

Figure Legend

Figure 1: Experimental model (P_{SVC} : pressure superior vena cava; P_{IVC} : pressure inferior vena cava; P_{RA} : pressure right atrium; P_{LA} : pressure left atrium; P_{PA} : pressure pulmonary artery).

Figure 2: Systemic venous pressure: increased and maintained at goal range (14-15 mmHg) in SVC (A) and IVC (B) distributions days 1 - 20. Adjusted measurement indicates adjustment required in vena caval restriction to maintain measured systemic venous pressure within goal parameters after the initial value at that time interval had been determined.

Figure 3: Cardiac index: significant reduction after intervention, with normalization by day 14. * significant difference between experimental and control groups ($P \leq 0.05$).

Figure 4: Blood volume. * significant difference ($P \leq 0.05$) from control. # significant difference ($P \leq 0.05$) from baseline.

Figure 5: Serum aldosterone (A) and angiotensin II (B). * significant difference ($P \leq 0.05$) from control.

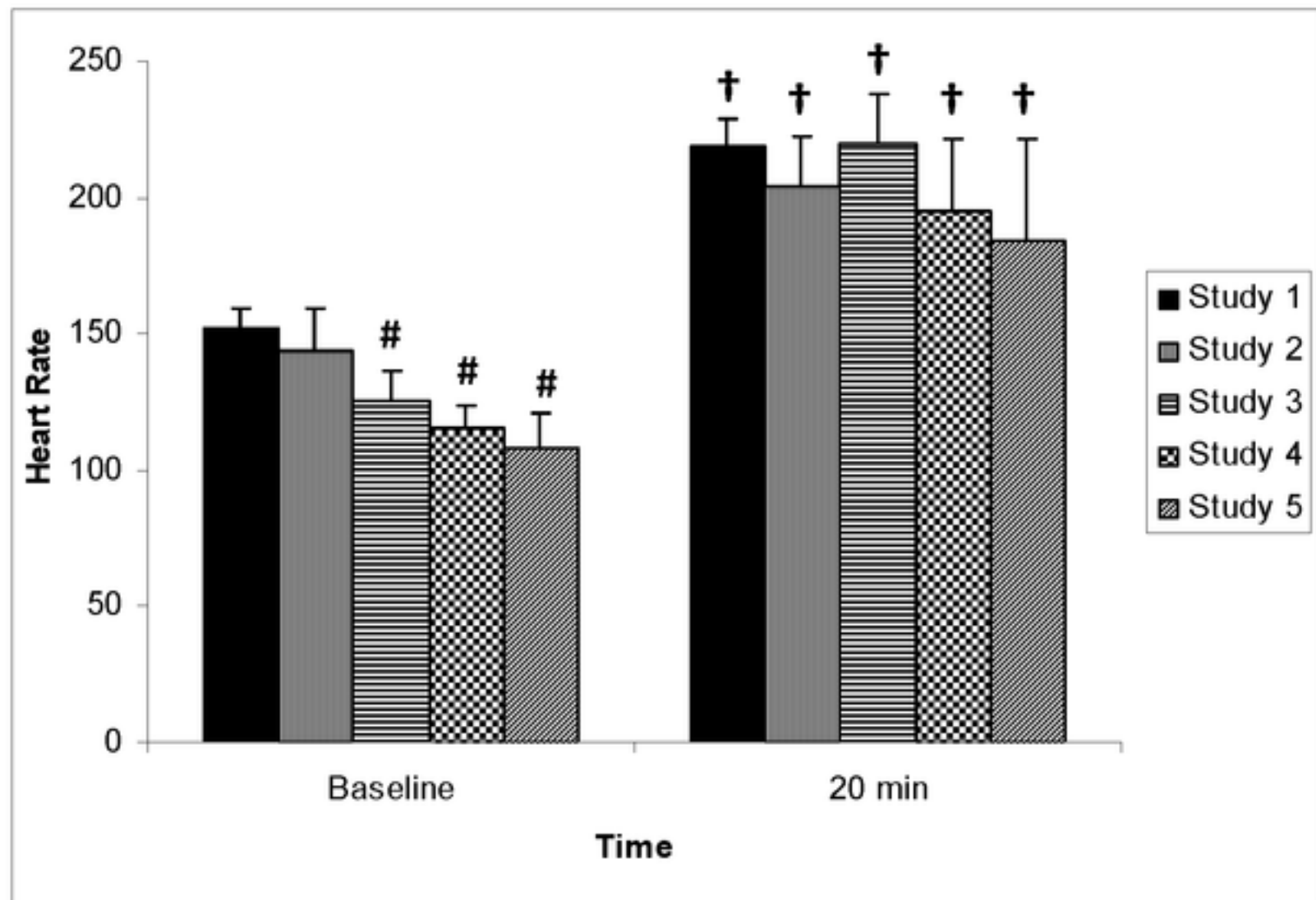
Figure E1: Heart rate in control (A) and experimental (B) groups, and cardiac index in control (C) and experimental (D) groups at baseline and after 20 minute dobutamine infusion. Study 1: one day prior to intervention; Study 2: 3 days postintervention; Study 3: 7 days postintervention; Study 4: 14 days postintervention; Study 5: 21 days postintervention. *

