
بسم الله الرحمن الرحيم

انجمن متخصصین گوارش و کبد ایران
Iranian Association of Gastroenterology and Hepatology
IAGH

وبینار علمی

پنجشنبه ۲۵ خرداد ۱۴۰۲

بیهوشی در اندوسکوپی

۱۰:۳۰ – ۱۲:۳۰



دکتر کامران باقری لنکرانی
فوق تخصص گوارش و کبد



دکتر علیرضا تقوی
فوق تخصص گوارش و کبد



دکتر رامین نیک نام
فوق تخصص گوارش و کبد



دکتر محمدعلی سهم الدینی
متخصص بیهوشی

پخش زنده از لینک
https://www.skyroom.online/ch/iagh/monthlymeeting

Free

www.iagh.org
info@iagh.org
Telegram.me/iagh94
Instagram.com/iagh97

Orchid Pharmed
Sky's the Limit

abidi
SINCE 1946

ASACOL
On Target for Remission

اقدامات تسکینی
در
حین اندوسکوپی در مطب

کامران باقری لنکرانی

استاد ممتاز دانشگاه علوم پزشکی شیراز

تعریف

- تجویز داروهای ضداضطراب ، آرام بخش ، خواب آور ، ضد درد یا بیهوشی
- با هدف
  - کاهش اضطراب
  - کاهش درد
  - جلوگیری از واکنش ها یا حرکات ناخواسته بیمار
  - ایجاد فراموشی
  - راحتی بیمار
  - ایمنی بیمار
- در حین اندوسکوپی تشخیصی یا درمانی

مزایا

- رضایتمندی بیماران

- Patient satisfaction RR= 2.29, (1.16-4.53)
- Willingness to repeat EGD RR = 1.25, (1.13-1.38)

- بررسی دقیق تر

- ADR, 22.5% vs. 17.0%, p < 0.001, OR: 1.47, 95% CI: 1.33–1.63
- CIR, 94.7% vs. 91.2%, p < 0.001
- More early GC and precancerous lesion detection

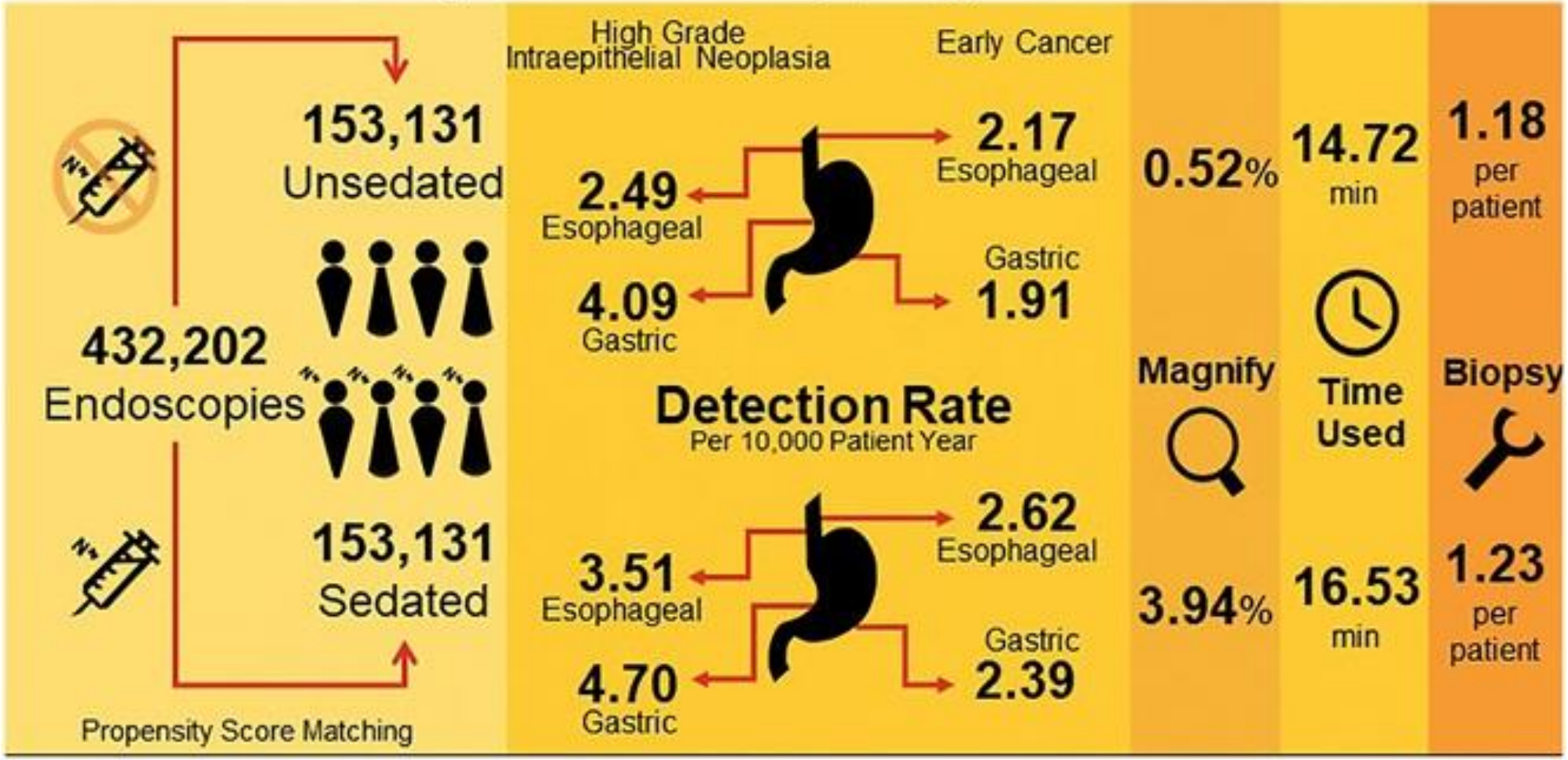
- کاهش احتمال صدمه به بیمار

Am J Gastroenterol . 2021 ;116(6):1230-1237

Gastroenterol Res Pract. 2020; 2020: 3089094.

Gastroenterol Res Pract. 2023 ; 2023: 1172478.

Sedation & early detection of upper gastrointestinal cancer



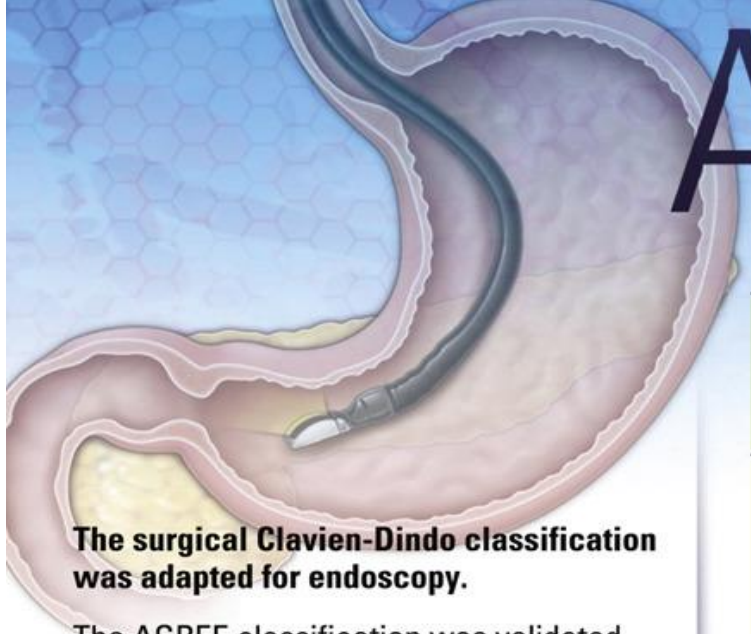
Zhou et al. *Am J Gastroenterol.* 2021

All icons above are from Zhou's painting.

