HỘI NGHỊ KHOA HỌC GÂY MÊ HỒI SỨC TOÀN QUỐC 2023
THE SCIENTIFIC CONFERENCE OF VIETNAM SOCIETY OF ANAESTHESIOLOGISTS
Tp. Buôn Ma Thuột, Đắk Lắk, 24 - 25 | 11 | 2023

MỘT SỐ VẤN ĐỀ CỦA GÂY MÊ NGOÀI PHÒNG MỔ

ThS.BS. Trần Việt Đức
Khoa Gây mê hồi sức và chống đau – Bệnh viện Đại học Y Hà Nội

NỘI DUNG

1. Đại cương
2. Nguy cơ của gây mê ngoài phòng mổ
3. Quy trình gây mê ngoài phòng mổ: đánh giá BN trước GM
4. Các thuốc gây mê ngoài phòng mổ
5. Kết luận

ĐẠI CƯƠNG

- Non-operating room anesthesia (NORA)
- Procedural sedation and analgesia (PSA)

"Việc sử dụng một hoặc nhiều thuốc để tạo thuận lợi cho các thủ thuật chẩn đoán hoặc điều trị, vẫn đảm bảo an toàn đường thở, hô hấp tự nhiên, các phản xạ bảo vệ đường thở, huyết động ổn định trong khi bệnh nhân không cảm thấy lo lắng hay đau đớn."

Procedural sedation: providing the missing definition. Green SM, Irwin MG, Mason KP, International Committee for the Advancement of Procedural Sedation. Anaesthesia. 2021;76(5):598. Epub 2020 Jul 23.

CHỈ ĐỊNH VÀ CHỐNG CHỈ ĐỊNH

- Chỉ định:
  - Các thủ thuật gây đau/khó chịu: nội soi tiêu hóa, nội soi phế quản, sốc điện chuyển nhịp...
  - Người bệnh không hợp tác: trẻ em, người già, RL tâm thần...
  - Khoa bỏng, chấn thương, PK răng...
- Chống chỉ định:
  - Nguy cơ trào ngược, dạ dày đầy
  - Đường thở khó
  - Bệnh lý phối hợp, béo phì... → đánh giá khi khám mê

Non-Operating Room Anesthesia: Patient Selection and Special Considerations. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6956865/

QUY TRÌNH GMNPM

- Thăm khám, đánh giá bệnh nhân trước TT
  - ASA, METs
  - Các bệnh lý mạn tính và tình trạng hiện tại
  - Dị ứng
  - Đường thở khó
  - Tư thế trong khi làm thủ thuật

HEALTHCARE ECONOMICS, POLICY, AND ORGANIZATION: ORIGINAL CLINICAL RESEARCH REPORT

Growth of Nonoperating Room Anesthesia Care in the United States: A Contemporary Trends Analysis

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Author Information

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	NORA		OR		
	n	%	n	%	P
Total	5,929,953	–	12,387,574	–	
Patient age					
Mean age (SD)	53.8 (20.8)		50.3 (22.6)		<.001
Age ≤ 18	491,628	8.5	1,455,765	11.9	<.001
Age 19–49	1,413,929	24.6	3,722,825	30.5	<.001
Age 50–64	1,898,993	33.0	3,266,679	26.7	<.001
Age 65–79	1,496,862	26.0	2,850,608	23.3	<.001
Age 80+	456,835	7.9	924,726	7.6	<.001
Sex					
Male	2,512,271	44.7	5,323,815	44.3	<.001
Female	3,112,296	55.3	6,704,463	55.7	
ASA PS					
I–II	3,075,953	62.4	7,303,971	67.0	<.001
III–V	1,856,849	37.6	3,602,805	33.0	

1 MET ↓ **4 METs**	Can you take care of yourself?	**4 METs** ↓ **> 10 METs**	Climb two flights of stairs or walk up a hill?
	...eat, dress, or use the toilet?		Run on short distances?
	...walk indoors around the house?		Do heavy work around the house?
	...walk 100 m on level ground at 3-5 km/h?		Participate in sports like swimming, tennis, football, skiing?

BỆNH VIỆN ĐẠI HỌC Y HÀ NỘI

PHIẾU KHÁM GÂY MÊ TRƯỚC NỘI SOI TIÊU HÓA

Họ tên: | Nặng: kg Cao: cm

Tuổi: | ASA: Mallampati:

Giới: ☐ Nam ☐ Nữ | K/c cằm giáp: Há miệng:

Răng giả: ☐ Không ☐ Tháo được ☐ Cố định

Chẩn đoán:

Hướng xử trí: ☐ Nội soi thực quản - dạ dày - tá tràng ☐ Can thiệp khác:

☐ Nội soi đại trực tràng

Tiền sử nội khoa:

Tiền sử ngoại khoa:

Tiền sử gây mê, gây tê: **Dị ứng:**

Nghiện: ☐ Thuốc lá ☐ Thuốc lào ☐ Rượu ☐ Ma túy Bệnh lây nhiễm:

Thuốc đang điều trị:

Khám lâm sàng:

Tuần hoàn: M: HA:

Hô hấp: ECG:

Thần kinh: SpO2:

Cột sống:

Cận lâm sàng:

Yêu cầu bổ sung:

Ngày	Bổ sung	Bác sĩ CĐ	Nhận xét	BS đọc KQ

Dự kiến vô cảm:

Y lệnh trước gây mê: ☐ Nhịn ăn, nhịn uống ☐ Y lệnh khác:

