

Wei Nasal Jet Tube

Publications Introduction



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Advancements in Airway Management: The Rapid Evolution of SJOV in OR and Non-OR Settings

Since the introduction of the supraglottic jet oxygenation and ventilation (SJOV) technique in 2006, it has been increasingly used for various aspects of airway management. The technique has been facilitated largely by the introduction of the the jet nasal tube—a prime example being the Wei Nasal Jet Tube (WNJ).

A large number of studies demonstrated the high efficiency of SJOV to prevent or treat hypoxia during upper gastrointestinal endoscopy, colonoscopy, endoscopic retrograde cholangiopancreatography and hysteroscopy, under propofol sedation/anaesthesia, especially in obese patients or in locations with high altitude (e.g., Tibet, China).

SJOV has also been used to maintain oxygenation/ventilation during elective difficult airway management and to facilitate tracheal intubation. The guideline on difficult airway management by the American Society of Anesthesiologists in 2022 suggested that SJOV could be considered one of the approaches to rescue patients with urgent or emergent difficult airways.

Publications of WNJ

20+ studies and case reports have been published, highlighting the effectiveness of WNJ in endoscopic surgery airway management, elective difficult airway management, urgent/emergent airway management, and the treatment of respiratory failure

#	LITERATURE	JOURNAL	YEAR
1	Evaluating lung ventilation via electrical impedance tomography during flexible bronchoscopy with supraglottic jet ventilation: a prospective pilot study	Journal of Anesthesia	2025
2	Supraglottic jet oxygenation and ventilation on hypoxemia risk: A trial sequential analysis	Journal of Clinical Anesthesia	2025
3	Effect of supraglottic jet oxygenation and ventilation on hypoxemia in patients undergoing endoscopic surgery with sedation: A meta-analysis of randomized controlled trials	Journal of Clinical Anesthesia	2024
4	Efficacy and safety of supraglottic jet oxygenation and ventilation to minimize sedation-related hypoxemia: a meta-analysis with GRADE approach	Systematic Reviews	2024
5	Advancement of supraglottic jet oxygenation and ventilation technique	Indian Journal of Anaesthesia	2024
6	Supraglottic jet oxygenation and ventilation improves oxygenation during endoscopic retrograde cholangiopancreatography: a randomized controlled clinical trial	BMC Anesthesiology	2024
7	Supraglottic Jet Oxygenation and Ventilation (SJOV) to Assist Emergent Resection of a Large Vocal Cord Tumor Using Suspension Laryngoscopy	Annal of Otolaryngology Head and Neck Surgery	2024
8	Supraglottic Jet Oxygenation and Ventilation to Minimize Hypoxia in Patients Receiving Flexible Bronchoscopy Under Deep Sedation: A 3-Arm Randomized Controlled Trial	Anesthesia & Analgesia	2023
9	Evaluation of Supraglottic Jet Oxygenation and Ventilation in 105 Patients During Bronchoscopy Using the Twinstream® Microprocessor-Controlled Jet Ventilator and the Wei Nasal Jet® Tube	Medical Science Monitor	2023
10	Supraglottic jet oxygenation and ventilation decreased hypoxemia during gastrointestinal endoscopy under deep sedation at high altitudes: a randomized clinical trial	BMC Anesthesiology	2022
11	Supraglottic jet oxygenation and ventilation (SJOV) for resuscitation of injured soldiers and people in war field	Military Medical Research	2022
12	Comparing performance of Wei nasal jet tube and nasal cannula during flexible bronchoscopy with sedation	European journal of anaesthesiology	2022