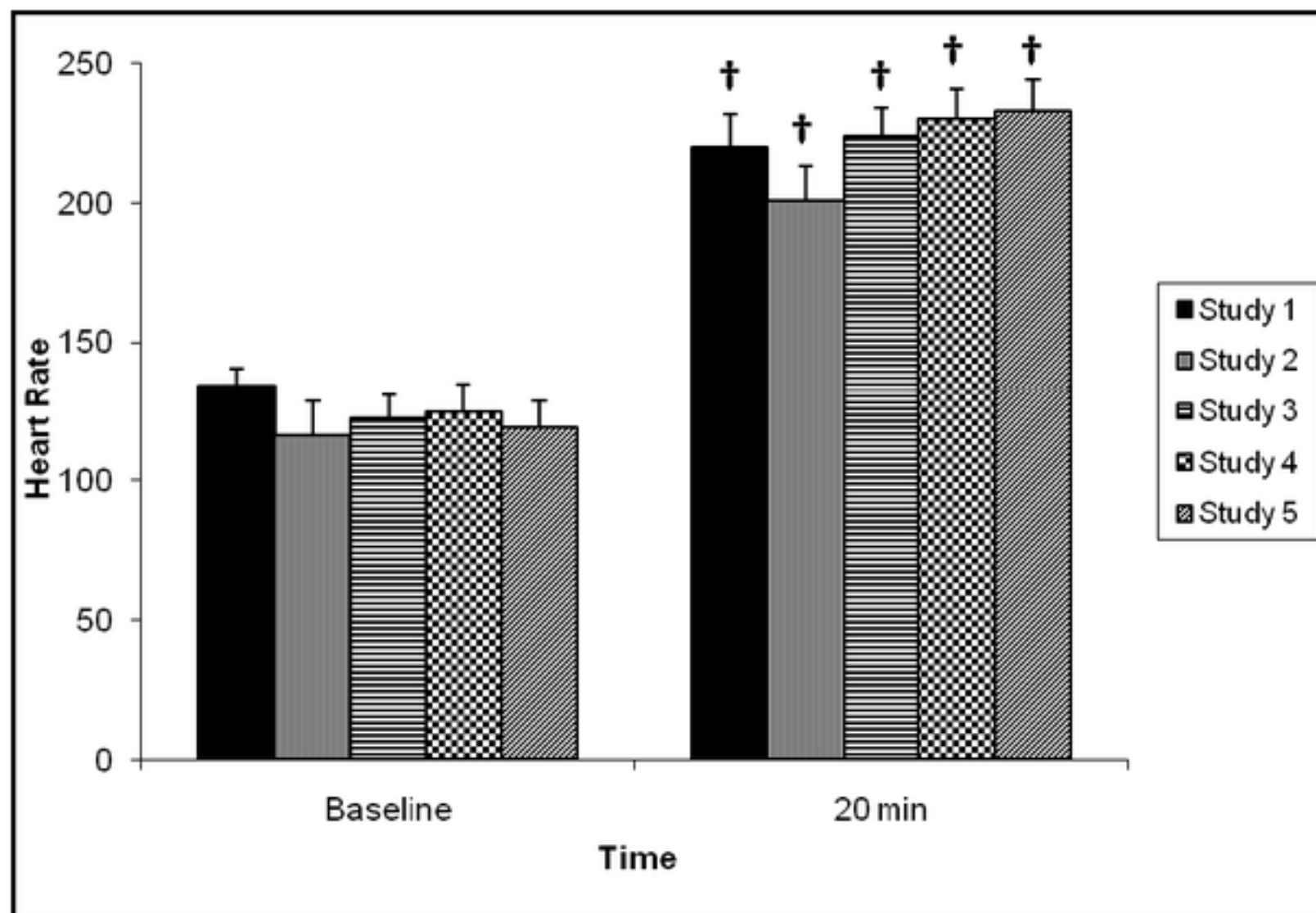
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4 significant difference ($P \leq 0.05$) from control. # significant difference ($P \leq 0.05$) from
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6 Study 1. † significant difference ($P \leq 0.05$) from baseline.
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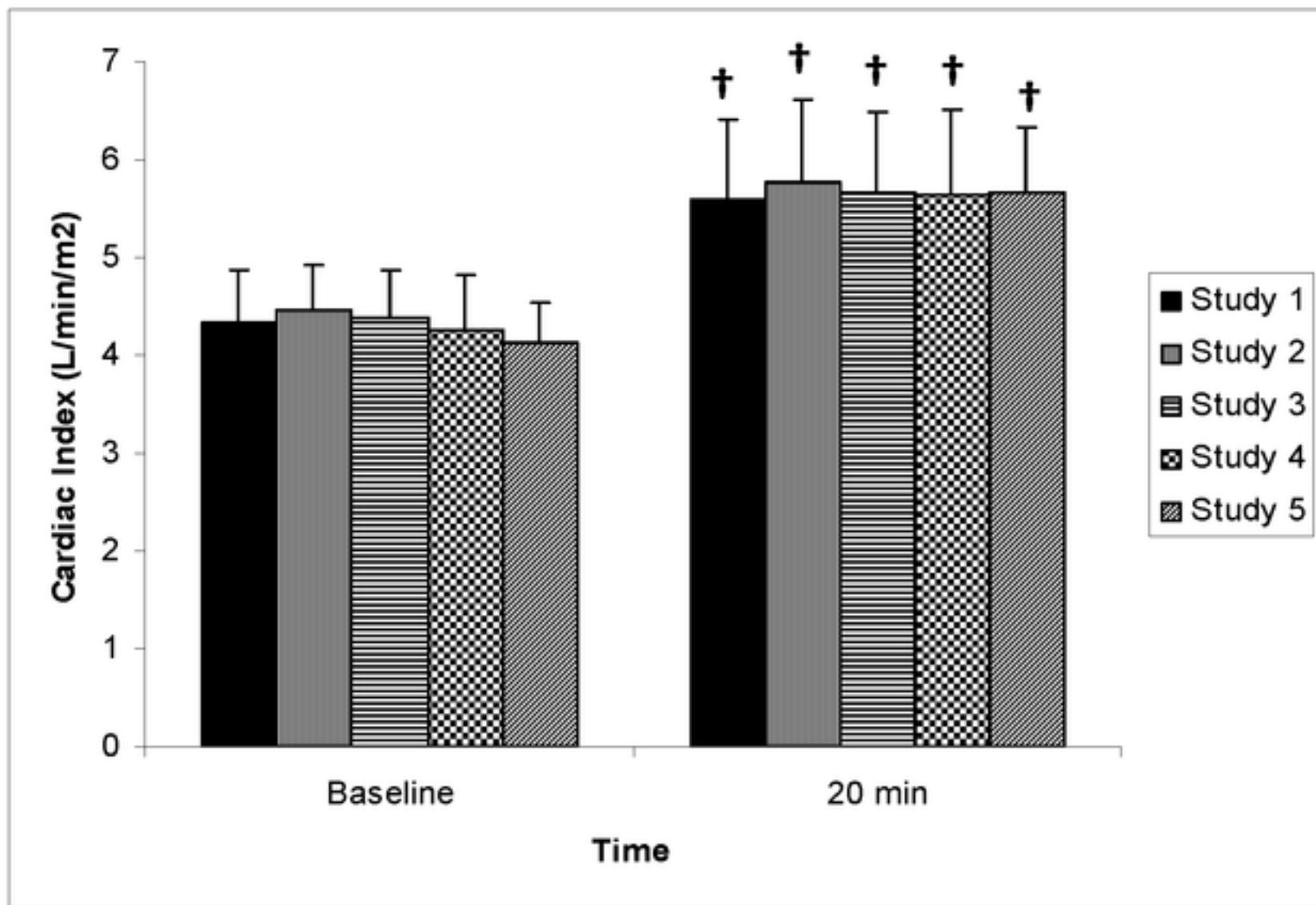
10 Figure E2: Blood oxygen saturation in SVC in control (A) and experimental (B) animals and IVC
11 in control (C) and experimental (D) animals at baseline after 20 minute dobutamine
12 infusion. (E) represents near-infrared spectroscopy measurements in experimental
13 animals (n=4) at baseline after 20 minute dobutamine infusion. Study 1: one day prior to
14 intervention; Study 2: 3 days postintervention; Study 3: 7 days postintervention; Study 4:
