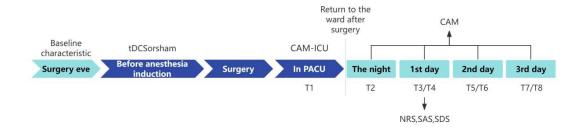


**Supplementary Figure 1 The apparatus used in this test.** A: The mainframe of the apparatus and electrodes; B: Stretchy hat used to fix the electrodes.



Supplementary Figure 2 The timeline of the trial. tDCS: Transcranial direct current stimulation; CAM-ICU: Confusion assessment method of intensive care unit; PACU: Postanesthesia care unit; CAM: Confusion assessment method; NRS: Numeric rating scale; SAS: Self-rating anxiety scale; SDS: Self-rating depression scale; T1: When the patients were prepared to be transferred back to the ward; T2: The evening of the day of surgery; T3: The morning of the first postoperative day; T4: The afternoon of the first postoperative day; T5: The morning of the second postoperative day; T6: The afternoon of the second postoperative day.

Subgroup	Active group	Sham group			OR(95%CI)	P for interaction
All Patients	7/100	23/101	<b>→</b>		0.26(0.10,0.63)	0.002
Age			į.			
< 72	1/44	6/43	+		0.14(0.02,1.24)	0.565
≥72	6/56	17/58	<b>→</b> ;		0.29(0.11,0.80)	
ASA			;			0.634
П	4/76	17/81	<b>→</b>		0.21(0.07, 0.65)	
Ш	3/24	6/20	<b>→</b>		0.33(0.07,1.56)	
Frail			į			0.969
No	2/56	5/44	<b>—</b>		0.29(0.05,1.57)	
Yes	5/44	18/57	<b>→</b> ;		0.28(0.09,1.82)	
Anaemia						0.415
No	6/78	14/69	<b>⊢</b> ◆──		0.33(0.12,0.91)	
Yes	1/22	9/32	<b>+</b>		0.12(0.01,1.04)	
MMSE			į			0.998
≤26	7/53	17/57	<b>→</b>		0.36(0.14,0.95)	
> 26	0/47	6/44	į			
education						0.998
≤9	7/92	18/90	<b>⊢</b>		0.33(0.13,0.83)	
> 9	0/8	5/11				
		-1.0	0.0 1.0	2.0	3.0	
		Active tDCS B	etter	Sham tDCS Bette	er	

Supplementary Figure 3 Forest plot of the subgroup analysis.

## Supplementary Table 1 Intraoperative data by treatment group

Characteristics	Sham-tDCS $(n = 101)$	Active-tDCS ( $n = 100$ )	P value
Remifentanil,median(IQR), mg	2.50 (2.00-3.3)	2.50 (1.90-3.08)	0.097
Duration of surgery, median (IQR),	210 (165-260)	200 (180-230)	0.526
minute	210 (103-200)	200 (100-230)	
Duration of anesthesia, median	240 (200-280)	225 (210-260)	0.265
(IQR), Characteristics	240 (200-200)	223 (210-200)	0.205
Infusion quantity, median (IQR),	2150 (1850-2750)	2000 (1750-2500)	0.300
ml	2130 (1630-2730)	2000 (1730-2300)	
Estimated blood loss, median (IQR),	100 (50-120)	100 (50-150)	0.119
ml	100 (50-120)	100 (30-130)	
Ephedrine,median(IQR), mg	3 (0-9)	3 (0-11.5)	0.930
Phenylephrine,median(IQR), μg	280 (120-800)	400 (50-950)	0.861

## Supplementary Table 2 Mediating model examination by bootstrap

Model	Mediating effect	LL 95%CI	UL 95%CI	P value
Anxiety	-0.01	-0.03	0.01	0.35
Depression	0.01	-0.01	0.03	0.23

CI: Confidence interval.

## **Supplementary Table 3 Adverse events in the trial**

Characteristics	Sham-tDCS ( $n = 101$ )	Active-tDCS ( $n = 100$ )	P value
Fever	17 (16.8)	16 (16.0)	0.874
Nausea and vomiting	9 (8.9)	7 (7.0)	0.617
pneumothorax	1 (1.0)	0	1.000
Oliguria	1 (1.0)	0	1.000
Hypoxia	1 (1.0)	1 (1.0)	1.000
Skin erythema at the stimulation site	3 (3.0)	8 (8.0)	0.117
Skin pain at the stimulation site	3 (3.0)	15 (15.0)	0.003