Ngày khám: **Bác sĩ GMHS**

Ngày khám lại: **Bác sĩ GMHS**

Đánh giá nguy cơ tim mạch

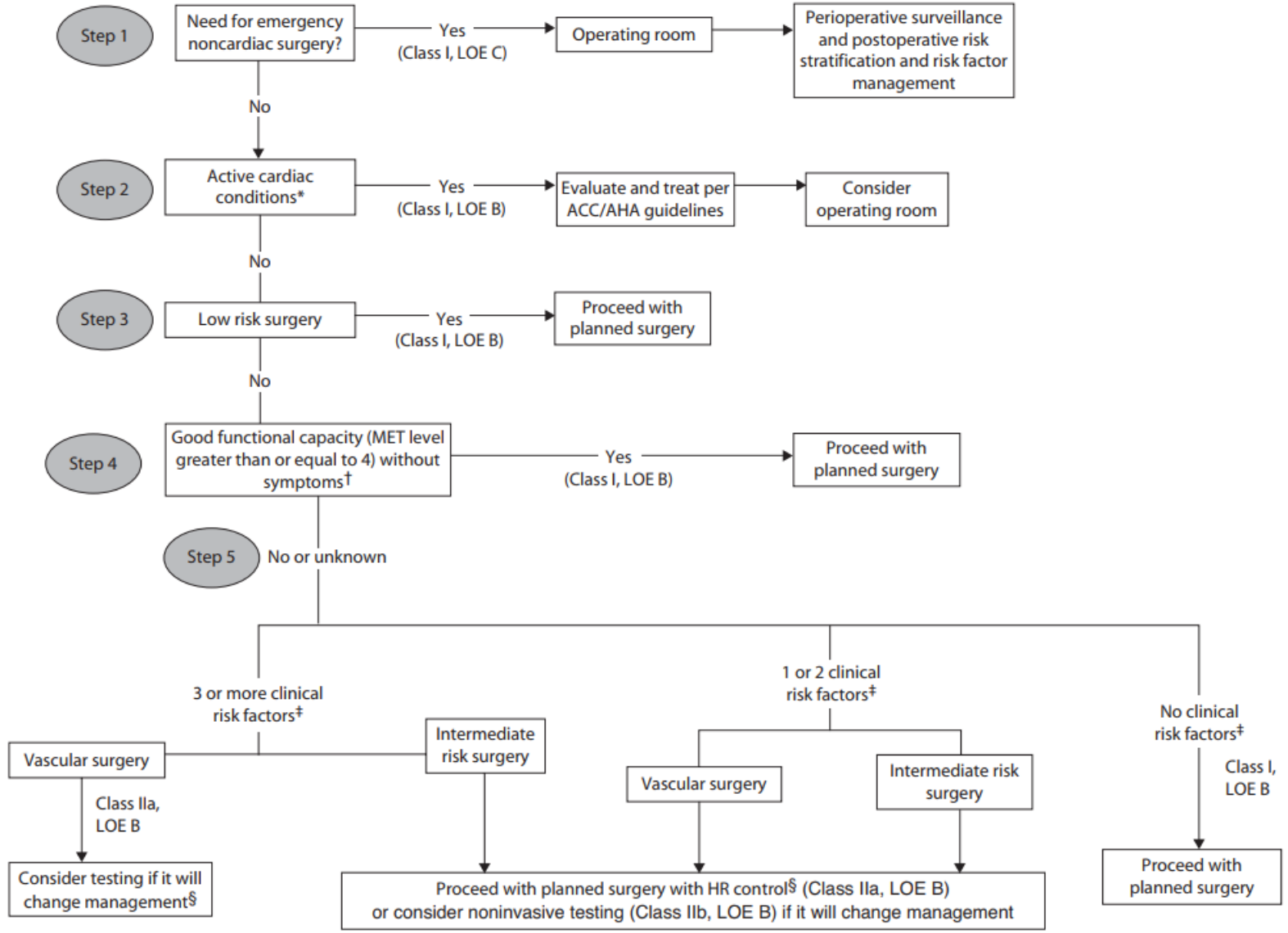


FIGURE 2.1. American College of Cardiology/American Heart Association algorithm for cardiac evaluation for noncardiac surgery. (Reprinted with permission 2007 American Heart Association. Guidelines on perioperative cardiovascular evaluatioin and care for noncardiac surgery. *J Am Coll Cardiol*. 2007;50:1707–1732. © 2007 American Heart Association, Inc.)

Một số tình trạng tim mạch cần lưu ý

- THA: mức độ kiểm soát (200/115mmHg → hoãn). Các bệnh lý đi kèm: suy tim, suy thận, bệnh mạch não, thiếu máu cơ tim). Mức HA chấp nhận được thường < 180/100mmHg nếu không có tổn thương cơ quan đích.
- Suy tim: suy tim tâm thu (EF giảm) hoặc suy tim tâm trương (EF bảo tồn với tăng áp lực đổ đầy thất T (THA)
- Các tiếng thổi tâm thu cơ năng hay bệnh lý. Tiếng thổi tâm trương cần siêu âm tim đánh giá thêm.
- BN có máy tạo nhịp/máy khử rung: lưu ý môi trường từ trường, nam châm,. Cần thiết phải tham khảo ý kiến BS TM để điều chỉnh mode không đồng bộ hoặc tắt máy ICD tạm thời (chuẩn bị chống rung ngoài).
- BN có dùng chống đông hoặc kháng NTTC: cân bằng giữa lợi ích và nguy cơ. Đánh giá nguy cơ huyết khối của BN vs nguy cơ chảy máu của TT.

1. Wilson W, Taubert KA, Gewitz M, et al. Prevention of infective endocarditis. Guidelines from the American Heart Association. *Circulation*. 2007 ; 116 : 1736 – 1754.
2. American Society of Anesthesiologists Task Force on Perioperative Management of Patients with Cardiac Rhythm Management Devices. Practice advisory for the perioperative management of patients with cardiac rhythm management devices: pacemakers and implantable cardioverter-defibrillators. *Anesthesiology*. 2005; 103 : 186 – 198 .
3. Howell SJ, Sear JW, Foex P. Hypertension, hypertensive heart disease and perioperative cardiac risk. *Br J Anaesth*. 2004 ; 92: 570 – 583.

Đánh giá nguy cơ hô hấp và đường thở trên

- Hoãn NORA khi BN có biểu hiện viêm nhiễm cấp tính đường thở trên và dưới (trừ các trường hợp CC đe dọa tính mạng)
- Các tình trạng bệnh lý hô hấp mạn tính: HPQ, BPTNMT kiểm soát tốt sẽ giảm nguy cơ biến chứng hô hấp trong quá trình NORA.
  - Đo SPO_2, nghe phổi
  - Đánh giá việc điều trị cơn cấp tính và điều trị dự phòng
  - Cân nhắc đo CNHH
  - Các đối tượng nguy cơ cao phối hợp: tuổi cao, suy tim, hút thuốc, OSA.

Smetana GW, Lawrence VA, Cornell JE. Preoperative pulmonary risk stratification for noncardiothoracic surgery: systematic review for the American College of Physicians. *Ann Intern Med*. 2006 ; 144 : 581 – 595.

Đánh giá nguy cơ hô hấp và đường thở trên

➢Hội chứng ngưng thở khi ngủ do tắc nghẽn (OSA)

- YTNC: Ngáy, buồn ngủ ban ngày, tăng huyết áp, béo phì và tiền sử gia đình mắc OSA. Chu vi vòng cổ lớn (>43cm ở nam, >40cm ở nữ)
- Hậu quả: thông khí khó, đặt NKQ khó, dễ tụt SPO2 khi GM
- Các bệnh lý thường kèm theo: ĐTĐ, THA, RN/nhịp tim chậm, ngoại tâm thu thất, đột quỵ, suy tim, tăng áp phổi, bệnh cơ tim giãn, T

Hwang D, Shakir N, Limann B, et al. Association of sleepdisordered breathing with postoperative complications. *Chest*. 2008; 133 : 1128 – 1134 .

Một số bệnh lý mạn tính khác

- Đái tháo đường: nguy cơ tụt đường huyết khi nhịn ăn uống >< tăng đường huyết kịch phát, toan lactic khi ĐH kiểm soát kém.
- Béo phì: BMI >= 40kg/m^2 và các bệnh lý kèm theo → kiểm soát đường thở.
- Suy thận: đánh giá mức lọc cầu thận, kali máu, lịch IHD (nếu có) → tránh quá tải dịch, cân bằng điện giải.
- Thiếu máu: đánh giá cơ năng và mức độ

TABLE 2.3. *Preoperative Testing Guidelines for Patients Outside of the Operating Room*

Procedure/Patient Type	*Tests*[a]
Injection of contrast dye	Creatinine[a]
Potential for significant blood loss	Hemoglobin/hematocrit[a]
Likelihood of transfusion requirement	Type and screen
Possibility of pregnancy	Pregnancy test[b]
End-stage renal disease	Potassium level[c]
Diabetes	Glucose level on day of surgery[c]
Active cardiac condition (e.g., decompensated heart failure, arrhythmia, chest pain, murmur)	Electrocardiogram[a]

[a]Results from laboratory tests within 3 months of surgery are acceptable unless major abnormalities are present or a patient's condition has changed.
[b]A routine pregnancy test before surgery is not recommended *before* the day of surgery. A careful history and local practice determine whether a pregnancy test is indicated.
[c]There is no absolute level of either potassium or glucose that precludes surgery and anesthesia. The benefits of the procedure must be balanced against the risk of proceeding in a patient with abnormal results.