#	LITERATURE	JOURNAL	YEAR
13	Supraglottic jet oxygenation and ventilation reduces desaturation during bronchoscopy under moderate to deep sedation with propofol and remifentanyl: a randomized controlled trial	European Journal of Anaesthesiology	2021
14	Supraglottic jet oxygenation and ventilation – A novel ventilation technique	Indian Journal of Anaesthesia	2020
15	Comparison of two supplemental oxygen methods during gastroscopy with propofol mono-sedation in patients with a normal body mass index.	World Journal of Gastroenterology	2020
16	Supraglottic jet oxygenation and ventilation via nasal approach during microlaryngeal surgery for vocal polyps resection	Trends in Anaesthesia and Critical Care	2020
17	Supraglottic jet oxygenation and ventilation for obese patients under intravenous anesthesia during hysteroscopy: a randomized controlled clinical trial	BMC Anesthesiology	2019
18	Supraglottic jet oxygenation and ventilation assisted fiberoptic intubation in a paralyzed patient with morbid obesity and obstructive sleep apnea: a case report.	BMC anesthesiology	2019
19	WEI nasal jet tube during monitored anaesthesia care for removal of oesophageal foreign body for a patient with fragile cardiopulmonary function.	Indian journal of anaesthesia	2019
20	Supraglottic Jet Oxygenation During Upper Gastrointestinal Endoscopy Reduces Hypoxia With Propofol Sedation	Anesthesiology News	2018
21	Supraglottic jet oxygenation and ventilation enhances oxygenation during upper gastrointestinal endoscopy in patients sedated with propofol: a randomized multicentre clinical trial	British Journal of Anaesthesia	2017
22	Supraglottic jet oxygenation and ventilation saved a patient with 'cannot intubate and cannot ventilate' emergency difficult airway	Journal of Anesthesia	2017
23	Supraglottic jet oxygenation and ventilation-assisted fibre-optic bronchoscope intubation in patients with difficult airways	Internal and Emergency Medicine	2016
24	Supraglottic jet oxygenation and ventilation during colonoscopy under monitored anesthesia care: a controlled randomized clinical trial	European review for medical and pharmacological sciences	2016

Study Overview of WNJ



1-Application in Sedation

—A meta-analysis with GRADE approach

Chen et al. Systematic Reviews (2024) 13:281
https://doi.org/10.1186/s13643-024-02702-w

Systematic Reviews

RESEARCH Open Access

Efficacy and safety of supraglottic jet oxygenation and ventilation to minimize sedation-related hypoxemia: a meta-analysis with GRADE approach

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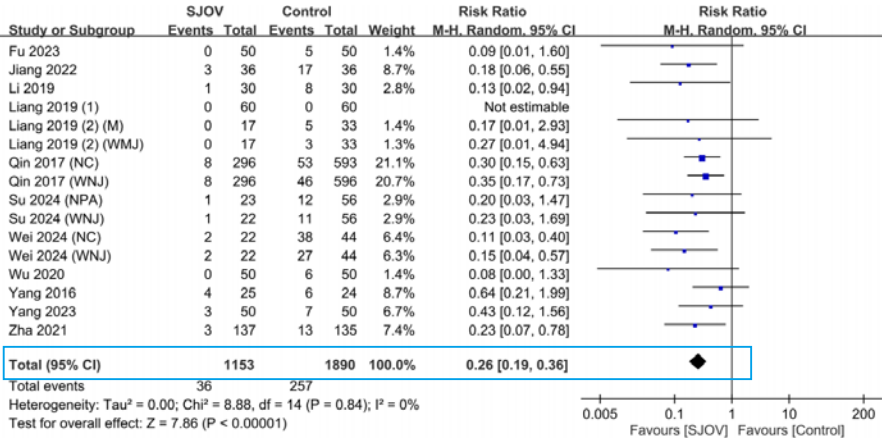


Fig. 3 Forest plot showing the efficacy of supraglottic jet oxygenation and ventilation (SJOV) against intraprocedural hypoxemia defined as SpO₂ < 90%. CI: confidence interval. M-H, Mantel-Haenszel; NPA, nasopharyngeal airway; WNJ, Wei nasal jet tube; NC, nasal cannula; M, mask

1-Application in Sedation

——A meta-analysis with GRADE approach

OBJECTIVES

Evaluate the efficacy and safety in preventing hypoxemia during sedative procedures

SAMPLE SIZE

12 trials, n=3058, 49 to 1781 patients in each RCT

RESULTS

- The evidence suggests that SJOV results in **a large reduction in the risk of hypoxemia and subclinical respiratory depression** compared with the control.
- In addition, it may result in a large reduction in the need for jaw lift and mask ventilation.
- The risk of sore throat probably increases with SJOV, whereas SJOV may result in little to no difference in nasal bleeding.
- Evidence is very uncertain regarding the effect of SJOV on hemodynamics and procedure time.
- SJOV probably resulted in little to no difference in sedative doses between the groups.

