

# Krvácení z GIT:

...pohled anesteziologa

Roman Kula

*Oddělení anesteziologie, resuscitace a intenzivní medicíny*



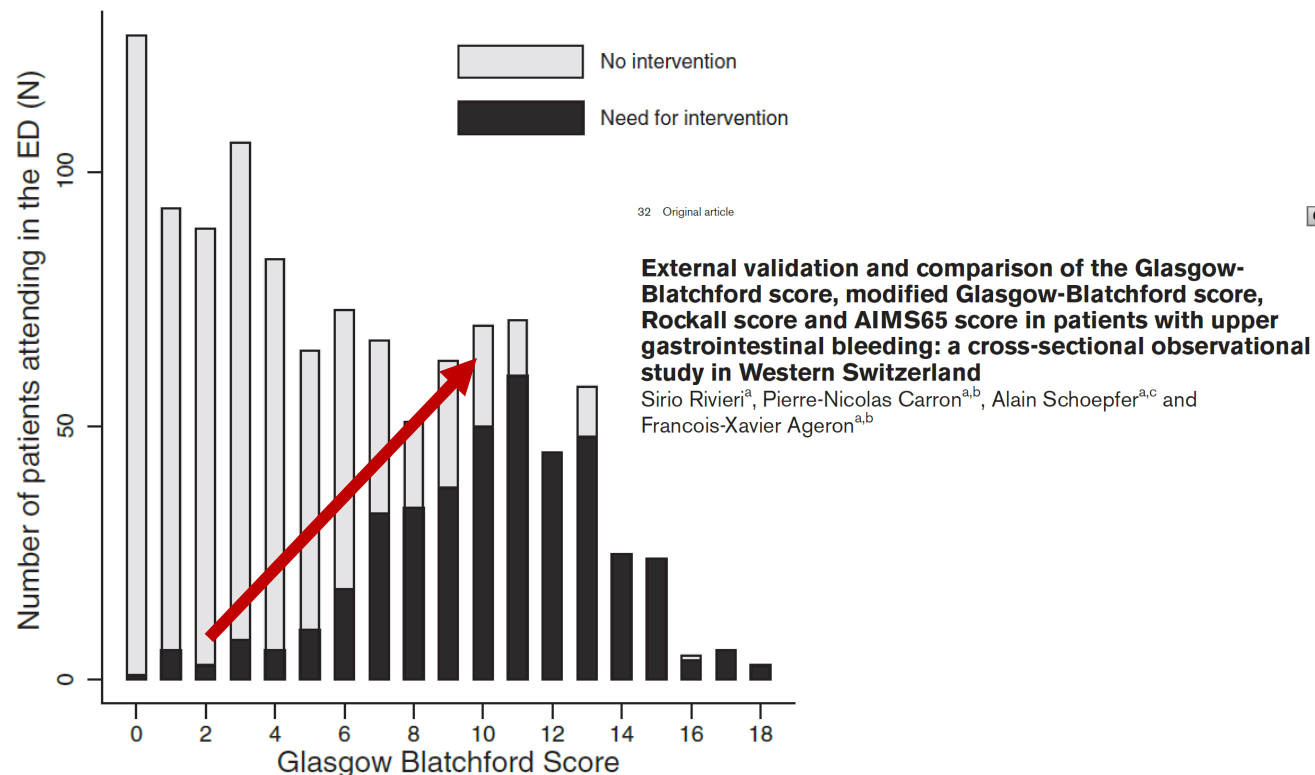
**Nemám žádný konflikt zájmů!**

# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

## Jak zhodnotit závažnost pacienta?

### Glasgow-Blatchford score

- Predikce potřeby endoskopické intervence
- U nevarikózního krvácení a při hodnotě skóre do 2 lze pacienta propustit z ED do ambulantní péče



Risk factors at presentation	Threshold	Score
Blood urea nitrogen (mmol/l)	6.5–7.9	2
	8.0–9.9	3
	10.0–24.9	4
	≥25.0	6
Hemoglobin for men (g/l)	120–130	1
	100–119	3
	<100	6
Hemoglobin for women (g/l)	100–120	1
	<100	6
Systolic blood pressure (mmHg)	100–109	1
	90–99	2
	<90	3
Heart rate (bpm)	>100	1
Melena	Present	1
Syncope	Present	2
Hepatic disease	Present	2
Cardiac failure	Present	2


# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

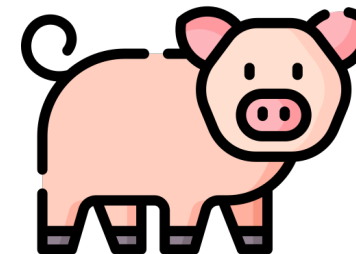
## Jak zhodnotit závažnost krevní ztráty?