AJG The American Journal of GASTROENTEROLOGY

Levels of sedation and anesthesia

	Minimal sedation (anxiolysis)	Moderate sedation (conscious sedation)	Deep sedation	General anesthesia
Responsiveness	Normal response to verbal stimulation	Purposeful response to verbal or tactile stimulation	Purposeful response after repeated or painful stimulation	Unarousable even with painful stimulus
Airway	Unaffected	No intervention required	Intervention may be required	Intervention often required
Spontaneous ventilation	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular function	Unaffected	Usually maintained	Usually maintained	May be impaired



AGREE

Classification for **A**dverse events **G**ast**R**oint**E**stinal **E**ndoscopy

The surgical Clavien-Dindo classification was adapted for endoscopy.

The AGREE classification was validated in 3 steps:

1. Perception of patients, nurses, and enodoscopists corresponded with severity grading of the AGREE classification
2. The AGREE classification significantly correlated with ASGE classification
3. International validation by 57 expert endoscopists: Experts considered the AGREE classification as simple (86%), reproducable (98%), logical (98%) and useful (98%). 84% of the clinical cases were correctly graded by the experts according to the AGREE classification.

The AGREE classification provides a standardized and reproducible approach to the assessment of adverse in gastrointestinal endoscopy.

Grading	Definition
No adverse event	▪ A telephone contact with the general practitioner, outpatient clinic, or endoscopy service without any intervention or ▪ Extended observation of the patient after the procedure, < 3 hours, without any intervention
Grade I	Adverse events with any deviation of the standard post-procedural course, without the need for pharmacologic treatment or endoscopic, radiologic, or surgical interventions. ▪ Presentation at the emergency ward, without any intervention or ▪ Hospital admission (< 24 hours), without any intervention or ▪ Allowed therapeutic regimens are drugs as antiemetics, antipyretics, analgesics, and electrolytes or ▪ Allowed diagnostic tests: radiology and laboratory tests
Grade II	▪ Adverse events requiring pharmacologic treatment with drugs other than those allowed for grade I adverse events (ie, antibiotics, antithrombotics, etc) or ▪ Blood or blood product transfusions or ▪ Hospital admission for more than 24 hours
Grade III	Adverse events requiring endoscopic, radiologic, or surgical intervention
Grade IIIa	Endoscopic or radiologic intervention
Grade IIIb	Surgical intervention
Grade IV	Adverse events requiring intensive care unit/critical care unit admission
Grade IVa	Single-organ dysfunction (including dialysis)
Grade IVb	Multiorgan dysfunction
Grade V	Death of the patient

Adverse Events

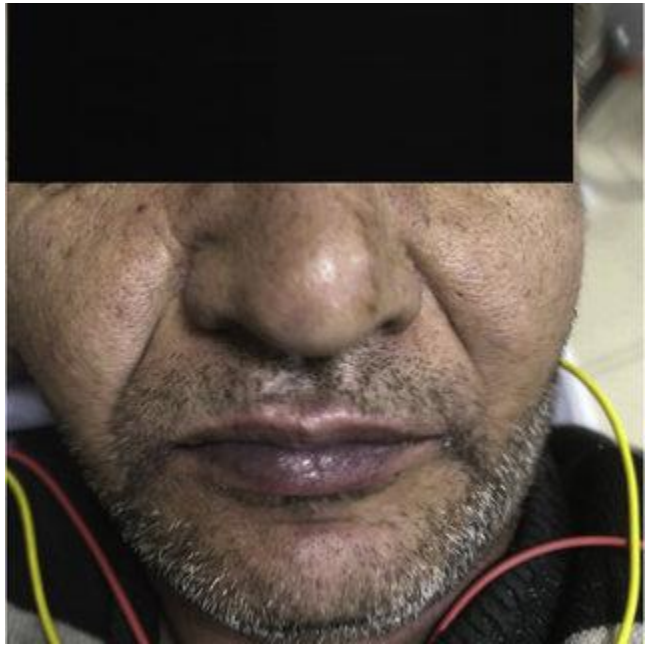
- Cardiopulmonary adverse events related to sedation and analgesia account for as much as 60% of UGI endoscopy adverse events.
- Rates between 1 in 170 and 1 in 10,000.
- Changes in O2 sat , HR , aspiration pneumonia, respiratory arrest, ACS, stroke, and shock.
- Difficulty with intubating the esophagus, a prolonged procedure, and a patient in the prone position.
- The incidence of aspiration events requiring hospitalization after colonoscopy with moderate or deep sedation is ≤1 in 1000

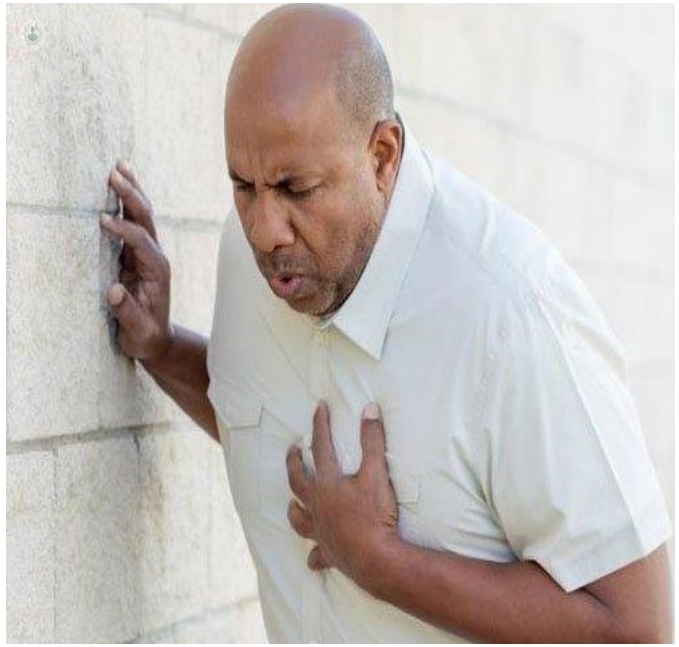
مخاطرات اصلی بیهوشی یا تسکین در اندوسکوپی

- افت اکسیژن
- آسپیراسیون و ذات الریه
- آریتمی
- حمله قلبی
- مشکلات محل تزریق
- تخریب دندان
- انتقال عفونت به کارکنان از طریق ذرات هوایی

ASA PS classification	Definition	Examples, including, but not limited to:
ASA I	A normal healthy patient	Healthy, nonsmoking, no or minimal alcohol use.
ASA II	A patient with mild systemic disease	Mild diseases only without substantive functional limitations. Current smoker, social alcohol drinker, pregnancy, obesity (30<BMI<40), well-controlled DM/HTN, mild lung disease.
ASA III	A patient with severe systemic disease	Substantive functional limitations; one or more moderate to severe diseases. Poorly controlled DM or HTN, COPD, morbid obesity (BMI ≥40), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, ESKD undergoing regularly scheduled dialysis, premature infant PCA <60 weeks, history (>3 months) of MI, CVA, TIA, or CAD/stents.
ASA IV	A patient with severe systemic disease that is a constant threat to life	Recent (<3 months) MI, CVA, TIA, or CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, sepsis, DIC, ARDS, or ESKD not undergoing regularly scheduled dialysis.
ASA V	A moribund patient who is not expected to survive without the operation	Ruptured abdominal/thoracic aneurysm, massive trauma, intracranial bleed with mass effect, ischemic bowel in the face of significant cardiac pathology or multiple organ/system dysfunction.
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes	

بررسی قبل از پروسیجور







بررسی قبل از پروسیجور







بررسی قبل از پروسیجور

وجود بیماری های همراه :

- آپنه خواب
- مصرف اوپوئیدها
- مصرف دارهای روان گردان
- مصرف داروهای مسکن

آزمایش؟

Preoperative blood work is not performed for most diagnostic endoscopies, unless indicated by patient comorbidities.

