Appendix 1 Supplemental files

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Comparison of high-flow nasal cannula with conventional oxygen therapy for preventing postoperative hypoxemia in patients with lung resection surgery: a systematic review and meta-analysis

1 Search strategy

1.1 Table S1: Cochrane Library Search Strategy

Time limit: Initially until July 3, 2023.

Serial number	Search terms	Count
#1	('Humidication oxygen' OR 'humidified oxygen' OR 'HFO' OR 'high-flow' OR 'high flow' OR ' HFNC' OR 'HFNP' OR 'Nasal Cannula'):ti,ab, kw	16291
#2	('lung resection' OR 'pneumonectomy' OR 'lobectomy' OR 'wedge resection' OR 'video assisted thoracoscopic surgery' OR 'vats'):ti,ab,kw	7521
#3	#1 AND #2	65

Abbreviations: HFO, high flow oxygen; HFNC, high flow nasal cannula; HFNP, high-flow nasal prongs; vats, video assisted thoracoscopic surgery.

1.2 Table S2: Embase Search Strategy

Time limit: Initially until July 3, 2023.

Serial number	Search terms	Count
#1	'high flow nasal cannula therapy'/exp OR 'high flow nasal cannula therapy' OR 'humidication oxygen':ti,ab,kw OR 'humidified oxygen':ti,ab,kw OR HFO:ti,ab,kw OR 'high flow':ti,ab,kw OR HFNC:ti,ab,kw OR HFNP:ti,ab,kw OR 'nasal cannula':ti,ab,kw	24581
#2	'lung resection'/exp OR 'lung resection' OR (('lung'/exp OR lung) AND ('resection'/exp OR resection)) OR pneumonectomy:ti,ab,kw OR lobectomy:ti,ab,kw OR 'wedge resection':ti,ab,kw OR 'video assisted thoracoscopic surgery':ti,ab,kw	533109
#3	'crossover procedure':de OR 'double-blind procedure':de OR 'randomized controlled trial':de OR 'single-blind procedure':de OR (random* OR factorial* OR crossover* OR cross NEXT/1 over* OR placebo* OR doubl* NEAR/1 blind* OR singl* NEAR/1 blind* OR assign* OR allocat* OR volunteer*):de,ab,ti	3157687
#4	#1 And #2 And #3	231

Abbreviations: HFO, high flow oxygen; HFNC, high flow nasal cannula; HFNP, high-flow nasal prongs.

1.3 Table S3: PubMed Search Strategy

Time limit: Init	ially un	til July	3,	2023.

Serial number	Search terms	Count
#1	(((((((Humidication oxygen[Title/Abstract]) OR (humidified oxygen[Title/Abstract])) OR (HFO[Title/Abstract])) OR (high-flow[Title/Abstract])) OR (high flow[Title/Abstract])) OR (HFNC[Title/Abstract])) OR (HFNP[Title/Abstract])) OR (Nasal Cannula[Title/Abstract])	14,330
#2	(((((lung resection[Title/Abstract]) OR (pneumonectomy[Title/Abstract])) OR (lobectomy[Title/Abstract])) OR (wedge resection[Title/Abstract])) OR (video assisted thoracoscopic surgery[Title/Abstract])) OR (vats[Title/Abstract]) OR (vats[Title/Abstract]))	43,310
#3	#1 AND #2	33

Abbreviations: HFO, high flow oxygen; HFNC, high flow nasal cannula; HFNP, high-flow nasal prongs; vats, video assisted thoracoscopic surgery.

1.4 Table S4: Web of Science Search Strategy

Time limit: Initially until July 3, 2023.

Serial number	Search terms	Count			
#1	((((((TS=(Humidication oxygen)) OR TS=(humidified oxygen)) OR TS=(HFO)) OR TS=(high-flow)) OR TS=(high flow)) OR TS=(HFNC)) OR TS=(HFNP)) OR TS=(Nasal Cannula)	492,342			
#2	(((((TS=(lung resection)) OR TS=(pneumonectomy)) OR TS=(lobectomy)) OR TS=(wedge resection)) OR TS=(video assisted thoracoscopic surgery)) OR TS=(vats)	42,059			
#3	#1 AND #2	294			

Abbreviations: HFO, high flow oxygen; HFNC, high flow nasal cannula; HFNP, high-flow nasal prongs; vats, video assisted thoracoscopic surgery.

1.5 Table S5: Scopus Search Strategy

Time limit: Initially until January 2024.

Serial number	Search terms	Count
#1	TITLE-ABS-KEY ("humidication oxygen" OR "humidified oxygen" OR "HFO" OR "high-flow" OR "high flow" OR "hend "high flow" OR "HFNC" OR "HFNP" OR "nasal cannula")	46,424
#2	TITLE-ABS-KEY ("lung resection" OR "pneumonectomy" OR "lobectomy" OR "wedge resection" OR "video assisted thoracoscopic surgery" OR "vats")	110,344
#3	INDEXTERMS ("clinical trials" OR "clinical trials as a topic" OR "randomized controlled trial" OR "Randomized Controlled Trials as Topic" OR "controlled clinical trial" OR "Controlled Clinical Trials" OR "random allocation" OR "Double-Blind Method" OR "Single-Blind Method" OR "Cross-Over Studies" OR "Placebos" OR "multicenter study" OR "double blind procedure" OR "single blind procedure" OR "crossover procedure" OR "clinical trial")	2,160,954
#4	#1 AND #2	137
#5	#4 AND #3	19

Abbreviations: HFO, high flow oxygen; HFNC, high flow nasal cannula; HFNP, high-flow nasal prongs; vats, video assisted thoracoscopic surgery.

2 Data Retrieval Details

2.1 Figure S1: Navicat Premium was used to manage the extracted data.

Navicat Premium is used for extracting and managing data from each article. Only a fraction of the data framework is displayed.

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	style	ret	
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	I: C	HFNC: COT	R_meta
	ITT_PPA		postop_weaning_p
	total sum(sample)	30	OID
	L group		1008431
		HPNC	所有者 postgres
	I_total	47	4.01
	C_group	COT	AGL
	C_total	48	表类型
	duration_oxygen	(NULL)	常规
	primary_outcome	the incidence of postoperative hypoxemia within four postoperative days	分区属于
	secondary_outcome	(NULL)	
	setting	In this single-center, randomized trial conducted in a teaching hospital in Italy	行
	country	Italy	
	definition	postoperative hypoxemia (i.e., ratio of the partial pressure of arterial oxygen to FiO2 (PaO	王耀 0
	inclusion	All adult patients scheduled for elective thoracotomic	有 OIDs
	exclusion	Exclusion criteria were refusal of informed consent, pregnancy, body mass index	否
	I_h_los_mean(day)	6	外部服务器
	L h los sd(dav)	153	
	C h los mean(day)	100 8	外部模式
	C_n_ros_mean(day)		AL WE WE
	C_n_los_sd(day)	1.53	シトロロ北

Figure S1 Navicat Premium was used to manage the extracted data from the included articles. Abbreviations: HFNC, high flow nasal cannula; COT, conventional oxygen therapy; RCT, Randomized Controlled Trial.