Figure 1 Definition of anaemia (based on: WHO definition of anaemia)[1,80]

Age (years)	Haemoglobin (g/L)
<5	110
5–11	115
12–15	120
Non-pregnant girls over 15	120
Boys over 15 years and men	130
Non-pregnant women	120 (WHO definition) 130 (International consensus definition)
Pregnant women	110

https://www.cpoc.org.uk/sites/cpoc/files/documents/202209/1.%20CPOC_GuidelinefortheManagementofAnaemia_September2022.pdf

QUY TRÌNH GMNPM

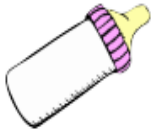
- Giải thích, BN kí cam kết
- Kiểm tra lại thời gian nhịn ăn, uống:

chú ý các đối tượng nguy cơ "chậm tiêu"

Texas Children's Hospital

PRE-OPERATIVE FASTING GUIDELINES

Guide for parents/guardians to know what to eat and drink prior to your child's procedure

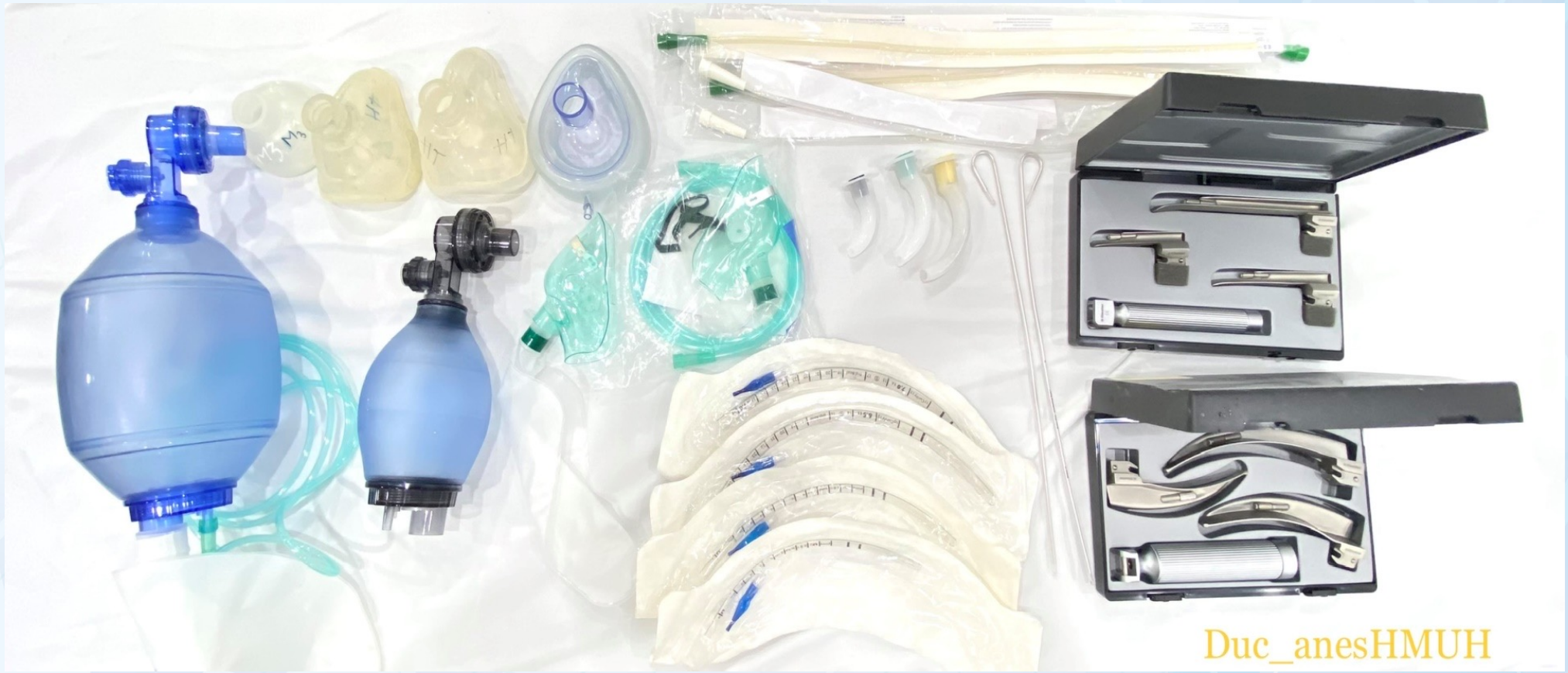
	Enjoy the following	Up until ___ prior	Examples
	Clear Liquids	2 hours	Any liquid you can see through, such as water, Pedialyte, apple juice, jello, soft drinks and other clear juices
	Breast Milk	4 hours	
	Infant Formula and Non-Human Milk	6 hours	
	Light Meals	6 hours	Toast, Crackers, Jam, Cereal, Low Fat Yogurt: Any foods with low fat and protein content
	Heavy Meals	8 hours	All fatty or fried foods, meat, cheese, ice cream
	Medications	Usual Time with sip of water	EXCEPTIONS: Hold ACE inhibitors and ARBs on day of surgery; Give white liquid antacids 8 hrs prior

If you have any questions, please call the Anesthesia PASS Clinic at 832-824-5800 or contact your surgeon's office

http://tchanesthesia.org/npo-guidelines.html

QUY TRÌNH GMNPM

- Kiểm tra các phương tiện cấp cứu đường thở



QUY TRÌNH GMNPM

- Thăm khám, đánh giá bệnh nhân trước TT.
- Giải thích, BN kí cam kết
- Kiểm tra lại thời gian nhịn ăn, uống
- Kiểm tra các phương tiện cấp cứu đường thở
- Chuẩn bị bệnh nhân, monitoring, máy hút, oxy
- Làm đường truyền tĩnh mạch, lắp máy theo dõi các dấu hiệu sinh tồn
- Lựa chọn phương pháp gây mê phù hợp