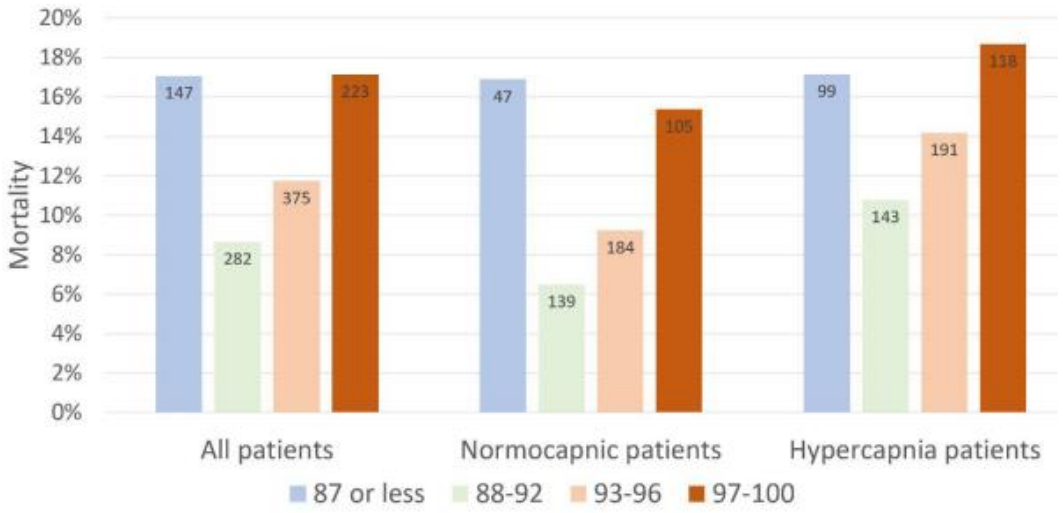
Endoscopy . 2010 Nov;42(11):960-74.

ناشتا بودن

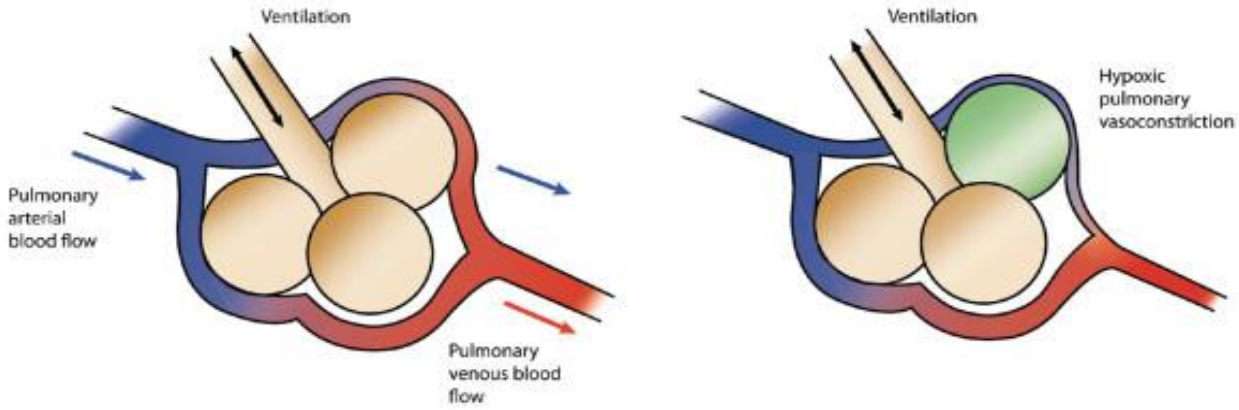
- دو ساعت مایعات شفاف
- ۶ ساعت مواد جامد

- بیمارن دیابتی
- آشالازی
- احتمال انسداد مکانیکی یا عملکردی

Oxygen therapy in COPD



Emergency Medicine Journal 2021;38:170-177.



In patients with COPD, hypoxic pulmonary vasoconstriction is the most efficient way to alter the Va/Q ratios to improve gas exchange.

A titrated oxygen therapy to achieve saturations of 88% to 92%

Delay in Dx of hypoventilation while on O2 Rx

متخصص بیهوشی

Anesthesia provider assistance should be considered in the following situations:

- Prolonged or therapeutic endoscopic procedures requiring deep sedation
- Anticipated intolerance to standard sedatives
- Increased risk for adverse event because of severe comorbidity (ASA class IV or V)
- Increased risk for airway obstruction because of anatomic variant

Drug	Dosing Pediatric	Dosing Adult	Onset	Duration	Comments
Midazolam	Initial: 0.05–0.1 mg/kg Titrate: 0.025 mg/kg every 5 min	Initial: 0.5–2.5 mg/kg slowly over 2 min Titrate: 0.5 mg/kg	1–5 min	1–2.5 hrs	Major side effect is respiratory depression.
Diazepam	0.1–0.3 mg/kg	Initial: 2.5–10 mg slowly Titrate: 2–5 mg every 5–10 min Max: 20 mg/kg	30 sec–5 min	2–6 hrs	Painful on injection
Meperidine hydrochloride	Initial: 1–1.5 mg/kg Titrate: 1 mg/kg increments	Initial: 10 mg Titrate: 10 mg increments	1–5 min	1–3 hrs	
Fentanyl	Not recommended	Initial: 0.005–2 µg/kg slowly Titrate: 1 µg/kg every 30 min Max: 4 µg/kg	30–60 sec	30–60 min	
Propofol		Initial: 20–60 mg Titrate: 10–30 mg every 30–60 sec	30–45 sec	4–8 min	Deep sedation possible

پایش

- حین پروسیجور
- بلافاصله پس از پروسیجور: تصمیم به ترخیص
- بعد از ترخیص

Checklist for home discharge after digestive endoscopy under sedation

- Stable vital signs for at least 1 hour
- Alert and oriented to time, place, and person (infants and patients whose mental status was initially abnormal should have returned to their baseline status)
- No excessive pain, bleeding, or nausea
- Ability to dress and walk with assistance
- Discharged home with a responsible adult who will remain with the patient overnight to report any postprocedure complications
- Written and verbal instructions outlining diet, activity, medications, follow-up appointments, and a phone number to be called in case of emergency
- A contact person and circumstances that warrant seeking the assistance of a health care professional clearly outlined
- Tolerating oral fluids not mandatory, unless specified by physician (i. e. patient is diabetic, frail, and/or elderly; not able to tolerate an extended period of NPO status)

Endoscopy . 2010 Nov;42(11):960-74.