2.2 Table S6. Extracting PaO_2/FiO_2 from articles that fulfill the criteria.

Author	Crown	Hours following extubation					
Author	Group	1h	3-6h	12h	24h	72h	
Yu 2017 (24)	HFNC	304.5±8	320.5±17.1	322.7±11.3	335.2±15.9	351.1±13.6	
	COT	286.4±5.7	293.2±9.1	294.3±6.8	303.4±5.7	317.1±11.4	
Pennisi 2019 (5)	HFNC	351.7±105.8	309.6±98.6	Null	282.1±78.3	312.6±68.1	
	COT	305.3±62.3	303.9±75.4	Null	293.7±75.4	311.1±75.4	
Zhu 2022 (25)	HFNC	289.2±82.0	Null	313.5±114.6	301.5±129.1	Null	
	COT	281.9±76.7	Null	284±80.5	268.3±102.5	Null	

The data of Yu (2017) and Pennisi (2019) were obtained from *Figures S2,S3*) using Digitizelt software (Braunschweig, Germany, https:// www.digitizeit.xyz/), and Zhu (2022)'s data was taken from the original article's table and transformed from median and quartiles to mean \pm standard deviation. Abbreviations: HFNC, high flow nasal cannula; COT, conventional oxygen therapy. Null: There was no relevant data available at the corresponding time point in the original article.



Figure S2 Collect data related to the postoperative PaO₂/FiO₂ from Yu (2017) (24). Explanation:

1. The "*" symbol is a graphic element present in the original article and was not produced during the data extraction process.

2. The X-axis denotes the time point subsequent to the removal of tracheal intubation. On the Y-axis, the value of PaO_2/FiO_2 is depicted.

Abbreviations: HFNCG, high-flow nasal cannula group; COG, conventional oxygen group; PaO₂/FiO₂, the arterial pressure of oxygen/inspiratory fraction of oxygen.



Figure S3 Collect data related to the postoperative PaO2/FiO2 from Pennisi (2019) (5). Explanation:

1. The "*" symbol is a graphic element present in the original article and was not produced during the data extraction process.

2. The coordinate axes X1, X2, Y1, and Y2 are calibrated to convert graphical data in the article into numerical values using DigitizeIt software.

Abbreviations: HFNC, high-flow nasal cannula, PaO₂/FiO₂, the arterial pressure of oxygen/inspiratory fraction of oxygen.

Author	Crown		Hours following extubation					
Author	Group	1h	3-6h	12h	24h	72h		
Yu 2017 (24)	HFNC	43.5±3.8	45.7±4.9	46.4±5.8	45.0±3.5	47.2±2.0		
	COT	45.2±4.3	44.2±3.6	45.8±2.5	43.8±3.5	46.9±3.3		
Pennisi 2019 (5)	HFNC	40.1±4.4	39.4±4.0	Null	39.3±4.8	38.5±3.8		
	COT	42.6±4.2	42.5±4.7	Null	41.2±4.6	37.9±3.7		
Zhu 2022 (25)	HFNC	38.5±1.7	Null	38.7±1.7	37.8±2.5	Null		
	COT	38.4±1.7	Null	38.7±1.7	38.6±1.8	Null		

2.3 Table S7. Extracting PaCO₂ from articles that fulfill the criteria.

The data from Yu (2017) and Pennisi (2019) were obtained from *Figures S4*,*S5* using Digitizelt software (Braunschweig, Germany, https:// www.digitizeit.xyz/). Zhu (2022)'s data was taken from the original article's table and transformed from medians and quartiles to means \pm standard deviations. Abbreviations: HFNC, high flow nasal cannula; COT, conventional oxygen therapy. Null: There was no relevant data available at the corresponding time point in the original article.



Figure S4 Collect data related to postoperative PaCO2 from Yu (2017) (24).

Explanation:

1. The coordinate axes X1, X2, Y1, and Y2 are calibrated to convert graphical data in the article into numerical values using DigitizeIt software.

2. The X-axis denotes the time point subsequent to the removal of the tracheal intubation. On the Y-axis, the value of $PaCO_2$ is depicted.

Abbreviations: HFNCG, high-flow nasal cannula group; COG, conventional oxygen group; PaCO₂, partial pressure of arterial carbon dioxide.



Figure S5 Collect data related to postoperative PaCO2 from Pennisi (2019) (5). Explanation:

1. The "*" symbol is a graphic element present in the original article and was not produced during the data extraction process. 2. The coordinate axes X1, X2, Y1, and Y2 are calibrated to convert graphical data in the article into numerical values using DigitizeIt software.

Abbreviations: HFNC, high-flow nasal cannula; PaCO₂, partial pressure of arterial carbon dioxide.

3 Assessing the certainty of evidence.

3.1 Table S8. Additional summaries of the findings were assessed from the article.

This table provides additional summaries of the findings from the research.

		(Certainty assessr	nent			No of p	atients	Effect	
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	HFNC	COT	Absolute (95% CI)	Certainty
3-6 hours F	PaO ₂ /FiO ₂ after	interventic	n use							
2 (5,24)	Randomised trials	Seriousª	Not serious ^f	Not serious [°]	Serious ^{d,e}	None	103	102	MD 23.87 mmHg higher (8.41 higher to 39.34 higher)	⊕⊕⊝⊝ Low
12 hours P	aO ₂ /FiO ₂ after in	nterventior	n use							
2 (24,25)	Randomised trials	Seriousª	Not serious ^{f,g}	Not serious ^c	Serious ^{d,e}	None	116	114	MD 28.41 mmHg higher (24.96 higher to 31.87 higher)	⊕⊕⊝⊝ Low
24 hours P	aO ₂ /FiO ₂ after in	nterventior	n use							
3 (5,24,25	5) Randomised trials	Serious ^a	Very serious ^{b,h}	Not serious ^c	Serious ^{d,e}	None	163	162	MD 19.03 mmHg higher (9.37 lower to47.42 higher)	⊕⊝⊝⊝ Very low
3-6 hours I	PaCO ₂ after inte	ervention u	se							
2 (5,24)	Randomised trials	Seriousª	Very serious ^{b,j}	Not serious ^c	Not serious ^{d,i}	None	103	102	MD 0.79 mmHg lower (5.29 lower to 3.72 higher)	⊕⊝⊝⊝ Very low
12 hours P	aCO ₂ after inter	rvention us	e							
2 (24,25)	Randomised trials	Seriousª	Not serious ^{f,g}	Not serious [°]	Serious ^{d,e}	None	116	114	MD 0.07 mmHg higher (0.5 lower to 0.64 higher)	⊕⊕⊝⊝ Low
24 hours P	aCO ₂ after inter	rvention us	e							
3 (5,24,25	5) Randomised trials	Seriousª	Very serious ^{b,j}	Not serious ^c	Not serious ^{d,i}	None	163	162	MD 0.82 mmHg lower (2.81 lower to 1.17 higher)	⊕⊝⊝⊝ Very low