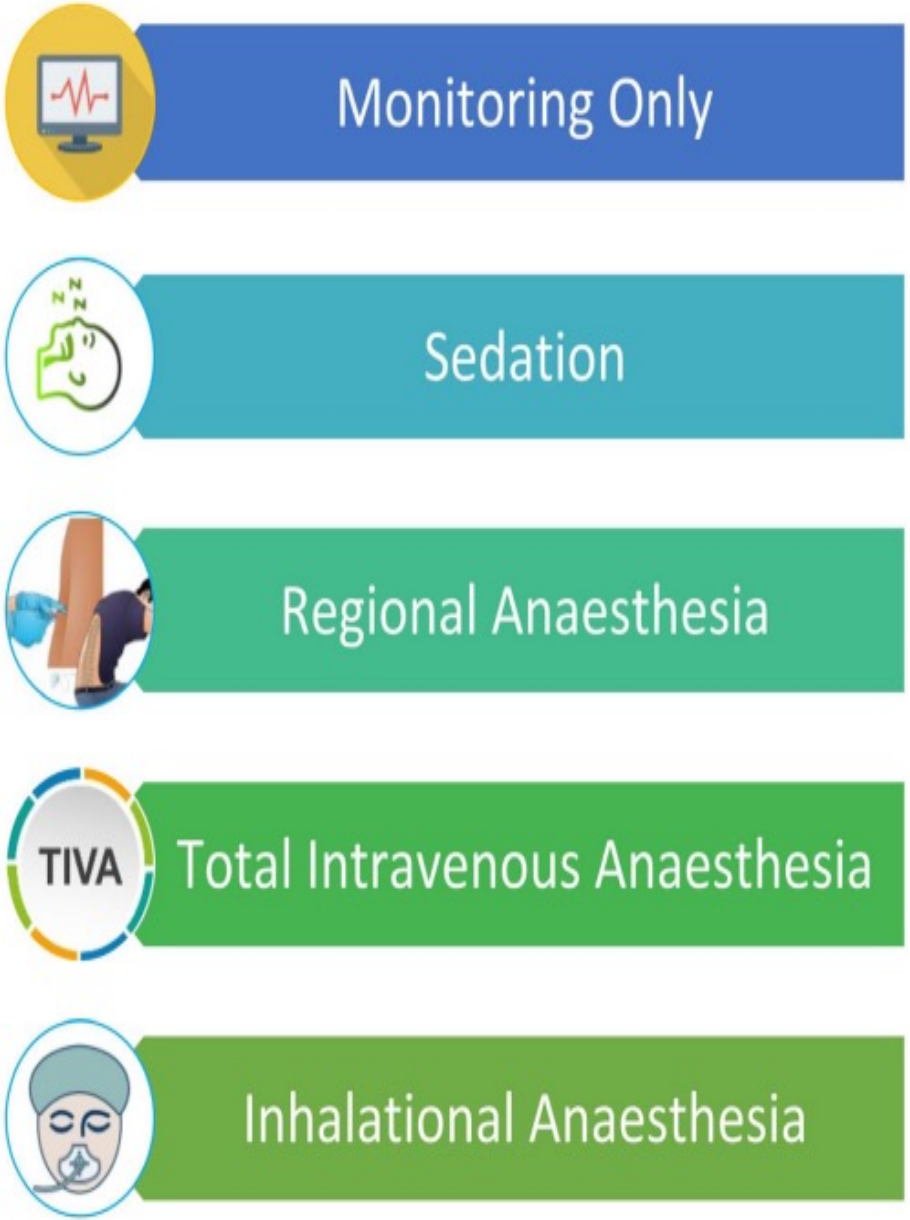


Table 7-1 American Society of Anesthesiologists Definitions of General Anesthesia and Levels of Sedation and Analgesia

Evaluation Factors	Minimal Sedation (Anxiolysis)	Moderate Sedation/Analgesia ("Conscious Sedation")	Deep Sedation/Analgesia
Responsiveness	Normal response to verbal stimulation	Purposeful* response to verbal or tactile stimulation	Purposeful response* following repeated or painful stimulation
Airway	Unaffected	No intervention required	Intervention may be required
Spontaneous ventilation	Unaffected	Adequate	May be inadequate
Cardiovascular function	Unaffected	Usually maintained	Usually maintained

*Reflex withdrawal from a painful stimulus is *not* considered a purposeful response.
From American Society of Anesthesiologists. *ASA standards, guidelines and statements*, October 2007. http://www.asahq.org/publications/p-106-asa-standards-guidelines-and-statements.aspx.

TABLE 4.2. *Reference for Induction, Bolus, and Infusion Rates of Commonly Used MAC and GA Anesthetics in Adults*

Agent	*Induction for GA*	*Bolus Doses for MAC*	*Infusion (MAC or GA)*
Dexmedetomidine	0.5–1 µg/kg (over 10 minutes)		0.2–0.7 µg/kg/hr, not to exceed 24 hours
Fentanyl	50–100 µg/kg for single-agent GA	1–2 µg/kg for sedation	1–3 µg/kg/hr
Ketamine	1–2 mg/kg	0.25–1 mg/kg for sedation	1–2 mg/kg/hr
Midazolam	0.3–0.35 mg/kg for single-agent GA	10–20 µg/kg	0.02–0.1 mg/kg/hr
Propofol	1.5–2.5 mg/kg for single-agent GA	0.25–0.5 mg/kg	25–200 µg/kg/min
Remifentanil		0.5–1 µg/kg	0.02–0.3 µg/kg min

GA, general anesthesia; MAC, monitored anesthesia care.

CÁC THUỐC GMNPM

Thuốc được lựa chọn lý tưởng:

- Khởi phát tác dụng nhanh
- Thời gian tác dụng ngắn
- Duy trì được huyết động ổn định
- Không có các tác dụng phụ nghiêm trọng

https://www.uptodate.com/contents/procedural-sedation-in-adults-outside-the-operating-room

CÁC THUỐC GMNPM

1. Propofol

- phenol, ưa mỡ → qua hàng rào máu não nhanh
- Onset 40s, duration ~ 6min
- Người trên 55 tuổi → Cp tăng → kéo dài TGTD và ức chế TM mạnh hơn
- Loading dose 0,5-1mg/kg TMC → 0,25-0,5mg/kg mỗi 1-3 phút
- Không có tác dụng giảm đau + buốt chỗ tiêm → lidocain/fentanyl/ketamin

CÁC THUỐC GMNPM

2. Etomidate

- imidazole
- Onset 60s, duration ~ 5-15min
- Không có tác dụng giảm đau
- Loading dose 0,1-0.15mg/kg TMC → nhắc lại mỗi 3-5 phút
- ADR: giật cơ (hay gặp) → thêm BZD/$MgSO_4$, nôn/buồn nôn, suy thượng thận (hiếm)

CÁC THUỐC GMNPM

3. Midazolam

- Benzodiazepine, ưa lipid
- Hay dùng để giảm lo âu
- Không có tác dụng giảm đau
- Onset 2-5 phút, thời gian tác dụng 30-60 phút
- 0,02-0,03mg/kg, không quá 2,5mg, có thể nhắc lại (dễ tích lũy, đặc biệt BN béo phì)

CÁC THUỐC GMNPM

4. Ketamin

- phencyclidine, gây mê "phân ly"
- An thần, giảm đau, bảo toàn phản xạ đường thở, duy trì tự thở
- Thời gian tác dụng 10-20 phút
- 1-2mg/kg TMC → 0,25-1mg/kg mỗi 5-10ph
- ADR: tăng nhịp tim, tăng HA, tăng tiết nước bọt, co thắt đường thở, nôn/buồn nôn, tăng ALNS/AL nội nhãn

CÁC THUỐC GMNPM

5. Fentanyl

- 0,5-1mcg/kg TMC, max 5mcg/kg
- Onset 2-3ph, thời gian tác dụng 30-60ph
- An thần, giảm đau, ít khi gây tụt HA, không kích thích tăng tiết histamine.
- ADR: ức chế hô hấp (+an thần), kéo dài tác dụng khi suy gan thận/già.
- Khác: alfentanyl, remifentanil.