Non pharmacologic Measures

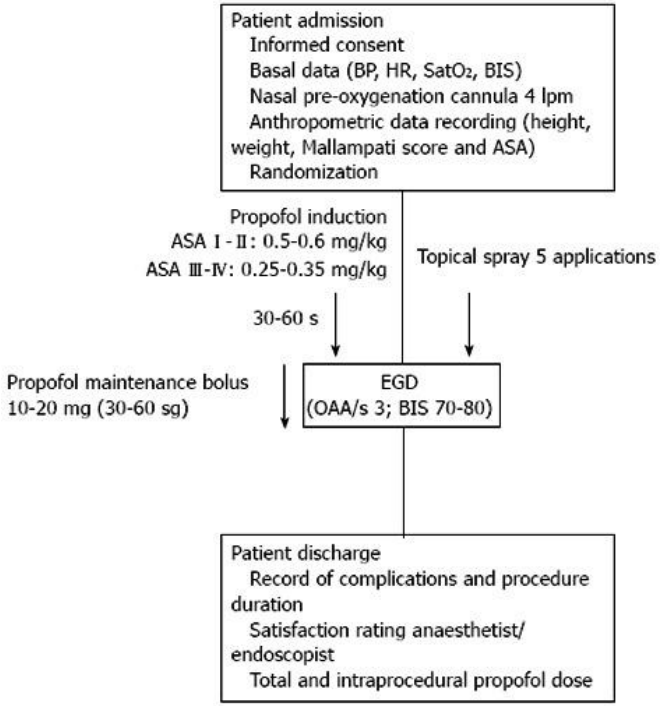
- Listening to patient-selected music during colonoscopy allows the dose of propofol administered to be decreased specially in colonoscopy.
- Result meta analysis border line

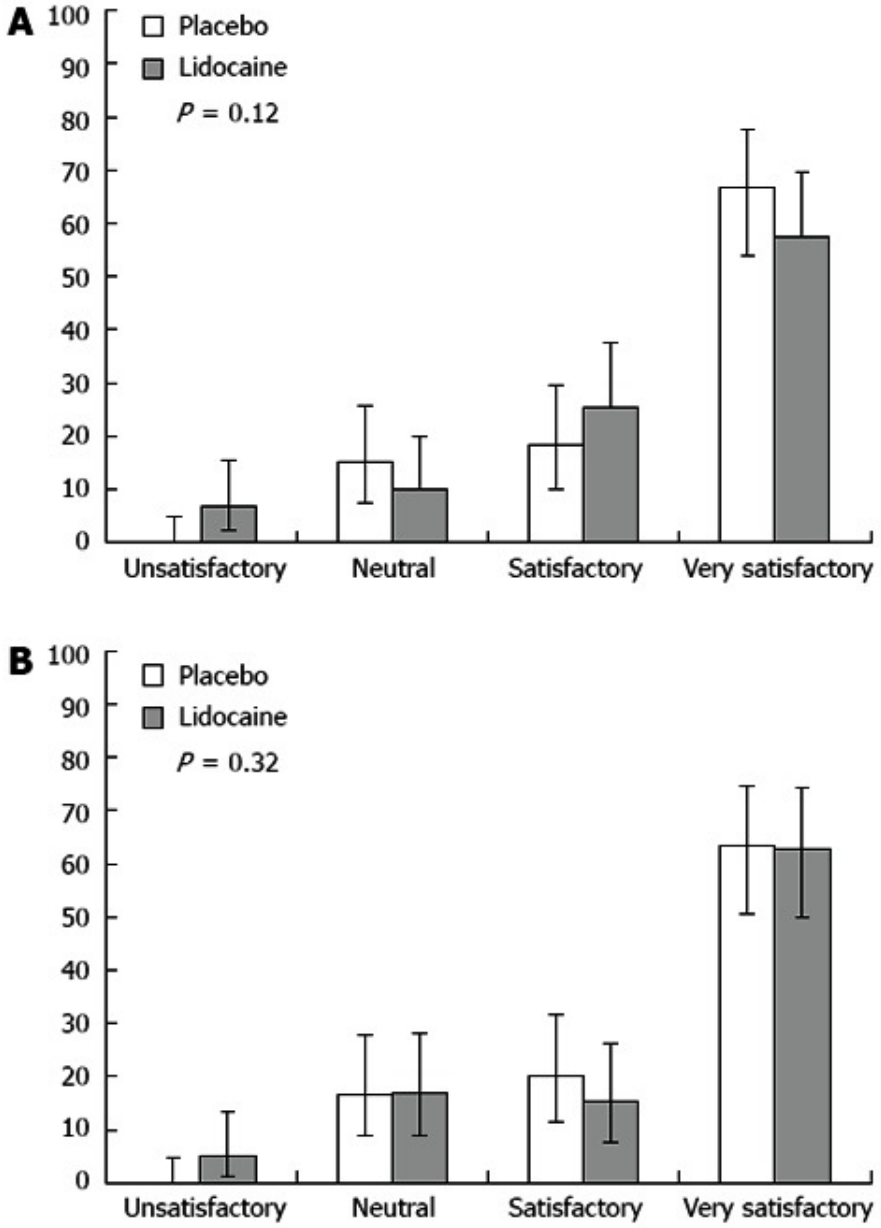


World J Gastroenterol 2008; 14: 5336–5343

Endoscopy . 2010 Nov;42(11):960-74.

Lidocaine





Topical pharyngeal anesthesia is safe in EGD but does not reduce the necessary dose of propofol or improve the anesthetist's or endoscopist's satisfaction with the procedure.

