

**Table 1 Baseline characteristics between the case group and the control group**

Baseline characteristic	Case group (n=130)	Control group (n=265)	t/Z/X <sup>2</sup> value	P value
Age (years)	31.25(28.75,33.00)	30.00(28.00,32.00)	- 1.76	0.079
Gestational (W)			156. 4	<0.00 1
24 <sup>+0</sup> ~ 34 <sup>+6</sup> W	64(49.23%)	35(13.21%)		
35 <sup>+0</sup> ~ 36 <sup>+6</sup> W	48(36.92%)	116(43.77%)		
37 <sup>+0</sup> ~ 40 <sup>+6</sup> W	18(13.85%)	114(43.02%)		
Mode of delivery			132. 47	<0.00 1
Vaginal delivery	41(31.54%)	233(87.92%)		
Cesarean section	89(68.46%)	32(12.08%)		
Neonatal sex			1.54	0.214
Male	62(47.69)	144(54.34)		
Female	68(52.31)	121(45.66)		
Birth weight (g)	2700.50(2270.00, 2964.25)	3110.00(2930.00,334 0.00)	- 11.14	<0.00 1
Apgar score			18.2 4	<0.00 1
5-minute ≤ 7	39(30.00%)	33(12.45%)		
5-minute > 7	91(70.00%)	232(87.55%)		
NRDS			35.6 7	<0.00 1
Yes	41(31.54%)	21(7.92%)		
No	89(68.46%)	244(92.08%)		

W weeks, g grams

**Table 2 Comparison of multimodal ultrasound parameters between the two groups**

Ultrasound parameter	Case group (n=130)	Control group
Left lung area (cm <sup>2</sup> )	7.32(5.98,9.02)	8.48(5.93
Right lung area (cm <sup>2</sup> )	7.42(6.13,9.19)	8.92(6.93
Left lung volume (cm <sup>3</sup> )	10.57(7.62,14.06)	19.64(13.1
Right lung volume (cm <sup>3</sup> )	15.39(10.38,19.21)	27.74(19.5
Pulmonary artery diameter (mm)	6.24±1.31	6.40±
AT(ms)	34.00(29.00,45.50)	42.61(37.9
ET(ms)	179.00(171.00,184.00)	177.15(175.0
AT/ET	0.19(0.16,0.25)	0.23(0.2
UA		
S/D	3.49±0.85	2.47±
PI	1.24±0.27	0.85±
RI	0.73±0.08	0.59±
MCA		
S/D	3.18±0.78	4.60±
PI	1.16±0.27	1.54±
RI	0.66±0.06	0.77±
PSV(cm/s)	47.33±5.82	56.83±

Note: cm<sup>2</sup> square centimeters, cm<sup>3</sup> cubic centimeters, mm Millimeter, ms milliseconds, cm/s centimeters per second, AT acceleration time, ET ejection time, UA umbilical artery, S/D systolic/diastolic ratio, PI pulsatility index, RI resistance index, MCA middle cerebral artery, PSV peak systolic velocity

**Table 3 Characteristics of multimodal ultrasound parameters in the control group by gestational age**

Ultrasound parameter	Group A (n=35)	Group B (n=116)	Group C (n=114)	F/X <sup>2</sup> value	P v alue
Left lung area (cm <sup>2</sup> )	6.20±1.20	8.48±1.35	11.09±1.50	24	<0.001
Right lung area (cm <sup>2</sup> )	6.85±1.45	9.65±1.60	11.93±1.75	27	<0.001
Left lung volume (cm <sup>3</sup> )	15.80±	23.64±	28.20±	21	<0.

