



The clinical efficacy of high-flow nasal oxygen in patients submitted to ERCP under sedation

Hee kyung Shin

Inha University College of Medicine

Background

- Desaturation rate during sedated ERCP
21.4 % (12/56) under 65 years old
16.2% (12/74) over 65 years old during sedated ERCP

Characteristics	Group 1 (≥ 65 y, n = 74)	Group 2 (< 65 y, n = 56)	<i>p</i> Value
Oxygen saturation < 90%, n (%)	12 (16.2%)	12 (21.4%)	0.596

Gastrointestinal Endoscopy (2006)

- Age over 60 years old, ASA grade III were identified as predictive factors of desaturation during ERCP.

Arq Gastroenterol (2004)

Variables	PR	<i>P</i>	CI 95%
Age ≥60 years old	1.58	0.02	1.04 – 2.39
Gender female	1.41	0.09	0.94 – 2.11
Group C*	0.94	0.80	0.57 – 1.52
Group B*	0.92	0.72	0.59 – 1.42
ASA III**	1.80	0.01	1.13 – 2.88
ASA IV**	1.66	0.07	0.94 – 2.94
Therapeutic exam***	0.86	0.56	0.53 – 1.40
Scopolamine (Yes)	1.42	0.20	0.82 – 2.45
Hb altered	0.95	0.83	0.63 – 1.45

- BMI over 20kg/m², EGD+Colonoscopy, Comorbidities (hypertension, DM, heart disease) increased relative risk of desaturation rate during sedated endoscopy.

Methods

- A total of 262 patients were applied high-flow nasal oxygen during ERCP under sedation from March 2019 to June 2019
- High flow nasal oxygen : FiO₂ 0.5, LPM 50
- Sedation by midazolam or propofol or combination
- Definition of '**Desaturation**' : below 90% (SaO₂ ≤ 90%)
- The **inclusion** criteria :
 - ✓ age over 19 years old
 - ✓ level of consciousness (LOC) under II (alert and drowsy)
- The **exclusion** criteria :
 - ✓ coagulation disorders or a tendency of nasopharyngeal bleeding or obstruction
 - ✓ patients with or scheduled airway intubation or tracheostomy state;
 - ✓ patients with home oxygen or respirator
 - ✓ patients with chronic destructive pulmonary disease
 - ✓ failure of technical success (cannula failure, altered anatomy)

Aim

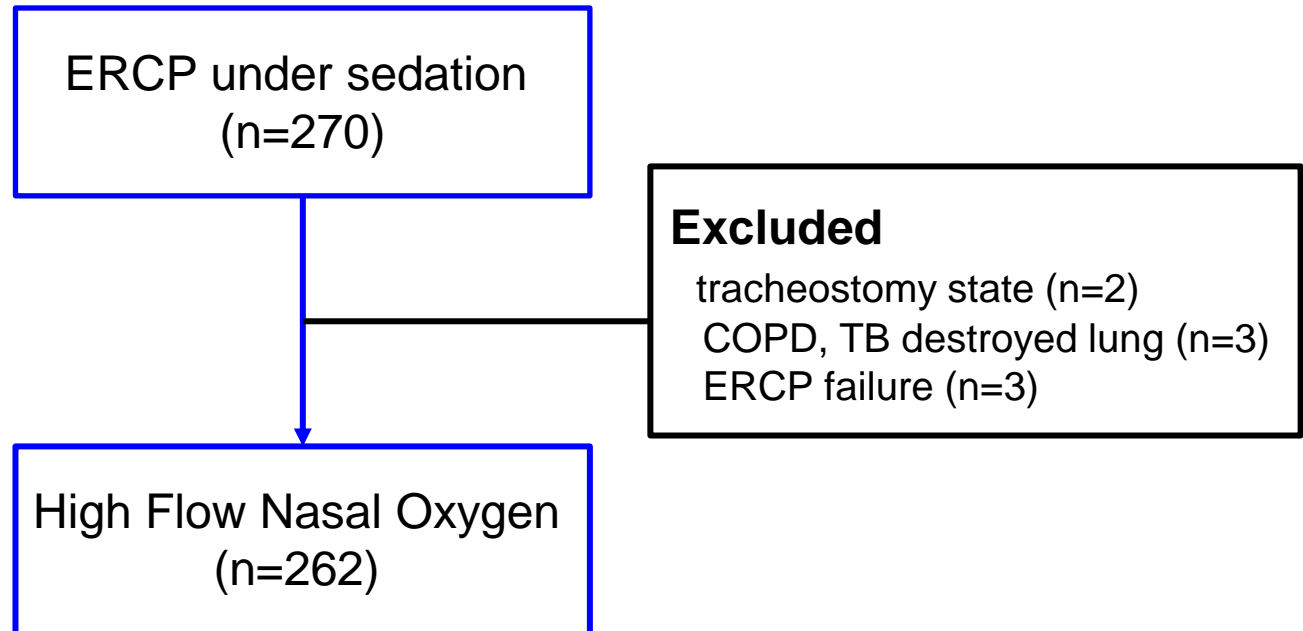
- To see the prevention effect of

High Flow Nasal Oxygen (HFNO)