CONCLUSION

SJOV likely results in a large reduction in the risk of severe hypoxemia but probably increases the risk of sore throat. Compared with the control, evidence suggests that SJOV results in a large reduction in the risk of hypoxemia, subclinical respiratory depression, and the need for airway manipulation, with little to no difference in nasal bleeding. The integration of SJOV into clinical practice may help minimize hypoxemic events in at-risk patients.

2-Application in Endoscopic Surgery

—A meta-analysis of randomized controlled trials



Effect of supraglottic jet oxygenation and ventilation on hypoxemia in patients undergoing endoscopic surgery with sedation: A meta-analysis of randomized controlled trials

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Table 1
Characteristics of included studies.

Author	Population	Risk of hypoxemia	Number of patients (SJOV/COT)	SJOV group	COT group	Definition of hypoxemia
Wei 2023	Bronchoscopy	High	88(44/44)	FiO ₂ :100%; DP:103 kPa; JF:15 bpm; I:E ratio: 1:2	Nasopharynx, 4 L/min	SpO ₂ < 90%
Jiang 2022	Gastrointestinal Endoscopy	High	72(36/36)	FiO ₂ :100%; DP:103 kPa; JF:20 bpm; I:E ratio: 1:2	Nasal cannula; 2 L/min	SpO ₂ < 90%
Liang 2019 _a	Hysteroscope (obesity)	High	67(34/33)	FiO ₂ :100%; DP:100 kPa; JF:15 bpm; I:E ratio: 1:1.5	Face mask; 6 L/min; FiO ₂ :100%	SpO ₂ < 90%
Qin 2017	Gastrointestinal Endoscopy	High	1185(592/593)	FiO ₂ :100%; DP:103 kPa; JF:20 bpm; I:E ratio: 1:2	Nasal cannula; 2 L/min	SpO ₂ < 90%
Yang 2016	Colonoscopy	Low	49(25/24)	DP:103 kPa or 100 kPa; JF:15 bpm; I:E ratio: 1:1	Nasal cannula; 6 L/min	SpO ₂ < 90%
Zha 2021	Bronchofiberscope	High	280(140/140)	FiO ₂ :100%; DP:103 kPa; JF:20 bpm; I:E ratio: 1:2	Nasal cannula; 4 L/min	SpO ₂ < 90%
Liang 2019 _b	Hysteroscope	Low	120(60/60)	DP:100–300 kPa; JF:15–20 bpm; I:E ratio: 1:1.5	Face mask, 6 L/min, FiO ₂ :45%	SpO ₂ < 95%
Wu 2020	Gastroscope	High	100(50/50)	DP:103.4 kPa; JF:15–20 bpm	Nasal cannula, 6 L/min	SpO ₂ < 95%
Xiao 2013	Gastroscope	High	64(33/31)	DP: 100 kPa; JF: 30–50 bpm	Nasal cannula, 4–5 L/min	SpO ₂ < 90%

DP: Driving pressure;
JF: Jet frequency = Respiratory rate;
Inspiratory/Expiratory (I: E) ratio: I:E ratio;
1 psi = 6.895 kPa, 1 psi = 0.069 bar.
OSAHS: obstructive sleep apnea-hypopnea syndrome;
Liang.2019_a and Liang.2019_b are two studies by the same author.