	2.50	3.80	4.50	5.82	001
Right lung volume (cm <sup>3</sup> )	18.50±	31.80±	37.60±	31	<0.
	3.00	4.50	5.50	2.76	001
Pulmonary artery diameter (mm)	5.43±0.69	6.90±1.10	7.89±0.75	15	<0.
				6.82	001
AT(ms)	37.41±	44.08±	47.34±	39	<0.
	3.73	1.50	1.88	8.45	001
ET(ms)	178.52±	177.03±	180.23±	5.	0.7
	4.54	6.15	2.39	23	99
AT/ET	0.21±0.02	0.24±0.02	0.26±0.01	89	<0.
				.67	001
UA					
S/D	2.68±0.40	2.40±0.31	2.33±0.34	21	<0.
				.45	001
PI	0.92±0.12	0.83±0.12	0.81±0.14	18	<0.
				.92	001
RI	0.63±0.05	0.58±0.05	0.57±0.06	38	<0.
				.76	001
MCA					
S/D	5.50±2.03	4.46±1.30	3.42±0.87	45	<0.
				.34	001
PI	1.77±0.31	1.51±0.27	1.27±0.23	80	<0.
				.18	001
RI	0.82±0.06	0.77±0.04	0.71±0.05	0.	<0.
				05	001
PSV(cm/s)	52.5±7.50	60.0±8.0	58.0±7.0	18	<0.
				.91	001

Note: cm<sup>2</sup> square centimeters, cm<sup>3</sup> cubic centimeters, mm Millimeter, ms milliseconds, cm/s centimeters per second, AT acceleration time, ET ejection time, UA umbilical artery, S/D systolic/diastolic ratio, PI pulsatility index, RI resistance index, MCA middle cerebral artery, PSV peak systolic velocity

**Table 4 Characteristics of multimodal ultrasound parameters in the case group by gestational age**

Ultrasound parameter	Group A (n=35)	Group B (n=116)	Group C (n=114)	F/X <sup>2</sup> value	P v alue
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Left lung area (cm <sup>2</sup> )	5.79 ± 1.94	8.14 ± 1.83	9.19 ± 1.89	85.3	<0.001
Right lung area (cm <sup>2</sup> )	6.55 ± 2.55	8.60 ± 2.75	10.10 ± 2.62	42.1	<0.001
Left lung volume (cm <sup>3</sup> )	9.89 ± 4.99	14.50 ± 6.49	16.61 ± 2.90	18.7	<0.001
Right lung volume (cm <sup>3</sup> )	14.95 ± 5.55	17.00 ± 7.75	19.10 ± 4.62	25.4	<0.001
Pulmonary artery diameter (mm)	5.39 ± 0.73	6.62 ± 1.21	7.34 ± 0.87	98.9	<0.001
AT(ms)	32.65 ± 7.21	36.70 ± 10.24	46.94 ± 1.61	98.4	<0.001
ET(ms)	179.52 ± 18.96	178.03 ± 18.94	175.11 ± 4.31	0.35	0.799
AT/ET	0.18 ± 0.04	0.20 ± 0.06	0.26 ± 0.01	89.6	<0.001
UA					
S/D	3.80 ± 0.90	3.34 ± 0.72	3.00 ± 0.65	21.4	<0.001
PI	1.35 ± 0.25	1.21 ± 0.25	1.10 ± 0.25	18.9	<0.001
RI	0.75 ± 0.08	0.72 ± 0.07	0.70 ± 0.07	8.76	<0.001
MCA					
S/D	3.50 ± 0.80	3.20 ± 0.70	2.60 ± 0.60	25.3	<0.001
PI	1.25 ± 0.30	1.15 ± 0.22	0.95 ± 0.20	30.1	<0.001
RI	0.68 ± 0.06	0.65 ± 0.05	0.60 ± 0.05	35.6	<0.001
PSV(cm/s)	45.0 ± 4.30	50.0 ± 5.25	45.0 ± 5.30	28.9	<0.001

Note: cm<sup>2</sup> square centimeters, cm<sup>3</sup> cubic centimeters, mm Millimeter, ms milliseconds, cm/s centimeters per second, AT acceleration time, ET ejection time, UA umbilical artery, S/D systolic/diastolic ratio, PI pulsatility index, RI resistance index, MCA middle cerebral artery, PSV peak systolic velocity