2023

Article

## Hemorrhagic Shock: Blood Marker Sequencing and Pulmonary Gas Exchange

Benedikt Tremel<sup>1,†</sup>, Axel Kleinsasser<sup>1,\*</sup>, Johann Knotzer<sup>2</sup>, Robert Breitkopf<sup>1</sup>, Corinna Velik-Salchner<sup>1</sup> and Sasa Rajsic<sup>1,†</sup> 



### Prasečí model hemoragického šoku:

- v experimentální skupině krevní ztráta 65% za 20 minut,
- hodnocení parametrů 1) hned poté, 2) s odstupem 1 hodiny
- bez objemové resuscitace

Circulatory Parameters	Baseline	<i>p</i> Value	Time 1 <sup>a</sup>	<i>p</i> Value	Time 2 <sup>a</sup>	<i>p</i> Value
<b>Heart Rate (beats/min)</b>						
Hemorrhage	89 ± 11	0.976	151 ± 39	0.001	164 ± 51	<0.001
Control	84 ± 12		85 ± 14		84 ± 11	
<b>Systolic arterial pressure (mmHg)</b>						
Hemorrhage	105 ± 15	0.840	47 ± 3	<0.001	50 ± 5	<0.001
Control	107 ± 15		114 ± 16		104 ± 15	
<b>CVP (mmHg)</b>						
Hemorrhage	9 ± 2	0.983	-3 ± 6	<0.001	0 ± 1	<0.001
Control	9 ± 2		9 ± 2		28 ± 3	
<b>PAPmean (mmHg)</b>						
Hemorrhage	26 ± 4	0.994	8 ± 5	<0.001	13 ± 2	<0.001
Control	26 ± 4		24 ± 2		28 ± 3	
<b>PCWP (mmHg)</b>						
Hemorrhage	11 ± 3	0.958	3 ± 2	0.001	2 ± 1	<0.001
Control	10 ± 2		11 ± 2		11 ± 3	
<b>Cardiac Output (liters/minute)</b>						
Hemorrhage	5.1 ± 0.6	0.822	2.6 ± 0.8	<0.001	2.0 ± 0.3	<0.001
Control	5.2 ± 0.8		5.7 ± 0.9		5.5 ± 0.8	

Vhodný šokový index (SI):

**HR/SBP**

**SI > 1.0 -> predikce vysoké mortality**


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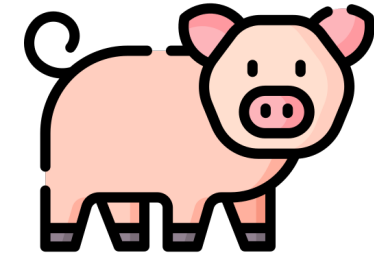
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2023

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Laboratory Parameter	Baseline	p Value	Time 1 <sup>a</sup>	p Value	Time 2 <sup>a</sup>	p Value
<b>Lactate (mg/dL)</b>						
Hemorrhage	15 ± 2	0.984	44 ± 3	0.001	95 ± 24	<0.001
Control	15 ± 3		14 ± 2		15 ± 2	
<b>Glucose (mg/dL)</b>						
Hemorrhage	95 ± 15	0.941	138 ± 35	0.002	161 ± 37	<0.001
Control	95 ± 12		97 ± 15		93 ± 11	
<b>SBED (mmol/l)</b>						
Hemorrhage	3.4 ± 2.9	0.649	-0.1 ± 1.9	0.270	-7.2 ± 3.6	0.001
Control	4.2 ± 2.6		2.7 ± 3.4		2.7 ± 2.3	
<b>Hemoglobin (g/dL)</b>						
Hemorrhage	7.1 ± 0.7	0.864	7.2 ± 0.5	0.973	6.3 ± 1.1	0.143
Control	7.1 ± 0.8		7.2 ± 0.9		7.5 ± 0.7	
<b>apri</b>						
Hemorrhage	7.48 ± 0.04	0.828	7.47 ± 0.04	0.846	7.30 ± 0.09	0.001
Control	7.49 ± 0.05		7.47 ± 0.05		7.44 ± 0.04	

- Jako první dochází k elevaci sérového laktátu a glykemie
- Base excès má zpoždění
- Hemoglobin se nezměnil VŮBEC

# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

## Jak zhodnotit závažnost krevní ztráty?

Digestive Diseases and Sciences (2023) 68:1042–1050  
<https://doi.org/10.1007/s10620-022-07744-w>

ORIGINAL ARTICLE



Hemoglobin byl  
srovnatelný mezi  
přeživšími a  
zemřelými pacienty ...