Abbreviations: CI, confidence interval; MD, mean difference; HFNC, high flow nasal cannula; COT, conventional oxygen therapy

Explanations:

a. The overall risk of bias of the included articles is ascertained by using the modified Cochrane Risk of Bias Evaluation Tool (Rob2).

b. The point estimates are significantly different, with an I-squared value of over 50%.

c. There were direct outcomes in terms of population, intervention, outcome assessment, and intervention modalities, with no indirect outcomes.

d. Imprecision varied slightly among the different evidence assessors, and we judged imprecision by assessing the width and narrowness of the 95% confidence interval between studies.

- e. The width of the 95% confidence interval varied widely among studies.
- f. The between-study confidence intervals had good overlap.
- g. Good homogeneity and I squared = 0%.
- h. There is significant heterogeneity and I squared = 87%.
- i. The width of the 95% confidence interval was consistent among studies.

j. There is significant heterogeneity and I squared = 93%.

Quality of the evidence (GRADE) $\oplus \ominus \ominus \ominus$: very low quality of the evidence $\oplus \oplus \ominus \ominus$: low quality of the evidence $\oplus \oplus \oplus \ominus$: moderate quality of the evidence $\oplus \oplus \oplus \oplus$: high quality of the evidence

4 Quality assessment of the included RCT studies.

4.1 Table S9. The result was assessed by the Modified Jadad Score.

Author/year	Randomization	Concealment of allocation	Double blinding	Withdrawals and dropouts	Total score
El-Nori 2023 (26)	2	1	0	1	4
Zhu 2022 (25)	2	1	0	1	4
Pennisi 2019 (5)	2	1	0	1	4
Yu 2017 (24)	2	1	0	1	4
Ansari 2016 (23)	2	2	0	1	5

The quality of the included trials was evaluated using the modified Jadad score. The score awards points for appropriate randomization, the presence of concealed allocation, the adequacy of double blinding, the appropriateness of the blinding technique, and the documentation of withdrawals and dropouts. The score ranges from 0 to 7, where a score of \geq 4 denotes "high quality" based on the original validation studies. Each study was evaluated using a scoring scale to assess randomization (0-2 points), double blinding (0-2 points), concealment of allocation (0-2 points), and withdrawals and dropouts (0-1 point).

4.2	Table S10.	The	risk	of bias	was assessed	using Rob2.
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Study (author, years)	Randomisation process	Deviations from the intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported result	Overall Rob
Ansari 2016 (23)	Low	Some concerns	Low	Some concerns	Low	Some concerns
Pennisi 2019 (5)	Low	Some concerns	Low	Some concerns	Low	Some concerns
Yu 2017 (24)	Low	Some concerns	Low	Some concerns	Some concerns	Some concerns
El-Nori 2023 (26)	Low	Some concerns	Low	Some concerns	Some concerns	Some concerns
Zhu 2022 (25)	Low	Some concerns	Low	Some concerns	Some concerns	Some concerns

4.3 Table S11. The details of the article (Ansari, 2016) were evaluated by the Rob2 tool.

Unique ID	Ansari 2016 (23)	Study ID	Ansari 2016 (23)	Assessor	Xingxing Zhang and Yun Yu		
Ref or Label	10.1016/j.athoracsur.2015.07.025	Aim	Assignment to intervention (the 'inte	ention-to-treat' e	-treat' effect)		
Experimental	HFNC	Comparator	COT	Source	Journal article(s)		
Outcome	Hospital length of stay(primary out	come) and othe	er patient centered outcomes				
Domain	Signalling question			Response	Comments		
Bias arising	1.1 Was the allocation sequence ra	andom?		Y	A computational random number generator was used to generate a sequence of		
from the randomization process	1.2 Was the allocation sequence c assigned to interventions?	oncealed until p	participants were enrolled and	Υ	numbers across the two groups. A randomization table was then created where patients would be assigned the treatment allocated to their consecutively assigned study number. Allocation concealment was maintained by using opaque, sealed, sequentially numbered envelopes.		
	1.3 Did baseline differences betwe randomization process?	en intervention	groups suggest a problem with the	Ν	The baseline characteristics of the two groups were similar.		
	Risk of bias judgement			Low			
Bias due to	2.1.Were participants aware of the	ir assigned inte	rvention during the trial?	PY	Patients were randomly allocated to either HFNO or standard oxygen therapy during		
deviations from intended interventions	2.2.Were carers and people deliver intervention during the trial?	ring the interver	tions aware of participants' assigned	PY	surgery, and the anesthetist and surgeon were blinded to treatment group. Allocation concealment was maintained by using opaque, sealed, sequentially numbered envelopes. A clinical investigator not involved in the clinical care of the patient obtained the treatment allocation and prepared the appropriate therapy.		
	2.3. If Y/PY/NI to 2.1 or 2.2: Were t arose because of the experimental	there deviations I context?	from the intended intervention that	NI	There was no mention of this information in the article.		
	2.4 If Y/PY to 2.3: Were these devi	ations likely to I	nave affected the outcome?	NA			
	2.5. If Y/PY/NI to 2.4: Were these of between groups?	deviations from	intended intervention balanced	NA			
	2.6 Was an appropriate analysis us intervention?	sed to estimate	the effect of assignment to	Υ	The RCT was registered and ITT analysis was used.		
	2.7 If N/PN/NI to 2.6: Was there por failure to analyse participants in the	otential for a sul e group to whic	ostantial impact (on the result) of the h they were randomized?	NA			
	Risk of bias judgement			Some concer	ns		
Bias due to missing outcome data	s due to 3.1 Were data for this outcome available for all, or nearly all, participants randomized? sing outcome a				In all, 68 patients were recruited to the study between June and December 2014; 9 were withdrawn before allocation to treatment group owing to conversion to pneumonectomy (2 patients), lung resection not performed (1 patient), study personnel (2 patients), or equipment not available (3 patients), and surgeon request (1 patient). Of the remaining 59 patients, 28 were randomly allocated to receive HFNO, and 31, to standard oxygen therapy.		
	3.2 If N/PN/NI to 3.1: Is there evide data?	ence that result	was not biased by missing outcome	NA			
	3.3 If N/PN to 3.2: Could missingne	ess in the outco	ome depend on its true value?	NA			
	3.4 If Y/PY/NI to 3.3: Is it likely that value?	t missingness ir	n the outcome depended on its true	NA			
	Risk of bias judgement			Low			
Bias in	4.1 Was the method of measuring	the outcome in	appropriate?	Ν	The study utilized a predetermined outcome.		
the outcome	4.2 Could measurement or ascerta intervention groups?	ainment of the o	utcome have differed between	Ν	Uniform standards are used to determine results.		
	4.3 Were outcome assessors awar	e of the interve	ntion received by study participants?	NI	There was no mention of this information in the article.		
	4.4 If Y/PY/NI to 4.3: Could assess knowledge of intervention received	sment of the ou d?	tcome have been influenced by	NI	There was no mention of this information in the article.		
	4.5 If Y/PY/NI to 4.4: Is it likely that knowledge of intervention received	t assessment o d?	f the outcome was influenced by	PN			
	Risk of bias judgement			Some concer	ns		
Bias in selection of the reported result	5.1 Were the data that produced the specified analysis plan that was fir available for analysis?	nis result analys nalized before u	ed in accordance with a pre- nblinded outcome data were	PY	The RCT was registered.		
	5.2 multiple eligible outcome me within the outcome domain?	easurements (e.	g. scales, definitions, time points)	PN	The study presented an exhaustive analysis of the anticipated outcomes.		
	5.3 multiple eligible analyses of	the data?		PN	The study presented an exhaustive analysis of the anticipated outcomes.		
	Risk of bias judgement			Low			
Overall bias	Risk of bias judgement			Some concerns			