**Table 5 Comparison of data between the NRDS group and the non-NRDS group**

Ultrasound	NRDS group (n=42)	non-NRDS group	t/Z/X	P val
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parameter		(n=353)	<sup>2</sup> value	ue
Age (years)	31.25(28.75,33.00)	30.00(28.00,32.00)	-1.76	0.079
Gestational (W)			156.4	<0.001
24 <sup>+0</sup> ~ 34 <sup>+6</sup> W	64(49.23%)	35(13.21%)		
35 <sup>+0</sup> ~ 36 <sup>+6</sup> W	48(36.92%)	116(43.77%)		
37 <sup>+0</sup> ~ 40 <sup>+6</sup> W	18(13.85%)	114(43.02%)		
HDP			35.67	<0.001
yes	41(31.54%)	21(7.92%)		
no	89(68.46%)	244(92.08%)		
Left lung area (cm <sup>2</sup> )	7.32(5.98,9.02)	8.48(5.93,11.45)	-3.85	<0.001
Right lung area (cm <sup>2</sup> )	7.42(6.13,9.19)	8.92(6.93,12.06)	-4.96	<0.001
Left lung volume (cm <sup>3</sup> )	10.57(7.62,14.06)	19.64(13.18,28.83)	10.57	<0.001
Right lung volume (cm <sup>3</sup> )	15.39(10.38,19.21)	27.74(19.52,38.45)	10.94	<0.001
Pulmonary artery diameter (mm)	6.24±1.31	6.40±1.27	1.11	0.267
AT(ms)	34.00(29.00,45.50)	42.61(37.96,44.63)	-5.27	<0.001
ET(ms)	179.00(171.00,184.00)	177.15(175.00,181.00)	-1.29	0.199
AT/ET	0.19(0.16,0.25)	0.23(0.21,0.24)	-5.36	<0.001
UA				
S/D	3.49±0.85	2.47±0.39	15.02	<0.001
PI	1.24±0.27	0.85±0.13	18.3	<0.001

				9	001
RI	$0.73 \pm 0.08$	$0.59 \pm 0.06$	20.1	<0.	
			4	001	
MCA					
S/D	$3.18 \pm 0.78$	$4.60 \pm 1.65$	15.0	<0.	
			2	001	
PI	$1.16 \pm 0.27$	$1.54 \pm 0.31$	18.3	<0.	
			9	001	
RI	$0.66 \pm 0.06$	$0.77 \pm 0.07$	-0.11	<0.	
				001	
PSV(cm/s)	$47.33 \pm 5.82$	$56.83 \pm 8.37$	-9.5	<0.	
				001	

Note: W weeks, cm<sup>2</sup> square centimeters, cm<sup>3</sup> cubic centimeters, mm millimeter, ms milliseconds, cm/s centimeters per second, AT acceleration time, ET ejection time, UA umbilical artery, S/D systolic/diastolic ratio, PI pulsatility index, RI resistance index, MCA middle cerebral artery, PSV peak systolic velocity

**Table 6 Univariate logistic regression analysis of NRDS group and non-NRDS group**

Parameter	$\beta$ coefficient	Standard error	Wald value	OR value	95% CI	P value
Age (years)	0.04	0.04	1.00	1.04	0.96- 1.12	0.317
Gestational age	-0.45	0.08	31.64	0.64	0.55- 0.75	<0.001
HDP (Yes/No)	3.76	0.58	42.01	42.92	13.78- 133.70	<0.001
Left lung area (cm <sup>2</sup> )	-0.24	0.05	22.09	0.79	0.71- 0.87	<0.001
Right lung area (cm <sup>2</sup> )	-0.28	0.05	31.36	0.76	0.69- 0.83	<0.001
Left lung volume (cm <sup>3</sup> )	-0.21	0.04	28.90	0.81	0.75- 0.88	<0.001
Right lung volume (cm <sup>3</sup> )	-0.22	0.04	30.25	0.80	0.74- 0.87	<0.001