2-Application in Endoscopic Surgery

—A meta-analysis of randomized controlled trials

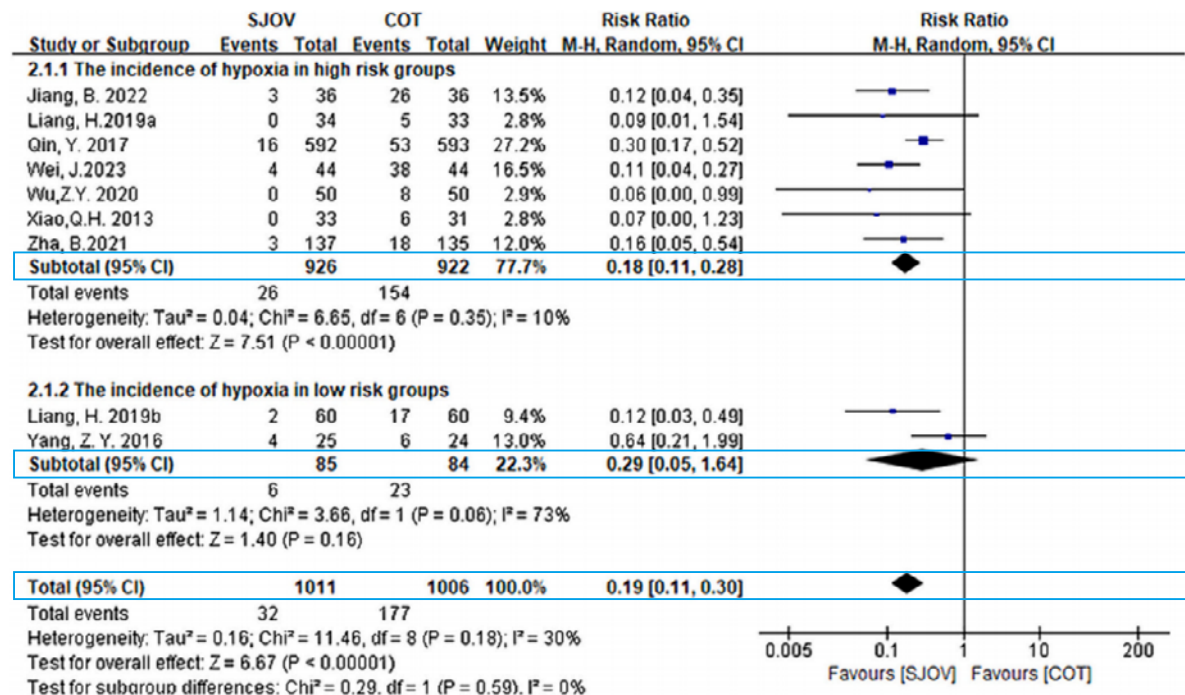


Fig. 3. The forest plot of the incidence of hypoxemia (high and low risk subgroups). SJOV, supraglottic jet oxygenation and ventilation; COT, conventional oxygen therapy; CI, confidence interval; RR, risk ratio.

2-Application in Endoscopic Surgery

——A meta-analysis of randomized controlled trials

OBJECTIVES

Assess the oxygenation/ ventilation efficacy and side effects of the of SJOV in endoscopic surgery

SAMPLE SIZE

9 trials, n=2017, 49 to 1185 patients in each RCT

RESULTS

- The results demonstrated that the incidence of hypoxemia was lower in the SJOV group compared with the conventional oxygen therapy (COT) group
- SJOV reduced the incidence of hypoxemia in the high-risk group but had no effect on the low-risk group.
- The incidence of respiratory depression is lower in SJOV than in COT, but has increased side effects such as dry mouth.
- There was no statistically significant difference in nose bleeding or sore throat between the two groups.

CONCLUSION

Compared with the COT, **the SJOV decreased the incidence of hypoxemia in high-risk patients during endoscopic surgery with sedation.** There was an increased risk of dry mouth, but not of nose bleeding or sore throat, during endoscopic surgery under sedation.

3-Application in Flexible Bronchoscopy

—A randomized controlled clinical trial

EJA

OPEN

Eur J Anaesthesiol 2021; **38**:294–301

ORIGINAL ARTICLE

Supraglottic jet oxygenation and ventilation reduces desaturation during bronchoscopy under moderate to deep sedation with propofol and remifentanyl

A randomised controlled clinical trial

Benjun Zha, Zhiyun Wu, Ping Xie, Huaping Xiong, Li Xu and Huafeng Wei

Table 3 Incidence of hypoxaemia and need for airway assistance

Characteristic	NCO group (n = 135)	SJOV group (n = 137)	P value
Hypoxaemia	50 (37.0)	18 (13.1)	0.001
Subclinical respiratory depression	32 (23.7)	15 (10.9)	0.005
Hypoxaemia	13 (9.6)	3 (2.2)	0.009
Severe hypoxaemia	5 (3.7)	0 (0)	0.023
Need for airway assistance	50 (37.0)	18 (13.1)	0.000
Stimulation	15 (11.1)	8 (5.8)	0.118
Increasing oxygen delivery	14 (10.4)		0.002
Increasing driving pressure		2 (1.5)	
Jaw thrust	19 (14.1)	8 (5.8)	0.023
Mask ventilation	2 (1.5)	0 (0)	0.156

Values are number of patients (% of group total). NCO group, nasal cannula supplement oxygen group; SJOV group, supraglottic jet oxygenation and ventilation group.

