

Supplementary Table S1. Demographic and Clinical Characteristics and Morbidities of Infants Receiving Conservative, Medical and Surgical Treatment for Patent Ductus Arteriosus.

Characteristic	Treatment group			Medical vs	
	Conservative management	Medical treatment only	Surgical ligation	Overall	Surgical
	N = 874	N = 1901	N = 1296	<i>p</i> value ^a	<i>p</i> value ^a
Gestational age, weeks, mean (SD)	25.6 (1.4)	25.7 (1.2)	25.4 (1.3)	<0.001	<0.001
Birth weight, gram, mean (SD)	844 (208)	855 (186)	817 (173)	<0.001	<0.001
Cesarean section	416/856 (48.6%)	967/1891 (51.1%)	699/1255 (55.7%)	0.003	0.012
Male sex	479/873 (54.9%)	1000/1901 (52.6%)	693/1296 (53.5%)	0.538	0.629
SGA	99/858 (11.4%)	168/1899 (8.8%)	113/1296 (8.7%)	0.066	0.901
Multiple gestation	203/865 (23.5%)	447/1895 (23.6%)	335/1265 (26.5%)	0.138	0.065
Preeclampsia	56/747 (7.5%)	128/1691 (7.6%)	90/1182 (7.6%)	0.998	0.965
Antenatal steroid ≥ 2 doses	329/770 (42.7%)	774/1786 (43.3%)	542/1184 (45.8%)	0.165	0.190
Not born at institution	134/865 (15.5%)	364/1878 (19.4%)	202/1280 (15.8%)	0.008	0.010
Apgar score at 5 min <7	400/846 (47.3%)	853/1817 (46.9%)	542/1247 (43.5%)	0.106	0.057
RDS requiring surfactant use	594/855 (69.5%)	1382/1889 (73.2%)	1002/1286 (77.9%)	<0.001	0.002
Mechanical ventilation	748/868 (86.2%)	1706/1900 (89.8%)	1270/1295 (98.1%)	<0.001	<0.001
Nitric oxide use	125/820 (15.2%)	116/1870 (6.2%)	172/1273 (13.5%)	<0.001	<0.001
Severe IVH	220/792 (27.8%)	317/1769 (17.9%)	223/1230 (18.1%)	<0.001	0.919
Cystic PVL	56/773 (7.2%)	137/1708 (8.0%)	107/1215 (8.8%)	0.431	0.417
Culture positive sepsis	230/868 (26.5%)	651/1888 (34.5%)	442/1294 (34.2%)	<0.001	0.850
NEC, stage ≥ 2	81/871 (9.3%)	279/1899 (14.7%)	141/1295 (10.9%)	<0.001	0.002

Data are presented as n/N (%), where N represents the number of infants with available data for each variable.

Definitions of abbreviations: SGA = small for gestational age; RDS = respiratory distress syndrome; SD = standard deviation; IVH = intraventricular hemorrhage; PVL = periventricular leukomalacia; NEC = necrotizing enterocolitis.

^a χ^2 test for categorical variables and the t test or Wilcoxon rank-sum test for continuous variables.

Supplementary Table S2. Distribution of BSID Versions Used for Neurodevelopmental Assessment.

Treatment group	Total, N	BSID-II, n (%)	BSID-III, n (%)
Before propensity score matching			
Conservative management	874	193 (22.1)	218 (24.9)
Medical treatment only	1901	490 (25.8)	613 (32.2)
Surgical ligation	1296	257 (19.8)	582 (44.9)
After propensity score matching			
Medical treatment only	1211	334 (27.6)	351 (29.0)
Surgical ligation	1211	239 (19.7)	575 (47.5)

Percentages were calculated using the total number of infants in each treatment group as the denominator. No additional statistical calibration or equating between the BSID-II and BSID-III was performed. Different cutoff values for defining cognitive and motor impairment were applied based on previous studies to improve comparability between the two editions.

Definitions of abbreviations: BSID-II = Bayley Scales of Infant and Toddler Development, Second Edition; BSID-III = Bayley Scales of Infant and Toddler Development, Third Edition

Supplementary Table S3. Risk of Bronchopulmonary Dysplasia and Retinopathy of Prematurity Requiring Treatment Among Infants Who Survived Beyond 36 Weeks' PMA: Surgical Ligation Versus Medical Treatment Only^a.

Outcomes	Crude RR (95% CI)	Adjusted RR (95% CI) ^b
BPD	1.29 (1.16-1.44)	1.25 (1.12-1.40)
ROP requiring treatment	1.34 (1.13-1.61)	1.27 (1.06-1.52)

Definitions of abbreviations: RR = risk ratio; BPD = bronchopulmonary dysplasia; ROP = retinopathy of prematurity; NEC = necrotizing enterocolitis

^aMedical treatment only was the reference group.

^bAdjusted for mechanical ventilation, nitric oxide use, and NEC, stage ≥ 2 .

Supplementary Table S4-1. Association Between Surgical Ligation and Outcomes, Stratified by Birth Period (1997 – 2006, n=779).

Outcomes	Model A		Model B	
	Crude RR (95% CI)		Adjusted RR (95% CI) ^a	
	Overall	PMA 36-week survivor cohort	Overall	PMA 36-week survivor cohort
NDI	1.16 (0.84-1.61)	1.11 (0.79-1.56)	1.10 (0.78-1.55)	1.05 (0.74-1.50)
Death before discharge	0.71 (0.52-0.95)	1.15 (0.59-2.24)	0.71 (0.52-0.96)	1.44 (0.72-2.90)
Death before discharge or NDI	0.97 (0.78-1.21)	1.11 (0.82-1.50)	0.96 (0.76-1.20)	1.09 (0.80-1.49)

Definitions of abbreviations: RR = risk ratio; NDI = neurodevelopmental impairment

^aAdjusted for mechanical ventilation, nitric oxide use, and NEC, stage ≥ 2 .

Medical treatment only was the reference group.

Supplementary Table S4-2. Association Between Surgical Ligation and Outcomes, Stratified by Birth Period (2007 – 2017, n=1643).

Outcomes	Model A		Model B	
	Crude RR (95% CI)		Adjusted RR (95% CI) ^a	
	Overall	PMA 36-week survivor cohort	Overall	PMA 36-week survivor cohort
NDI	1.27 (1.06-1.52)	1.24 (1.02-1.51)	1.15 (0.96-1.38)	1.12 (0.92-1.37)
Death before discharge	0.60 (0.47-0.76)	1.73 (0.85-3.53)	0.51 (0.40-0.66)	1.37 (0.67-2.81)
Death before discharge or NDI	1.07 (0.93-1.23)	1.25 (1.03-1.51)	0.98 (0.85-1.14)	1.13 (0.93-1.37)

Definitions of abbreviations: RR = risk ratio; NDI = neurodevelopmental impairment

^aAdjusted for mechanical ventilation, nitric oxide use, and NEC, stage ≥ 2 .

Medical treatment only was the reference group.