## MELD-Lactate Predicts Poor Outcome in Variceal Bleeding in Cirrhosis

Thomas Horvatits<sup>1</sup> · Nadim Mahmud<sup>2,3</sup> · Marina Serper<sup>2,3</sup> · Oliver Seiz<sup>1</sup> · Dominik Reher<sup>1</sup> · Andreas Drolz<sup>1</sup> · Naveed Sarnast<sup>4</sup> · Wenyi Gu<sup>5</sup> · Hans Peter Erasmus<sup>5</sup> · Gabriel Allo<sup>6</sup> · Phillip Ferstl<sup>5</sup> · Sebastian Wittmann<sup>1</sup> · Felix Piecha<sup>1</sup> · Stefan Groth<sup>7</sup> · Stefan Zeuzem<sup>5</sup> · Christoph Schramm<sup>6</sup> · Samuel Huber<sup>1</sup> · Thomas Rösch<sup>7</sup> · Ansgar W. Lohse<sup>1</sup> · Jonel Trebicka<sup>5</sup> · Gerald Ogola<sup>4</sup> · Sumeet K. Asrani<sup>4</sup> · Johannes Kluwe<sup>1</sup>

(formula:  $0.251 + 5.257 \times \text{square root (LA)} + 0.338 \times \text{MELD}$ )

Parameter	AUROC	95% CI	Cut-off
Lactate	0.73	0.66–0.81	> 3.5
MELD	0.78	0.71–0.84	> 15
MELD-LA	0.82	0.76–0.88	> 14.4

# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

**Jak zhodnotit závažnost krevní ztráty?**

*Clinical Study*

Hindawi  
Gastroenterology Research and Practice  
Volume 2019, Article ID 5048078, 10 pages  
<https://doi.org/10.1155/2019/5048078>

## Lactate Level Predicts Mortality in Patients with Upper Gastrointestinal Bleeding

Muge Gulen <sup>1</sup>, Salim Satar,<sup>1</sup> Adnan Tas,<sup>2</sup> Akkan Avci <sup>1</sup>, Hakan Nazik <sup>3</sup>  
and Basak Toptas Firat<sup>1</sup>

TABLE 3: ROC analysis of lactate values and GBS for need for red blood cell transfusion.

	AUC	SD	95% CI	Cutoff	Sensitivity	Specificity	<i>p</i>
GBS	0.904	0.029	0.848-0.961	9.5	83.3	80	<0.001
Lactate	0.689	0.050	0.590-0.788	1.58	70.2	60	0.003

AUC: area under the curve; CI: confidence interval; GBS: Glasgow-Blatchford Bleeding Score; SD: standard deviation.

TABLE 4: ROC analysis of lactate values and GBS for hospital mortality.

	AUC	SD	95% CI	Cutoff	Sensitivity	Specificity	<i>p</i>
GBS	0.683	0.078	0.530-0.835	13.5	66.7	71	0.021
Lactate	0.664	0.086	0.495-0.834	2.32	66.7	63.7	0.038

AUC: area under the curve; SD: standard deviation; CI: confidence interval; GBS: Glasgow-Blatchford Bleeding Score.

# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

Proč je správná indikace transfuze tak důležitá?



## Transfusion Strategies for Acute Upper Gastrointestinal Bleeding

Càndid Villanueva, M.D., Alan Colomo, M.D., Alba Bosch, M.D., Mar Concepción, M.D., Virginia Hernandez-Gea, M.D., Carles Aracil, M.D., Isabel Graupera, M.D., María Poca, M.D., Cristina Alvarez-Urturi, M.D., Jordi Gordillo, M.D., Carlos Guarner-Argente, M.D., Miquel Santaló, M.D., Eduardo Muñoz, M.D., and Carlos Guarner, M.D.

### CONCLUSIONS

As compared with a liberal transfusion strategy, a restrictive strategy significantly improved outcomes in patients with acute upper gastrointestinal bleeding. (Funded by Fundació Investigació Sant Pau; ClinicalTrials.gov number, NCT00414713.)