3-Application in Flexible Bronchoscopy

——A randomized controlled clinical trial

OBJECTIVES

Evaluate the efficacy and complications of SJOV via the WNJ during flexible bronchoscopy under moderate to heavy sedation with propofol and remifentanyl

SAMPLE SIZE

280 patients

RESULTS

- Compared with the nasal cannula oxygenation (NCO) group, the incidence of desaturation in the SJOV group was lower.
- There was no significant difference between the groups in respect of sore throat, subcutaneous emphysema or nasal bleeding.

CONCLUSION

SJOV via a WNJ during flexible bronchoscopy under moderate to deep sedation with propofol and remifentanyl significantly reduces the incidence of desaturation when compared with regular oxygen supplementation via a nasal cannula. Patients in the SJOV group had an increased incidence of transient dry mouth.

4-Application in Routine Upper GI Endoscopy

—A randomized multicentre clinical trial

BJA

British Journal of Anaesthesia, 119 (5), 158-166 (2017)

doi:10.1093/bja/aex006

Registration and for listing

Supraglottic jet oxygenation and ventilation enhances oxygenation during upper gastrointestinal endoscopy in patients sedated with propofol: a randomized multicentre clinical trial

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Table 3 adverse events and intervention related to hypoxia. The χ^2 test (Fisher's exact test) was used to analyse the adverse events incidence rate. Given that two χ^2 tests were done, the P-value was adjusted to 0.05/2=0.025. SJOV, supraglottic jet oxygenation and ventilation; WNJ, Wei nasal jet tube

	Nasal cannula oxygen (I) (n=593)	WNJ oxygen (II) (n=596)	WNJ SJOV (III) (n=592)	P-value (I vs II)	P-value (I vs II)
Total adverse events [n (%)]	231 (39)	209 (35)	156 (26)	0.165	<0.0001
Subclinical respiratory depression [n (%)]	82 (14)	72 (12)	59 (10)	0.370	0.040
Hypoxia [n (%)]	53 (9)	46 (8)	16 (3)	0.447	<0.0001
Severe hypoxia [n (%)]	2 (0.3)	1 (0.2)	0	0.624	0.5
Jaw lift [n (%)]	105 (18)	56 (9)	20 (3)	<0.0001	<0.0001
Mask ventilation [n (%)]	4 (0.7)	1 (0.2)	0	0.271	0.124

4-Application in **Routine Upper GI Endoscopy**

——A randomized multicentre clinical trial

OBJECTIVES

Evaluate whether SJOV improves oxygenation and decreases the risk of hypoxia compared to conventional oxygen supplementation methods during propofol sedation for upper gastrointestinal endoscopy procedures

SAMPLE SIZE

1781 outpatients

RESULTS

- Supraglottic jet oxygenation and ventilation decreased the incidence of hypoxia from 9 to 3%.
- No severe hypoxia occurred in the WNJ SJOV group, one instance occurred in the WNJ oxygen group, and two instances were observed in the nasal cannula oxygen supply control group.

CONCLUSION

The use of **SJOV during upper gastrointestinal endoscopy for patients who are sedated with propofol reduces the incidence of hypoxia**, with minor and tolerable adverse events. Supraglottic jet oxygenation and ventilation has a favourable risk-to-benefit ratio and may improve patient safety.

5-Application in ERCP

——A randomized controlled clinical trial

Su et al. BMC Anesthesiology (2024) 24:21
https://doi.org/10.1186/s12871-024-02436-y

BMC Anesthesiology

RESEARCH

Open Access

Supraglottic jet oxygenation and ventilation improves oxygenation during endoscopic retrograde cholangiopancreatography: a randomized controlled clinical trial



Dan Su^{1*}, Wei Zhang^{1*}, Jingze Li^{2*}, Xi Tan², Hualong Wei³, Yinglin Wang^{1*} and Zhonghua Ji^{1*}

Table 2 Sedation-related adverse events (SRAEs) and subclinical respiratory depression