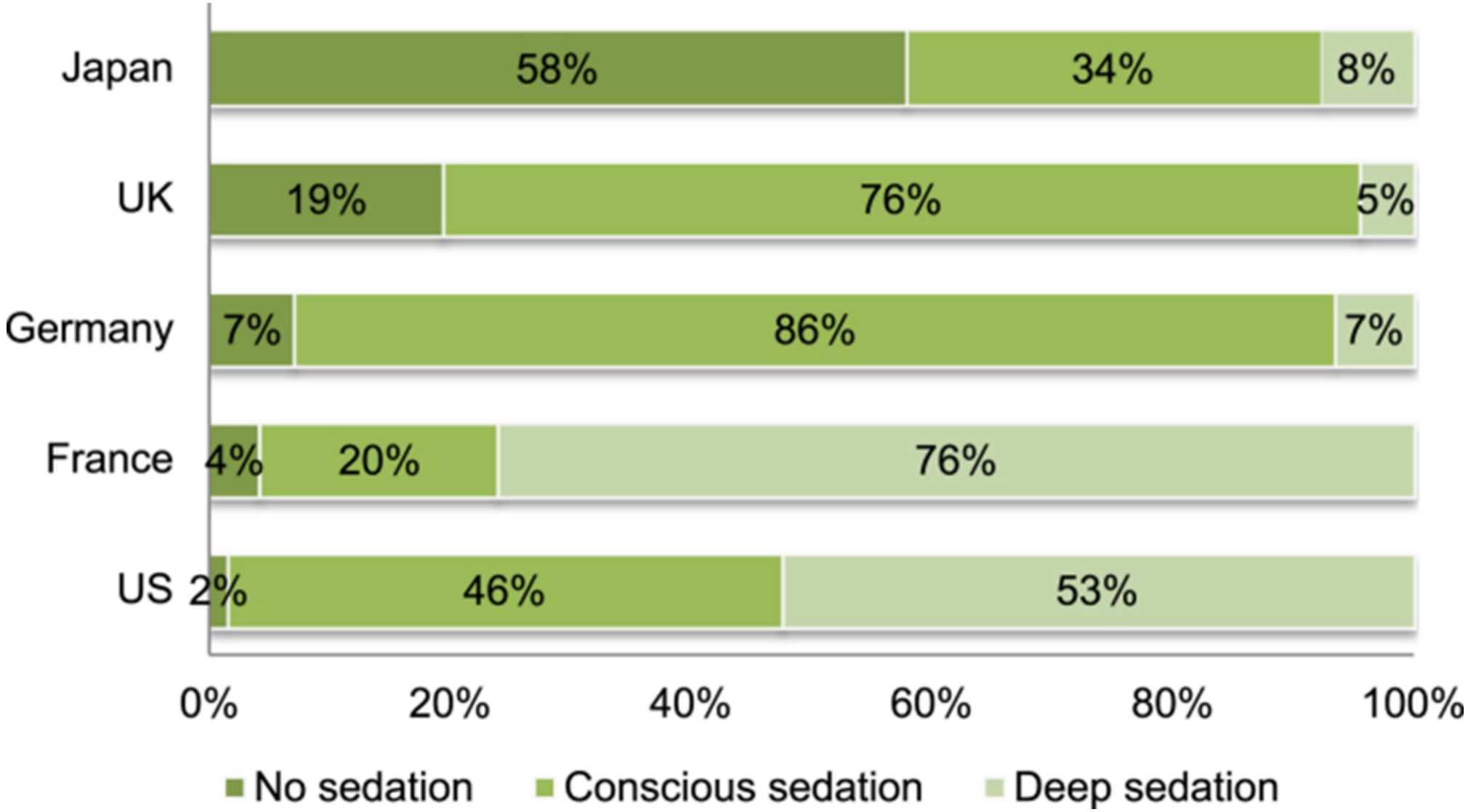
World J Gastrointest Endosc. 2013 May 16; 5(5): 231–239.

کولونوسکوپی بدون دارو

- تسریع در ترخیص
- کمک در بیمار در حین پروسیجور برای گردش و پوزیشن

نرخ دریافت دارو برای انجام کولونوسکوپی

Contemp Clin Trials Commun. 2017 Sep; 7: 116–121



RCT on demand sedation vs sedation US

- Male gender (OR 4.33; 95% CI [2.27, 8.26])
- Increasing age (OR for 10-year increase 1.28; 95% CI [1.01, 1.06])
- Absence of abdominal pain (OR 5.13; 95% CI [1.68, 15.63])
- 94% total colonoscopy was possible
- Pain scores were higher in the sedation as needed arm.
- In the sedation as needed arm, 31 of the 34 were "very satisfied" and 3 were "somewhat satisfied".
- All randomized patients said they would return to the same colonoscopist.
- Patients in the sedation as needed arm had less decline in blood pressure, less hypoxemia, and lower charges than those in the routine sedation arm.

Gastrointest Endosc . 1999 May;49(5):554-9.

Colonoscopy without sedation Taiwan

109 patients : no sedation

- Ninety-three (85.3%) colonoscopies were completed.

Completion rate OR:

- Male gender (5.03 [1.35-18.86])
- High body mass index (4.42 [1.18-16.67])
- No previous history of gynecological surgery (6.36 [1.84-22.14])
- Previous colonic resection.
- No complications relating to colonoscopy were observed.

Hepatogastroenterology . 2008 Sep-Oct;55(86-87):1606-8.

Colonoscopy without sedation US

- 27.6% out of 2091 patients chose to start without sedation
- 81.1%, (95% CI, 77.9%-89.3%) completed the examination without medication
- Cecal intubation (99.4%, 95% CI, 98.1%-99.8%) for unsedated,
- Satisfaction rate : (97.4%, 95% CI, 95.6%-98.5%) & willing to have their next colonoscopies without sedation.

Gastrointestinal Endoscopy, 2009 : 69(3) 567-572

Unsedated colonoscopy Italy

Acceptance rate for unsedated colonoscopy was 56.2%

The cecal intubation rate was 81.6%

Increased to 97.3% with the option of on-demand sedation.

OR for acceptance of no sedation :

No previous colonoscopy (OR 1.52; 95% CI, 1.10-2.11)

Absent/low level of anxiety (OR 3.82; 95% CI, 2.71-5.38)

No concern about the examination (OR 1.80; 95% CI, 1.17-2.77).

Fear of procedure-related pain (OR 0.28; 95% CI, 0.17-0.35)

Male sex (OR 3.59; 95% CI, 2.13-6.05).

Gastrointest Endosc. 2012 Feb;75(2):392-8

نتیجه مطالعات

کولونوسکوپی بدون داروبرای بسیاری از بیماران امکان پذیر است

میزان قبولی در جامع مختلف فرق میکند بین ۲۵ تا ۸۰ درصد

برای همین بیماران هم باید امکان تجویز دارو را پیش بینی کرد: رگ گیری

اندوسکوپی و کولونوسکوپی بدون داروی وریدی

- سن بالا
- مردان
- بدون اضطراب
- بدون سابقه درد شکم

- استفاده از اسپری لیدوکایین در اندوسکوپی فوقانی
- استفاده از اب یا دی اکسید کربن در کولونوسکوپی

European Society of Gastrointestinal Endoscopy, European Society of Gastroenterology and Endoscopy Nurses and Associates, and the European Society of Anaesthesiology Guideline: Non-anesthesiologist administration of propofol for GI endoscopy

Endoscopy . 2010 Nov;42(11):960-74.

Sedation in digestive endoscopy: the Athens international position statements 2010

- The presence of an anesthesia professional for sedation of low-risk individuals (ASA 1 or 2) undergoing routine endoscopy has not been demonstrated to improve endoscopic outcomes.
- ASA I, II and many III patients can be safely sedated for endoscopy by a trained endoscopist/nurse team
- Benzodiazepine and opioid antagonists have not been demonstrated to produce meaningful savings.
- Gastroenterologists and nurses with appropriate training for propofol sedation may administer propofol safely and effectively.

Aliment Pharmacol Ther 2010; 32: 425–442

ASGE Guideline 2018

- Combination of an opioid and benzodiazepine is a safe and effective regimen for achieving minimal to moderate sedation for upper endoscopy and colonoscopy in patients without risk factors for sedation-related adverse events.
- Appropriate adjunctive agent (eg, diphenhydramine, promethazine, or droperidol) in combination with conventional sedative drugs in select clinical circumstances
- Endoscopists use propofol-based sedation (endoscopist-directed or anesthesia-provider administered) when it is expected to improve patient safety, comfort, procedural efficiency, and/or successful procedure completion.

Hellenic Guideline 2023

- The benzodiazepines mainly recommended for sedation during endoscopy are primarily midazolam
- Propofol can be administered by gastroenterologists, in endoscopy rooms adequately equipped and in patients with ASA score I-II.

Ann Gastroenterol. 2023 May-Jun; 36(3): 231–243.