15 14 days postintervention; Study 5: 21 days postintervention. * significant difference
16 ($P \leq 0.05$) from control. # significant difference ($P \leq 0.05$) from study 1 values. †
17 significant difference ($P \leq 0.05$) from baseline.
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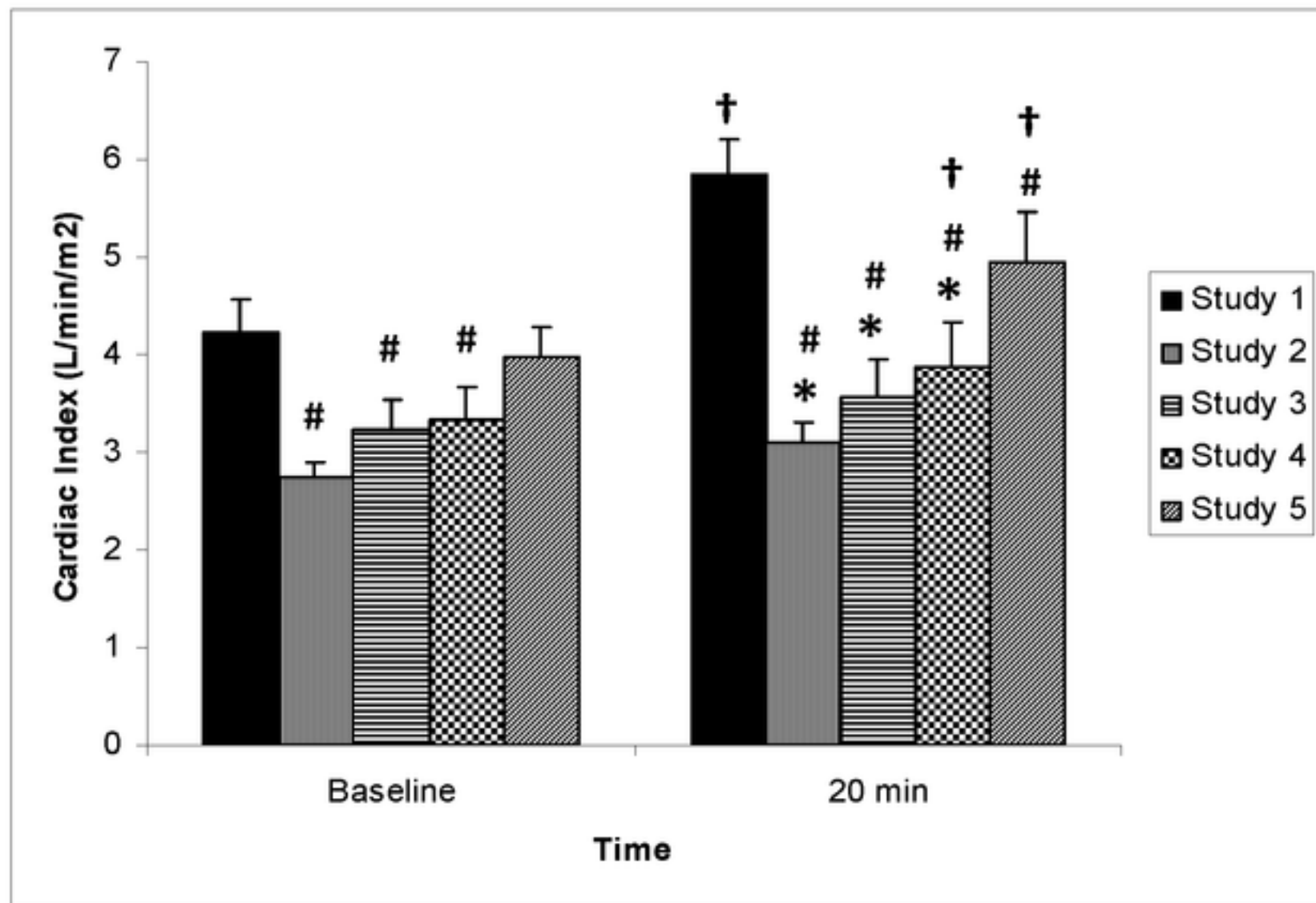
31 Figure E3: Oxygen extraction in the SVC (A) and IVC (B) versus time. * significant difference
32 ($P \leq 0.05$) from control. # significant difference ($P \leq 0.05$) from baseline.
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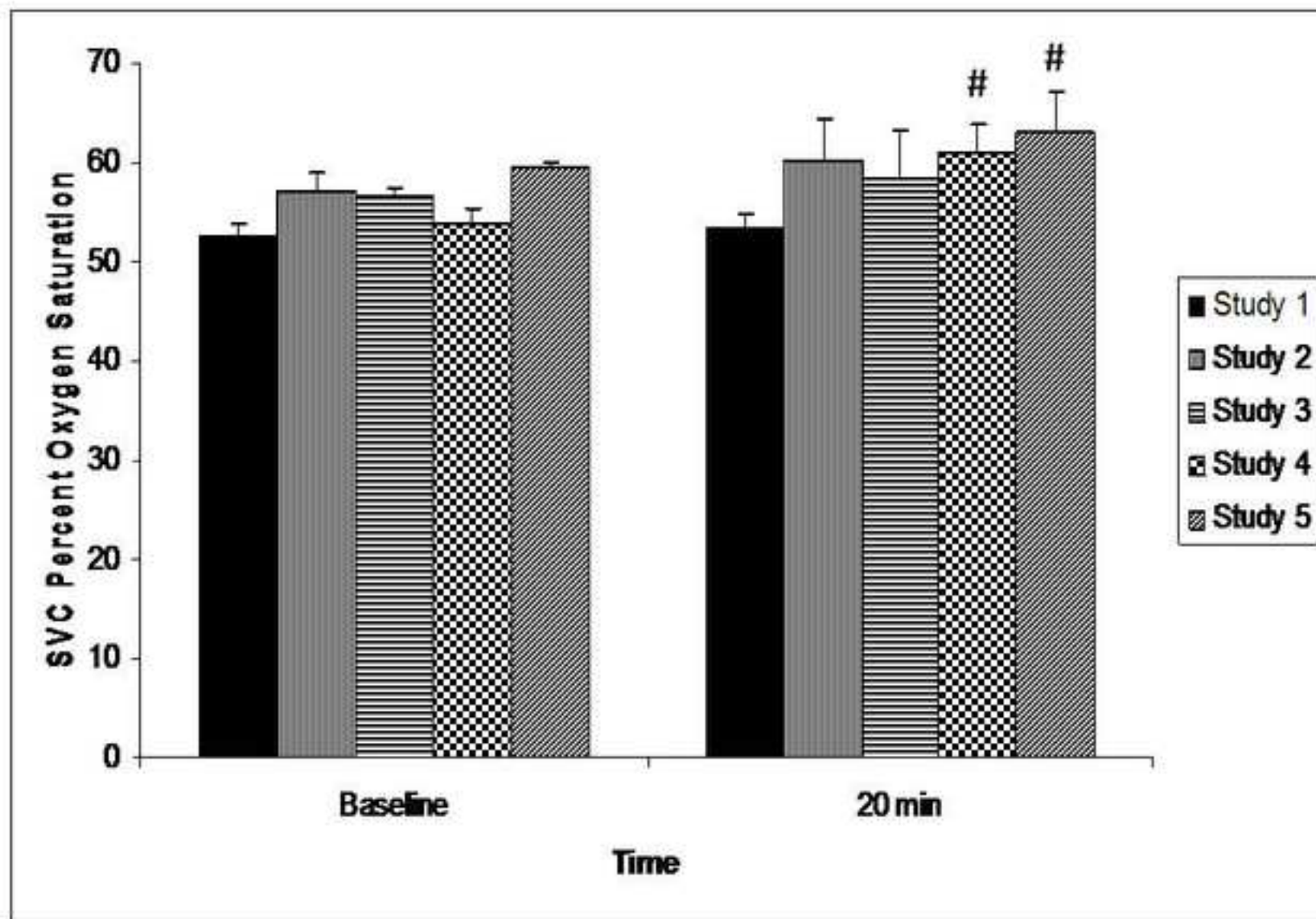
38 Figure E4: Correlation between cerebral near infrared spectroscopy measurements and SVC (A)
39 and IVC (B) blood oxygen saturation in experimental animals (n=4). $P < 0.001$.
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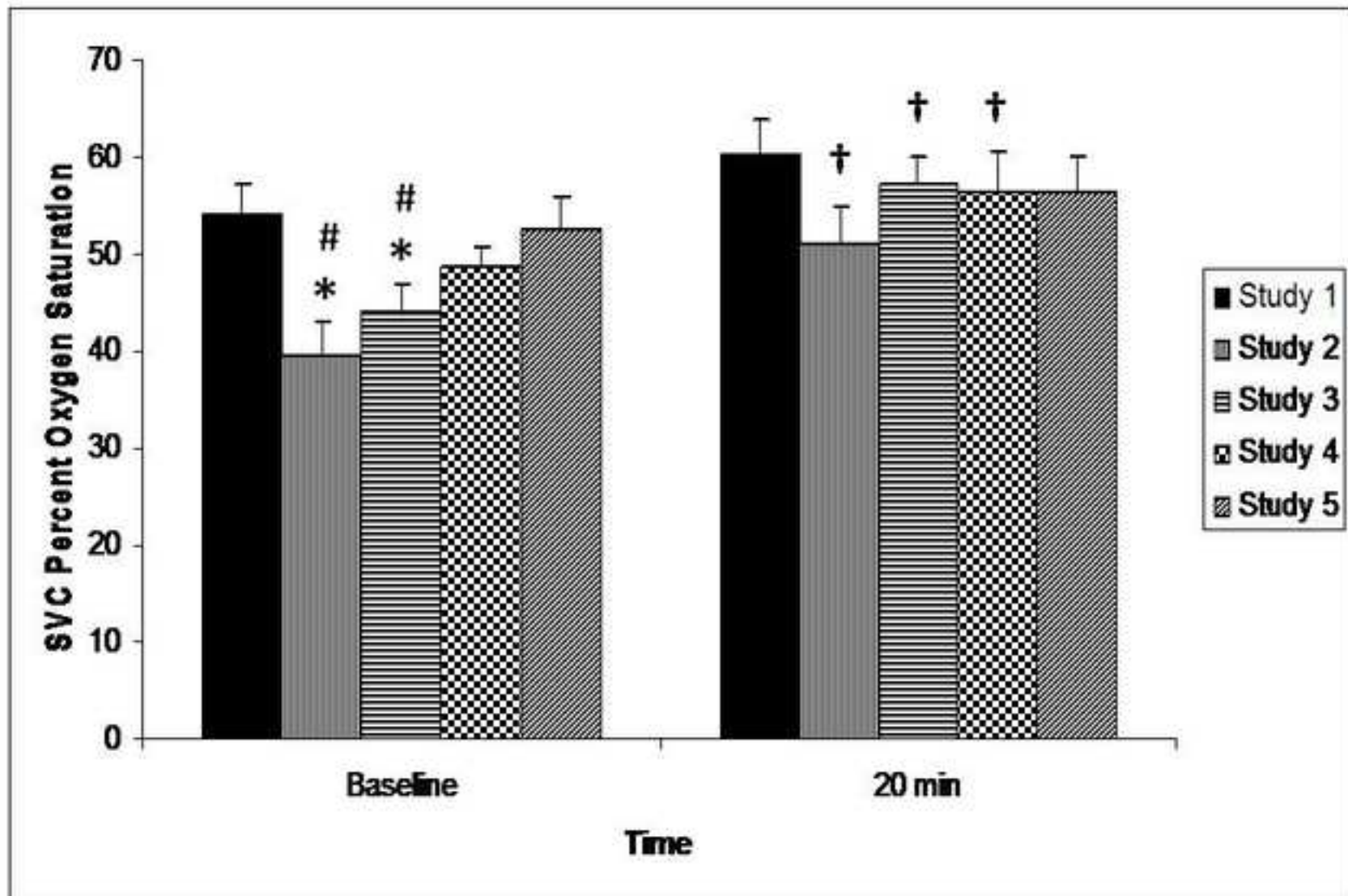