	Group N(I) (n = 56)	Group W(II) (n = 56)	Group WS(III) (n = 55)	P-value (I vs. II)	P-value (II vs. III)	P- value (I vs. III)
Subclinical respiratory depression[n(%)]	15(27)	12(21)	3(6)	0.508	0.014	0.002
SRAEs[n(%)]	16(29)	12(21)	2(4)	0.383	0.005	0.000
Hypoxemia	12(21)	11(20)	2(4)	0.815	0.009	0.005
Severe hypoxemia	4(7)	1(2)	0(0)	0.364	1.000	0.118
P _{ET} CO ₂ <10mmHg[n(%)]	-	13(23)	4(7)	-	0.020	-
Jaw lift[n(%)]	13(23)	11(20)	2(4)	0.645	0.009	0.003
Mask ventilation[n(%)]	5(9)	5(9)	0(0)	1.000	0.057	0.057
Endotracheal intubation[n(%)]	2(4)	0(0)	0(0)	0.495	-	0.495

Subclinical respiratory depression: SpO₂=90–95%, SRAEs: SpO₂<90% and the implementation of emergency measures; P_{ET}CO₂: End-tidal carbon dioxide partial pressure. The χ^2 test and Fisher's exact test were used to analyze the incidence rate of SRAEs. The *P*-value was adjusted to 0.05/3=0.017 by Bonferroni adjustment

5-Application in ERCP

—A randomized controlled clinical trial

OBJECTIVES

Investigate the effectiveness of supraglottic jet oxygenation and ventilation (SJOV) via the Wei nasal jet tube (WNJ) to reduce hypoxia during deep sedation in patients undergoing endoscopic retrograde cholangiopancreatography (ERCP)

SAMPLE SIZE

171 patients

RESULTS

- **Compared with the N group (supplementary oxygen via a nasopharyngeal airway) , the incidence of hypoxemia and subclinical respiratory depression in the WS group (SJOV via WNJ) was significantly lower** (21% vs. 4%, $P=0.005$; 27% vs. 6%, $P=0.002$).
- **Compared with Group W (supplementary oxygen via WNJ) , the incidence of hypoxemia and subclinical respiratory depression in Group WS was also significantly less frequent** (20% vs. 4%, $P=0.009$; 21% vs. 6%, $P=0.014$).
- No severe hypoxia occurred in the group WS, while four and one instances were observed in the group N and group W respectively. There were no significant differences in other adverse events among the three groups.

CONCLUSION

SJOV can effectively improve oxygenation during ERCP in deeply sedated semiprone patients.

6-Application in Obese Patients Undergoing Hysteroscopy

—A randomized controlled clinical trial

Liang et al. BMC Anesthesiology (2019) 19:151
https://doi.org/10.1186/s12871-019-0621-6

BMC Anesthesiology

RESEARCH ARTICLE

Open Access

Supraglottic jet oxygenation and ventilation for obese patients under intravenous anesthesia during hysteroscopy: a randomized controlled clinical trial

Hansheng Liang¹, Yuanhao Hou¹, Liang Sun¹, Qingyue Li¹, Huafeng Wei² and Yi Feng^{1*}



Table 2 Data about the procedure, drugs dosage, adverse events and remedial interventions. Compared with the mask oxygen or WNI oxygen groups, the use of SJOV via WNI during the surgery significantly decreased the total percentage of adverse events and surgical time, cases of $SpO_2 < 95\%$ and $P_{ET}CO_2 < 10$ mmHg, and the application rate of jaw lift