4.4 Table S12. The details of the article (Pennisi 2019) evaluated by Rob2 tool.

	Descript 0040 (5)	0111D		•		
	Pennisi 2019 (5)	Study ID	Pennisi 2019 (5)	Assessor		
Ref or Label	10.1186/S13054-019-2361-5	Aim				
Experimental			COT	Source	Journal anicie(s)	
Domoin	Postoperative hypoxemia(primary ou	ilcome) and oth	ler patient centered outcomes	Boononco	Commonto	
Domain Biog griging from the	1.1. Was the allocation acquirace ran	dom2		v	A computer concreted random allocation list was used to allocate enrolled nationte	
randomization process	1.1 Was the allocation sequence rand	dom?	disionante como secondo al secol	ř DV	to study arms.	
	assigned to interventions?	icealed until pai	rticipants were enrolled and	PY		
	1.3 Did baseline differences between the randomization process?	n intervention gr	roups suggest a problem with	Ν	Demographics, most relevant clinical characteristics, main comorbidities, preoperative arterial blood gases and respiratory function, and surgical procedures are reported in Table 1 and were well balanced in the two study groups.	
	Risk of bias judgement			Low		
Bias due to deviations	2.1.Were participants aware of their a	assigned interve	ention during the trial?	PY	This single center, open label, randomized controlled study was conducted in the	
from intended interventions	2.2.Were carers and people deliverin assigned intervention during the trial	g the interventio ?	ons aware of participants'	PY	a tertiary university hospital in Italy, between September 2015 and April 2018.	
	2.3. If Y/PY/NI to 2.1 or 2.2: Were the that arose because of the experiment	ere deviations fr tal context?	rom the intended intervention	NI	There was no mention of this information in the article.	
	2.4 If Y/PY to 2.3: Were these deviati	ions likely to ha	ve affected the outcome?	NA		
	2.5. If Y/PY/NI to 2.4: Were these development groups?	viations from inf	tended intervention balanced	NA		
	2.6 Was an appropriate analysis used intervention?	d to estimate th	e effect of assignment to	Y	The analysis was conducted on a "modified intention-to-treat" population that included all patients who underwent the allocated treatment for at least 6 h.	
	2.7 If N/PN/NI to 2.6: Was there pote the failure to analyse participants in t	ential for a subst the group to wh	tantial impact (on the result) of ich they were randomized?	NA		
	Risk of bias judgement			Some concer	ns	
Bias due to missing outcome data	3.1 Were data for this outcome availa randomized?	able for all, or ne	early all, participants	PY	Between September 2015 and April 2018, of the 522 patients undergoing thoracic surgery for lung cancer, 99 patients were eligible for inclusion in the study and 96 underwent randomization.	
	3.2 If N/PN/NI to 3.1: Is there evidend outcome data?	ce that result wa	as not biased by missing	NA		
	3.3 If N/PN to 3.2: Could missingnes	s in the outcom	ne depend on its true value?	NA		
	3.4 If Y/PY/NI to 3.3: Is it likely that n true value?	nissingness in t	he outcome depended on its	NA		
	Risk of bias judgement			Low		
Bias in measurement of	4.1 Was the method of measuring the	e outcome inap	propriate?	Ν	The study utilized a predetermined outcome.	
the outcome	4.2 Could measurement or ascertain intervention groups?	ment of the out	come have differed between	Ν	Uniform standards are used to determine results.	
	4.3 Were outcome assessors aware oparticipants?	of the interventi	on received by study	NI	There was no mention of this information in the article.	
	4.4 If Y/PY/NI to 4.3: Could assessm knowledge of intervention received?	ent of the outco	ome have been influenced by	NI	There was no mention of this information in the article.	
	4.5 If Y/PY/NI to 4.4: Is it likely that a knowledge of intervention received?	issessment of th	he outcome was influenced by	PN		
	Risk of bias judgement			Some concer	ns	
Bias in selection of the reported result	5.1 Were the data that produced this specified analysis plan that was final available for analysis?	result analysec ized before unb	d in accordance with a pre- linded outcome data were	PY	The protocol was registered on clinical trials.gov(NCT02544477).	
	5.2 multiple eligible outcome meas points) within the outcome domain?	surements (e.g.	scales, definitions, time	Ν	The study presented an exhaustive analysis of the anticipated outcomes.	
	5.3 multiple eligible analyses of the	e data?		Ν	The study presented an exhaustive analysis of the anticipated outcomes.	
	Risk of bias judgement			Low		
Overall bias	Risk of bias judgement			Some concer	ns	