Program of a training course for non-anesthesiologist administration of propofol

Theoretical part

– Pharmacology, pharmacokinetics, and interactions of sedatives, analgesics, and respective antidotes

– Principles of sedation and monitoring patients including analysis of ECG monitoring

– Different sedation concepts

– Pre-, intra- and postendoscopy patient care concerning sedation, monitoring, recovery, discharge criteria, management of complications and documentation

– Legal aspects (e. g. delegation, informed consent)

Practical part

– Basic airway management (e. g. freeing of airways, jaw thrust, bag-valve mask ventilation)

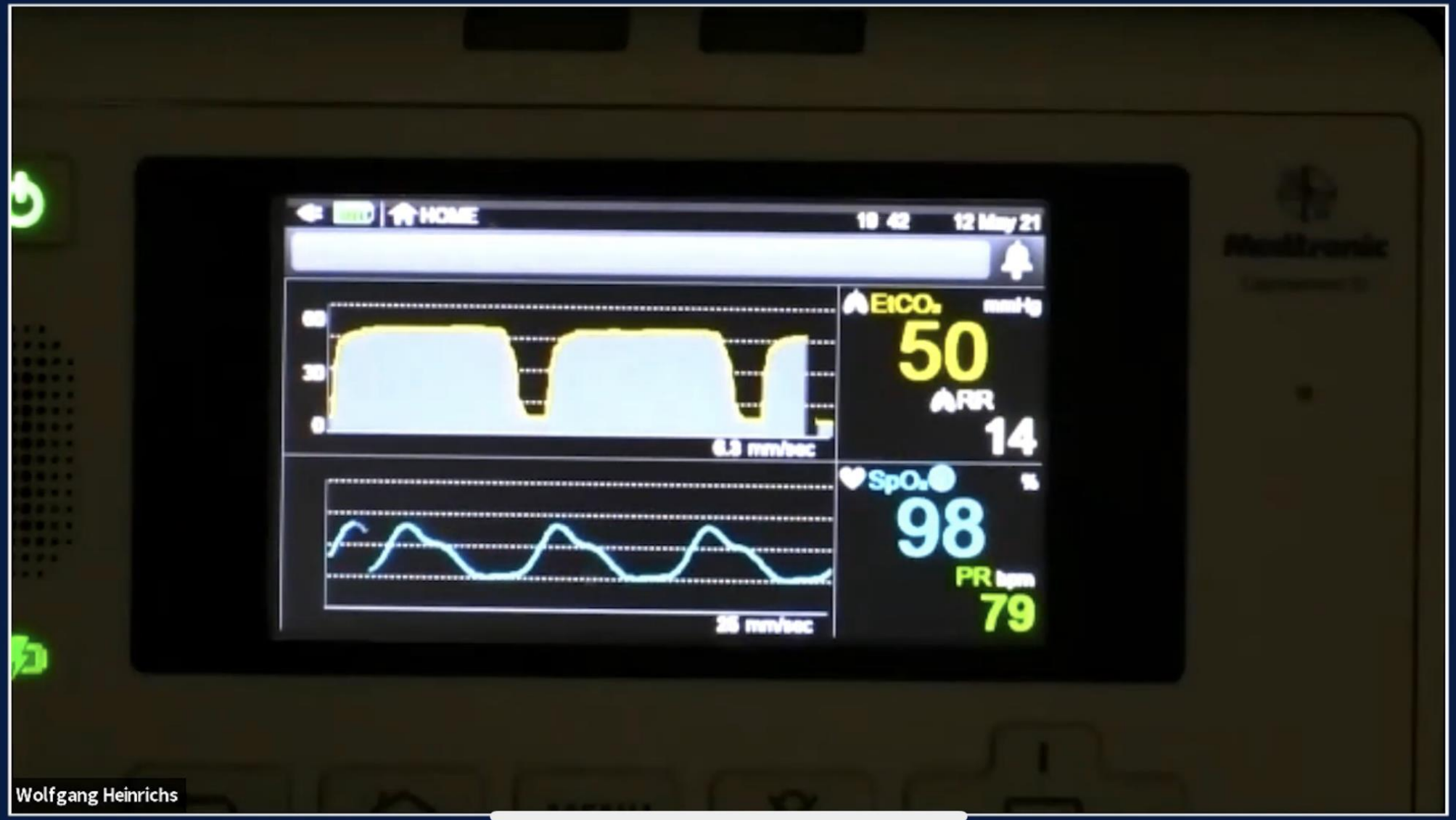
– Use of different tubes for airway ventilation (e. g. Guedel tube, laryngeal tube)

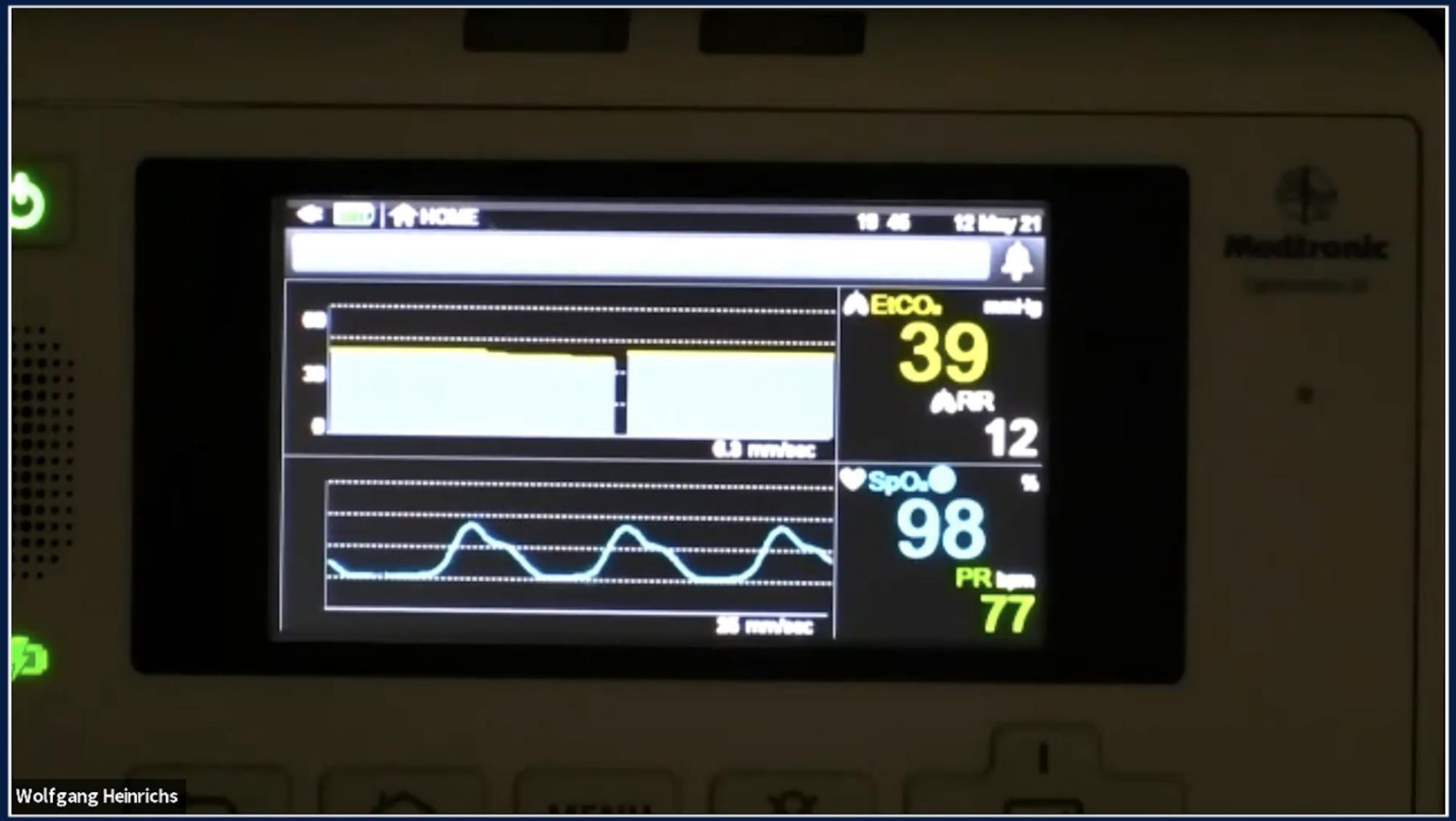
– Treatment of acute respiratory problems