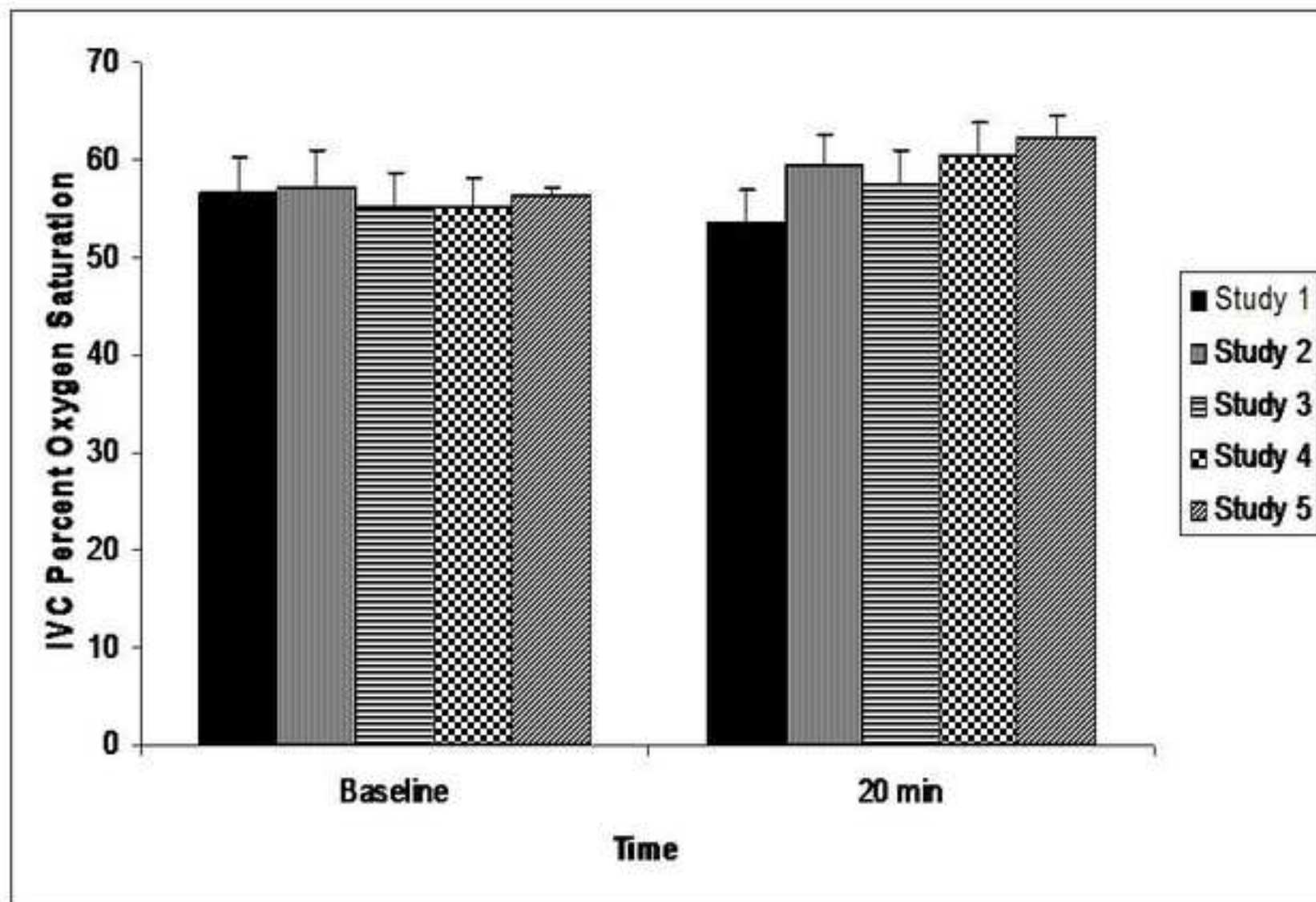


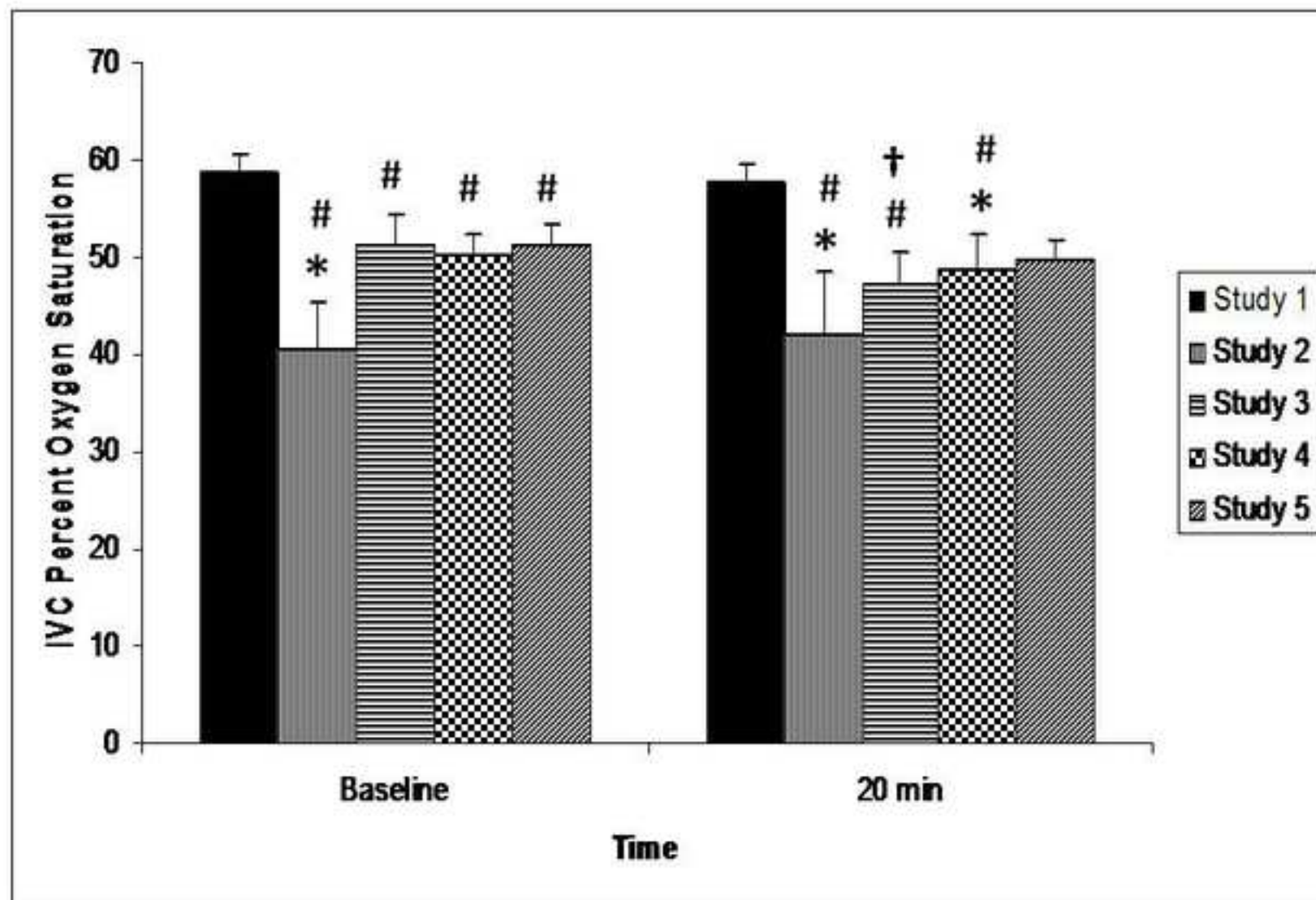


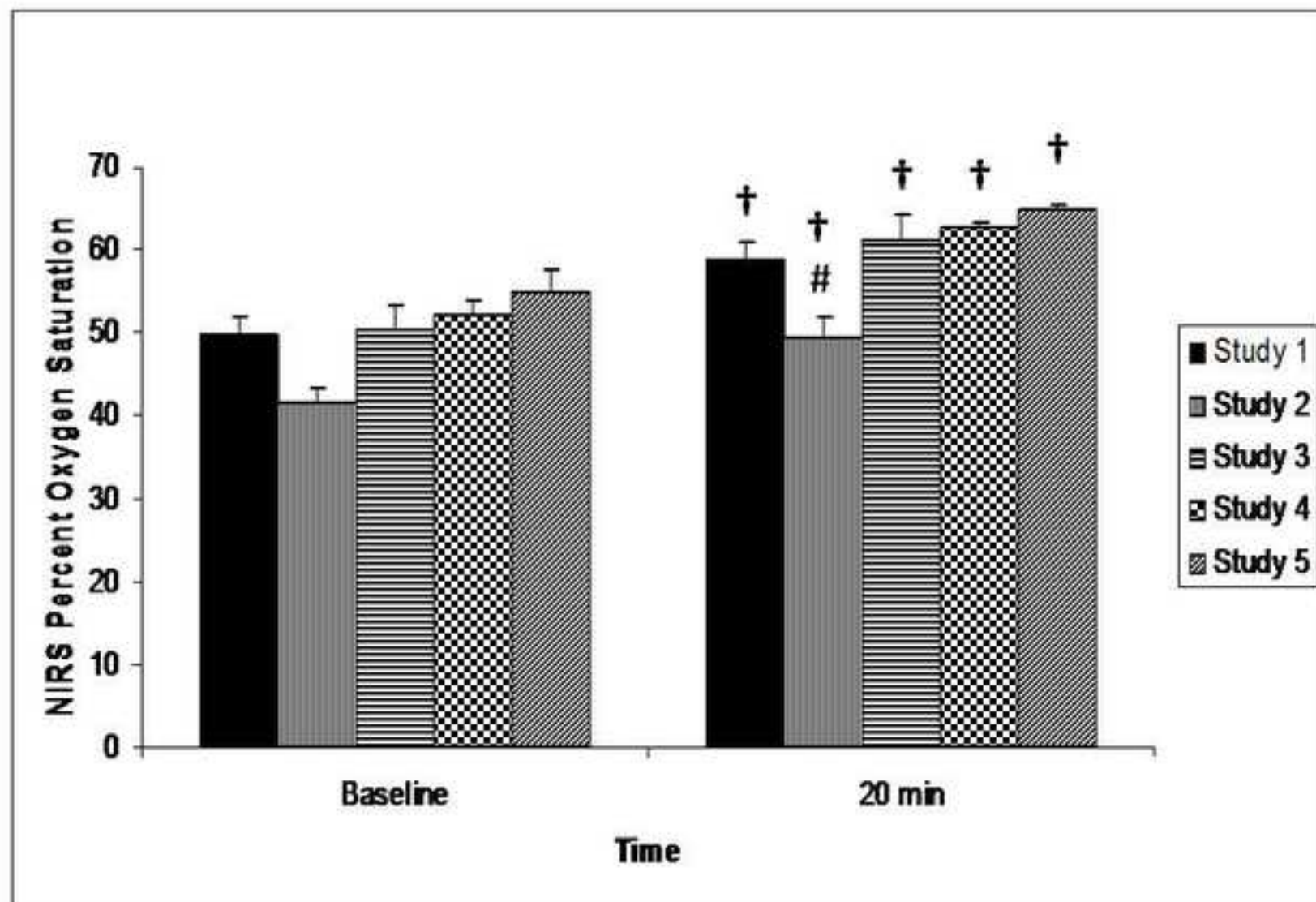


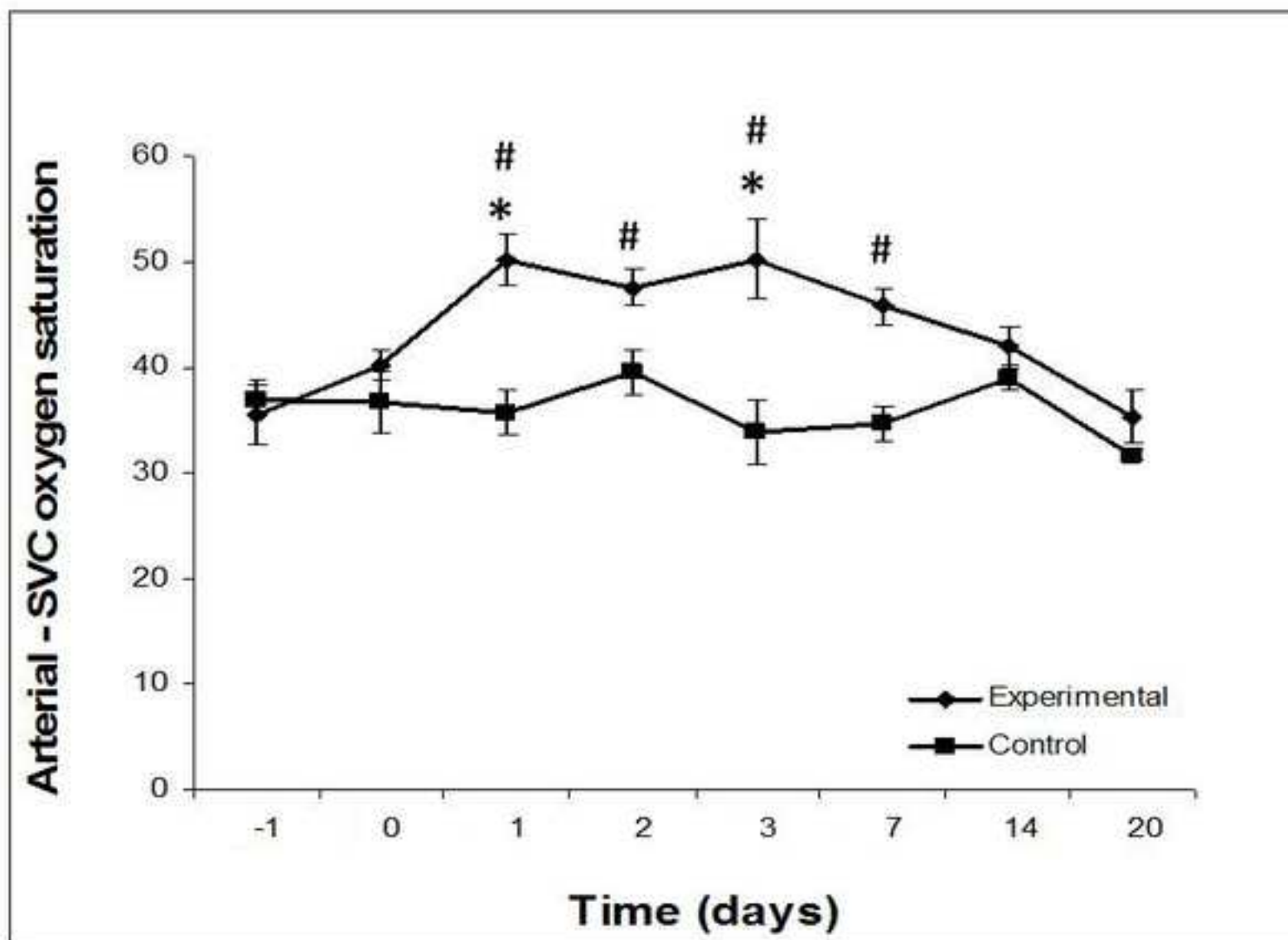


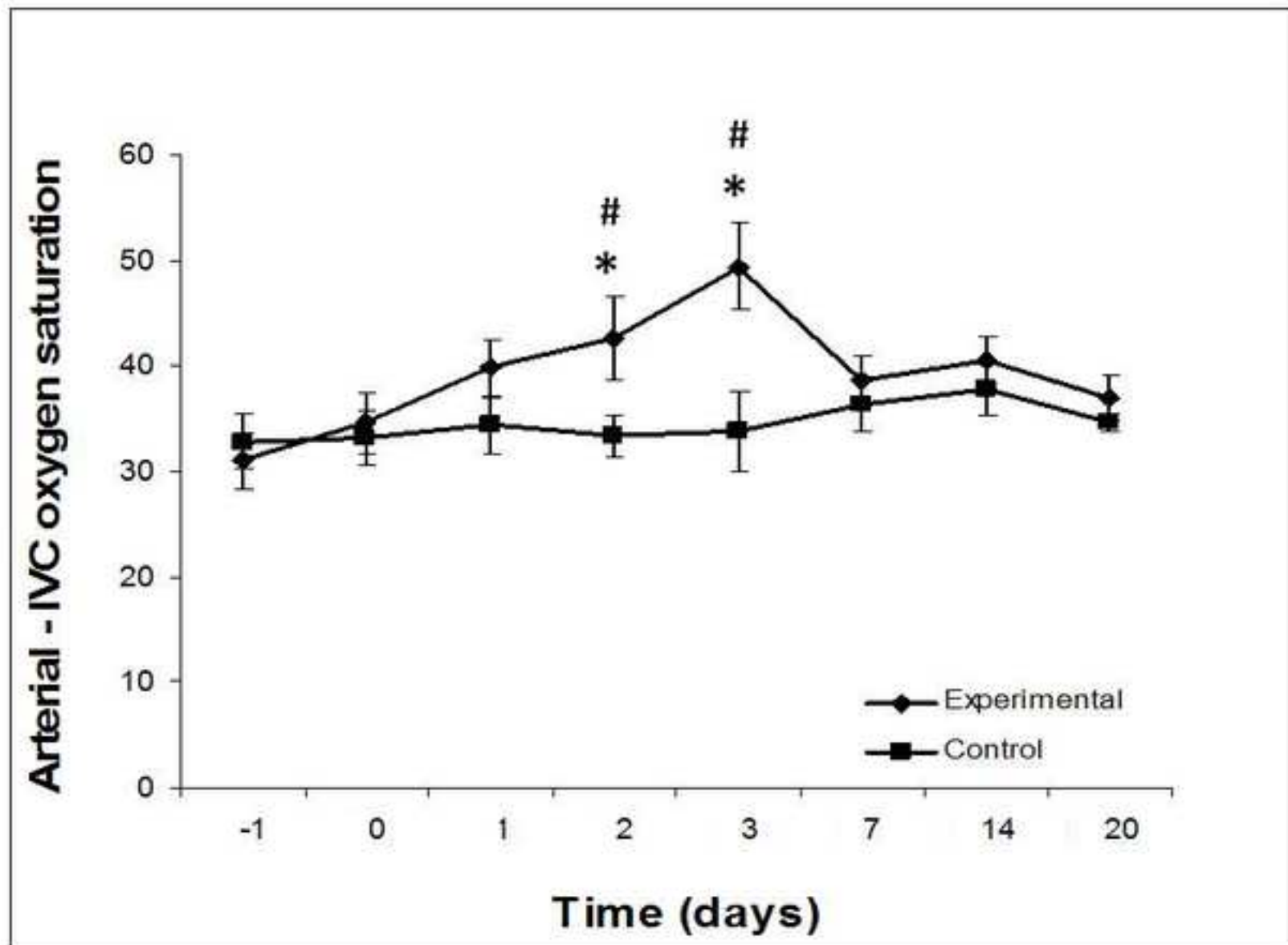


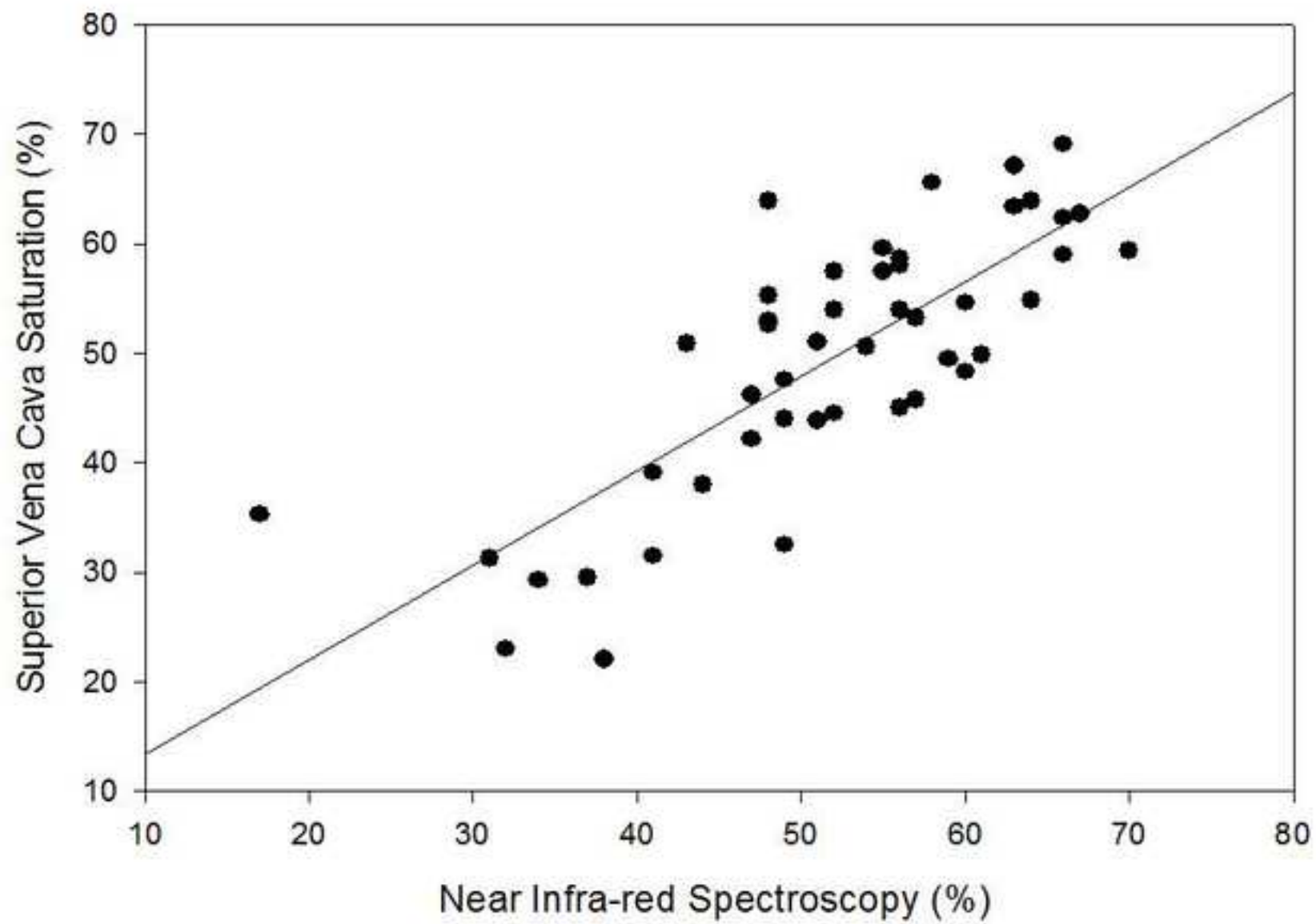












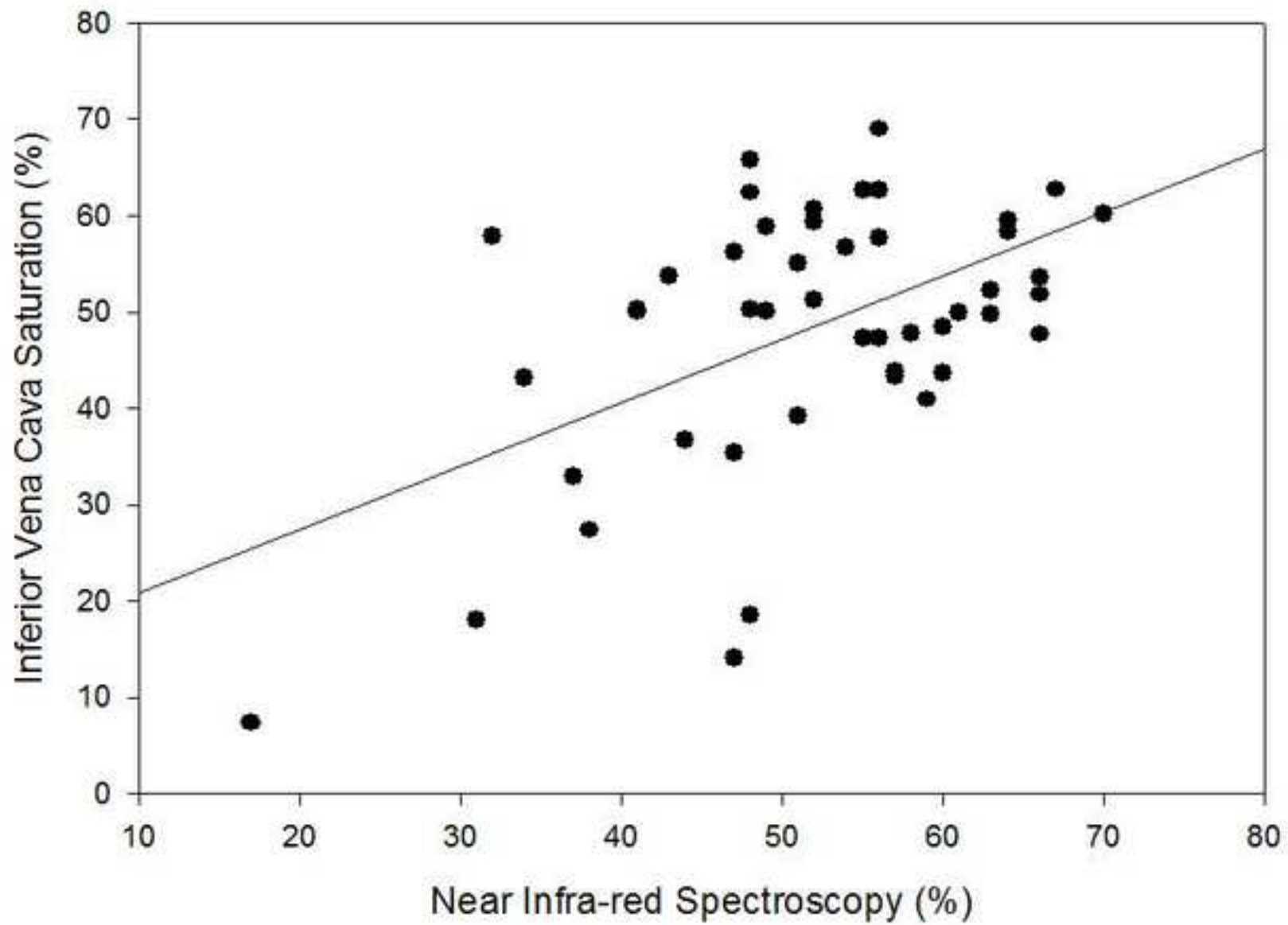


Table EI: Hemodynamic and Blood Gas Data

Parameter		Group	Baseline (Day 0 preintervention)		Day 1			Day 3		
			Value	II	Value	I	II	Value	I	II
Heart Rate	0.048	Control	151±11.6	0.391	145±18	0.865	0.868	138±39	0.641	0.274
		Experimental	139±8.6		148±31	0.075		122±31	0.987	
Systolic Blood Pressure	0.869	Control	98±5	0.510	103±3	0.988	0.053	100±7	0.992	0.130
		Experimental	95±10		94±10	0.996		93±9	0.996	
Diastolic Blood Pressure	0.982	Control	76±6		79±4		NS	75±4		NS
		Experimental	76±7		73±12			70±9		
Superior Vena Cava Pressure	<0.001	Control	5±2	0.496	4±2	0.899	<0.001	5±2	1.000	<0.001
		Experimental	4±2		14±1	<0.001		15±1	<0.001	
Inferior Vena Cava Pressure	<0.001	Control	5±2	0.339	3±2	0.199	<0.001	5±3	0.999	<0.001
		Experimental	3±2		15±1	<0.001		15±1	<0.001	
Cardiac Index	<0.001	Control	4.2±0.9	0.547	4.5±0.9	1.000	0.001	4.4±1.1	1.000	0.002
		Experimental	3.9±1.0		2.7±0.7	<0.001		2.7±0.4	<0.001	
Mean Pulmonary Arterial Pressure	0.960	Control	17±2	0.156	16±1	0.935	0.351	17±1	0.970	0.139