Transfuze byla podána, pokud Hb klesl:

- 1) U restriktivní skupiny **Hb < 70 g/l**
- 2) U liberální skupiny **Hb < 90 g/l**

- U liberální skupiny bylo popsáno **signifikantní zvýšení portálního tlaku** jako možné vysvětlení zvýšené mortality
- Je zde prostor pro **restriktivní objemovou resuscitaci a permisivní hypotenzi?**



# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

Je rozhodnuto o provedení akutní gastrofibroskopie za přítomnosti anesteziologa.

Zajistěte provedení GFS za optimálních podmínek (nejlépe na operačním sále)!

British Journal of Anaesthesia **107** (5): 687–92 (2011)  
Advance Access publication 8 August 2011 · doi:10.1093/bja/aer251

BJA

## CLINICAL PRACTICE

### Out-of-theatre tracheal intubation: prospective multicentre study of clinical practice and adverse events<sup>†</sup>

T. M. Bowles<sup>1\*</sup>, D. A. Freshwater-Turner<sup>2</sup>, D. J. Janssen<sup>3</sup> and C. J. Peden<sup>4</sup>, on behalf of the RTIC Severn Group

Incidence nežádoucích událostí u akutní intubace mimo operační sály je vysoká - **až 40%**

**Table 2** Data collected on adverse events around the time of intubation

#### Adverse events

- Death
- Non-fatal cardiac arrest
- Significant hypoxaemia
- Significant hypotension
- Dysrhythmia requiring treatment
- Challenging intubation
- Oesophageal intubation
- Aspiration of gastric contents
- Dental injury
- Dangerous agitation

# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

Musím vždy intubovat?


**JGH Open** An open access journal of  
gastroenterology  
and hepatology  
Open Access



doi:10.1002/jgh3.12195

ORIGINAL ARTICLE

## Prophylactic endotracheal intubation in critically ill patients with upper gastrointestinal bleed: A systematic review and meta-analysis

Dipayan Chaudhuri,<sup>\*,1</sup>  Kirles Bishay,<sup>†,1</sup> Parul Tandon,<sup>†</sup> Vatsal Trivedi,<sup>‡</sup> Paul D James,<sup>†</sup> Erin M Kelly,<sup>§,¶</sup> Kednapa Thavorn<sup>||,\*\*</sup> and Kwadwo Kyeremanteng<sup>§,¶,††,‡‡</sup>

Profylaktická intubace je spojená s:

- Vyšším rizikem aspirační pneumonie
- Vyšší délkou pobytu v nemocnici
- Vyšší mortalitou
- Vyššími náklady na péči

v porovnání s provedením endoskopie bez intubace

Indikace intubace musí být racionální - tj. pouze v případech, kdy je **skutečně ohrožena průchodnost dýchacích cest.**

# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

Musím vždy intubovat?

2022

OPEN ACCESS

SPECIALIST REVIEW

bmjmedicine

## Update on the management of upper gastrointestinal bleeding



Josh Orpen-Palmer , Adrian J Stanley

**Pokud intubuju,  
extubace by měla  
nastat co nejdříve,  
ideálně bezprostředně  
po endoskopii.**

The European non-variceal UGIB guidelines recommend that prophylactic intubation should be performed only in the context of severe haematemesis, agitation, or inability to protect the airway.<sup>15</sup> The Baveno VII guidance for variceal bleeding suggests use of intubation in patients with altered consciousness and actively vomiting blood, with extubation as soon as possible after endoscopy.<sup>16</sup> In these situations, early anaesthetic input should be provided. Patients unable to tolerate endoscopy under conscious sedation might also require intubation.

# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

## Když jsem se tedy rozhodl pro intubaci:

- Je indikováno **RSI**
- U šokových stavů je očekávána hypotenze po úvodu - **noradrenalin mít nachystaný před zahájením RSI**
- **NGS:**

### Gastroenterologická indikace:

#### Randomized pragmatic trial of nasogastric tube placement in patients with upper gastrointestinal tract bleeding

[Don C Rockey](#)<sup>1</sup>, [Chul Ahn](#)<sup>2</sup>, [Silvio W de Melo Jr](#)<sup>3</sup>

Affiliations + expand

PMID: 28069629 DOI: [10.1136/jim-2016-000375](https://doi.org/10.1136/jim-2016-000375)

presence of high-risk lesions was poor. Routine NG placement did not improve physician's predictive ability, did not affect outcomes, and was complicated in one-third of patients.