on sedated ERCP

Results

Flow chart



Basic characteristics & Sedation protocol

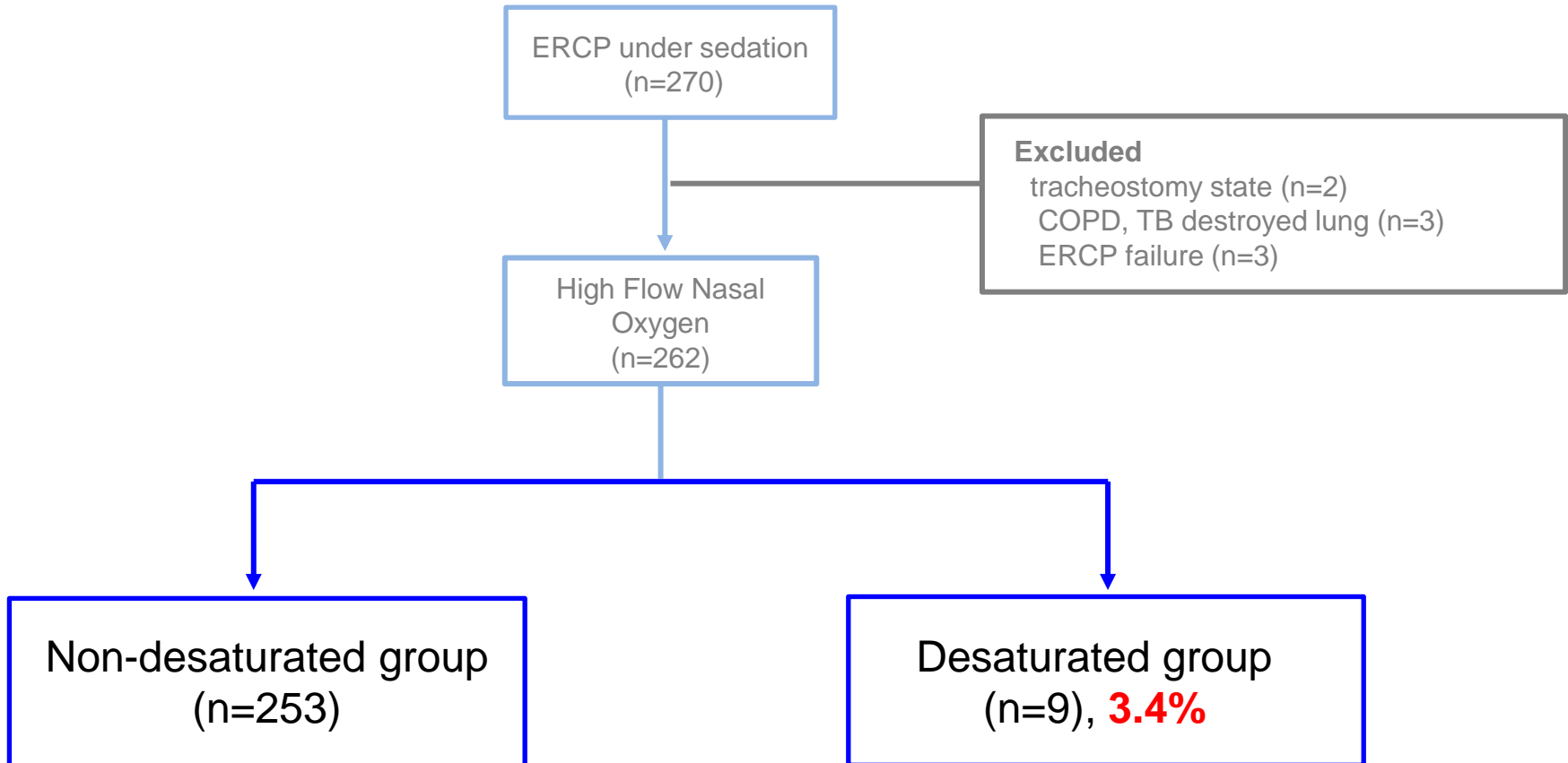
	N=262
Age (yr)	68.1 ± 16.0
Gender, n (%)	
male	135 (51.5)
female	127 (48.5)
BMI (kg/m²)	23.9 ± 4.4
Underlying disease, n(%)	
DM	78 (29.7)
HTN	96 (36.6)
CAOD, MI	16 (6.1)
CHF	2 (0.8)
Cerebral infarction	15 (5.7)
Antiplatelet, antithrombotic medication use, n(%)	40(15.3)

