVA test. [b] Friedman ANOVA by ranks test. [c] $P<0.01$ compared to time 0 (Wilcoxon matched pairs test, with level of significance re-adjusted).

Effects of low-dose propofol vs ketamine on emergence cough in children undergoing flexible bronchoscopy with sevoflurane-remifentanil anesthesia: a randomised, double-blind, placebocontrolled trial. Ozturk et al. J Clin Anesth

Table 3 Cough scores of 0/1 (<3 coughs/min) and 2/3 (≥3 coughs/min) in children during the recovery period (at times 0, 5 min, 10 min, 15 min, and 20 min) after diagnostic fiberoptic bronchoscopy.

	Group Control (n=23) 0/1 : 2/3	Group Propofol (n=22) 0/1 : 2/3	Grup Ketamine (n=23) 0/1 : 2/3	P^a
T0 (emergence)	17 (74) : 6 (26)	17 (77) : 5 (23)	16 (70) : 7 (30)	0.8
T5 min	18 (78) : 5 (22)	16 (73) : 6 (27)	17 (74) : 6 (26)	0.9
T10 min	22 (96) : 1 (4)	18 (82) : 4 (18)	17 (74) : 6 (26)	0.1
T15 min	22 (96) : 1 (4)	18 (82) : 4 (18)	19 (83) : 4 (17)	0.3
T20 min	22 (96) : 1 (4)	21 (95) : 1 (5)	22 (96) : 1 (4)	1.0

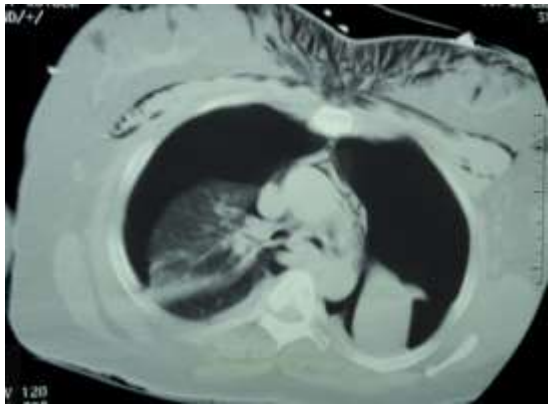
Data are given as number (percentage)

[a] Pearson Chi-square test

BRONKOSKOPİ SONRASI SORUNLAR

PNÖMOTORAKS

- Lokal gaz trapping etkisi- ***BAL***
- ***Öksürük***- Transpulmoner basınç grandiyentinde artış
- Sürfarktan da azalma- ***BAL*** ile



Bilateral Pneumothorax After Bronchoscopy Without Biopsy—A Rare Complication: Case Presentation and Literature Review

Setu Patolia, MD, Mehjabin Zahir, MD, Frances Schmidt, MD, Danilo Enriquez, MD,

- **J Bronchol Intervent Pulmonol 2012;19:57–60**

BRONKOSKOPİ SONRASI SORUNLAR

UVULADA NEKROZ

Fig. 1. The whitish-colored lower half of the uvula (arrow) is necrotic one day after bronchoscopy.

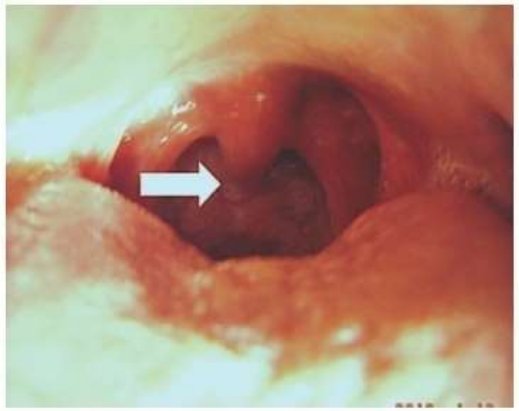


Fig. 2. Two weeks after bronchoscopy the necrotic portion of the uvula had detached from the upper half of the uvula (arrow).

Uvular Necrosis as an Unusual Complication of Bronchoscopy Via the Nasal Approach. Lily Kristine F Sunio et al. Respir Care 2011;56(5):695– 697.© 2011

Sonuç

- Standart monitorizasyon
- Acil durumlara hazırlığı
- Hipokseminin önlenmesi
- Uygulayıcı ile perioperatif işbirliği

“Gemlik’e doğru denizi göreceksin, sakın şaşırma”

O Veli

Teşekkürler….