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Anesteziologická indikace:



BJA Education, 22(12): 484–490 (2022)

doi: [10.1016/j.bjae.2022.09.001](https://doi.org/10.1016/j.bjae.2022.09.001)

Advance Access Publication Date: 1 November 2022

## Rapid sequence induction and intubation

J. Collins\* and E.P. O'Sullivan

St James's Hospital, Dublin 8, Ireland

\*Corresponding author. [collinja@tcd.ie](mailto:collinja@tcd.ie)

**Keywords:** airway management; rapid sequence induction and intubation; respiratory aspiration

with breathing high concentration oxygen. Finally, if a nasogastric tube is present it should be aspirated and left open to air before RSII. The insertion and aspiration of a nasogastric tube before RSII can be considered in patients who are likely to have a significant volume of gastric residue.

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- U šokových stavů je očekávána hypotenze po úvodu - **noradrenalin mít nachystaný před zahájením RSI**
- **NGS**
- Mít možnost rychlého umístění pacienty do **Trendelenburgovy polohy při zvracení**

St. Pierre et al. *BMC Anesthesiology* (2019) 19:16  
<https://doi.org/10.1186/s12871-019-0686-x>

BMC Anesthesiology

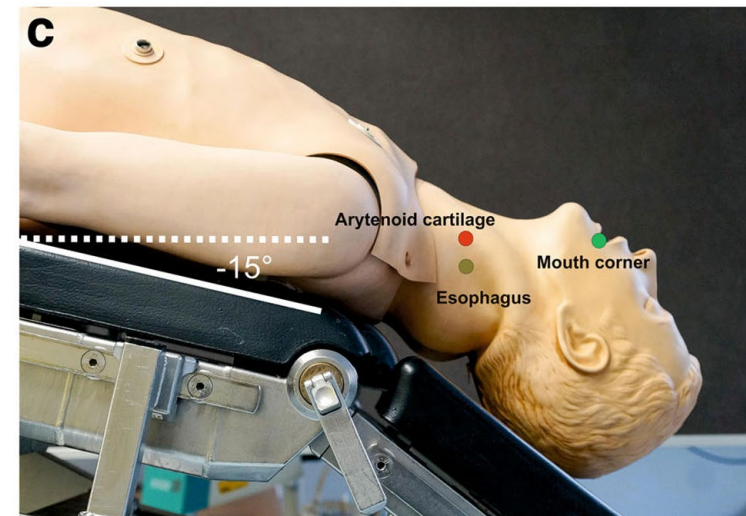
RESEARCH ARTICLE

Open Access

The influence of different patient positions during rapid induction with severe regurgitation on the volume of aspirate and time to intubation: a prospective randomised manikin simulation study



Michael St. Pierre , Frederick Krischke, Bjoern Luetcke and Joachim Schmidt



**Conclusions:** In a simulated setting, using a manikin-based simulator capable of fluid regurgitation, a – 15° head-down tilt with Sellick position reduced the amount of aspirated fluid but increased the difficulty in visualising the vocal cords and prolonged the time taken to intubate. Assessing the airway management in the identical position in healthy patients without risk of aspiration might be a promising next step to take.

# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

## Prokinetika

### Anesteziologická indikace:

Research

#### Original Investigation

## Erythromycin for Gastric Emptying in Patients Undergoing General Anesthesia for Emergency Surgery A Randomized Clinical Trial

Christoph Czarnetzki, MD, MBA; Nadia Elia, MD, MSc; Jean-Louis Frossard, MD; Emiliano Giostra, MD; Laurent Spahr, MD; Jean-Luc Waeber, MD; Gordana Pavlovic, MD; Christopher Lysakowski, MD; Martin R. Tramèr, MD, DPhil

**INTERVENTIONS** Patients were randomized to intravenous erythromycin lactobionate, 3 mg/kg, or placebo 15 minutes before tracheal intubation. Patients were followed up for 24 hours.

**CONCLUSIONS AND RELEVANCE** In patients undergoing general anesthesia for emergency procedures, erythromycin administration increased the proportion with a clear stomach and decreased the acidity of residual gastric liquid. Erythromycin was particularly efficacious in the nontrauma population. Adverse effects were minor. Further large-scale studies are warranted to confirm the potential of erythromycin to reduce the incidence of bronchoaspiration in patients undergoing emergency surgery.