		Experimental	15±2		15±2	0.999		15±2	0.995	
Right Atrial Pressure	0.169	Control	3±2		1.3±2.3		NS	2±2.6		NS
		Experimental	0.8±1.8		-0.8±1.9			0.4±4		
Left Atrial Pressure	0.119	Control	2.3±2.1		2.5±1.9		NS	1.8±2.2		NS
		Experimental	1.2±2.2		0.8±3			0.7±2.7		
Pulmonary Vascular Resistance	0.001	Control	9.4±2.6	0.827	8.6±1.9	0.999	0.021	9.9±4.0	1.000	0.058
		Experimental	9.9±3.2		14.8±4.9	0.027		14.8±4.7	0.025	
Arterial Oxygen Saturation	0.255	Control	89.5±4.7		90.1±2.4			91±4.4		
		Experimental	89.7±5.2		90.3±2.0			89.8±2.6		
SVC Oxygen Saturation	0.001	Control	52.5±2.8	0.651	54.4±4.0	0.984	<0.001	57.1±3.7	0.839	<0.001
		Experimental	54.1±7.5		40.1±7.5	<0.001		39.6±8.7	<0.001	
IVC Oxygen Saturation	<0.001	Control	56.7±7.1	0.678	55.7±5.0	0.947	0.287	57.2±7.7	0.873	0.003
		Experimental	58.7±4.6		50.6±7.2	0.018		40.5±12.4	<0.001	
Plasma Volume	0.059	Control	85.8±12	0.876	87.3±14	0.945	0.444	87.8±13	0.972	0.058
		Experimental	84.8±8.7		92.3±13	0.059		100.7±7.3	0.002	

Values expressed as mean ± s.d. Control group includes n=4 measurements; Experimental group includes n=6 measurements for all variables and time points. Columns headed by I are *p* values for within-group comparisons with baseline. Columns