Pulmonary artery diameter (mm)	-0.08	0.07	1.32	0.92	0.80, 1.06	0.267
AT(ms)	-0.08	0.02	20.25	0.92	0.89-0.96	<0.001
ET(ms)	-0.01	0.01	0.85	0.99	0.97-1.01	0.357
AT/ET	-0.58	0.12	23.36	0.56	0.44-0.71	<0.001
UA						
S/D	1.09	0.20	29.75	2.96	2.00-4.39	<0.001
PI	2.85	0.52	30.05	17.30	6.24-47.94	<0.001
RI	2.85	0.51	31.24	17.36	6.38-47.20	<0.001
MCA						
S/D	-0.21	0.13	2.61	0.81	0.63-1.05	0.106
PI	-1.92	0.61	9.91	0.15	0.04-0.47	<0.01
RI	-4.71	1.09	18.70	0.01	0.00-0.09	<0.001
PSV(cm/s)	-0.16	0.03	25.60	0.85	0.80-0.90	<0.001

Note: cm<sup>2</sup> square centimeters, cm<sup>3</sup> cubic centimeters, mm Millimeter, ms milliseconds, cm/s centimeters per second, AT acceleration time, ET ejection time,

UA umbilical artery, S/D systolic/diastolic ratio, PI pulsatility index, RI resistance index, MCA middle cerebral artery, PSV peak systolic velocity

**Table 7 Multivariate logistic regression analysis of NRDS group and non-NRDS group**

Parameter	$\beta$ coefficient	Standard error	Wald value	OR value	95% CI	P value
Gestational age	-0.38	0.09	17.83	0.68	0.57-0.81	<0.001

HDP (Yes/No)	2.85	0.62	21.12	17.26	5.12- 58.21	<0.001
AT(ms)	-0.06	0.02	9	0.94	0.90- 0.98	0.003
UA-PI	2.12	0.58	13.35	8.33	2.67- 25.97	<0.001
MCA-PI	-1.65	0.68	5.89	0.19	0.05- 0.72	0.015

Note: ms milliseconds, HDP hypertensive disorders of pregnancy, AT acceleration time, UA-PI umbilical artery-pulsatility index, MCA-PI middle cerebral artery-pulsatility index

**Table 8 Comparison of diagnostic performance between the combined NRDS prediction model and single indicators**

Predictor	AUC(%)	ACC(%)	SEN(%)	SPE(%)
Prediction model	0.828(0.798- 0.902)	75.2(70.5- 79.9)	80.1(75.2- 85.0)	74.3(69.5- 79.1)
HDP (Yes/No)	0.718(0.645- 0.791)	74.8(70.1- 79.5)	31.5(25.9- 37.1)	76.2(71.4- 81.0)
Gestational age	0.752(0.685- 0.819)	72.5(67.7- 77.3)	71.4(66.0- 76.8)	72.8(67.9- 77.7)
UA-PI	0.795(0.732- 0.858)	76.8(72.1- 81.5)	73.8(68.6- 79.0)	77.5(72.8- 82.2)
MCA-PI	0.683(0.607- 0.759)	68.5(63.5- 73.5)	61.9(56.1- 67.7)	70.2(65.2- 75.2)
AT (ms)	0.724(0.652- 0.796)	71.3(66.4- 76.2)	66.7(61.1- 72.3)	72.6(67.7- 77.5)

Note: ms milliseconds, HDP hypertensive disorders of pregnancy, UA-PI umbilical artery-pulsatility index, MCA-PI middle cerebral artery-pulsatility index

AT acceleration time, AUC area under the curve, ACC accuracy, SEN sensitivity, SPE specificity, Data in parentheses denote the 95% confidence interval.