### Gastroenterologická indikace:



Cochrane Database of Systematic Reviews

2023

## Erythromycin prior to endoscopy for acute upper gastrointestinal haemorrhage (Review)

Adão D, Gois AFT, Pacheco RL, Pimentel CFMG, Riera R

*„Erythromycin may improve the quality of visualisation of the stomach and may also slightly reduce the need for blood transfusion.“*

# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

## Jak provést sedaci bezpečně?

- Zajistit **oxygenoterapii** a **kapnografický monitoring**
- Nezapomenout na **topickou anestezii lidokainem**

BJA

*British Journal of Anaesthesia*, 128 (4): 644–654 (2022)

doi: [10.1016/j.bja.2021.08.036](https://doi.org/10.1016/j.bja.2021.08.036)

Advance Access Publication Date: 5 November 2021

Review Article

### CLINICAL PRACTICE

## Impact of intravenous and topical lidocaine on clinical outcomes in patients receiving propofol for gastrointestinal endoscopic procedures: a meta-analysis of randomised controlled trials

Kuo-Chuan Hung<sup>1,2</sup>, Ming Yew<sup>3</sup>, Yao-Tsung Lin<sup>1,2</sup>, Jen-Yin Chen<sup>1</sup>, Li-Kai Wang<sup>1,2</sup>, Ying-Jen Chang<sup>1,4</sup>, Yang-Pei Chang<sup>5,6</sup>, Kuo-Mao Lan<sup>1</sup>, Chun-Ning Ho<sup>1</sup> and Cheuk-Kwan Sun<sup>7,8,\*</sup>

**Conclusion:** This meta-analysis demonstrated that i.v. or topical lidocaine appears safe to use and may be of benefit for improving propofol sedation in patients undergoing gastrointestinal endoscopic procedures. Further large-scale trials are warranted to support our findings.



# Jste voláni k anestezii/sedaci pacienta s krvácením z GIT...

## Jak provést sedaci bezpečně?

- Zajistit **oxygenoterapii** a **kapnografický monitoring**
- Nezapomenout na **topickou anestezii lidokainem**
- Myslet na **ketamin** - zachované obranné dýchací reflexy

BJA

*British Journal of Anaesthesia*, 118 (3): 344–54 (2017)

doi: 10.1093/bja/aex004

Review Article

## Pulmonary aspiration during procedural sedation: a comprehensive systematic review

S. M. Green<sup>1,\*</sup>, K. P. Mason<sup>2</sup> and B. S. Krauss<sup>3</sup>

Although propofol is likely to be the most common procedural sedation agent used in most settings, ketamine remains a common first or second choice, particularly in children.<sup>58</sup> It is noteworthy that our only occurrence of ketamine-associated aspiration was in subdissociative doses as a secondary adjunct to propofol (Table 1). Ketamine is well known to preserve protective airway reflexes, and our review fails to counter the previous observation that, despite almost 50 yr of continual worldwide use, there are no documented reports—except in medically compromised neonates—of clinically significant aspiration when ketamine is used as the principal sedative.<sup>65</sup> Accordingly,

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- Nezapomenout na **topickou anestezii lidokainem**
- Myslet na **ketamin** - zachované obranné dýchací reflexy
- Sedace se zdá být **bezpečnou alternativou**

Digestive Diseases and Sciences (2023) 68:1426–1434  
<https://doi.org/10.1007/s10620-022-07740-0>

ORIGINAL ARTICLE



## Safety and Efficacy of Sedation During Emergency Endoscopy for Upper Gastrointestinal Bleeding: A Propensity Score Matching Analysis

Daisuke Yamaguchi<sup>1,2</sup> · Goshi Nagatsuma<sup>1</sup> · Yasuhisa Sakata<sup>2</sup> · Yumi Mizuta<sup>1</sup> · Tadahiro Nomura<sup>1</sup> · Azuki Jinnouchi<sup>1</sup> · Kasumi Gondo<sup>1</sup> · Ryosuke Asahi<sup>1</sup> · Satoshi Ishida<sup>1</sup> · Shunichiro Kimura<sup>1</sup> · Shun Fujimoto<sup>1</sup> · Akane Shimakura<sup>1</sup> · Amane Jubashi<sup>1</sup> · Yuki Takeuchi<sup>1</sup> · Kei Ikeda<sup>1</sup> · Yuichiro Tanaka<sup>1</sup> · Wataru Yoshioka<sup>1</sup> · Naoyuki Hino<sup>1</sup> · Tomohito Morisaki<sup>1</sup> · Keisuke Ario<sup>1</sup> · Seiji Tsunada<sup>1</sup> · Motohiro Esaki<sup>2</sup>

**Conclusions** Sedation reduced the procedure time during emergency endoscopy for UGIB. Sedation during emergency endoscopy for UGIB is acceptable for safe endoscopic procedures.

**Děkuji Vám za pozornost!**