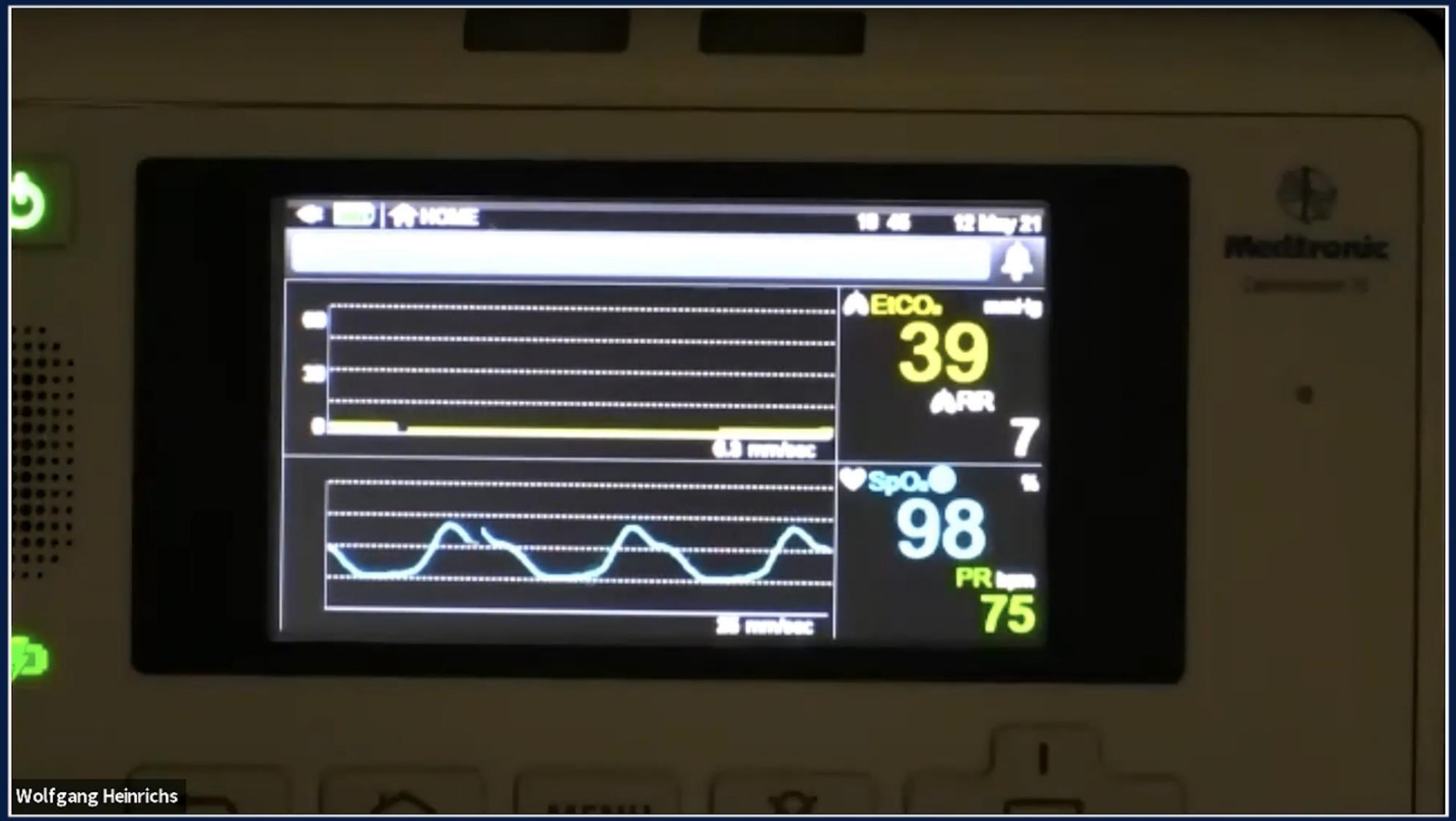
– BLS and ACLS, including the use of defibrillators

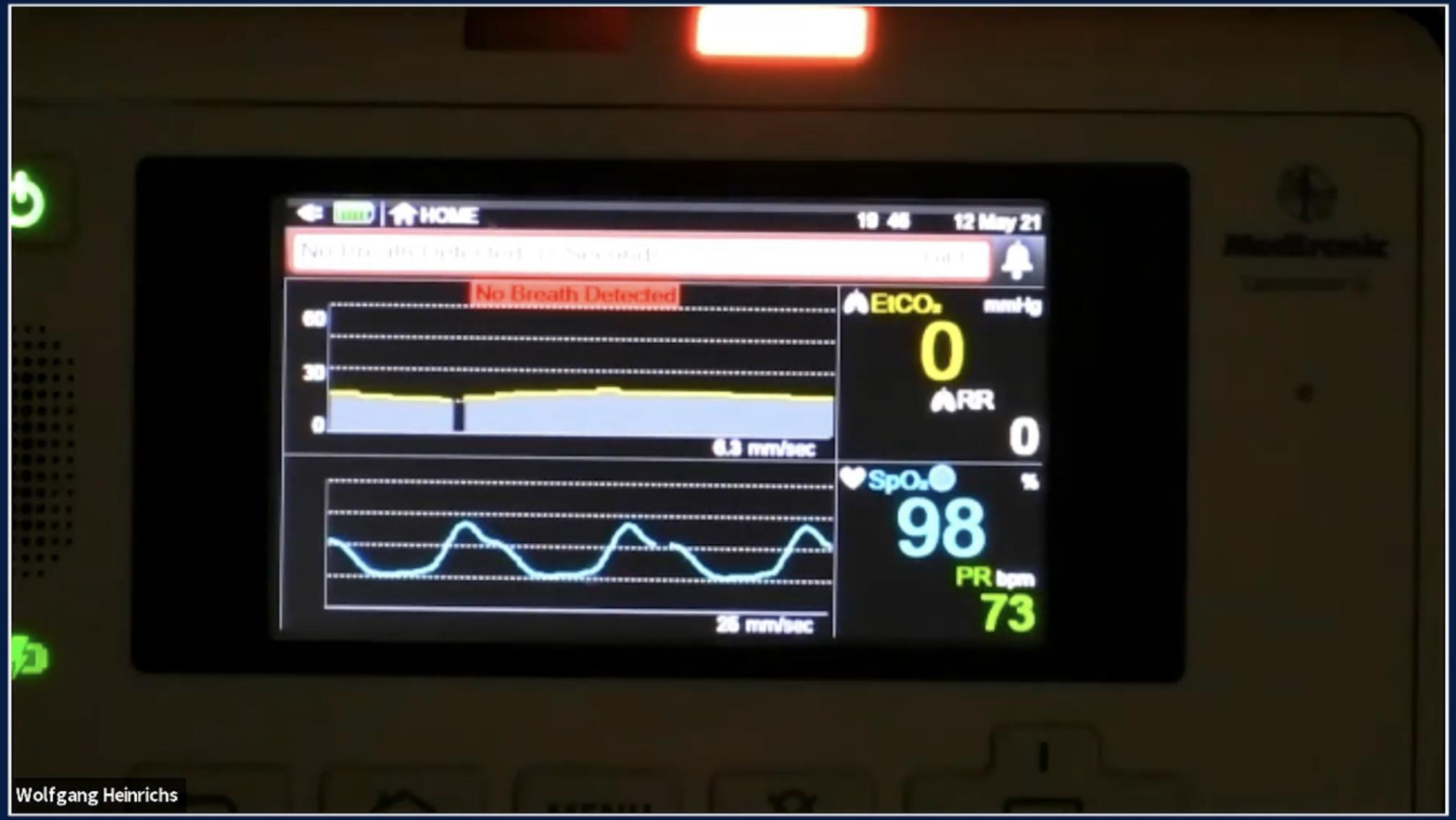
Step	Patient assessment and sedation administration
1	Evaluate the patient's ASA status
2	Obtain informed consent
3	Ensure that a pulse oximeter, an O_2 supply source, a suction device and the appropriate airway patency equipment are available
4	Administer benzodiazepines and/or analgesics
5	Administer propofol only in interventional endoscopic procedures and in patients with ASA score I-II