headed by II are *p* values for between-group comparisons. The column headed by III shows *p* values for two-way analysis of variance group effect for time. Significant *p* values are in bold. Blood pressure expressed in mmHg. Cardiac

index calculated as cardiac output/weight, expressed in units L/min/m². Pulmonary vascular resistance calculated as $(P_{PA} - P_{LA}) \times 80 / (\text{cardiac output/weight})$, expressed as $10^3 \text{ dynes} \cdot \text{cm}^{-5} \cdot \text{kg}$. Oxygen saturation expressed as percent saturation. Blood volume expressed mL/kg.

Parameter	Group	Week-1 Day 7			Week-2 Day 14			Week-3 Day 21		
		Value	I	II	Value	I	II	Value	I	II
Heart Rate	Control	128±21	0.458	0.827	111±11	0.028	0.89	103±23	0.006	0.297
	Experimental	124±15	0.972		113±16	0.908		119±20	0.967	
Systolic Blood Pressure	Control	94±5	0.657	0.762	98±7	0.898	0.844	99±9	0.949	0.303
	Experimental	95±8	1.000		97±6	0.954		94±4	0.997	
Diastolic Blood Pressure	Control	74±3		NS	76±5		NS	75±6		NS
	Experimental	73±8			75±6			71±5		
Superior Vena Cava Pressure	Control	5±1	0.999	<0.001	5±2	0.880	<0.001	3±2	0.316	<0.001
	Experimental	14±1	<0.001		14±1	<0.001		14±2	<0.001	
Inferior Vena Cava Pressure	Control	5±1	0.993	<0.001	7±4	0.955	<0.001	5±4	0.998	<0.001