CÁC THUỐC GMNPM

Thuốc được lựa chọn lý tưởng:

- Khởi phát tác dụng nhanh
- Thời gian tác dụng ngắn
- Duy trì được huyết động ổn định
- Không có các tác dụng phụ nghiêm trọng

→ Không có một thuốc nào là lý tưởng cho mọi tình huống lâm sàng → **Nghiên cứu so sánh...**

CÁC THUỐC GMNPM
PROPOFOL vs KETAMIN

Academic Emergency Medicine
A GLOBAL JOURNAL OF EMERGENCY CARE

ACAD EMERG MED • June 2010, Vol. 17, No. 6 • www.aemj.org

Randomized Clinical Trial of Propofol Versus Ketamine for Procedural Sedation in the Emergency Department

James R. Miner MD, Richard O. Gray MD, Jennifer Bahr MD, Roma Patel, John W. McGill MD

propofol 1mg/kg IV followed by 0.5mg/kg every 3 minutes (n = 50)
ketamine 1mg/kg IV followed by 0.5mg/kg every 3 minutes (n = 47)

Table 3
Main Results for the Procedures

Procedure	Ketamine (n = 47)	Propofol (n = 50)	Difference (95% CI)
Initial sedative bolus (mg/kg), median (range) IQR	1.00 (0.67–1.83) 0.95–1.01	1.00 (0.30–1.50) 0.95–1.05	
No. of sedative doses, median (range) IQR	1 (1–4) 1–1	3 (1–7) 24	
Total sedative dose (mg/kg), median (range) IQR	1.00 (0.85–3.00) 1.00–1.07	1.46 (0.65 to 3.8) 1.13–2.50	
Subclinical respiratory depression, n/N (%) 95% CI	30/47 (63.8) 48.5 to 77.3	20/50 (40.0) 26.4 to 54.8	−23.8 (−43.1 to −4.5)
Maximum absolute change from baseline $ETCO_2$ (mm Hg), median (range) IQR	10 (5–15) 0–34	8.5 (6–19) 0–42	−0.9 (−4.5 to 2.7)
Lowest oxygen saturation during procedure, median (range) IQR	96.5 (67–100) 92–99	99.0 (45–100) 94–100	−0.69 (−3.9 to 2.5)
Heart rate maximum (beats/min), median (range) IQR	119 (79–180) 101–130	96 (57–147) 85–109	18.4 (10.3 to 25.5)
Change in $ETCO_2$ >10 mm Hg, n/N (%) 95% CI	21/47 (44.7) 29.9 to 59.4	15/50 (30.0) 16.8 to 43.2	14.7% (−4.8 to 34.1)
Capnogram waveform absent at any time (%) 95% CI	11/47 (23.4) 10.8 to 36.0	9/50 (18.0) 7.0 to 29.0	5.4% (−11.0 to 21.9)
Oxygen saturation <92% at any time, n/N (%) 95% CI	6/47 (12.7) 2.9 to 22.7	7/50 (14.0) 4.0 to 24.0	−1.2 (−15.1%to 12.6)
Lowest blood pressure recorded during procedure (mm Hg), median (range) IQR	126 (79–187) 118–139	120.5 (73–178) 110–130	8.3 (0.2 to 16.3)
% decrease in sBP from baseline (range) IQR	0.0 (0–37.8) 0–0	8.5 (0–26.1) 3.5–12.9	−6.4 (−9.2 to −3.5)
OAAS score, median (range) IQR	2 (1–4) 1–3	2 (1–5) 1–3	−0.15 (−0.49 to 0.20)
Total time of sedation procedure (min), median (range) IQR	11 (4–33) 9–14	10 (5–36) 8–13	0.35 (−1.76 to 2.51)
% patients reporting pain during procedure (95% CI)	2.1 (−2.2 to 6.4)	6.0 (2.7 to 21.3)	−3.8 (−11.9 to 0.4)
% patients reporting recall of the procedure (95% CI)	12.8 (2.9 to 22.7)	12.0 (2.7 to 27.3)	0.8 (−12.7 to 14.2)
% patients reporting satisfaction with the procedure	100	100	
Recovery agitation	17 (36.2)	4 (8.0)	28.2 (12.4 to 43.9)
Time to return to baseline mental status, median (range) IQR	14 (2–47) 10–29	5 (0–32) 4–12	9.38 (5.28 to 13.48)

$ETCO_2$ = end-tidal carbon dioxide; IQR = interquartile range; OAAS = modified observer's assessment of alertness score; sBP = systolic blood pressure.

Conclusions: This study detected a higher rate of subclinical respiratory depression in patients in the ketamine group than the propofol group. There was no difference in the rate of clinical interventions related to respiratory depression, pain, or recall of the procedure between the groups. Recovery agitation was seen more frequently in patients receiving ketamine than in those receiving propofol. The time to regain baseline mental status was longer in the ketamine group than the propofol group. This study suggests that the use of either ketamine or propofol is safe and effective for procedural sedation in the ED.

CÁC THUỐC GMNPM
PROPOFOL vs KETAMIN

Sedation in Uncooperative Children Undergoing Dental Procedures: A Comparative Evaluation of Midazolam, Propofol and Ketamine.

Kavitha Rai; Amitha Hegde; Kukul Goel

J Clin Pediatr Dent (2007) 32 (1): 1–4.

JOCPD
Journal of Clinical Pediatric Dentistry

Table II. Houpt's et al sedation rating score[a]:

RATING SCALE	SCORE
(a)**SLEEP**	
Awake, but responsive	4
Drowsy, disoriented	3
A sleep, easily aroused	2
Asleep, difficulty to arouse	1
(b)**MOVEMENT**	
No movement	4
Intermittent movement affecting treatment	3
Continuous movement affecting treatment	2
Violent Movement that Interrupted or prevented the treatment	1
(c)**CRYING**	
No crying	4
Intermittent crying	3
Continuous crying	2
Hysterical crying	1
(d)**OVERALL BEHAVIOR**	
Excellent, no disruption	6
Very good, limited disruption	5
Good, some difficulty	4
Fair, Much difficulty but treatment done	3
Poor, partial treatment done	2
aborted	1

Table I. Drugs and Their Dosages Used in the Study

Drugs	Bolus dose	Infusion dose
Midazolam	0. 1 mg kg^{-1}	0.004 mg $kg^{-1}min^{-1}$
Propofol	1 mg kg^{-1}	0.06 mg $kg^{-1}min^{-1}$
Ketamine	0.5 mg kg^{-1}	0.01 mg $kg^{-1}min^{-1}$

Kết luận:

- Propofol khởi mê nhanh nhất nhưng cần liều nhắc lại mỗi 2,5 phút, hồi tỉnh nhanh, khóc to → quấy khóc
- Ketamin và midazolam không cần liều nhắc lại, trẻ ít kích động quấy khóc sau hồi tỉnh (ke > mida)

CÁC THUỐC GMNPM

PROPOFOL vs MIDAZOLAM

Eur Respir J 2009; 34: 1277–1283
DOI: 10.1183/09031936.00142108

Titrated sedation with propofol or midazolam for flexible bronchoscopy: a randomised trial

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Observer's Assessment of Alertness/Sedation Scale (OAAS)

Scores	Descriptions
5	Responds readily to name spoken in normal tone
4	Lethargic response to name spoken in normal tone
3	Responds only after name is called loudly and/or repeatedly
2	Responds only after mild prodding or shaking
1	Responds only after painful trapezius squeeze
0	No response after painful trapezius squeeze

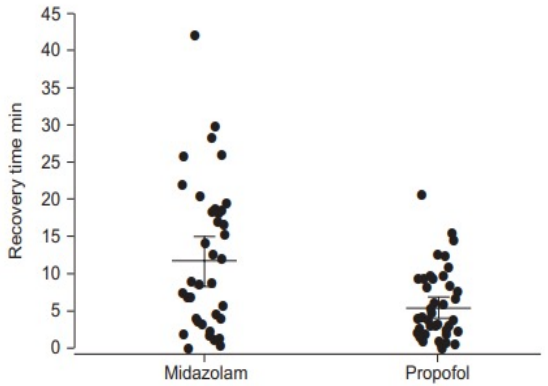

FIGURE 2. Recovery time (min) after flexible bronchoscopy. Horizontal bars are means and whiskers indicate 95% CI. Mean (95% CI) difference between midazolam and propofol was 380 s (170–580 s), in favour of propofol, and p=0.001 (t-test with unequal variance).