4.5 Table S13. The details of the article (Yu 2017) evaluated by Rob2 tool.

Unique ID	Yu 2017 (24)	Study ID	Yu 2017 (24)	Assessor	Xinoxing Zhang and Yun Yu		
Ref or Label	10.1155/2017/7894631	Aim Assignment to interventi		ion (the 'intentio	on-to-treat' effect)		
Experimental	HENC	Comparator	COT	Source			
Outcome	The occurrence rate of hypoxemia (r	primary outcom	e) and other patient cente	red outcomes			
Domain	Signalling question			Response	Comments		
Bias arising from the	1 1 Was the allocation sequence ran	dom?		Y	Patients were classified into two groups by random figure table following A Bandom		
randomization process	1.2 Was the allocation sequence cor and assigned to interventions?	ncealed until pa	rticipants were enrolled	PY	number sequence was generated with STATA statistical software version 12.1.		
	1.3 Did baseline differences betweer with the randomization process?	n intervention g	roups suggest a problem	Ν	The baseline characteristics of the 110 eligible patients are shown in Table 1. There were no significant differences between patients in two groups in all aspects.		
	Risk of bias judgement			Low			
Bias due to deviations from	2.1.Were participants aware of their	assigned interv	ention during the trial?	PY	The study was unblinded.		
intended interventions	2.2.Were carers and people deliverin assigned intervention during the trial	g the intervention?	ons aware of participants'	PY			
	2.3. If Y/PY/NI to 2.1 or 2.2: Were the intervention that arose because of the	ere deviations fine experimental	rom the intended context?	NI	There was no mention of this information in the article.		
	2.4 If Y/PY to 2.3: Were these deviat outcome?	ions likely to ha	ve affected the	NA			
	2.5. If Y/PY/NI to 2.4: Were these de balanced between groups?	viations from in	tended intervention	NA			
	2.6 Was an appropriate analysis use intervention?	d to estimate th	e effect of assignment to	PY	All analyses were performed on an intention-to-treat basis and a two-sided P<0.05 was considered to be statistically significant.		
	2.7 If N/PN/NI to 2.6: Was there pote result) of the failure to analyse partic randomized?	ential for a subs ipants in the gro	tantial impact (on the oup to which they were	NA			
	Risk of bias judgement			Some concer	ns		
Bias due to missing outcome data	3.1 Were data for this outcome avail randomized?	able for all, or n	early all, participants	PY	Over the study period, a total of 141 patients were screened and 110 eligible patients were recruited for the study. A total of 56 patients were assigned to HFNCG and 58 patients to COG.		
	3.2 If N/PN/NI to 3.1: Is there eviden outcome data?	ce that result w	as not biased by missing	NA			
	3.3 If N/PN to 3.2: Could missingnes value?	s in the outcom	ne depend on its true	NA			
	3.4 If Y/PY/NI to 3.3: Is it likely that r on its true value?	nissingness in t	he outcome depended	NA			
	Risk of bias judgement			Low			
Bias in measurement of the outcome	4.1 Was the method of measuring th	e outcome inap	ppropriate?	Ν	The incidence of hypoxemia (defined as PaO_2/FiO_2 of 300 mmHg or less) was recorded in the first 72 h after extubation and the differences of PaO_2 , PaO_2/FiO_2 , SaO_2/FiO_2 , and $PaCO_2$ between the two groups were compared. Secondly, the rates of PPC like suspected pneumonia.		
	4.2 Could measurement or ascertain between intervention groups?	ment of the out	come have differed	Ν	Uniform standards are used to determine results.		
	4.3 Were outcome assessors aware participants?	of the intervent	ion received by study	NI			
	4.4 If Y/PY/NI to 4.3: Could assessment of the second seco	nent of the outco tion received?	ome have been	NI			
	4.5 If Y/PY/NI to 4.4: Is it likely that a influenced by knowledge of interven	assessment of t tion received?	ssessment of the outcome was ion received?				
	Risk of bias judgement			Some concer	ns		
Bias in selection of the reported result	5.1 Were the data that produced this pre-specified analysis plan that was were available for analysis?	result analysed finalized before	d in accordance with a unblinded outcome data	NI	There was no mention of this information in the article.		
	5.2 multiple eligible outcome mea points) within the outcome domain?	surements (e.g.	scales, definitions, time	Ν	The study presented an exhaustive analysis of the anticipated outcomes.		
	5.3 multiple eligible analyses of th	e data?		Ν	The study presented an exhaustive analysis of the anticipated outcomes.		
	Risk of bias judgement			Some concerns			
Overall bias	Risk of bias judgement			Some concer	ns		