	Experimental	14±1	<0.001		15±1	<0.001		15±1	<0.001	
Cardiac Index	Control	4.2±0.7	1.000	0.038	4.2±0.9	0.999	0.074	4.0±0.6	0.775	0.789
	Experimental	3.2±0.7	0.129		3.3±0.9	0.302		3.9±0.7	0.977	
Mean Pulmonary Arterial Pressure	Control	20±4	0.718	0.023	17±1	0.965	0.124	17±1	0.990	0.194
	Experimental	16±3	0.944		15±2	0.995		15±2	0.981	
Right Atrial Pressure	Control	4.7±3.2			2.3±3.5			2.7±2.3		
	Experimental	-0.2±1.8		NS	-0.2±2.5		NS	1.4±1.7		NS
Left Atrial Pressure	Control	3.5±2.6			3±2.8			3.3±3.2		
	Experimental	0±1.3		NS	0±0.6		NS	2.5±2.6		NS
Pulmonary Vascular Resistance	Control	10.7±4.1	0.999	0.134	9.3±3.4	1.000	0.159	9.5±2.5	1.000	0.895
	Experimental	14.5±5.1	0.036		12.8±3.8	0.308		9.2±3.1	0.941	
Arterial Oxygen Saturation	Control	91.4±3.9			92.8±1.3			91.2±0.6		
	Experimental	90±2.9			90.6±2.5			88.1±2.7		
SVC Oxygen Saturation	Control	56.7±1.3	0.009	0.001	53.7±3.4	0.985	0.165	59.5±0.9	0.487	0.057
	Experimental	44.2±6.9	0.835		48.7±5.1	0.240		52.7±7.4	0.516	
IVC Oxygen Saturation	Control	55.1±7.4	0.985	0.436	55.1±6.2	0.957	0.312	56.5±1.2	0.817	0.206
	Experimental	51.3±7.1	0.027		50.2±5.4	0.018		51.2±5.0	0.030	
Plasma Volume	Control	86.8±4.7	0.841	0.072	87.9±9.1	0.992	0.020	85.5±8.4	0.950	0.034
	Experimental	98.8±7	0.002		104±8.5	<0.001		100±9.4	0.002	