	N=262
ASA status, n(%)	
I	108 (41.2)
II	56 (21.4)
III	98 (37.4)
Sedation type, n (%)	
midazolam	41 (15.6)
propofol	172 (65.6)
both	98 (37.4)
Sedation dose (mg)	
midazolam	1.7 ± 2.5
propofol	105.9 ± 69.5
Procedure time (min)	17.6 ± 10

Indications for ERCP

Cause of ERCP, n(%)	
CBD stone	159 (60.7)
Malignancies	61 (23.3)
cholangiocarcinoma	22 (36.1)
gall bladder cancer	14 (23.0)
pancreatic cancer	11 (18.0)
Klatskin tumor	5 (8.2)
AoV cancer	5 (8.2)
HCC	4 (6.6)
Benign stricture	23 (8.8)
etc.	19 (7.3)
SOD	5 (26.3)
pancreatic pseudocyst	4 (21.1)
IPMN	3 (15.8)
post cholecystectomy biliary leakage	3 (15.8)
choledochal cyst	1 (5.3)
PSC	1 (5.3)
pancreatic NET	1 (5.3)
AoV adenoma	1 (5.3)

Clinical outcome



Desaturation event

	Age	Gender	BMI	ASA	Cause of procedure	Procedure time	Type of sedation	Accompanying symptom	Treatment
1	84	F	24.9	3	Stone	6	Midazolam (5mg)	Agitation	Flumazenil
2	84	M	21.1	1	Stone	32	Midazolam (10mg)	Agitation	Flumazenil
3	88	F	22.6	2	Stone	6	Midazolam (10mg)	Bradycardia	Flumazenil
4	92	F	18.2	1	Stone	27	Midazolam (5mg)	Tachycardia	Flumazenil 0.7/50
5	89	M	28.4	2	Stone	25	Midazolam (5mg)	Agitation	Flumazenil 0.6/50
6	79	F	16.9	2	Stone	12	Mida 5mg, Propofol 30mg	Agitation	Flumazenil 0.7/50
7	59	M	26.6	2	Stone	13	Propofol (240mg)	Agitation	0.7/50, Stop procedure
8	82	M	18.7	1	Stone	13	Midazolam (5mg)	Agitation	Flumazenil 0.7/50
9	82	M	18.5	3	Stone	3	Midazolam (5mg)	Agitation	Flumazenil 0.7/50

Comparison to desaturation group

	Desaturation group (n=9)	No desaturation group (n=253)	P value
Age	82.1 ± 9.6	67.6 ± 16	<0.05
BMI	21.8 ± 4.1	23.9 ± 0.5	0.15
Sex (male)	5 (55.6)	130 (51.4)	0.81
Procedure time	15.2 ± 10.3	17.7 ± 10	0.39
Sedation dose			
midazolam	5.6 ± 3.0	1.53 ± 2.4	<0.05
Propofol	30 ± 79.4	108.6 ± 67.8	<0.05
Sedation drug			<0.05
mida	7 (77.8)	34 (13.4)	
propofol	1 (11.1)	171 (67.6)	
both	1 (11.1)	48 (19)	
Antiplatelet	1 (11.1)	39 (15.4)	0.72
Underlying disease			
DM	1 (11.1)	77 (30.4)	0.21
HTN	5 (55.6)	91 (36)	0.23
CAOD	0 (0)	16 (6.3)	0.44
CHF	0 (0)	2 (0.8)	0.79
Cerebral infarction	1 (11.1)	14 (5.5)	0.48
ASA			0.22
I	3 (33.3)	105 (41.5)	
II	4 (44.4)	52 (20.6)	
III	2 (22.2)	96 (7.5)	

Conclusion

- This study showed a significantly lower desaturation rate during ERCP by using HFNO.
- The variables of **older age, higher sedation dose, use of midazolam** are identified as increased risk for desaturation.
- *The use of **HFNO** is necessary to decrease the incidence of desaturation during ERCP.*