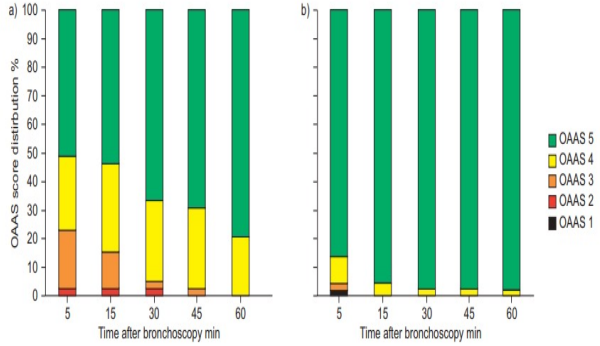

FIGURE 3. Evolution of the Observer Assessment of Alertness/Sedation score (OAAS) score distribution for patients in the a) midazolam and b) propofol groups at different time points after bronchoscopy. Patients with OAAS score=5 have full conscious level, patients with OAAS score=1 are asleep and do not react to mechanical stimuli. For the difference between midazolam and propofol, p=0.004, derived from mixed logistic model with dichotomised OAAS score (>4), controlling for group, baseline score, time and interaction time group.

TABLE 5 Adverse events for both groups during bronchoscopy

	Midazolam (n=39)	Propofol (n=43)	p value#
Hypotension %¶	0	2 (4.7)	0.495
Tachycardia %+	11 (28.2)	7 (16.3)	0.285
Hypoxemia %§	14 (35.9)	15 (34.9)	1
Bradycardia %	0	0	1

Data are presented as n (%). #: Fischer's exact test; ¶: systolic blood pressure <100 mmHg or mean arterial blood pressure <60 mmHg; +: cardiac frequency >100 bpm and/or a variation of >20% from baseline value; §: arterial oxygen saturation decrease <90% for >30 s, cardiac frequency <50 bpm.

CÁC THUỐC GMNPM

PROPOFOL vs MIDAZOLAM

Propofol sedation for upper gastrointestinal endoscopy in patients with liver cirrhosis as an alternative to midazolam to avoid acute deterioration of minimal encephalopathy: A randomized, controlled study

Scandinavian Journal of Gastroenterology, 2009; 44: 1244–1251

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N	Midazolam group ($n=20$)	Propofol group ($n=40$)	Control group ($n=20$)
Age (years)*	61.5±10.3	62.6±11.4	60.2±10.8
Gender (n)			
Male	11	23	12
Female	9	17	8
ASA I (n)	–	–	5
ASA II (n)	12	20	10
ASA III (n)	8	20	5
CHILD score (points)*	6.2±2.0	6.4±2.5	–
CHILD A (n)	13	25	–
CHILD B (n)	5	11	–
CHILD C (n)	2	4	–
Serum albumin level <3.5 g/dl (n)	12	23	
Liver cirrhosis established histologically (n)	8	17	–
Present ascites at study entry (by ultrasonography)	11	29	–
Diagnostic EGD (n)	14	28	–
EGD with band ligation (n)	6	12	–

Abbreviations: CHILD = Child-Pugh score; ASA = American Society of Anesthesiologists; EGD = esophagogastroduodenoscopy. Differences between the midazolam and the propofol group are not significant.
*Mean ± standard deviation.

	Midazolam ($n=20$)	Propofol ($n=40$)	Controls ($n=20$)
NCT values (s) before sedation	85.8±40.5 [27–188]	95.3±68.3 [30–395]	48.3±25.4 [14–111]
NCT values (s) 2 h after sedation	93.2±50.3 [29–205]	85.6±62.7 [30–380]	40.4±20.1 [14–88]
P-value	0.11	0.001	0.006
PSE score (points) before sedation	−10 (−2 to −18) (−11 to −7)	−9 (0 to −18) (−10 to −7)	−1 (0 to −6) [−3 to +1]
PSE score (points) 2 h after sedation	−11 (0 to −18) (−12 to −8)	−7 (+1 to −18) (−9 to −6)	0 (1 to −5) (−1 to 0)
P-value	0.2	0.0006	0.001

All parametric data are given as means ± standard deviation with ranges (in parentheses); the non-parametric data are given as medians, ranges (in parentheses) as well as 95% confidence intervals (in brackets).

Table II. Procedural characteristics and results of recovery in 60 patients with known liver cirrhosis who underwent upper gastrointestinal endoscopy under sedation with propofol or midazolam in randomized fashion.

	Midazolam $n=20$	Propofol $n=40$
Midazolam (mg)	5.3±1.7 (2.5–7.5)	161±69 – (50–320)
Propofol (mg)	–	
Procedure duration (min)	9.5±2.3 (4–16)	9.8±3.7 (4–18)
SaO_2 <90%	2	3
Systolic blood pressure <90 mmHg	2	3
Heart rate <50/min	3	3
Recovery time (min)	18.38±6.69 (0–28)	7.75±2.85* (3–14)
PARS (points)	6.1±1.1 (5–8)	8.2±1.3* (6–10)

Abbreviations: PARS = post-anesthesia recovery score (assessed 30 min after completion of the endoscopic procedure).
*$p<0.001$ between the two groups. None of the other differences are significant.
All parametric data are given as means ± standard deviation and ranges (in parentheses).

→PROPOFOL và midazolam không gây HC não gan ở BN xơ gan soi DD GM

→PROPOFOL có thời gian hồi tỉnh nhanh hơn nhiều so với midazolam

CÁC THUỐC GMNPM

PROPOFOL vs ETOMIDATE

Randomized Clinical Trial of Etomidate Versus Propofol for Procedural Sedation in the Emergency Department

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Volume 49, NO. 1 : January 2007

Annals of Emergency Medicine

Table 1. Characteristics of the study subjects.

Procedures and Characteristics	Etomidate	Propofol	Difference (95% CI)
Procedures	N=105 (%)	N=109 (%)	
Incision and drainage of abscess	40 (38.1%)	40 (37.6%)	0.5% (–12.5 To 13.5)
Fracture reduction	44 (41.9%)	38 (35.8%)	6.1% (–6.9 To 19.2)
Dislocation reduction	17 (16.2%)	26 (24.8%)	–8.6% (–19.3 To 2.2)
Tibial traction pin placement	3 (2.9%)	0	2.9% (–0.3 To 6.0)
Cardioversion	0	1 (0.9%)	–0.9 (–2.7 To 0.9)
Chest tube placement	1 (0.9%)	3 (2.9%)	–1.8% (–5.4 To 1.8)
Foreign body removal	0	1 (0.9%)	–0.9 (–2.7 To 0.9)
Patient Characteristics			
Age, y (SD)	36.9 (3.1) (Range 18–74)	40.4 (14.5) (Range 18–78)	–3.9 (–7.2 To 0.2)
Weight, kg (SD)	82.2 (21.1)	81.8 (23.3)	0.5 (–5.9 To 6.0)
ASA physical status score=1 (%)	66/105 (62.9)	67/109 (62.4)	0.5 (–12.5 To 13.4)
Initial systolic blood pressure, mm Hg, mean (+95% CI)	135.0 (131–138, Range 96–196)	132.0 (128–135, Range 93–201)	3.1 (–2.2 To 8.3)
Initial $ETCO_2$ (mm Hg), mean (+95% CI)	40.9 (39.4–42.3) (Range 6–59)	38.5 (36.9–40.2) (Range 15–58)	2.6 (0.4–4.5)
Initial oxygen saturation, %, mean (SD)	99.3±1.3	98.7±3.3	0.6 (–0.1 To 1.3)
Preprocedural supplemental oxygen use	87/105 (82.8%)	87/109 (79.8%)	–3.0 (–11.8 To 9.5)
Initial BIS score, [illegible] range)			6)
Initial OAAS scor			3)
Number of dose (95% CI, rang			0.1)
Total time of pro min (95% CI)			1)