Monitored variables [n (%)]	mask oxygen(I) (N = 33)	WNI oxygen (II) (N = 33)	WNI SJOV (III) (N = 34)	P-value (I VS II)	P-value (I VS III)	P-value (II VS III)	P
Surgical time (min)	24.28 ± 10.18	23.19 ± 9.72	22.56 ± 5.91	0.053	0.013	0.053	0.027 (Kruskal-wallis)
Anesthesia recovery (min)	14.73 ± 5.59	13.22 ± 3.73	13.97 ± 4.12	0.068	0.217	0.866	0.061 (Kruskal-wallis)
WNI placement depth (cm)	—	12.22 ± 0.54	12.34 ± 0.47	—	—	0.087 ^a	—
Propofol dose (mg)	207.01 ± 62.85	212.57 ± 51.44	225.01 ± 48.63	1.000	0.002	< 0.001	< 0.001 (Kruskal-wallis)
Remifentanyl dose (μg)	32.28 ± 6.18	33.02 ± 8.27	33.21 ± 4.97	0.059	0.244	0.196	0.079 (Kruskal-wallis)
Ephedrine dose (mg)	5.14 ± 1.03	5.23 ± 1.16	5.25 ± 1.10	0.516	0.417	0.975	0.022 (Kruskal-wallis)
Total adverse events	12 (36)	13 (39)	4 (12)	1.000	0.004	0.002	0.013
Intra-operation							
$SpO_2 < 95\%$	11 (33)	9 (27)	2 (6)	0.789	0.006	0.023	0.017
$P_{ET}CO_2 < 10$ mmHg	12 (36)	11 (33)	3 (9)	1.000	0.009	0.017	0.019
Jaw-lift	11 (33)	10 (30)	1 (3)	1.000	0.001	0.003	0.004
Mask pressurized ventilation	5 (15)	3 (9)	0 (0)	0.708	0.025	0.114	0.071
Oropharyngeal tube	2 (6)	0 (0)	0 (0)	0.492	0.239	—	0.126
Nasal bleeding	0 (0)	1 (3)	2 (6)	1.000	0.493	1.000	0.369
Cough	3 (9)	1 (3)	1 (3)	0.613	0.356	1.000	0.420
Laryngospasm	0 (0)	0 (0)	0 (0)	—	—	—	—
Aspiration	0 (0)	0 (0)	0 (0)	—	—	—	—
Hip twist	2 (6)	1 (3)	0 (0)	1.000	0.239	0.493	0.348
Bradycardia	9 (27)	8 (24)	4 (12)	1.000	0.132	0.217	0.254
Tachycardia	2 (6)	1 (3)	0 (0)	1.000	0.239	0.493	0.348
Hypertension	5 (15)	4 (12)	1 (3)	1.000	0.105	0.197	0.221
Hypotension	1 (3)	1 (3)	3 (9)	1.000	0.614	0.614	0.453
Post-operation							
Nausea or Vomiting	1 (3)	2 (6)	1 (3)	1.000	1.000	0.614	0.761
Pharyngalgia	2 (6)	3 (9)	3 (9)	1.000	1.000	1.000	0.881
Xerostomia	2 (6)	3 (9)	4 (12)	1.000	0.427	0.709	0.488
Nasal bleeding	0 (0)	0 (0)	0 (0)	—	—	—	—
Barotrauma	0 (0)	0 (0)	0 (0)	—	—	—	—

SpO_2 : pulse oxygen saturation; $P_{ET}CO_2$: End-tidal carbon dioxide partial pressure; SJOV/supraglottic jet oxygenation and ventilation; WNI: Wei nasal jet tube

Reference: Liang, Hansheng et al. "Supraglottic jet oxygenation and ventilation for obese patients under intravenous anesthesia during hysteroscopy: a randomized controlled clinical trial." BMC anesthesiology vol. 19,1 151. 14 Aug. 2019

6-Application in Obese Patients Undergoing Hysteroscopy

—A randomized controlled clinical trial

OBJECTIVES

Investigate the efficacy and safety of SJOV using WEI Nasal Jet tube (WNJ) for obese patients who underwent hysteroscopy under intravenous anesthesia without endotracheal intubation.

SAMPLE SIZE

100 patients.

RESULTS

- Compared with the Control Group with oxygen via face mask, the incidence of $PETCO_2 < 10$ mmHg, $SpO_2 < 95\%$ in the WNJ SJOV group dropped from 36 to 9%, from 33 to 6% respectively, and the application rate of jaw-lift decreased from 33 to 3%, and the total percentage of adverse events decreased from 36 to 12%.
Compared with the WNJ Oxygen Group, the use of SJOV via WNJ significantly decreased episodes of $SpO_2 < 95\%$ from 27 to 6%, $PETCO_2 < 10$ mmHg from 33 to 9%, respectively.
There was no significantly difference of cross sectional area of the gastric antrum before and after SJOV in the WNJ SJOV Group.

CONCLUSION

SJOV can effectively and safely maintain adequate oxygenation in obese patients under intravenous anesthesia without intubation during hysteroscopy. This efficient oxygenation may be mainly attributed to supplies of high concentration oxygenation to the supraglottic area, and the high pressure jet pulse providing effective ventilation.



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