4.6 Table S14. The details of the article (El-Nori 2023) evaluated by Rob2 tool.

Unique ID	El-Nori 2023 (26)	Study ID	El-Nori 2023 (26)	Assessor	Xingxing Zhang and Yun Yu
Ref or Label	DOI: 10.4103/ejs.ejs_225_22	Aim	Assignment to intervent	ion (the 'intentio	on-to-treat' effect)
Experimental	HFNC	Comparator	СОТ	Source	Journal article(s)
Outcome	Postoperative hypoxemia (primary o	utcome) and ot	her patient centered outco	omes	
Domain	Signalling question			Response	Comments
Bias arising from the	1.1 Was the allocation sequence ran	idom?		PY	A simple multicentric randomized controlled trial was performed. The two groups
randomization process	1.2 Was the allocation sequence con and assigned to interventions?	ncealed until pa	rticipants were enrolled	PY	were equally allocated on a 1:1 ratio into the control and treatment arms. There were two groups: those that received the conventional oxygen and those that received the high-flow oxygen therapy. Convenience sampling was used. All our participants who met all of the inclusion criteria and exclusion criteria were enrolled.
	1.3 Did baseline differences between with the randomization process?	n intervention g	roups suggest a problem	PN	Patients were randomly allocated to the two groups.
	Risk of bias judgement			Low	
Bias due to deviations from	2.1.Were participants aware of their	assigned interv	ention during the trial?	PY	The study was unblinded.
intended interventions	2.2.Were carers and people deliverin assigned intervention during the tria	ig the intervention I?	ons aware of participants'	PY	
	2.3. If Y/PY/NI to 2.1 or 2.2: Were th intervention that arose because of the	ere deviations f ne experimental	rom the intended context?	NI	There was no mention of this information in the article.
	2.4 If Y/PY to 2.3: Were these deviat outcome?	ions likely to ha	we affected the	NA	
	2.5. If Y/PY/NI to 2.4: Were these de balanced between groups?	eviations from in	tended intervention	NA	
	2.6 Was an appropriate analysis use intervention?	d to estimate th	ne effect of assignment to	Y	The collected data were revised, coded, tabulated, and introduced to a PC using Statistical Package for the Social Sciences. Data were presented, and suitable analysis was done according to the type of data obtained for each parameter. Level of significance was set at P value <0.05.
	2.7 If N/PN/NI to 2.6: Was there pote result) of the failure to analyse partic randomized?	ential for a subs ipants in the gr	tantial impact (on the oup to which they were	NA	
	Risk of bias judgement			Some concer	rns
Bias due to missing outcome data	3.1 Were data for this outcome avail randomized?	able for all, or n	early all, participants	Υ	This study was conducted on 180 patients who underwent lung resection (wedge resection, segmentectomy, lobectomy, or pneumonectomy) surgery between November 2019 and April 2022 at the Cardiothoracic department, Ain Shams University Hospitals.
	3.2 If N/PN/NI to 3.1: Is there eviden outcome data?	ice that result w	as not biased by missing	NA	
	3.3 If N/PN to 3.2: Could missingnes value?	ss in the outcon	ne depend on its true	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that r on its true value?	missingness in t	the outcome depended	NA	
	Risk of bias judgement			Low	
Bias in measurement of the outcome	4.1 Was the method of measuring th	ne outcome inap	opropriate?	PN	The end points of the study were to investigate whether HFNC therapy is superior to conventional oxygen therapy for reducing hypoxemia and postoperative pulmonary complications in extubated patients after lung resection.
	4.2 Could measurement or ascertain between intervention groups?	nment of the out	tcome have differed	Ν	Uniform standards are used to determine results.
	4.3 Were outcome assessors aware participants?	of the intervent	ion received by study	NI	There was no mention of this information in the article.
	4.4 If Y/PY/NI to 4.3: Could assessm influenced by knowledge of interven	nent of the outc tion received?	ome have been	NI	There was no mention of this information in the article.
	4.5 If Y/PY/NI to 4.4: Is it likely that a influenced by knowledge of interven	assessment of t tion received?	he outcome was	PN	
	Risk of bias judgement			Some concer	'ns
Bias in selection of the reported result	5.1 Were the data that produced this pre-specified analysis plan that was were available for analysis?	s result analyse finalized before	d in accordance with a unblinded outcome data	NI	There was no mention of this information in the article.
	5.2 multiple eligible outcome mea points) within the outcome domain?	surements (e.g.	scales, definitions, time	NI	There was no mention of this information in the article.
	5.3 multiple eligible analyses of th	e data?		Ν	The study presented an exhaustive analysis of the anticipated outcomes.
	Risk of bias judgement			Some concer	'ns
Overall bias	Risk of bias judgement			Some concer	'ns