ASA, American Soc

In conclusion, our comparison of etomidate and propofol found that both agents produce similar rates of sedation, subclinical respiratory depression, hypoxia, apnea, and clinical events related to respiratory depression and a slightly different rate of procedural success. Myoclonus was observed more frequently with etomidate, and hypotension was observed more frequently with propofol. With these observations in mind and with a careful selection of patients, both agents appear similarly safe for use in ED procedural sedation.

Table 2. Main results for the procedures.

Results	Etomidate (n=105)	Propofol (n=109)	Difference (95% CI)
First dose (SD)	0.15 mg/kg (±0.07)	0.99 mg/kg (±0.17)	
Total dose, mean (SD)	0.26 mg/kg (±0.13)	1.86 mg/kg (±0.82)	
Subclinical respiratory depression (%)	34.3% (36/105)	42.2% (46/109)	–7.9% (–20.9 To 5.1)
Absolute change in $ETCO_2$ from baseline, mean mm Hg (range, SD)	10.0 (1–29, ±6.1)	11.5 (5–34, ±8.1)	–1.5 (–3.4 To 0.5)
Change in $ETCO_2$ >10 mm Hg	26.7% (28/105)	37.6% (40/109)	–10.9% (–23.4 To 1.4)
Loss of $ETCO_2$ waveform	4.8% (5/105)	11.0% (12/109)	–6.2% (–13.4 To 0.9)
Oxygen saturation <92%, %	9.5 (10/105)	9.1 (10/109)	0.3 (–7.5 To 8.2)
Increased supplemental oxygen, %	6.7 (7/105)	5.5 (6/109)	1.2 (–5.2 To 7.6)
Bag-valve-mask, %	3.8 (4/105)	4.6 (5/109)	–0.8 (–6.1 To 4.6)
Airway repositioning, %	13.3 (14/105)	11.0 (12/109)	2.3 (–6.4 To 11.1)
Stimulation to induce breathing, %	11.4 (12/105)	11.9 (13/109)	–0.5 (–9.1 To 8.1)
Systolic blood pressure low, mm Hg	129.6 (Range 64–178)	120.9 (Range 60–158)	8.7 (3.7 To 13.6)
Decrease in systolic blood pressure from baseline, %	3.8	7.9	–4.1 (–6.4 To 1.7)
BIS nadir	63.6 (Range 25 to 97)	62.0 (Range 5 to 94)	1.6 (–4.1 To 6.2)
Observer's Assessment of Alertness score nadir	Median=1 (IQR=1–2)	Median=1 (IQR 1–2)	*P*=.77 (Wilcoxon rank sum)
Time to return of baseline mental status after completion of procedure, mean min	8.8 min (Range 1–42, median 7, IQR=4–10)	6.8 min (Range 1–20, median 5, IQR 3–10)	2.0 (0.4 To 3.6)
Myoclonus, %	20.0 (21/105)	1.8 (2/109)	18.2 (10.1 To 26.2)
Successful procedure	89.5 (94/105)	97.2 (106/109)	–7.4 (–14.3 To –1.1)

KHÓ KHĂN KHI GMNPM

Khó khăn từ bệnh nhân	Quan hệ NORA - OR
Các bệnh lý nền chưa kiểm soát	Thuốc và vật tư không đủ/xa
Đường thở khó, thông khí khó	NVYT không chuyên GMHS
Nhịn ăn uống chưa đủ thời gian	Khí y tế gắn tường, máy hút, máy thở... không quen dùng/cũ/không đủ size
Khó khăn từ môi trường làm việc	Làm ngoài giờ/thêm giờ
Thiếu không gian	Thủ thuật cấp cứu
Khó tiếp cận bệnh nhân nhanh chóng	**Khó khăn từ thủ thuật**
Thiếu ánh sáng, nhiệt độ	Đe dọa an toàn đường thở/tim mạch
Ồn ào	Thời gian kéo dài
Thiếu an toàn bức xạ/từ trường	Hồi tỉnh nhiều nguy cơ liên quan: chảy máu, PONV...
	Tư thế bệnh nhân

KHÓ KHĂN KHI GMNPM

NGUY CƠ CỦA GMNPM

TABLE 3. Minor Adverse Outcomes Analysis: OR Versus NORA

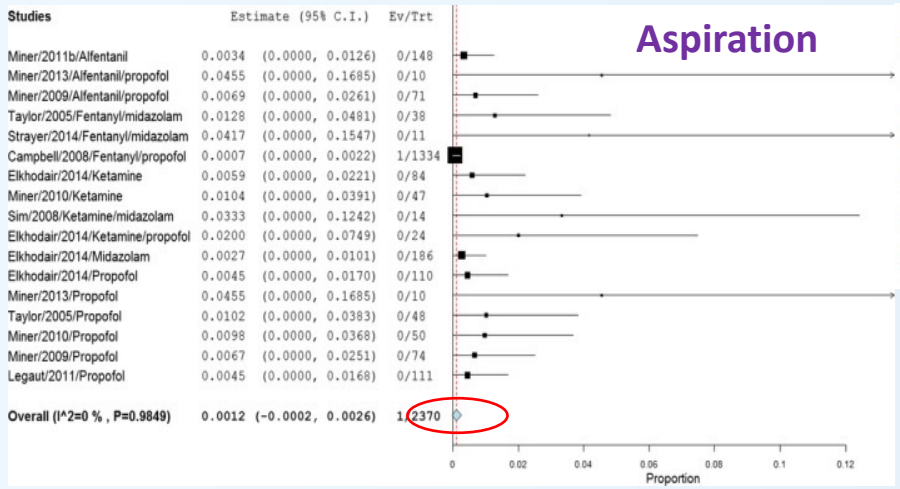
Outcomes	OR Counts	NORA Counts
Any PONV	70,116	7915
Inadequate postoperative pain control	44,195	7508
Dental/oral/tooth/mouth	1055	144
Blood-vascular	197	40
Airway/intubation	3763	776
Hemodynamic instability	41,902	4650
Unanticipated upgrade of care	1324	140
Eye/ocular/corneal	1475	414
Respiratory-pulmonary	865	153
Neurological-any	551	179
Dural/wet/headache	262	32
Central/intravenous line problem	280	40
Equipment/monitor	405	125
Reversal of neuromuscular blocking agents	795	85
Regional anesthesia problem	475	18
Reversal of narcotics	222	28