ASA, American Society of Anesthesiologists


HOME
19 42
12 May 21
EtCO2
mmHg
50
RR
14
6.3 mm/sec
SpO2
%
98
PR bpm
79
25 mm/sec
Wolfgang Heinrichs


HOME
EtCO2
39
RR
12
SpO2
98
PR
77
Medtronic
MENU
Wolfgang Heinrichs


HOME
EtCO2
39
RR
7
SpO2
98
PR
75
Medtronic
MENU
Wolfgang Heinrichs


HOME
19 46
12 May 21
No Breath Detected
60
30
0
6.3 mm/sec
EtCO2
mmHg
0
RR
0
SpO2
%
98
PR bpm
73
25 mm/sec
Wolfgang Heinrichs

Capnography

- No significant differences were found between use and non use of capnography in terms of minimum SpO2 during operation, patient satisfaction, or endoscopist satisfaction rating.
- There was no statistically significant difference in adverse events of anesthesia sedation between the two groups.
- Capnography during sedation for EGD and colonoscopy allows for the detection of apnea and altered breathing patterns in mildly obese patients before SpO2 is reduced.
- Effective intervention measures are given to patients within this time frame, which reduces the incidence of hypoxia and severe hypoxia in patients.

BMC Anesthesiol . 2023 May 31;23(1):188

REVIEW

Clin Endosc 2022;55:581-587
https://doi.org/10.5946/ce.2021.283
pISSN: 2234-2400 • eISSN: 2234-2443

Open Access

CLINICAL ENDOSCOPY

New sedatives and analgesic drugs for gastrointestinal endoscopic procedures

Drug	Initial dose	Repeat dose	Onset	Duration	Pros	Cons	Reversal agent	Analgesic effect
Etomidate	0.15 mg/kg	0.05 mg/kg q 2 min	30–60 sec	3–5 min	Fast onset of action Hemodynamic stability Low risk of respiratory depression	Myoclonus Adrenal suppression	-	-
Dexmedetomidine	1 µg/kg	Continuous infusion of 0.2–0.7 µg/kg/hr	1 min	2–4 hr	Ability to preserve spontaneous ventilation	Slow onset and slow offset of effect	Atipamezole	++
Remimazolam	0.05–0.075 mg/kg	0.2 mg/kg	30–60 sec	3–5 min	Fast onset of action Short recovery time		Flumazenil	-
Ketamine	1–2 mg/kg IV	0.5 mg/kg q 2 min	30–120 sec	15–30 min	Analgesic effect Ability to preserve spontaneous ventilation	Hallucination Increased salivation	-	++
Fospropofol	6.5 mg/kg	1.6 mg/kg	4–8 min	2–16 min	Aqueous formulation	Currently not available	-	-
Remifentanil	0.1–0.3 µg/kg	0.025–0.1 µg/kg/min	30–60 sec	3–6 min	Hemodynamic stability Low risk of respiratory depression Short recovery time		Naloxone	+++
Oliceridine	1–3 mg	1 mg	5–20 min	1–3 hr	No dose adjustment Low risk of respiratory depression	Slightly slow onset	Naloxone	+++

KETAMINE

- Used since 1965
- N-methyl-d-aspartate receptor antagonist
- Peak action on one minute, lasting 10-15 min
- induction dose is 0.5 mg/kg.
- Dissociative anesthesia: preserving breathing and airway reflexes during endoscopy.
- Cardiopulmonary stability
- 10%–30% of patients experience hallucinations, visual distortions, and the sensation of floating during the recovery period.
- 0.3% incidence of laryngospasms during endoscopic procedures
- Combination with midazolam
- Pediatric sedation
- Midazolam 0.03 mg/kg + ketamine 0.65 mg/kg + propofol 2.5 mg/kg performed by an anesthesiologist

ETOMIDATE

- Short-acting intravenous anesthetic
- An imidazole derivative that acts as a GABA-A receptor agonist
- Older than propofol , Used mainly in anesthesia
- Onset 30 seconds
- Peak 60 seconds
- Duration 3-5 min
- 0.05 mg/kg with additional 0.05 mg/kg every 3–5 minutes
- Lower risk of respiratory depression or hypotension
- Pain associated with the injection as well as myoclonus.
- Combination with propofol
- Not to be used by non anesthesiologist

Dexmedetomidine

- Highly selective α2 agonist
- Anxiolytic, sedative, and pain reliever
- Bradycardia and hypotension
- 1 µg/kg for 6–10 minutes, followed by an intravenous infusion of 0.5–0.8 µg/kg/hr.
- Fewer adverse effects on respiratory function than propofol
- Risk of inducing insufficient sedation during endoscopic procedures

REMIMAZOLAM

- Short-acting benzodiazepine
- Metabolized by tissue esterases, regardless of their location in the body.
- Rapidly metabolizing in blood plasma and tissues
- 0.1–0.2 mg/kg or an initial dose of 5.0 mg
- Risk of respiratory failure and hypoxia and chest stiffness

پیام ها

- انتخاب درست بیمار: بیماری زمینه . طبقه بندی
- کار گروهی: متخصصان بیهوشی
- انتخاب روش مناسب
- استفاده به جا از اکسیژن
- پایش مناسب قبل ، حین و بعد از پروسیجور
- مسئول مجزا برای تسکین یا بیهوشی
- ثبت وقایع
- آمادگی برای احیا به خصوص اداره راه هوایی