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		Experimental	15±2		15±2	0.999		15±2	0.995	
Right Atrial Pressure	0.169	Control	3±2		1.3±2.3		NS	2±2.6		NS
		Experimental	0.8±1.8		-0.8±1.9			0.4±4		
Left Atrial Pressure	0.119	Control	2.3±2.1		2.5±1.9		NS	1.8±2.2		NS
		Experimental	1.2±2.2		0.8±3			0.7±2.7		
Pulmonary Vascular Resistance	0.001	Control	9.4±2.6	0.827	8.6±1.9	0.999	0.021	9.9±4.0	1.000	0.058
		Experimental	9.9±3.2		14.8±4.9	0.027		14.8±4.7	0.025	
Arterial Oxygen Saturation	0.255	Control	89.5±4.7		90.1±2.4			91±4.4		
		Experimental	89.7±5.2		90.3±2.0			89.8±2.6		
SVC Oxygen Saturation	0.001	Control	52.5±2.8	0.651	54.4±4.0	0.984	<0.001	57.1±3.7	0.839	<0.001
		Experimental	54.1±7.5		40.1±7.5	<0.001		39.6±8.7	<0.001	
IVC Oxygen Saturation	<0.001	Control	56.7±7.1	0.678	55.7±5.0	0.947	0.287	57.2±7.7	0.873	0.003
		Experimental	58.7±4.6		50.6±7.2	0.018		40.5±12.4	<0.001	
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Parameter	Group	Day 7			Day 14			Day 21		
		Value	I	II	Value	I	II	Value	I	II
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Systolic Blood Pressure	Control	94±5	0.657	0.762	98±7	0.898	0.844	99±9	0.949	0.303
	Experimental	95±8	1.000		97±6	0.954		94±4	0.997	
Diastolic Blood Pressure	Control	74±3	NS	NS	76±5	NS	NS	75±6	NS	NS
	Experimental	73±8			75±6			71±5		
Superior Vena Cava Pressure	Control	5±1	0.999	<0.001	5±2	0.880	<0.001	3±2	0.316	<0.001
	Experimental	14±1	<0.001		14±1	<0.001		14±2	<0.001	
Inferior Vena Cava Pressure	Control	5±1	0.993	<0.001	7±4	0.955	<0.001	5±4	0.998	<0.001
	Experimental	14±1	<0.001		15±1	<0.001		15±1	<0.001	
Cardiac Index	Control	4.2±0.7	1.000	0.038	4.2±0.9	0.999	0.074	4.0±0.6	0.775	0.789
	Experimental	3.2±0.7	0.129		3.3±0.9	0.302		3.9±0.7	0.977	
Mean Pulmonary Arterial Pressure	Control	20±4	0.718	0.023	17±1	0.965	0.124	17±1	0.990	0.194
	Experimental	16±3	0.944		15±2	0.995		15±2	0.981	
Right Atrial Pressure	Control	4.7±3.2	NS	NS	2.3±3.5	NS	NS	2.7±2.3	NS	NS
	Experimental	-0.2±1.8			-0.2±2.5			1.4±1.7		
Left Atrial Pressure	Control	3.5±2.6	NS	NS	3±2.8	NS	NS	3.3±3.2	NS	NS
	Experimental	0±1.3			0±0.6			2.5±2.6		
Pulmonary Vascular Resistance	Control	10.7±4.1	0.999	0.134	9.3±3.4	1.000	0.159	9.5±2.5	1.000	0.895
	Experimental	14.5±5.1	0.036		12.8±3.8	0.308		9.2±3.1	0.941	
Arterial Oxygen Saturation	Control	91.4±3.9	0.009	0.001	92.8±1.3	0.985	0.165	91.2±0.6	0.487	0.057
	Experimental	90±2.9			90.6±2.5			88.1±2.7		
SVC Oxygen Saturation	Control	56.7±1.3	0.835	0.001	53.7±3.4	0.240	0.312	59.5±0.9	0.516	0.206
	Experimental	44.2±6.9	0.985		48.7±5.1	0.957		52.7±7.4	0.817	
IVC Oxygen Saturation	Control	55.1±7.4	0.027	0.436	55.1±6.2	0.018	0.312	56.5±1.2	0.030	0.206
	Experimental	51.3±7.1	0.841		50.2±5.4	0.992		51.2±5.0	0.950	
Plasma Volume	Control	86.8±4.7	0.841	0.072	87.9±9.1	0.992	0.020	85.5±8.4	0.950	0.034
	Experimental	98.8±7	0.002		104±8.5	<0.001		100±9.4	0.002	

Table EII: Serum neurohormonal markers.

	Group	Study 1 (Day -1)	Postintervention (Day 0)	Study 2 (Day 3)	Study 3 (Day 7)	Study 4 (Day 14)	Study 5 (Day 21)
ADH (pg/ml)	Control	1.15 ± 1.11	2.11 ± 0.9	1.64 ± 1.13	2 ± 0.83	2.72 ± 1.07	2.85 ± 0.64
	Experimental	2.6 ± 1.03	21.14 ± 38.64	3.82 ± 2.31	4.39 ± 1.82	3.1 ± 2.31	3.43 ± 2.09
Aldosterone (pg/ml)	Control	58.2 ± 18.59	41.68 ± 42.43	59.44 ± 41.88	17.82 ± 27.55	16.62 ± 22.09	47.78 ± 56.15
	Experimental	106.7 ± 116.9	252.3 ± 230.4	284.7 ± 230.1	58.6 ± 86.8	107.2 ± 203.8	32.5 ± 32.5
Angiotensin II (pg/ml)	Control	506.5 ± 306	601 ± 206.8	518.6 ± 174.1	424.1 ± 108.4	474.3 ± 230.9	550.1 ± 160.7
	Experimental	1610.1 ± 701.3	3261.2 ± 2394.3	4576.8 ± 3894.5	2840.6 ± 2528.7	1745.4 ± 1337.4	1759.3 ± 1109.5
BNP (ng/ml)	Control	0.25 ± 0.03	0.26 ± 0.06	0.31 ± 0.08	0.32 ± 0.12	0.38 ± 0.12	0.33 ± 0.1
	Experimental	0.3 ± 0.07	0.22 ± 0.03	0.21 ± 0.02	0.27 ± 0.08	0.27 ± 0.05	0.28 ± 0.03
Epinephrine (ng/ml)	Control	0.09 ± 0.05	0.05 ± 0.05	0.07 ± 0.05	0.04 ± 0.03	0.09 ± 0.09	0.07 ± 0.09
	Experimental	0.08 ± 0.03	0.15 ± 0.09	0.11 ± 0.07	0.02 ± 0.02	0.00 ± 0.01	0.01 ± 0.02
Norepinephrine (ng/ml)	Control	0.58 ± 0.29	0.42 ± 0.22	0.63 ± 0.22	0.51 ± 0.38	0.61 ± 0.5	0.58 ± 0.44
	Experimental	1.25 ± 0.75	1.2 ± 0.88	1.48 ± 1.36	0.97 ± 0.69	0.22 ± 0.16	0.47 ± 0.26

Values expressed as mean ± s.d. Control group includes n = 4 measurements and experimental group includes n = 5 measurements for all variables and time points, except Angiotensin II, for which n = 3 in the experimental group.

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	Group	Study 1 (Day -1)	Postintervention (Day 0)	Study 2 (Day 3)	Study 3 (Day 7)	Study 4 (Day 14)	Study 5 (Day 21)
ADH (pg/ml)	Control	1.15 ± 1.11	2.11 ± 0.9	1.64 ± 1.13	2 ± 0.83	2.72 ± 1.07	2.85 ± 0.64
	Experimental	2.6 ± 1.03	21.14 ± 38.64	3.82 ± 2.31	4.39 ± 1.82	3.1 ± 2.31	3.43 ± 2.09
Aldosterone (pg/ml)	Control	58.2 ± 18.59	41.68 ± 42.43	59.44 ± 41.88	17.82 ± 27.55	16.62 ± 22.09	47.78 ± 56.15
	Experimental	106.7 ± 116.9	252.3 ± 230.4	284.7 ± 230.1	58.6 ± 86.8	107.2 ± 203.8	32.5 ± 32.5
Angiotensin II (pg/ml)	Control	506.5 ± 306	601 ± 206.8	518.6 ± 174.1	424.1 ± 108.4	474.3 ± 230.9	550.1 ± 160.7
	Experimental	1610.1 ± 701.3	3261.2 ± 2394.3	4576.8 ± 3894.5	2840.6 ± 2528.7	1745.4 ± 1337.4	1759.3 ± 1109.5
BNP (ng/ml)	Control	0.25 ± 0.03	0.26 ± 0.06	0.31 ± 0.08	0.32 ± 0.12	0.38 ± 0.12	0.33 ± 0.1
	Experimental	0.3 ± 0.07	0.22 ± 0.03	0.21 ± 0.02	0.27 ± 0.08	0.27 ± 0.05	0.28 ± 0.03
Epinephrine (ng/ml)	Control	0.09 ± 0.05	0.05 ± 0.05	0.07 ± 0.05	0.04 ± 0.03	0.09 ± 0.09	0.07 ± 0.09
	Experimental	0.08 ± 0.03	0.15 ± 0.09	0.11 ± 0.07	0.02 ± 0.02	0.00 ± 0.01	0.01 ± 0.02
Norepinephrine (ng/ml)	Control	0.58 ± 0.29	0.42 ± 0.22	0.63 ± 0.22	0.51 ± 0.38	0.61 ± 0.5	0.58 ± 0.44
	Experimental	1.25 ± 0.75	1.2 ± 0.88	1.48 ± 1.36	0.97 ± 0.69	0.22 ± 0.16	0.47 ± 0.26

Values expressed as mean ± s.d. Control group includes n = 4 measurements and experimental group includes n = 5 measurements for all variables and time points, except Angiotensin II, for which n = 3 in the experimental group.