TABLE 4. Major Adverse Outcomes Analysis: OR Versus NORA—Summary c

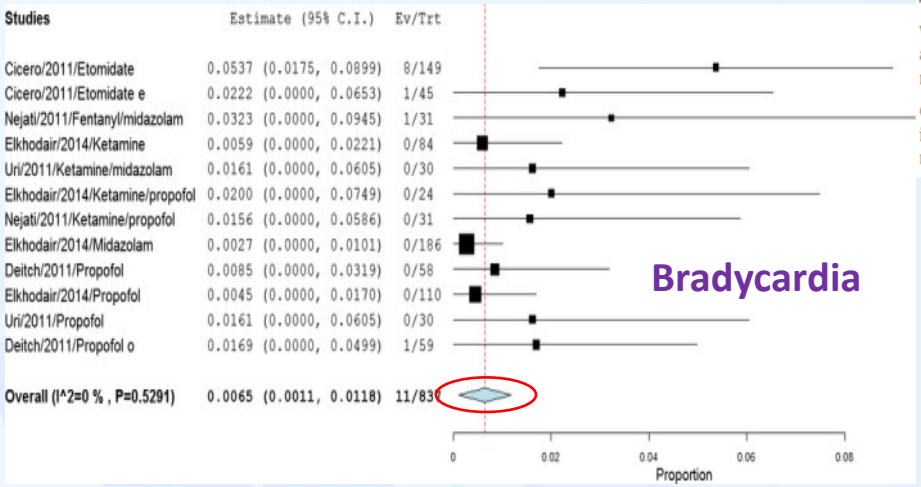
Outcomes	OR Counts	NORA Counts
Anaphylaxis	127	34
Awareness	68	25
Hemodynamic instability	2008	782
Central nervous system injury	379	85
Infection	95	8
Malignant hyperthermia	6	3
Medication error	148	50
Peripheral nerve injury	223	30
Respiratory	2191	664
Resuscitation	2006	213
Spinal/epidural/nerve block	29	7
Upgrade of care	4141	782
Vascular access	226	51
Visual loss	14	2
Wrong patient, wrong site, fall, burn	59	15

(J Patient Saf 2015;00: 00–00)

NGUY CƠ CỦA GMNPM



Aspiration



Bradycardia

ACADEMIC EMERGENCY MEDICINE • February 2016, Vol. 23, No. 2 • www.aemj.org

PROGRESSIVE CLINICAL PRACTICE

Incidence of Adverse Events in Adults Undergoing Procedural Sedation in the Emergency Department: A Systematic Review and Meta-analysis

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Results: The search yielded 2,046 titles for review. Fifty-five articles were eligible, including 9,652 procedural sedations. The most common adverse event was hypoxia, with an incidence of 40.2 per 1,000 sedations (95% CI = 32.5 to 47.9), followed by vomiting with 16.4 per 1,000 sedations (95% CI = 9.7 to 23.0) and hypotension with 15.2 per 1,000 sedations (95% CI = 10.7 to 19.7). Severe adverse events requiring emergent medical intervention were rare, with one case of aspiration in 2,370 sedations (1.2 per 1,000), one case of laryngospasm in 883 sedations (4.2 per 1,000), and two intubations in 3,636 sedations (1.6 per 1,000). The incidence of agitation and vomiting were higher with ketamine (164.1 per 1,000 and 170.0 per 1,000, respectively). Apnea was more frequent with midazolam (51.4 per 1,000), and hypoxia was less frequent in patients who received ketamine/propofol compared to other combinations. The case of laryngospasm was in a patient who received ketamine, and the aspiration and intubations were in patients who received propofol. When propofol and ketamine are combined, the incidences of agitation, apnea, hypoxia, bradycardia, hypotension, and vomiting were lower compared to each medication separately.

Conclusions: Serious adverse events during procedural sedation like laryngospasm, aspiration, and intubation are exceedingly rare. Quantitative risk estimates are provided to facilitate shared decision-making, risk communication, and informed consent.

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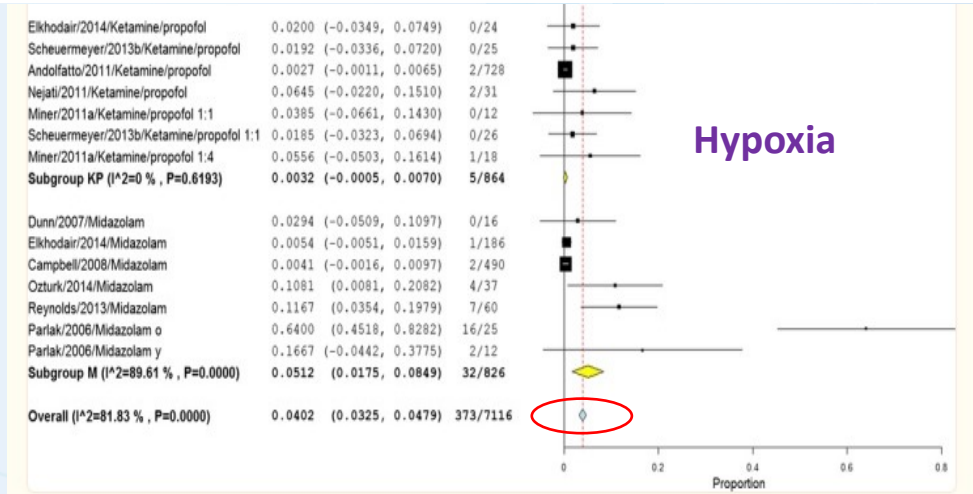

Hypoxia

NGUY CƠ CỦA GMNPM

Incidence and Nature of Adverse Events During Pediatric Sedation/Anesthesia for Procedures Outside the Operating Room: Report From the Pediatric Sedation Research Consortium

Joseph P. Cravero, MD; George T. Blike, MD; Michael Beach, MD; Susan M. Gallagher, BS; James H. Hertzog, MD; Jeana E. Havidich, MD; Barry Gelman, MD; and the Pediatric Sedation Research Consortium

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Pediatrics (2006) 118 (3): 1087–1096.

https://doi.org/10.1542/peds.2006-0313 **Article history**

RESULTS. A total of 26 institutions submitted data on 30037 sedation/anesthesia encounters during the study period from July 1, 2004, to November 15, 2005. Serious adverse events were rare in the institutions involved in this study; there were no deaths. Cardiopulmonary resuscitation was required once. Less serious events were more common with O_2 desaturation below 90% for >30 seconds, occurring 157 times per 10000 sedations. Stridor and laryngospasm both occurred in 4.3 per 10000 sedations. Unexpected apnea, excessive secretions, and vomiting had frequencies of 24, 41.6, and 47.2 per 10000 encounters, respectively.

CONCLUSIONS. Our data indicate that pediatric sedation/anesthesia for procedures outside the operating room is unlikely to yield serious adverse outcomes in a collection of institutions with highly motivated and organized sedation services. However, the safety of this practice depends on the systems' ability to manage less serious events.

KẾT LUẬN

- Gây mê ngoài phòng mổ ngày càng phổ biến và đảm bảo an toàn cho các thủ thuật nhưng bản thân lại có nhiều nguy cơ.
- Cần thăm khám, đánh giá kĩ bệnh nhân, sử dụng thuốc hợp lý, theo dõi sát, sớm phát hiện và xử trí các biến chứng khi gây mê ngoài phòng mổ.

Photo by Phòng truyền thông & marketing - BV ĐHYHN

Thanks for your attention!