4.7 Table S15. The details of the article (Zhu 2022) evaluated by Rob2 tool.

Ref of Label DD: [EXTUP: [10:0050140222:12:00] Am Adaptment to intervalue the instantion is brain allowed. Adaptment to intervalue the instantion is brain allowed. Adaptment to intervalue the instantion is the intervalue the instantion is brain allowed. Adaptment to instantiate the instantiate the instantion is brain allowed. Adaptment to instantiate the instantiate the instantiant is brain allowed. Adaptment to instantiate the instantiate the instantiate the instantiant is brain allowed. Adaptment to instantiate the instantiate the instantiate the instantiant is brain allowed. Adaptment to instantiate the instantiate the instantiant is brain allowed. Adaptment to instantiate the instantiant is brain allowed. Adaptment to instantiate the instantiate the instantiant is brain allowed. Adaptment to instantiant is b	Unique ID	Zhu 2022 (25)	Study ID	Zhu 2022 (25)	Assessor	Xingxing Zhang and Yun Yu
Net Note Note Note Note 1000 Sequence	Ref or Label	DOI: 10.3779/ j.issn.1009-3419.2022.102.38	Aim	Assignment to intervent	ion (the 'intentio	on-to-treat' effect)
Oto Control </th <th>Experimental</th> <th>HFNC</th> <th>Comparator</th> <th>COT</th> <th>Source</th> <th>Journal article(s)</th>	Experimental	HFNC	Comparator	COT	Source	Journal article(s)
DendNetworkNetworkNetworkBarlagence10	Outcome	Oxygen index(primary outcome) and	other patient ce	entered outcomes		
Bits prior the monor is a prior of the second sec	Domain	Signalling question			Response	Comments
process Particle status and subset of status and subs	Bias arising from the randomization	1.1 Was the allocation sequence rand	dom?		Υ	Table of random numbers and random assignment
Reserve of the independence of the independ	process	1.2 Was the allocation sequence con and assigned to interventions?	cealed until par	ticipants were enrolled	PY	
Image: Note:		1.3 Did baseline differences between with the randomization process?	intervention gr	oups suggest a problem	Ν	The article's results demonstrate an initial balance between the groups.
Bits devidents from the design of the read matrix of of the read		Risk of bias judgement			Low	
intermedions intermedions 2.3mm can and packed designing final example dexample a	Bias due to deviations from intended	2.1.Were participants aware of their a	assigned interve	ention during the trial?	PY	The RCT was unblinded.
April 1 and 2	interventions	2.2.Were carers and people delivering assigned intervention during the trial	g the interventic ?	ons aware of participants'	PY	
Apply Pay Same deviation is interval to interva		2.3. If Y/PY/NI to 2.1 or 2.2: Were the intervention that arose because of th	ere deviations fr e experimental	om the intended context?	NI	There was no mention of this information in the article.
Result of a constraint of a constra constraint of a constraint of a constraint of a constrain		2.4 If Y/PY to 2.3: Were these deviati outcome?	ons likely to hav	ve affected the	NA	
Ramapping and particular section of the sectin of the section of the section of the section of the section of		2.5. If Y/PY/NI to 2.4: Were these development between groups?	viations from int	ended intervention	NA	
Resumption Second second		2.6 Was an appropriate analysis used intervention?	d to estimate th	e effect of assignment to	Υ	The statistical analysis section describes the method used to analyze the data.
Bis debis designer Semeant set in the second seco		2.7 If N/PN/NI to 2.6: Was there pote result) of the failure to analyse partici randomized?	ntial for a subst pants in the gro	tantial impact (on the oup to which they were	NA	
Bis due to missing outcome and 1.4 Were due for this outcome available for all on early all particulations No Preame and particulations Reserve to this outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual No Solutions Solutions Bis due to missing outcome dual Solutions Solutions Solutions Bis due to missing outcome dual Solutin		Risk of bias judgement			Some concer	ns
Algebra Selection of Sel	Bias due to missing outcome data	3.1 Were data for this outcome availar randomized?	ble for all, or ne	early all, participants	Y	There are no patients who drop out.
Bis IN/PN to 3.2: Could missingness in the outcome depend on its true Na Bis in Measurement of the outcome Na Bis in measurement of the outcome integration or capscratinement of the outcome handpropriate? Na Natural and		3.2 If N/PN/NI to 3.1: Is there evidend outcome data?	ce that result wa	as not biased by missing	NA	
Alf XPY/N to 3.3 is likely that missingness in the outcome depended on its travelage National Section Se		3.3 If N/PN to 3.2: Could missingness value?	s in the outcom	e depend on its true	NA	
Instantane Instantane Bisa in measurement of the outpoin No Instantane concernance Columnation of the outpoint		3.4 If Y/PY/NI to 3.3: Is it likely that m on its true value?	nissingness in tl	he outcome depended	NA	
Biss in measurement of the outous 4.1 Was the method of measuring the outcome happropriate? N The study utilized a predetermine root utilized a predetermine results. 4.2 Could measurement or ascertainment of the outcome have differed between intervention groups? No Normational area used to determine results. 4.3 Were outcome assessors aware of the intervention received by study participants? No Normation of this information in the article. 4.4 MYP/NI to 4.3.3 Could assessment of the outcome have been influenced by knowledge of intervention received? No Normation of this information in the article. 5.1 MYP/NI to 4.4.1 is likely that assessment of the outcome have been influenced by knowledge of intervention received? No Normation of this information in the article. Fiss in selection of the reported Sin (More the data that produced this result analysed in accord ancord a		Risk of bias judgement			Low	
 A 2 Could measurement or ascertainment of the outcome have differed between intervention groups? A 3W ere outcome assessors aware of the intervention received by study participants? A 4 M Y/PY/NI to 4.3: Could assessment of the outcome have been infinuenced by knowledge of intervention received? A 5 M Y/PY/NI to 4.4: Is tilkiely that assessment of the outcome was influenced by knowledge of intervention received? Biss in selection of the reported respectively analysis plan that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome as inversions. Biss in selection of the reported respectively analysis of the data analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome as inversions. Sum unblinder intervention received? A 10 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome as inversions. Sum unblinder intervention received? Sum unblinder interventio	Bias in measurement of the outcome	4.1 Was the method of measuring the	e outcome inap	propriate?	Ν	The study utilized a predetermined outcome.
A:3 Were outcome assessors aware of the intervention received by study participants? NI There was no mention of this information in the article. A:4 IF Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received? NI There was no mention of this information in the article. Bias in selection of the reported Fit Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received? PN Bias in selection of the reported Fits of bias judgement Some cover Bias in selection of the reported S.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcomes are verified analysis plan that was finalized before unblinded outcome and verified analysis of the anticipated outcomes. NI S.1. multiple eligible outcome measurements (e.g. scales, definitions) the avaitable for analysis of the anticipated outcomes. NI The study presented an exhaustive analysis of the anticipated outcomes. S.3. multiple eligible analyses of the data? NI The study presented an exhaustive analysis of the anticipated outcomes. S.3. multiple eligible analyses of the data? NI The study presented an exhaustive analysis of the anticipated outcomes. S.3. multiple eligible analyses of the data? NI The study presented an exhaustive analysis of the anticipated outcomes. S.4. multiple eligible analy		4.2 Could measurement or ascertain between intervention groups?	ment of the out	come have differed	Ν	Uniform standards are used to determine results.
A lf Y/PY/Nt 0 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received? NI There was no mention of this information in the article. A lf Y/PY/Nt 0 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received? PN Bias of bias judgement Some concert Fesult 1. Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis? NI There was no mention of this information in the article. Some concert 5		4.3 Were outcome assessors aware o participants?	of the intervention	on received by study	NI	There was no mention of this information in the article.
h h		4.4 If Y/PY/NI to 4.3: Could assessm influenced by knowledge of intervent	ent of the outco ion received?	ome have been	NI	There was no mention of this information in the article.
Risk of bias judgementSome concertBias in selection of the reported resultS1 Were the data that produced this result analysed in accord and prespecified analysis plan that was finalized before unables.NoThe was no mention of this information in the article.S2multiple ligible outcome measurements (e.g. scale).NoNoNoS3multiple ligible outcome measurements (e.g. scale).NoNoNoS3multiple ligible outcome measurements (e.g. scale).NoNoNoS3multiple ligible outcome measurements (e.g. scale).NoNoNoSandtiple ligible outcome measurements (e.g. scale).NoNoNoNoNoNoNoNoSandtiple ligible outcome measurements (e.g. scale).Sandtiple ligible outcome measurements (e.g. scale).No<		4.5 If Y/PY/NI to 4.4: Is it likely that a influenced by knowledge of intervent	ssessment of th	ne outcome was	PN	
Bias in selection of the reported result5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcomes were available for analysis?Nere was no mention of this information in the article.5.2 multiple eligible outcome measurements (e.g. scales, definitions, minimultication)Nere was no mention of this information in the article.5.3 multiple eligible outcome domain?NereThe study presented an exhaustive analysis of the anticipated outcomes.5.3 multiple eligible analyses of the data?NereThe study presented an exhaustive analysis of the anticipated outcomes.5.3 multiple eligible analyses of the data?NereThe study presented an exhaustive analysis of the anticipated outcomes.6.3 multiple eligible analyses of the data?NereSome concert6.3 multiple eligible analyses of the data?NereSome concert6.3 multiple eligible analyses of the data?Some concert7.3 multip		Risk of bias judgement			Some concer	ns
S2 <th>Bias in selection of the reported result</th> <td>5.1 Were the data that produced this pre-specified analysis plan that was twere available for analysis?</td> <th>result analysed inalized before</th> <td>I in accordance with a unblinded outcome data</td> <td>NI</td> <td>There was no mention of this information in the article.</td>	Bias in selection of the reported result	5.1 Were the data that produced this pre-specified analysis plan that was twere available for analysis?	result analysed inalized before	I in accordance with a unblinded outcome data	NI	There was no mention of this information in the article.
5.3 multiple eligible analyses of the data? N The study presented an exhaustive analysis of the anticipated outcomes. Some concernation Overall bias M Some concernation Bisk of bias judgement Some concernation Some concernation		5.2 multiple eligible outcome meas points) within the outcome domain?	surements (e.g.	scales, definitions, time	Ν	The study presented an exhaustive analysis of the anticipated outcomes.
Risk of bias judgement Some concerns Overall bias Risk of bias judgement Some concerns		5.3 multiple eligible analyses of the	e data?		Ν	The study presented an exhaustive analysis of the anticipated outcomes.
Overall bias Risk of bias judgement Some concerns		Risk of bias judgement			Some concer	ns
	Overall bias	Risk of bias judgement			Some concer	ns

4.8 Differential analysis of modified Jadad and Rob2 assessment results.

We utilized the widely employed RCT assessment tools (modified Jadad and Rob2) to assess RCT articles.

The modified Jadad assessment comprises four key domains: randomization (0-2 points), allocation concealment (0-2 points), blinding (0-2 points), and handling of withdrawals and dropouts (0-1 point). It is designed to be straightforward and easy to use. The article's assessment is determined by ratings across multiple domains, with quality categorized into two levels: a score of 1-3 denotes low quality, while a score of 4-7 signifies high quality.

With its wealth of content and comprehensive coverage, Rob2 in the Cochrane Library provides an extensive array of bias risk information, enhancing the integration and evaluation of evidence in RCTs. The Rob2 evaluation, which is more rigorous, covers five domains and three risk levels (low, moderate, high). An overall low-risk assessment is only given if all three levels within the five domains are classified as low risk. When there is a degree of risk present in a particular domain, the collective outcome is classified as high risk. The remaining cases all pertain to some concerns.

The variation in assessment outcomes is attributed to the third-level standard of Rob2 and the second-level standard of Jadad. Compared to the modified Jadad tool, the Rob2 tool enforces stricter criteria and presents greater complexity. It is advisable for readers to consult and opt to employ it.

5 Forest plot

5.1 Figure S6: Forest Plot of postoperative hypoxemia after sensitivity analysis

	HFN	с	co	г		Risk Ratio	Risk Ratio	
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI	I M-H, Random, 95% CI	
Ahmed 2023	5	90	9	90	36.9%	0.56 [0.19, 1.59]]	
Yu 2017	7	56	16	54	63.1%	0.42 [0.19, 0.94]]	
Total (95% CI)		146		144	100.0%	0.47 [0.25, 0.89]		
Total events	12		25					
Heterogeneity: Tau ² = Test for overall effect:	0.00; Cł Z = 2.33	$hi^2 = 0.$ B (P = 0)	17, df = 0.02)	1 (P =	0.68); l ²	= 0%	0.01 0.1 1 10 Favours HFNC Favours COT	100

Figure S6 Forest Plot of postoperative hypoxemia after sensitivity analysis.

The result of a sensitivity analysis conducted after age (≥ 65 years old) was removed as a high-risk factor.

Abbreviations: HFNC, high-flow nasal cannula; COT, conventional oxygen therapy; CI, confidence interval.

5.2 Figure S7: Forest Plot of Reintubation Rate



Figure S7 Forest Plot of Reintubation Rate.

Abbreviations: HFNC, high-flow nasal cannula; COT, conventional oxygen therapy; CI, confidence interval.

5.3 Figure S8: Forest Plot of Escalation in Oxygen Therapy



Figure S8 Forest Plot of Escalation in Oxygen Therapy.

Abbreviations: HFNC, high-flow nasal cannula; COT, conventional oxygen therapy; CI, confidence interval.

5.4 Figure S9: Forest Plot of differences in PaCO₂ after extubation



Figure S9 Forest Plot of differences in PaCO2 after extubation.

Abbreviations: HFNC, high-flow nasal cannula; COT, conventional oxygen therapy; CI, confidence interval.

5.5 Figure S10: Forest Plot of length of hospital stay

		HFNC			сот			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
Ahmed 2023	6.01	1.89	90	6.38	1.79	90	21.2%	-0.37 [-0.91, 0.17]	
Ansari 2016	3	1.9	28	4	3.1	31	3.6%	-1.00 [-2.30, 0.30]	· · · · · · · · · · · · · · · · · · ·
Pennisi 2019	6	1.5	47	6	1.5	48	16.8%	0.00 [-0.60, 0.60]	
Yu 2017	7.41	0.82	56	7.54	0.91	54	58.3%	-0.13 [-0.45, 0.19]	
Total (95% CI)			221			223	100.0%	-0.19 [-0.44, 0.06]	-
Heterogeneity: Tau ² = 0.00; Chi ² = 2.44, df = 3 (P = 0.49); l^2 = 0% Test for overall effect: Z = 1.51 (P = 0.13)									-2 -1 0 1 2 Favours HFNC Favours COT

Figure S10 Forest Plot of Length of Hospital Stay

Abbreviations: HFNC, high-flow nasal cannula; COT, conventional oxygen therapy; CI, confidence interval.

5.6 Figure S11: Forest Plot of length of ICU stay

	ŀ	IFNC			сот			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
Ahmed 2023	1.17	0.69	90	1.2	0.9	90	56.2%	-0.03 [-0.26, 0.20]	—— — —
Yu 2017	3.72	0.56	56	3.64	0.83	54	43.8%	0.08 [-0.19, 0.35]	
Total (95% CI)			146			144	100.0%	0.02 [-0.16, 0.19]	-
Heterogeneity: Tau ² =	0.00; C								
Test for overall effect:	Z = 0.2	0 (P =	0.84)						Favours HFNC Favours COT

Figure S11 Forest Plot of Length of ICU Stay

Abbreviations: HFNC, high-flow nasal cannula; COT, conventional oxygen therapy; CI, confidence interval.

6 Trial sequential analysis

6.1 Figure S12: Trial sequential analysis plot

Trial sequential analysis for comparing the incidence of postoperative hypoxemia between two groups. The required information size for a conclusive result was 1372. We set RRR:((50/193)-(63/192))/(63/192)=-21%.



Figure S12 Trial sequential analysis for the comparison of the incidence of postoperative hypoxemia. Abbreviations: HFNC, high-flow nasal cannula; COT, conventional oxygen therapy.

6.2 Figure S13: Parameters of Trial Sequential Analysis

Edit Dichotomous Alpha-spend	ing Boundary		×
Boundary Identifier			
Name: postoperative hypox	emia		
Hypothesis Testing		0	•
Boundary Type: One	-sided Upper	○ One-sided Lower	O Two-sided
Type 1 Error: 5.0	%		
a -spending Function: O'Bri	en-Fleming ∨	- · ·	
Information Axis: O Sam	ple Size	() Event Size	○ Statistical Information
Inner Wedge			
Repert		04	
i over.	o' 7	v	
P-spending Function:	0.8	rien fleming 🗸	
Required Information Size			
Information Size:	1372	🔿 User Defined	Estimate
Type 1 Error:	5.0	96	
Power:	80.0	%	
Relative Risk Reduction:	21.0	% OUser Defined	O Low Bias Based
Incidence in Intervention are	25.91	% Ollser Defined	
Incidence in Control erro	32.8		
incluence in control arm.	32.0	N	
Meterogeneity Correction:	0.0	% 🔾 User Defined	O Model Variance Based
			Apply Changes Cancel

Figure S13 Parameters of Trial Sequential Analysis

Parameters of TSA for comparison in the incidence of postoperative hypoxemia.